

Journal of Human Lactation (JHL) (ISSN 0890-3344) (J397) is published quarterly—in February, May, August, and November—for the International Lactation Consultant Association®, 2501 Aerial Center Parkway, Ste. 103, Morrisville, NC 27560, USA by SAGE Publishing, 2455 Teller Rd., Thousand Oaks, CA 91320, USA. Periodicals postage paid at Thousand Oaks, CA, and at additional mailing offices. POSTMASTER: Send address changes to *Journal of Human Lactation (JHL)*, c/o SAGE Publishing, 2455 Teller Road, Thousand Oaks, CA 91320.

Copyright © 2020 International Lactation Consultant Association. All rights reserved. No portion of the contents may be reproduced in any form without written permission from the publisher.

Subscription Information: All subscription inquiries, orders, back issues, claims, and renewals should be addressed to SAGE Publishing, 2455 Teller Road, Thousand Oaks, CA 91320; telephone: (800) 818-SAGE (7243) and (805) 499-0721; fax: (805) 375-1700; e-mail: journals@sagepub.com; journals.sagepub.com. **Subscription Price:** Institutions: \$1102; Individuals: \$241. For all customers outside the Americas, please visit <http://www.sagepub.co.uk/customer-Care.nav> for information. **Claims:** Claims for undelivered copies must be made no later than 6 months following month of publication. The publisher will supply replacement issues when losses have been sustained in transit and when the reserve stock will permit.

ILCA Membership Information: Inquiries on ILCA membership (which includes a subscription to *JHL*) should be addressed to the ILCA Business Office, 2501 Aerial Center Parkway, Ste. 103, Morrisville, NC 27560, USA. Telephone: (919) 861-5577; fax: (919) 459-2075; www.ilca.org; info@ilca.org.

Copyright Permission: To request permission for republishing, reproducing, or distributing material from this journal, please visit the desired article on the SAGE Journals website (journals.sagepub.com) and click "Permissions." For additional information, please see www.sagepub.com/journalsPermissions.nav.

Disclaimer: Statements of fact or opinion expressed by authors in the *Journal of Human Lactation* are solely the responsibility of those authors. ILCA, *JHL* editorial personnel, and the publisher do not assume responsibility for the accuracy of the editorial material contained herein, and such material does not represent the official policy, opinion, recommendation, or endorsement of ILCA. The appearance and content of advertisements contained herein do not constitute a guarantee or an endorsement of the quality or value of the advertised products or services or of the claims made for them by their advertisers. The authors, editor, and publisher will not accept any legal responsibility for any errors or omissions that may be made in this publication. The publisher makes no warranty, expressed or implied, with respect to the material contained herein. All advertisements are subject to the approval of the International Lactation Consultant Association. ILCA reserves the right to decline any advertisement at any time.

C | O | P | E COMMITTEE ON PUBLICATION ETHICS

Journal of

HUMAN LACTATION

Official Journal of the International Lactation Consultant Association®

Editorial Staff

Editor-in-Chief Joan E. Dodgson, PhD, MPH, RN, FAAN—Honeoye Falls, New York, USA
Associate Editors Ellen M. Chetwynd, PhD, MPH, BSN, IBCLC, University of North Carolina at Greensboro, School of Public Health Education, NC, USA and University of North Carolina at Chapel Hill, School of Medicine, NC, USA;
Laura Duckett, PhD, MPH, RN, University of Minnesota, School of Nursing (Emerita), Minneapolis, MN, USA;

Sara L. Gill, PhD, RN, IBCLC, FAAN—University of Texas Health Science Center San Antonio School of Nursing, San Antonio, TX, USA; Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP—Connecticut Children's Medical Center, Hartford, CT, USA, and University of Connecticut School of Medicine, Farmington, CT, USA

Assistant Editors Azza Ahmed, DNSc, RN, IBCLC, CPNP—Purdue University School of Nursing, Indiana, USA

Ethan T. Bamberger, BS—CT, USA

Rebecca Costello, MPH, IBCLC—NY, USA

Managing Editor Erin Valentine, MA—Cary, NC, USA

Intern Cynthia M. Hoover, MA—CA, USA

International Lactation Consultant Association

President Mudiwah Kadeshe, MSN, RNC, IBCLC, CCE, CLNC—Lanham, MD, USA

Secretary Geraldine Cahill, IBCLC, BA, Community & Adult Ed.,

Dip.Ed.—Schull, Co. Cork, Ireland

Treasurer Angela Love-Zaranka, BA, IBCLC, RLC—Alexandria, VA, USA

Director Sabeen Adil, MD, IBCLC—Lagos, Lagos State, Nigeria

Director Stephanie George, BA(Hons), IBCLC—Jarvis, Ontario, Canada

Director Iona Macnab, BA(Hons), LLB, IBCLC—Melbourne, Victoria, Australia

Director Nor Kamariah Mohamad Alwi, BE, MIT, IBCLC—Bandar Baru Bangi, Selangor, Malaysia

Executive Director Marcy Cottle—Raleigh, NC, USA

CONSULTANT EDITORS

Book Editor: Audrey Thompson, BBA, RN, IBCLC—Atlanta, GA, USA

Social Media: Caroline K. Bamberger, BA—South Glastonbury, CT, USA

Statistical Research: Georgine Burke, PhD—Hartford, CT, USA

WHO Code and International Advocacy: Maryse Arendt, IBCLC—Luxemburg

EDITORIAL REVIEW BOARD

Ilana R. Azulay Chertok, PhD, MSN, RN, IBCLC, Ohio University
School of Nursing, Ohio, USA

Helen Ball, PhD, MA, Durham University, Durham, UK
Aimee Eden, PhD, MPH, The American Board of Family

Medicine, Lexington, KY, USA

Aiden Farrow, IBCLC, Victoria Native Friendship Centre, Victoria,
BC, Canada

Karleen D. Gribble, PhD, BRurSc(Hons), Adjunct Associate
Professor, School of Nursing and Midwifery, Western Sydney

University NSW, Australia

Laurence Grummer-Strawn, PhD, MPA, MA, World Health
Organization, Geneva, Switzerland

Paige Hall-Smith, PhD, Center for Women's Health and
Wellness, University of North Carolina at Greensboro Greensboro,
NC, USA

Elizabeth Hormann, Ed.M, IBCLC, European Institute for
Breastfeeding and Lactation, Cologne, Germany

Margaret Isabirye Kyenya, PhD, Atlanta, GA, USA

Dawn Leeming, PhD, Dip. Clin. Psychol, University of
Huddersfield, Huddersfield, UK

Katsumi Mizuno, PhD, MD, IBCLC, Showa University Koto
Toysosu Hospital, Tokyo, Japan

Fedro A. Peccatori, MD, PhD, European Institute of Oncology,
Milan, Italy

Marie Tarrant, PhD, MPH, RN, School of Nursing, University of
British Columbia, Kelowna, BC, Canada

Carol Wagner, MD, Medical University of South Carolina,
Charleston, SC, USA

Karen Wambach, PhD, RN, IBCLC, FAAN, University of Kansas
School of Nursing, Kansas City, KS, USA

Jacqueline H. Wolf, PhD, Ohio University, Department of Social
Medicine, Athens, OH, USA

For SAGE Publishing: Peter J. Alexander and Stephanie Henkel

Editorial Inquiries: *JHL* publishes unsolicited papers in the following categories: Original Research, Insights into Policy and Practice, and Letters to the Editor. Address all editorial inquiries, including manuscript submission, to Joan E. Dodgson, PhD, MPH, RN, FAAN, Editor-in-Chief, jhl@ilca.org. Manuscripts are accepted for consideration only if they have not been published previously and are not currently under consideration for publication elsewhere. Updated manuscript guidelines for authors may be found on the website at journals.sagepub.com/home/jhl

Advertising and Reprints: Current advertising rates and specifications may be obtained by contacting the advertising coordinator in the Thousand Oaks office at (805) 410-7772 or by sending an e-mail to advertising@sagepub.com. To order reprints, please e-mail reprint@sagepub.com. Acceptance of advertising in this journal in no way implies endorsement of the advertised product or service by SAGE, the journal's affiliated society(ies), or the journal editor(s). No endorsement is intended or implied. SAGE reserves the right to reject any advertising it deems as inappropriate for this journal.

Cover photos Mother, mother-in-law, and baby in a small village in the very rural Ssembabule district of South Central Uganda. Photographer: Laura Duckett, BSN, MS, PhD, RN; University of Minnesota-Twin Cities, School of Nursing (Emerita), Minneapolis, Minnesota, USA; *JHL* Editorial Board member.

Staff at Mothers' Milk Bank of the Western Great Lakes, Elk Grove Village, Illinois, USA, screen donor milk for *Bacillus cereus* in Lennon's Lab, an in-house microbiology lab funded by the Grossenbach family. Photographer: Marilyn J. Fergus, RN, IBCLC, RLC.



My Brest Friend™

#1 CHOICE NURSING PILLOW
by Lactation Consultants and millions of moms for 24 years.



LC's Contact Us for a Free Professional Pillow.
Info@zenoffprod.com
(415) 785-3890

Journal of

HUMAN LACTATION

Official Journal of the International Lactation Consultant Association®

Volume 36 Number 3 August 2020

Editorial

- Protecting and Supporting the WHO International Code During COVID-19 387
Joan E. Dodgson

JHL News

- WHO Frequently Asked Questions: Breastfeeding and COVID-19 For health care workers** 392

Lactation Newsmakers

- Being There: The Development of the International Code of Marketing of Breastmilk Substitutes, the Innocenti Declaration and the Baby Friendly Hospital Initiative 397
Margaret Isabirye Kyenya and Kathleen A. Marinelli

About Research

- Developing a Lactation Case Report or is it a Case Study? 403
Joan E. Dodgson

Socio-Cultural Perspectives

- Historical Research:** The Origin of 'Formula': State of the Science, 1890s 409
Jacqueline H. Wolf

- Supporting Exclusive Breastfeeding Among Factory Workers and Their Unemployed Neighbors: Peer Counseling in Bangladesh 413
Rukhsana Haider and Virginia Thorley

- Implementation of the Reimbursement Cost of Human-Milk-Based Neonatal Therapy in Polish Health Care Service: Practical and Ethical Background 425
Aleksandra Wesołowska, Urszula Bernatowicz-Łojko, Elena Sinkiewicz-Darol, Beata Pawlus, and Dominik Golicki

- The Patterns and Social Determinants of Breastfeeding in 12 Selected Regions in China: A Population-Based Cross-Sectional Study 435
Zhe Fang, Yuning Liu, Hanyu Wang, and Kun Tang

- Engaging African American Parents to Develop a Mobile Health Technology for Breastfeeding: KULEA-NET 447
Loral Patchen, Lindsey Ellis, Cherise B. Harrington, Tony Ma, Rohini Mohanraj, Virginia Andrews, and William Douglas Evans

- Discontinuation of Exclusive Breastfeeding in Ghana: A Longitudinal, One-Group Observational Study of Postnatal Mothers With Children 0–6 Months old 460
John Kuumuori Ganle and Vanessa-Marie Bedwei-Majdoub

- Factors Affecting the Behavior and Duration of Breastfeeding Among Physician Mothers 470
Gamze Ersen, Ismail Kasim, Ezgi Agadayı, Aybuke Demir Alsancak, Tijen Sengezer, and Adem Ozkara



Breastfeeding Essentials
For Moms, By Moms

Made in the USA, BPA free



Award-winning products and
exceptional customer support

Milk Collection • Milk Storage
Breastfeeding Nutrition • And More!

CALL FOR WHOLESALE PRICING

800-367-2837
www.mymilkies.com

Book Review: Cesarean Section: An American History of Risk, Technology and Consequence <i>Barbara Katz Rothman</i>	477
Clinical Practice	
The “Lactation After Infant Death (AID) Framework”: A Guide for Online Health Information Provision About Lactation After Stillbirth and Infant Death <i>Katherine Carroll, Debbie Noble-Carr, Lara Sweeney, and Catherine Waldby</i>	479
International Perspectives Concerning Donor Milk Banking During the SARS-CoV-2 (COVID-19) Pandemic <i>Kathleen A. Marinelli</i>	491
Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic <i>Kathleen A. Marinelli and Robert M. Lawrence</i>	497
Editor’s Note <i>Joan Dodgson</i>	501
The Role of <i>Staphylococcus aureus</i> in Mastitis: A Multidisciplinary Working Group Experience <i>Sara Giordana Rimoldi, Paola Pileri, Martina Ilaria Mazzocco, Francesca Romeri, Giovanna Bestetti, Nunziata Calvagna, Claudia Tonielli, Lorenza Fiori, Anna Gigantiello, Cristina Pagani, Paolo Magistrelli, Alessandra Sartani, Annalisa De Silvestri, Maria Rita Gismondo, and Irene Cetin</i>	502
Appropriate Infant and Young Child Feeding Practices in an Emergency for Non-Breastfed Infants Under Six Months: The Rohingya Experience <i>Alice Burrell, Anne M. Kueter, Sujan Ariful, Habibur Rahaman, Alessandro Iellamo, and Golam Mothabbir</i>	509
Ankyloglossia Identification, Diagnosis, and Frenotomy: A Qualitative Study of Community Referral Pathways <i>Crystal Unger, Ellen Chetwynd and Rebecca Costello</i>	518
Understanding the Challenges of Induction of Lactation and Relactation for Non-Gestating Spanish Mothers <i>Gemma Cazorla-Ortiz, Paola Galbany-Estragués, Noemí Obregón-Gutiérrez, and Josefina Goberna-Tricas</i>	527
Associations’ News Briefs	
ILCA News Brief: Facilitating Member Support in 2020 <i>Jessica Lytle</i>	536
Baby-Friendly Hospital Initiative Network News: Moving Forward With Step 2 Competency Tools <i>Trish MacEnroe</i>	537
IBFAN News Brief: Third World Breastfeeding Conference, Rio de Janeiro, Brazil <i>Elisabeth Sterken</i>	538
LEAARC News Brief: Lactation Education Accreditation and Approval Review Committee News <i>Laura Sieckmann</i>	539
World Alliance for Breastfeeding Action (WABA) News <i>Nisha Kumaravel</i>	540
Letters to the Editor	
Response to: Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic (Marinelli and Lawrence, 2020) <i>Lisa Stellwagen and Christina Chambers</i>	541
Concerns Regarding the Article Entitled ‘Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19)’ <i>Katrina B. Mitchell and Sarah R. Weinstein</i>	542
Response to Letters to the Editor about the Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic <i>Kathleen Ann Marinelli and Robert Michael Lawrence</i>	544
Use of Disinfectant Wipes to Sanitize Milk’s Containers of Human Milk Bank During COVID-19 Pandemic <i>Domenico Umberto De Rose, Maria Paola Reposi, Patrizia Amadio, Cinzia Auriti, Immacolata Dall’Oglio, Tiziana Corsetti, Andrea Dotta, and Guglielmo Salvatori</i>	549



DANISH WOOLEN DELIGHT

Importing

LANACARE Nursing Pads ...

- The Nursing Pads Women LOVE!

Made of soothingly soft organic merino wool.

Beneficial with most common nursing problems.

Available in a variety of sizes & styles to suit each woman's needs.



- Non-medicinal remedy for Vasospasms!

- Absorb moisture without feeling wet against skin; even when wet, wool feels warm, unlike cotton or disposables.
- Wool breathes to maintain comfortable temperature in either cold or warm climates.
- Wool's natural lanolin gives self-cleansing properties., for easy care.
- Only 2-3 pairs needed for entire nursing period.
- Larger sizes stem from Scandinavian midwives' age-old advice to keep breasts warm to prevent plugged ducts. Larger sizes less noticeable through clothing.
- Certified organic - often tolerated by women who are "allergic" to wool.

Contact us for free test sample!

Danishwool.com

info@danishwool.com

PO Box 124, Westford, VT 05494 877-878-6089



Sparkling brilliant solutions to lactation challenges.

Connect with thought leaders in lactation. Get new ideas to bring fresh solutions to the breastfeeding challenges in your community.

Get inspired today by LER experts.



Laurel Wilson

TEDx and international keynote speaker known for bringing together leading-edge information in new ways.

Topics: NeoHormones: Evolutionary Milk



Sekeita Lewis-Johnson

National leader in the breastfeeding community with a deep knowledge of current research.

Topics: Jaundice, Slow Weight Gain & Insufficient Milk Supply and Annual Research Update



Dayna Hall

Known for sifting through complex information and presenting it in new and engaging ways.

Topics: HIV & Lactation and Safe Sleep & Breastfeeding



Nekisha Killings

Leading expert in equity strategy and a maternal and child health professional.

Topics: Engorgement & Mastitis and Impact of Culture in Lactation Care

lactationtraining.com/featured-speakers

SAGE video

NEW!

Collections available now

- Leadership
- Nursing
- Social Work

Other available collections

- Business & Management
- Counseling & Psychotherapy
- Criminology & Criminal Justice
- Education
- Media, Communication, & Cultural Studies
- Politics & International Relations
- Psychology
- Sociology



SIGN UP TO TRIAL FOR 30 DAYS!

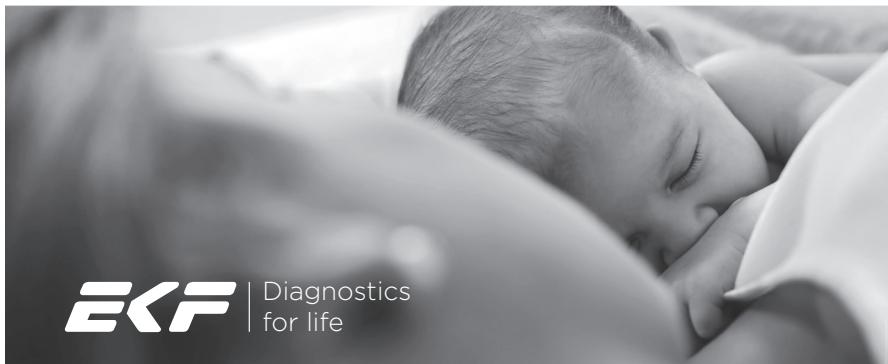
sagepub.com/trial

@SAGE_Libraries
sk.sagepub.com/video



Keep up-to-date with the latest in lactation with Nikki and Nikki's Live Q&A Sessions.

Nikki
Lactation Career Consultants



EKF | Diagnostics
for life

**SUPPORTS
BREASTFEEDING**
.....
**DISPLAYS FAT
AND CALORIES IN
MOTHERS' MILK**

To find out more:
call USA Toll-Free 1-800-531-5535
or 830-249-0772 or email
stanbioorders@ekfdiagnostics.com

The Creamatocrit Plus is a simple, inexpensive and accurate system for estimating the fat and calories in mothers' milk.

It is especially useful in the neonatal intensive care unit to ensure premature infants receive the calories they need.

It also provides mothers of healthy babies the confidence to continue breastfeeding.



www.ekfusa.com



Peer Reviewers

**Thank you for your generously
donated time and effort**

We appreciate your contribution and are grateful to you for helping authors develop their papers.

If you have reviewed for a SAGE journal you are entitled to:

- **60 days access** to all SAGE journals
- **60 days access** to e-book and e-reference platform *SAGE Knowledge* and methods platform *SAGE Research Methods*
- **25% discount** on SAGE books



FIND OUT MORE

sagepub.com/reviewerrewards

SAGE
Publishing

Thank You to the ILCA Virtual Conference 2020 Sponsors



L'institut international de lactation humaine inc.
The International Institute of Human Lactation Inc.

Health e-Learning -
IIHL/Step 2 Education Int'l Inc.



Jones & Bartlett Learning



Lactation
Education
Resources

Lactation Education Resources



Legendairy Milk



Motherlove Herbal Company



Zenoff Products/My Brest Friend

A natural galactagogue and superfood
that helps you increase your breast milk supply.*

Made with premium Moringa leaves. Grown organically on the rich volcanic soil
of the Philippine islands. Harvested with genuine care and love.

visit us at www.golacta.com for info

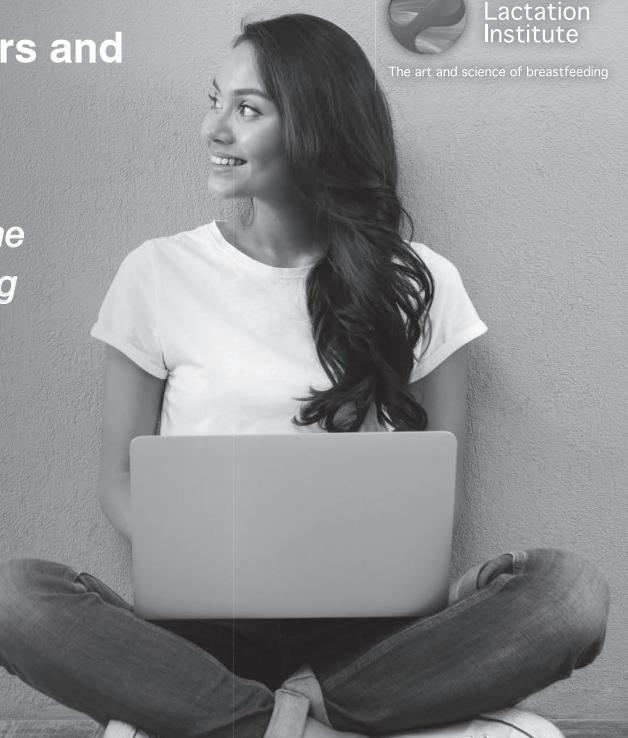


* THIS STATEMENT HAS NOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION. THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE OR PREVENT ANY DISEASE.

Discover interactive online education
designed for lactation practitioners and
health professionals worldwide.

Hazelbaker Lactation Institute teaches the art and science of lactation. Our engaging training integrates science, the art of service delivery, and best practices, and demonstrates real-world applications via video, imagery, and storytelling.

First time learners, use code **JHL20** to receive
20 percent off through September 30, 2020.
Visit hazelbakerinstitute.com to learn more.



Protecting and Supporting the WHO International Code During COVID-19

Joan E. Dodgson, PhD, MPH, RN, FAAN¹

Keywords

breastfeeding, COVID-19, International Code of Marketing Breast-milk Substitutes, Infant and Young Child Feeding

Worldwide, the changes brought on by the COVID-19 pandemic have altered our daily lives, our institutions, and the ways we are able to interact. It is a profound socio-cultural change, the implications of which will take us years to understand. What has not changed is the very essence of what human families need, which includes the need that infants have for human milk. Protecting lactating families and the institutions supporting these families becomes critical when the postpartum experience and lactation care are altered by social distancing and mandated isolation. The already life changing event of bringing a new child into the world becomes laden with additional layers of anxiety and stress, now without the support of family and without adequate lactation care. During a pandemic, when so many people are dying, when public messaging is so contradictory, and our understanding of this disease is so incomplete, becoming new parents has the added burden of disrupted expectations, increased fear and uncertainty, all mixed with the joy of the new life brought into their home.

Although the scale is massively different, our current situation reminds me of a different infectious disease outbreak. My colleagues and I were able to research new parents' experiences during the 2003 SARS epidemic in Hong Kong (Dodgson et al., 2010). We interviewed new mothers about their experiences of birthing and the early postpartum period during the height of that outbreak, when hospitals had strict no visitor (not even fathers) policies. Participants spoke about experiencing the fear and uncertainty of childbirth alone, isolated from all family. The only support they had was healthcare workers in full isolation gowns, face shields, and masks that covered their mouths. It was something they could not have imagined would ever happen—much like those hospitalized throughout the world during the COVID-19 pandemic. Four themes emerged from the participants' narratives (i.e., living with uncertainty, intense vigilance, isolation, and disrupted expectations), which are being echoed by new parents experiencing the COVID-19 pandemic, despite advances in technology and communication modalities since 2003. During the crisis period in Hong

Kong, healthcare priorities shifted away from maternal child issues, just as they have been during the COVID-19 pandemic, leaving those giving birth and bringing home a new infant without the care and support they need. I hope researchers are studying what has been happening in the lives of those who have become parents during the COVID-19 pandemic, so that we all might learn better ways to deliver and manage care for this vulnerable population during the next acute wave of an infectious disease, and not repeat the failures of the past.

Capitalizing on the uncertainties and fears of new parents has been a marketing strategy of commercial interests for many years. Of course, these strategies are contrary to the letter and intent of the *International Code of Marketing Breast-milk Substitutes* (IC; WHO, 1981) and its subsequent World Health Assembly Resolutions (World Health Assembly, 1981–2018). IC compliance has been a major international issue for as long as it has existed, particularly during infant and young children emergencies (WHO, 2003). In this issue, Burrell et al., 2020 describe the model they developed during the infant and young child feeding emergency among the Rohingya refugees in Cox Bazar, Bangladesh. They describe how, in the midst of this huge humanitarian crisis, organizations can still adhere to the IC, providing an excellent example for us all.

International monitoring of the IC traditionally has been the role of not for profit non-governmental organizations (e.g., International Baby Food Action Network-IBFAN; World Alliance for Breastfeeding Action [WABA]) and the World Health Organization [WHO]). However, individual countries have had the responsibility to enact IC legislation/regulations and to self-monitor compliance, which some do

Journal of Human Lactation
2020, Vol. 36(3) 387–389
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0890334420939554
journals.sagepub.com/home/jhl



JHL Editor in Chief, Honeoye Falls, NY, USA

Corresponding Author:

Joan E. Dodgson, PhD, MPH, RN, FAAN, JHL Editor in Chief, Honeoye Falls, NY 10003, USA.
Email: jhleditorinchief@gmail.com

much better than others, but all could improve. International Board Certified Lactation Consultants (IBCLCs) are required to adhere to the IC as part of their commitment to provide the best possible care to breastfeeding families. The *Journal of Human Lactation* (JHL) continues to support the IC through the articles we publish and our publication policies. Throughout the multiple societal layers, individuals and organizations are dedicated to promoting and enacting the IC. It is only through the conscientious and often volunteer monitoring that the IC has a meaningful presence globally, as the big money that international commercial interests use so freely continues to work against enacting the IC.

Clearly, we are living through a global infant and young child feeding emergency on a scale not previously experienced in modern times. This prompted UNICEF (2020a) to reiterate the IC stating:

Donations of BMS [breast milk substitutes] by manufacturers has been shown to lead to increased use of substitutes and a reduction in breastfeeding. For this reason, the World Health Assembly (WHA) has stated that there should be no donations of free or subsidized supplies of breastmilk substitutes in any part of the health care system. This prohibition extends to emergency settings where governments have been urged by WHA to ensure that any required breast-milk substitutes are purchased, distributed and used according to strict criteria. For more details refer to Operational Guidance on Infant Feeding in Emergencies (p. 1-2).

Many anecdotal reports have surfaced on social media and the internet concerning the violations of the IC by manufacturers of human milk substitutes. A number of these are cataloged on the *Baby Milk Action* website (<http://www.babymilkaction.org/archives/24341>) with new postings as they are reported. Examples from their website are, "Nestlé Lactogen follow-on formula was distributed by a charity in India." When this was questioned by the local breastfeeding support organization, the practice was stopped. Similarly, "Plasmon (the infant food brand of Kraft Heinz in Italy) announced the donation of 700,000 euros of products, including infant formula, for low income families economically affected by Covid19" (*Baby Milk Action, IBFAN UK*, <http://www.babymilkaction.org/archives/24341>). Members of IBFAN ITALIA recognized this as an IC violation and sent letters to their Ministry of Health and others in order to bring this practice into view. In the United Kingdom a similar incident occurred in a Baby-Friendly Hospital and was brought to light by local lactation advocates. These examples are most likely the tip of the iceberg. However, they also illustrate that IC activism works! The *Baby Milk Action (IBFAN UK)* website and the documentation posted from advocates around the world demonstrates how important it is that we all stay engaged in promoting the IC, especially during these difficult times.

What can you and I do? We can (1) be aware of the tenants of the IC and what the agencies and organizations within our

lives are doing to support or negate the IC; (2) We can intervene whenever and however possible through advocacy efforts and through examining our own practices then making changes that are necessary and; (3) We must make visible any unethical practices we observe; it is the only way to make any change. It is our responsibility to participate in monitoring IC violations in whatever ways we are able, which includes actively participating in IBFAN's global mandate to document any IC violations. Do you know who your local IBFAN organization is? We are an essential part of UNICEF's (2020b) agenda to:

Ensure safeguards are in place to avoid conflict of interest from companies marketing breastmilk substitutes and foods for infants and young children and women and ensure that donations or free supplies are prohibited. Prevent commercial exploitation of COVID-19 through unnecessary use of specialized foods and supplements, and spillover to those who do not need them (p. 3).

Breastfeeding families should be able to have the care they need, even during a pandemic, which can only happen if the IC is protected and enacted by us all.

During these pandemic consumed months, the *JHL*'s editorial team has been acutely aware of the many currently unanswered questions facing breastfeeding families and the healthcare providers who serve them. In keeping with the practices of the international healthcare publishing community, we have expedited the processing and publishing of COVID-related submissions that might be helpful to our readers and we will continue to do so throughout this global crisis. A number of these articles are published in this issue. We hope that you find them useful. The process of delivering these timely articles to you quickly without compromising quality has taken extra and concerted efforts by our editorial team, our peer reviewers, our ILCA colleagues, and our publisher, all of whom have shown their dedication to getting you, our readers, the best evidence as quickly as possible. I feel very fortunate to be able to work with them all.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Baby Milk Action, IBFAN UK. (2020). *How companies exploit the COVID-19 crisis*. <http://www.babymilkaction.org/archives/24341>
- Burrell, A., Kueter, A. M., Ariful, S., Rahaman, H., Iellamo, A., & Mothabbir, G. (2020). Appropriate infant and young child feeding practices in an emergency for non-breastfed infants

- under six months: The Rohingya experience. *Journal of Human Lactation*, 36(3). doi:10.1177/0890334420906838
- Dodgson, J. E., Tarrant, M., Chee, Y. -O., & Watkins, A. (2010). New mothers' experiences of social disruption and isolation during the severe acute respiratory syndrome outbreak in Hong Kong. *Nursing & Health Sciences*, 12(2), 198–204. doi:10.1111/j.1442-2018.2010.00520.x
- United Nations Children's Fund, Global Nutrition Cluster, Global Technical Assistance Mechanism for Nutrition. (2020a). *Infant and young child programming in the context of COVID-19. UNICEF (Brief 2 V1)*. https://mcusercontent.com/fb1d9aab6c823bef179830e9/files/ffa9cdc1-17de-4829-9712-16abe85c2808/IYCF_Programming_in_the_context_of_COVID_19_30_March_2020.pdf
- United Nations Children's Fund, Global Nutrition Cluster, Global Technical Assistance Mechanism for Nutrition. (2020b). *Protecting Maternal Diets and Nutrition Services and Practices in the Context of COVID-19 (Brief 4)*. <https://www.nutritioncluster.net/sites/default/files/2020-04/Maternal-Nutrition-Programming-COVID19-V3.pdf>
- World Health Assembly. (1981–2018). *World Health Assembly resolutions and documents 1981 to 2018*. World Health Organization. http://www.who.int/nutrition/topics/wha_nutrition_resolutions_and_documents_1981_to_2018
- World Health Organization. (1981). *International Code of Marketing of Breast-Milk Substitutes*. Author. ISBN: 92 4 154160 1.
- World Health Organization & United Nations Children's Fund. (2003). Global strategy for infant and young child feeding.

JHL News

Journal of Human Lactation
2020, Vol. 36(3) 390–391
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0890334420939555
journals.sagepub.com/home/jhl



Due to the Global COVID-19 Pandemic

All of us at *JHL* have been affected by the pandemic, just as you most likely have been too. As a result, we have had to make several modifications to our usual and expected review and publication processes. First, we had planned to have this issue be our annual *State of the Science* issue, but a number of the authors who wanted to submit *State of the Science* manuscripts have had life events that require a delay in their submissions. Most are able to get these papers submitted in time for our next issue in November. Therefore, we decided to move our Special *State of the Science* to November. One positive thing that has occurred during the stay at home orders has been the increase in manuscripts submitted. However, finding reviewers has been much more difficult, as our reviewers' lives have been affected in so many ways. This situation has affected how fast we can process manuscripts, creating a longer waiting time for authors. We are doing our best to minimize this issue and appreciate your understanding.

2020 JHL Award Winners

JHL Best Research Article With a Practice Focus winner is

Rukhsana Haider, MBBS, MSc, PhD, and **Virginia Thorley**, PhD, IBCLC, FILCA article *Supporting Female Factory Workers and Their Unemployed Neighbors to Breastfeed Exclusively: Report From a Peer Counseling Project in Bangladesh*, published in this issue.

The *JHL Best Research Article with a Practice Focus* is chosen from all articles published in *JHL* during the previous calendar year having a practice focus based on the quality of the science and the contribution to the field of lactation. The *JHL* Editorial Review Board, comprised of experts in our field, chooses the award winner by a simple majority vote.

The Miriam Labbok New Investigator Award winner is

Shujuan Li, MD, for her team's (Lan Zhang, MD, Qi Zhou, PhD, Siyuan Jiang, PhD, Yi Yang, PhD, and Yun Cao, MD PhD) paper *Characterization of Stem Cells and*

Immune Cells in Preterm and Term Mother's Milk published in *JHL* 35(3) 528–534.

The *Miriam Labbok New Investigator Award* is given to a novice researcher whose *JHL* published research has made a significant contribution to the body of lactation knowledge. Articles published during the previous calendar year by new investigators (students) are considered for the annual award. A panel of research experts will rate these manuscripts on the pre-established evaluation criteria.

Patricia Martin Annual Award for Excellence in Breastfeeding Research awardee is

Caroline Chantry, MD, for her significant research contributions to our evidence-base concerning early breastfeeding patterns, the influence of maternal nutrition on breastfeeding outcomes, and infants' physiological responses to human milk feedings. Additionally, she worked in Africa during the HIV epidemic, publishing a body of research about the nature and relationships between HIV and infant feeding. (This award is given to a senior researcher with a history of excellence in breastfeeding research. The Editorial Review Board and the Editors choose the award winner by majority vote.)

Submit your Photos for our 2021 *JHL* Cover (by August 30th)

For our cover photos for next year, we are asking you to send us photos that illustrate the teaching/learning process (send to: jhlmanagingeditor@gmail.com). These could be IBCLCs teaching a parent how to breastfeed, conducting a staff development class for others, or classes that prepare IBCLCs. Most important is that the picture demonstrates the process of conveying information to others who want to learn. There are specific requirements for the quality of the photo (300 × 300 dpi), so that it will print well during publishing. We will be sending each of the winners a lactation text. (Additional information on our Facebook page)

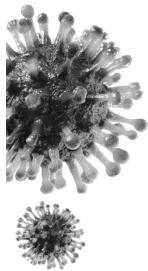
New Associate Editor

We are delighted to have one of our newest Editorial Review Board members join our Editorial Team as an Associate Editor: Dr. Ellen Chetwynd, whom we introduced to our readership in the last issue. Ellen is a researcher, writer, speaker, and public health advocate. Her research focuses on the craft of lactation consulting—from clinical aspects to practice integration and

research methods. She begins her new role with our next issue.

Products Advertised in *JHL*

The Editors want you to know that we do not have the responsibility for selecting or vetting the companies who advertise in *JHL*, nor do we have the responsibility for checking the validity of the claims made in these advertisements. ILCA assumes responsibility for all advertising content in this journal.



FREQUENTLY ASKED QUESTIONS:

Breastfeeding and COVID-19

For health care workers

(28 April 2020)



Preface

This FAQ complements the WHO interim guidance: *Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected*

(13 March 2020 - [www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](http://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)) and provides responses to questions that have arisen about the recommendations.



The interim guidance and FAQ reflect:

- i. the available evidence regarding transmission risks of COVID-19 through breastmilk;
- ii. the protective effects of breastfeeding and skin-to-skin contact, and,
- iii. the harmful effects of inappropriate use of infant formula milk.

The FAQ also draws on other WHO recommendations on Infant and Young Child Feeding and the Interagency Working Group Operational Guidance on Infant and Young Child Feeding in Emergencies. A decision tree shows how these recommendations may be implemented by health workers in maternity services and community settings, as part of daily work with mothers and families.

www.who.int/news-room/q-a-detail/q-a-on-covid-19-and-breastfeeding

1. Can COVID-19 be passed through breastfeeding?

The COVID-19 virus has not, to date, been detected in the breastmilk of any mother with confirmed/suspected COVID-19. It appears unlikely, therefore, that COVID-19 would be transmitted through breastfeeding or by giving breastmilk that has been expressed by a mother who is confirmed/suspected to have COVID-19. Researchers continue to test breastmilk from mothers with confirmed/suspected COVID-19.

regulation of newborns and several other physiological outcomes, and is associated with reduced neonatal mortality. Placing the newborn close to the mother also enables early initiation of breastfeeding which also reduces neonatal mortality.

The numerous benefits of skin-to-skin contact and breastfeeding substantially outweigh the potential risks of transmission and illness associated with COVID-19.

2. In communities where COVID-19 is prevalent, should mothers breastfeed?

Yes. In all socio-economic settings, breastfeeding improves survival and provides lifelong health and development advantages to newborns and infants. Breastfeeding also improves the health of mothers. In contrast, transmission of COVID-19 through breastmilk and breastfeeding has not been detected. There is no reason to avoid or stop breastfeeding.

Yes. The transmission of the COVID-19 virus through breastmilk and breastfeeding has not been detected. While breastfeeding, a mother should still implement appropriate hygiene measures, including wearing a medical mask if available, to reduce the possibility of droplets with COVID-19 being spread to her infant.

3. Following delivery, should a baby still be immediately placed skin-to-skin and breastfed if the mother is confirmed/suspected to have COVID-19?

Yes. Immediate and continued skin-to-skin care, including kangaroo mother care, improves thermal

Mothers and families can be advised that among the few cases of confirmed COVID-19 infection in children, most have experienced only mild or asymptomatic illness.

In contrast, there is high quality evidence showing that breastfeeding reduces neonatal, infant and child mortality including in high resource settings and improves lifelong health and development in all geographies and economic settings.

5. What are the hygiene recommendations for a breastfeeding mother confirmed/suspected to have COVID-19?

If a mother is confirmed/suspected to have COVID-19 she should:

- Wash hands frequently with soap and water or use alcohol-based hand rub, especially before touching the baby
- Wear a medical mask while feeding. It is important to:
 - Replace masks as soon as they become damp
 - Dispose of masks immediately
 - Not re-use a mask
 - Not touch the front of the mask but untie it from behind
- Sneeze or cough into a tissue, immediately dispose of it and use alcohol-based hand rub or wash hands again with soap and clean water
- Regularly clean and disinfect surfaces

6. If a mother confirmed/suspected to have COVID-19 does not have a medical face mask should she still breastfeed?

Yes. Breastfeeding unquestionably reduces neonatal and infant mortality and provides numerous lifelong health and brain development advantages to the infant/child. Mothers with symptoms of COVID-19 are advised to wear a medical mask, but even if this is not possible, breastfeeding should be continued. Other infection prevention measures, such as washing hands, cleaning surfaces, sneezing or coughing into a tissue are also important.

Non-medical masks (e.g. home-made or cloth masks) have not been evaluated. At this time, it is not possible to make a recommendation for or against their use.

7. Is it necessary for a mother with confirmed/suspected COVID-19 to wash her breast before she breastfeeds directly or before expressing milk?

If a mother is confirmed/suspected to have COVID-19 has just coughed over her exposed breast or chest, then she should gently wash the breast with soap and warm water for at least 20 seconds prior to feeding.

It is not necessary to wash the breast before every breastfeed or prior to expressing milk.

8. If a mother confirmed/suspected to have COVID-19 is not able to breastfeed what is the best way to feed her newborn/infant?

The best alternatives to breastfeeding a newborn or young infant are:

• *Expressed breastmilk*

- Expression of breastmilk is primarily done or taught through hand expression, with the use of a mechanical pump only when necessary. Hand expression and using a pump can be equally effective.
- The choice of how to express will depend on maternal preference, availability of equipment, hygiene conditions and cost.
- Expressing breastmilk is also important to sustain milk production so that mothers can breastfeed when they recover.
- The mother, and anyone helping the mother, should wash their hands before expressing breastmilk or touching any pump or bottle parts and ensure proper pump cleaning after each use. (See question 10 below)
- The expressed breastmilk should be fed to the child preferably using a clean cup and/or spoon (easier to clean), by a person who has no signs or symptoms of illness and with whom the baby feels comfortable. The mother/caregiver should wash their hands before feeding the newborn/infant.

• *Donor human milk*

- If the mother is unable to express milk and milk is available from a human milk bank, donor human milk can be fed to the baby while the mother is recovering.

• *If expressing breastmilk or donor human milk are not feasible or available then consider:*

- Wet-nursing (see question 11 below)
- Infant formula milk with measures to ensure that it is feasible, correctly prepared, safe and sustainable.

9. Is it safe to give expressed breastmilk from a mother confirmed/suspected to have COVID-19?

Yes. The COVID-19 virus has not, to date, been detected in the breastmilk of any mother confirmed/suspected to have COVID-19. It is unlikely that the virus can be transmitted by giving breastmilk that has been expressed by a mother with confirmed/suspected COVID-19.

10. If a mother with confirmed/suspected COVID-19 is expressing her milk for her baby, are there extra measures needed when handling the breastmilk pump, milk storage containers or feeding utensils?

Even when COVID-19 is not a consideration, breastmilk pumps, milk storage containers and feeding utensils need to be appropriately cleaned after every use.

- Wash the pump/containers after every use with liquid soap, e.g. dishwashing liquid and warm water. Rinse after with hot water for 10-15 seconds.
- Some breast pumps parts can be put in the top rack of a dishwasher (if available). Check the instruction manual before doing this.

11. If a mother with confirmed/suspected COVID-19 is not able to breastfeed or to express breastmilk, can wet-nursing be recommended?

Wet-nursing may be an option depending on acceptability to mothers/families, national guidelines, cultural acceptability, availability of wet-nurses and services to support mothers/wet-nurses.

- In settings where HIV is prevalent, prospective wet-nurses should undergo HIV counselling and rapid testing, according to national guidelines, where available. In the absence of testing, if feasible undertake HIV risk assessment. If HIV risk assessment/counselling is not possible, facilitate and support wet-nursing. Provide counselling on avoiding HIV infection during breastfeeding.
- Prioritise wet-nurses for the youngest infants.

12. If a mother confirmed/suspected to have COVID-19 was unable to breastfeed because she was too ill or because of another illness, when can she start to breastfeed again?

A mother can start to breastfeed when she feels well enough to do so. There is no fixed time interval to wait after confirmed/suspected COVID-19. There is no evidence that breastfeeding changes the clinical course of COVID-19 in a mother.

She should be supported in her general health and nutrition to ensure full recovery. She should also be supported to initiate breastfeeding or relactate.

13. Do the results of COVID-19 testing make any difference to infant and young child feeding recommendations?

COVID-19 testing does not have any immediate implications for decisions on infant and young child feeding.

However, confirmation of COVID-19 means that a mother should implement appropriate recommended hygiene practices for the period that she is likely to be infective i.e. while symptomatic or through the 14 days after the start of symptoms, whichever is longer.

14. Is it advisable for a mother with confirmed/suspected COVID-19 who is breastfeeding, to give a ‘top-up’ with infant formula milk?

No. If a mother is confirmed/suspected to have COVID-19 and is breastfeeding, there is no need to provide a ‘top-up’ with an infant formula milk. Giving a ‘top-up’ will reduce the amount of milk produced by a mother. Mothers who breastfeed should be counselled and supported to optimise positioning and attachment to ensure adequate milk production. Mothers should be counselled about responsive feeding and perceived milk insufficiency and how to respond to their infants’ hunger and feeding cues to increase the frequency of breastfeeding.

15. What are key messages for a mother who wants to breastfeed but is scared about passing COVID-19 to her infant?

As part of counselling, a mother’s or family’s anxiety about COVID-19 should be acknowledged and responded to with the following messages:

- I. COVID-19 has not been detected in the breastmilk of any mother with confirmed/suspected COVID-19 and there is no evidence so far that the virus is transmitted through breastfeeding.
- II. Newborns and infants are at low risk of COVID-19 infection. Among the few cases of confirmed COVID-19 infection in young children, most have experienced only mild or asymptomatic illness.
- III. Breastfeeding and skin-to-skin contact significantly reduce the risk of death in newborns and young infants and provide immediate and lifelong health and development advantages. Breastfeeding also reduces the risk of breast and ovarian cancer for the mother.
- IV. The numerous benefits of breastfeeding substantially outweigh the potential risks of transmission and illness associated with COVID-19.

- 16. If a mother is confirmed/suspected to have COVID-19, is infant formula milk safer for infants?**
- No. There are always risks associated with giving infant formula milk to newborns and infants in all settings.
- The risks associated with giving infant formula milk are increased whenever home and community conditions are compromised e.g. reduced access to health services if a baby becomes unwell / reduced access to clean water / access to supplies of infant formula milk are difficult or not guaranteed, not affordable and not sustainable.
- The numerous benefits of breastfeeding substantially outweigh the potential risks of transmission and illness associated with the COVID-19 virus.
- 17. For what period of time are WHO recommendations on Breastfeeding and COVID-19 relevant?**
- The recommendations on caring and feeding of infants of mothers with confirmed/suspected COVID-19 are for the time when she is likely to be infective, i.e. while symptomatic or through the 14 days after the start of symptoms, whichever is longer.
- 18. Why do recommendations for mothers with confirmed/suspected COVID-19 and their infants seem different from social distancing recommendations for the general population?**
- Recommendations for adults and older children to maintain social distancing aim to reduce contact with asymptomatic persons who have COVID-19 and transmission of the virus that may result. This strategy will reduce the overall prevalence of COVID-19 and the number of adults who experience more serious disease.
- The aim of recommendations on the care and feeding of infants and young children whose mothers have confirmed/suspected COVID-19 infection is to improve the immediate and lifelong survival, health and development of their newborns and infants. These recommendations consider the likelihood and potential risks of COVID-19 in infants and also the risks of serious illness and death when infants are not breastfed or when infant formula milk are used inappropriately as well as the protective effects of breastfeeding and skin-to-skin contact.
- In general, children are at low risk of COVID-19 infection. Among the few cases of confirmed COVID-19 infection in children, most have experienced only mild or asymptomatic illness. The numerous benefits of breastfeeding substantially outweigh the potential risks of transmission and illness associated with the COVID-19.
- 19. Is it alright for health facilities to accept free supplies of formula milk for infants of mothers with confirmed/suspected COVID-19?**
- No. Donations of infant formula milks should not be sought or accepted. If needed, supplies should be purchased based on assessed need. Donated formula milk is commonly of variable quality, of the wrong type, supplied disproportionate to need, labelled in the wrong language, not accompanied by an essential package of care, distributed indiscriminately, not targeted to those who need it, is not sustained, and takes excessive time and resources to reduce risks.
- 20. Why do WHO recommendations on mother/infant contact and breastfeeding for mothers with confirmed/suspected COVID-19 differ from those of some national and professional organizations?**
- WHO's recommendations on mother/infant contact and breastfeeding are based on a full consideration not only of the risks of infection of the infant with COVID-19, but also the risks of serious morbidity and mortality associated with not breastfeeding or the inappropriate use of infant formula milks as well as the protective effects of skin-to-skin contact and breastfeeding.
- Recommendations of other organizations may focus only on the prevention of COVID-19 transmission without full consideration of the importance of skin-to-skin contact and breastfeeding.



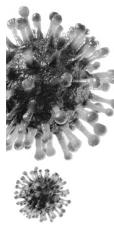
www.who.int/news-room/q-a-detail/q-a-on-covid-19-and-breastfeeding

Disclaimer

The responses to questions in this document are derived from WHO publications and the Interagency Working Group Operational Guidance on Infant and Young Child Feeding in Emergencies. The WHO interim guidance was developed by a WHO global network of clinicians and clinicians who have treated patients with SARS, MERS, or severe influenza or COVID-19.

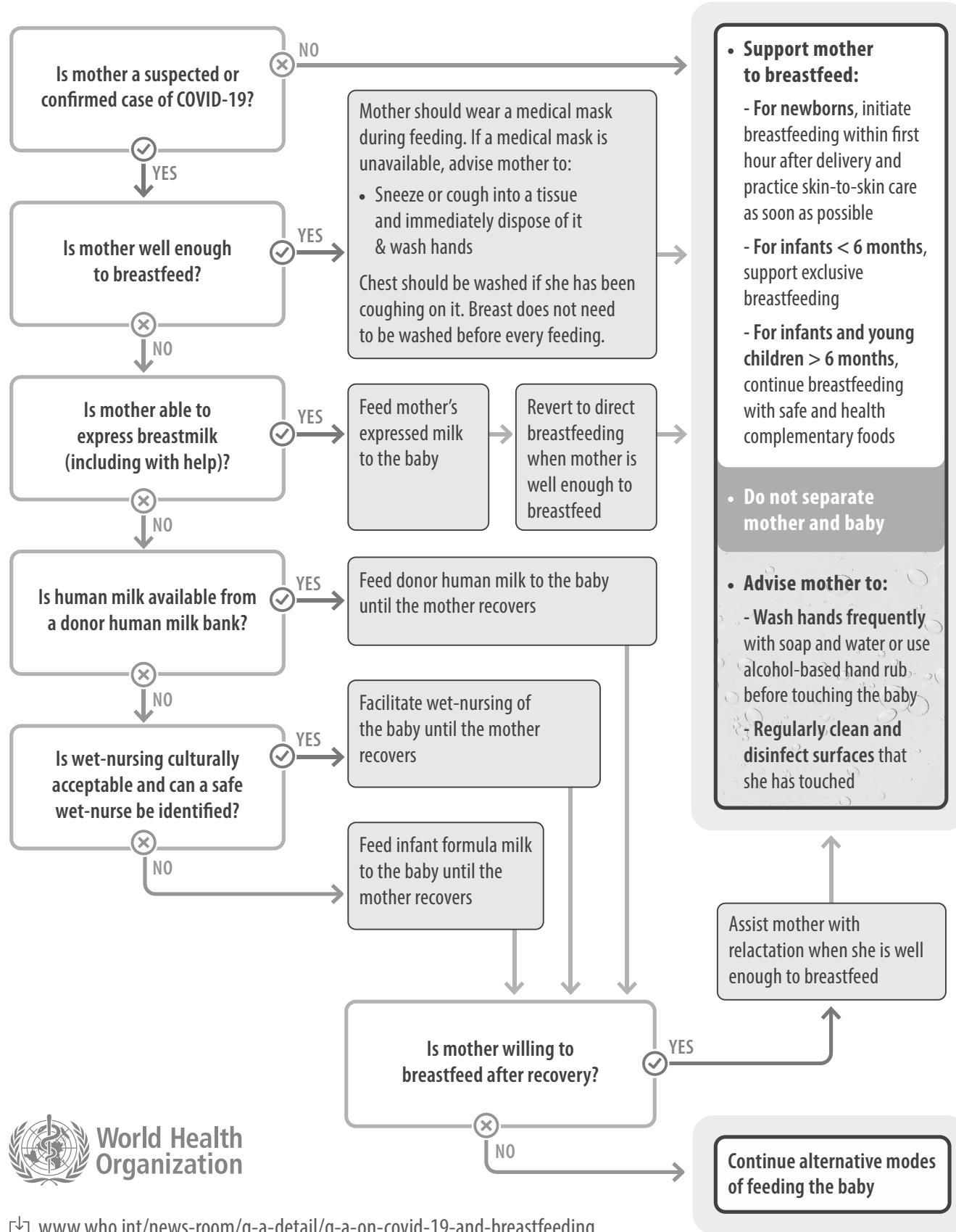
For queries, please email:
outbreak@who.int with
"COVID-19 clinical question"
 in the subject line.





DECISION TREE

for breastfeeding in context of COVID-19:
Guidance for **health care and community settings**



Being There: The Development of the International Code of Marketing of Breast-milk Substitutes, the Innocenti Declaration and the Baby-Friendly Hospital Initiative

Journal of Human Lactation
2020, Vol. 36(3) 397–403
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0890334420926951
journals.sagepub.com/home/jhl



Margaret Isabirye Kyenya, PhD¹ and Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP^{2,3} 

Abstract

Margaret Isabirye Kyenya (photo) grew up in Uganda with five brothers and six sisters. Her Bachelor of Arts was in Social Work and Social Administration (Makerere University, Uganda), and was followed by a Masters in Sociology, (Nairobi University), and a Certificate in Mother and Child Health (International Child Health Institute, London). Her PhD focused on Hospital Administration inspired by the WHO/UNICEF Baby Friendly Hospital Initiative. She has worked as a researcher, the founder of Non-Governmental Organizations, a Senior United Nations Officer (New York Headquarters and several regions), a Manager in the United States Agency for International Development-funded National Health and Nutrition Projects, and a governmental Health and Nutrition Adviser. A certified trainer in a number of health and nutrition areas, a breastfeeding counselor, and a retired La Leche League Leader, Dr. Kyenya has significantly influenced the course of lactation support and promotion globally. She stated, “My most precious and valued occupation is that of a mother [of five] and grandmother [of eight].” Dr. Kyenya currently lives in Atlanta, Georgia, in the United States. (This interview was conducted in-person and transcribed verbatim. It has been edited for ease of readability. MK refers to Margaret Kyenya; KM refers to Kathleen Marinelli.)

Keywords

Baby-Friendly Hospital Initiative, breastfeeding, breastfeeding promotion, UNICEF, World Health Organization, International Code of Marketing of Breastmilk Substitutes, Innocenti Declaration, International Baby Food Action Network, Nestle boycott, La Leche League International

Interview

KM: What made you go down the pathway of maternal-child health?

MK: When I was a young graduate student working at the Medical Research Center of the Royal Tropical Institute of Amsterdam [conducting longitudinal studies of mother and child health in Machakos, Kenya], my specialty was in Bilharzia control, but we did everything. This included field supervision for nutritionists, pediatricians, and epidemiologists. I learned to deliver babies and supported the researcher who was doing studies on the outcome



Dr. Margaret Isabirye Kyenya

of pregnancy. That's how I got into maternal-child health.

While doing that, I met a La Leche League (LLL) Leader, the late Helen Armstrong. She was looking for a professor to help her write a questionnaire studying the problems of breastfeeding in Africa. I was so intrigued because I did not believe there was a problem! Later, she organized a meeting, inviting me. There were six other women from six different countries. We sat together and asked “What do we do? There is an issue about breastfeeding.” We said, “Let’s form a breastfeeding group.” We formed and registered the first breastfeeding promotion group in Africa, the Breastfeeding Information Group (BIG) in 1978.

The Nestle boycott started in 1977. Professor Derick Jelliffe [a US Pediatrician] was helping to compile information on Nestle's marketing practices. As a researcher, I knew research methodology and I could go into every part of Nairobi... I took [Jelliffe's] questionnaire and collected information. There were [formula] samples being given out in hospitals, and mothers and babies were being separated in them. There were formula promotions in low-income areas... [and] posters of infant formula and the conditions were really bad! I had no idea before that this was a real problem. When I asked about breastfeeding only, many mothers said "Oh no, we mix-feed. We give our babies water because in the hospitals they tell us to give our babies water before you start breastfeeding." The rates of diarrhea! Whew!... All pediatricians and nurses I talked to said "Yes, most of the babies here are dying of diarrhea because of the water feeding, and the bottles are dirty." It was terrible. We sent off all this information to the United States.

Early 1980 the UNICEF representative in Kenya came to one of our meetings and said "A new Executive Director in UNICEF... wants to make breastfeeding one of UNICEF's priorities. He has written to all the countries that have representatives [asking them] to do something about breastfeeding, and we would like to work with you." We agreed.

KM: Who was this?

MK: James P. Grant. In 1978 the US Senate hearings recommended that WHO convene a meeting on infant and young child feeding, to consider [the] drafting of a regulation, some code to regulate [the] marketing of breast-milk substitutes (the 1979 Infant and Young Child Meeting). We got invited, and I went. It was overwhelming!... WHO headquarters was HUGE! I participated in the meetings as part of the NGOs, learned as much as possible and shared whatever I could. After that meeting, the NGOs formed IBFAN—International Baby Food Action Network—to push for and support a strong marketing code, and I went back and reported to my group what had happened. We continued contributing information to the IBFAN network.



Dr. Kathleen A. Marinelli

By this time, I was becoming a real activist. I was doing more work on breastfeeding and participating in meetings than I was on my research. Every time I went into the field to collect data, I worked more closely with the nutritionists, pediatricians, and obstetricians than the biologists. [Then in] 1981, I was sent by BIG [The Breastfeeding Information Group] as their representative to the IBFAN meetings, happening around the 1981 World Health Assembly [WHA] that was to adopt the International Code of Marketing of Breastmilk Substitutes [the Code].

Industry was also present and lobbying for a weaker code.... We heard that Nestle was sending delegates and was inviting people to try to get delegations to not vote on the Code. I decided that... I would try to penetrate the Nestle meeting. I went with a nurse on the Kenya delegation. [Nestle] told us they would send us on trips, and they would give us materials. I brought all this back to the IBFAN group.... Because of the global effort, Nestle and the other companies were telling the media, WHO, and UNICEF that they were no longer promoting artificial feeding (they were not giving out samples, posters, etc.). Unfortunately for them, I and other people from all continents had collected a lot of information prior to traveling to Geneva for the IBFAN 1981 meeting, and shared it with IBFAN colleagues. Immediately, they arranged for journalists to interview us. We shared the evidence of what Nestle and other companies were still doing. This helped the case for the strong regulation.... [IBFAN] produced simple materials to help us explain the draft Code to national delegations, and what was at stake if the Code did not get adopted by the WHA. Once they understood the politics, and how the companies were manipulating the situation to decrease breastfeeding and increase sales of infant formula, the delegations just wanted the Code.

The NGOs... would be at the WHA during the day and at night, we would meet between and share what we had learned and strategized the next steps. The small group of IBFAN people were amazing (Leah Margulies, Anwar Fazal, Patricia Young, Doug Clement, Ed Baer, Andy Chetley, Annelies Allain, Jean-Pierre Allain, Doug Jonson, Dr. Clavano,

¹Atlanta, GA, US

²Department of Pediatrics, University of Connecticut School of Medicine, Farmington, CT, USA

³Division of Neonatology, Connecticut Children's Medical Center, Hartford, CT, USA

Date submitted: April 25, 2020; Date accepted: April 25, 2020.

Corresponding Author:

Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP, Division of Neonatology, Connecticut Children's Medical Center, Hartford, CT, USA.

Email: kathleen.marinelli@cox.net

Professor Jelliffe), as well as the WHO team (Elizabeth Helsing, Manuel Carballo) and the UNICEF team (Kathleen Cravero, Marjorie Newman-Williams). Both WHO and UNICEF wanted a strong code to protect breastfeeding, and any help they could get from NGOs to educate the delegations was welcome. What was admirable to me was [that] the NGOs had no money. Each person donated their time and personal resources towards this work. We slept in dormitories. Young people from Europe and the US contributed to transport and food for us. Where donations had been received (by the IBFAN groups), they were used to send tickets to NGO representatives or individual health professionals to come to the 1981 WHA [meeting] and to the IBFAN meeting. They knew how to lobby and taught us! They were doing the writing and sending out information. It was amazing!

After the Code was overwhelmingly adopted in May 1981, we celebrated! That followed the NGO meeting that formed a bigger IBFAN. Every group decided, we shall work as a network, independent of but supporting each other. We shall have regional representatives and [they] shall manage the whole network. In the Africa group I had people from Kenya, West Africa, Nigeria, Ghana, South Africa. It was a big group. Because I came from the only formal Breastfeeding Support Group in the region, the group asked me to take on the IBFAN regional coordination job. I declined. I was working full time with the Medical Research Centre, a graduate student, a mother of two under-fives, and married. I [went] back to the Breastfeeding Information Group with the report from WHA and the IBFAN meeting and asked them to nominate an IBFAN regional coordinator. They turned to me and said, "You know you are the best person to do this." So, I took on the responsibility to set up IBFAN Africa [mid-1981].

Establishing the *IBFAN Africa Network* was challenging. BIG worked in sub-groups. We already had groups working on mother support, counseling at hospitals, giving talks to groups, producing the newsletter, and one on research (to find out what was happening with mothers in plantations and in rural areas). We decided another sub-group would work on the Code and I chaired that group, and it would support me with IBFAN Africa work. To reach out to other countries we went through UNICEF since breastfeeding was also their priority.... They started inviting me to meetings ... the regional director had a meeting of UNICEF representatives (1982) and they invited me to speak to them about breastfeeding.... UNICEF decided to work through their communications officers to promote breastfeeding in every country. In 1982, the East and Southern Africa Communications Officer organized an orientation meeting for journalists in Zimbabwe which

I chaired.... From then on, UNICEF was really engaged and kept me and my team busy. The same officers identified persons in their countries to set up national IBFAN groups. I also worked actively in Kenya. In 1981 the Kenya delegation had been a strong mobilizer for the Code in Geneva. We tried to get a Kenyan law.... However, we had a lot of Nestle opposition to a strong Kenya Code and they insisted on being full participants in the drafting process. BIG was small compared to them and we were losing. I appealed to the leader of the biggest and politically powerful grassroots women's organization, *Maendeleo ya Wanawake*. The organization had a nutritionist who was active in BIG (Mrs. Jennifer Mukolwe). She set up a meeting for me with the politically powerful Mrs. Jane Kiano... who said to me, "What is all this about breastfeeding and bringing woman backwards?" ... I told her this is a woman's issue and she had a responsibility to fight for us, for her children and grandchildren. I spoke in detail about what formula was made of and how marketing stole a woman's right to breastfeed. After she heard this, she was upset, "This is what they have done here? When is the next meeting?"

The next meeting was crucial because a decision was going to be made to not adopt the Code, because the Nestle reps were participating and our BIG group was a lone voice. Other organizations had been threatened and stopped participating. I was nervous; imagine my relief when this very tall, elegant, and well-known powerful lady walks in and sits right next to me! There was silence. They realized she was there to support breastfeeding. She just sat there; they started presenting what was going to happen in terms of the Code. She said, "What has happened to regulate the marketing of breastmilk substitutes?" and of course they were lost for words. She gave me an opening to reveal all the intricacies of how officials and NGO leaders were being threatened and intimidated, as well as the implications for the health and wellbeing of Kenyan infants and children if the marketing practices were not strongly regulated. I even questioned why Nestle reps were sitting in the meeting. She said, "I want this Code. Definitely. And I want it soon." That was a turning point for the Kenya Code. Higher level officials in government got involved and very strong decisions were made. Samples were banned from hospitals and posters removed with the biggest women's organization behind the breastfeeding movement.

After completing my MA requirements, I became a full-time employee of IBFAN, based in Kenya, with funding by the International Organization of Consumers Union. I was the first regional representative and the first regional coordinator for IBFAN Africa, covering both east and west Africa. I didn't have an office, working out of my house. I bought

baskets from the markets in Kenya and then traveled with them if I was invited to one of the organization's meetings. Someone would pay for me, and they would arrange for me to stay with someone... I sold these baskets and brought the money back to IBFAN Africa. I would ask my husband to donate to my efforts with cash, to buy supplies (such as pens, paper, stamps, envelopes, carbon paper). We didn't have computers then. We used typewriters and I donated mine. I worked with volunteers, who prepared documents and I would request friends with office set-ups to help with photocopying. We even started an *IBFAN Africa Newsletter!* My young children would help with sorting, packaging, and stamping the newsletter for mailing. Then later BIG got a grant, rented an office and I used one of the rooms for IBFAN Africa.... With the first grant we had, we provided \$500US to each new national group. UNICEF and WHO funded national level activities, including advocacy, training of health-workers, and national Code development.

I was invited by WHO and UNICEF to go to many meetings and conferences to speak about the issues and keep people up [to date]. In 1986 they called me to a meeting convened by WHO and UNICEF in New York ... where I was asked "Do you want to work for UNICEF?" I said, "UNICEF where?" "New York." "New York!! I am a village girl. I am not going away to NY." I was scared. I said "Uh uh! Send someone [else]." ...My husband ... had gone for his graduate studies to Yale University, and he was still in contact with people at Yale... He said "Yeah let's go!... but if you are going to go and move the children and me... then it has to be a contract that will last for 2 years." Eventually we accepted. It was one of the toughest jobs ever. The transition was so hard. We lived in New Rochelle, NY.

But the thing that made me accept was the deputy director (programs), Dr. Richard Jolly, interviewing me [during] a regional nutrition meeting in Nairobi, "Why are you resisting coming to New York?" I said, "I don't know. I know this work. I stand up, I go on the radio and I even criticize UNICEF for promoting immunization and oral rehydration salts without talking about breastfeeding and child nutrition." He said, "What are you doing now?" "I am creating programs and working on lactation management training of health workers. We are organizing women as consumers to protect breastfeeding, and we are creating mother-to-mother support groups to support breastfeeding." "Who do you work with?" I said I had LLL contacts in Zimbabwe and Zambia, Kenya, and South Africa; we work with everybody. He turned to me, "I want you to do that everywhere. Come to UNICEF and do exactly what you are doing but all over the world." My conditions were that my support network [must be] the International Organization of Consumers

Union, the Nestle boycott organizers, La Leche League, Nursing Mothers Association of Australia, and, in Europe, the active groups of young physicians. [He agreed]. We moved to New York in Oct 1987, on a 2-year contract, and I started my work as the first global Advisor on Infant and Young Child Feeding in UNICEF. I was continuously in touch with my network, working as a team with UNICEF.

In my UNICEF office in New York, I found a lot of documents, in boxes, from Ed Bear and Leah Margulies prepared for the draft Code, and I read them all. They gave me a starting point of what UNICEF had already supported. I also found a draft manual by Dr. Beverly Winnikoff, at the Population Council. I met with her and asked if I could continue working with it. It's from this manuscript that I wrote the *Protecting Promoting and Supporting Breastfeeding: The Role of Maternal Facilities* (1989). The draft went through a lot of reviews as I shared it widely. Question was: How to publicize it? Already Wellstart was implementing these very practices in 12 hospitals in the world, using funding from USAID. When I gave the near final draft to Dr. Richard Jolly, he said, "This is really good. However, you know how Jim (Grant, Executive Director) works. When he is talking to leaders, he pulls something out of his pocket (an ORS package, a vaccine vial) to make his point. He cannot pull out a breast or a large book to promote breastfeeding. How about you write a summary, say *Ten Steps to Breastfeeding* or something?" That was at 3pm. I went downstairs to my office on the 8th floor, called my close working team: Helen Armstrong (Massachusetts, US), Felix Savage (in the UK) and Audrey Naylor (San Diego, US) and alerted them to be ready to burn the midnight candle. Later I would check in with Beverly, of course. As usual they first protested about further compacting information that had already been very summarized in the booklet! And, again, I talked about the need to "simplify in order to popularize." It was so hard to attempt to summarize the book in 10 steps. Three hours later, I came up with 15 steps. Dr. Jolly would not have it. We did not use email then. I was faxing drafts back and forth to the team. We ended the night with 12 steps. I took it to my supervisor, Dr. Peter Greaves, and, after editing, we showed it to Dr. Jolly the following morning. We engaged colleagues at WHO, the communications team at UNICEF and eventually got to 10 steps. I shared this with my team, and they approved. Thus, the *Ten Steps to Successful Breastfeeding* were born and later became the basis for *The Baby-Friendly Ten Steps to Successful Breastfeeding*, which Jim Grant transformed into the *WHO/UNICEF Baby Friendly Hospital Initiative*, launched in 1992.

At first, the WHO publication department refused to publish the booklet, saying "no one will buy it" and

"it won't have a market and will be a waste of resources. It's your book Margaret, you publish it as a paper or something." However, we needed this booklet to have the WHO's endorsement. The WHO technical staff and leadership had already approved the content. My mission was to popularize the information and make the *Ten Steps* applicable everywhere. I was told: "you have to market it before we [the WHO] publish it." They reproduced 1000 copies and sent them to all the hospitals and organizations I knew, all over the world, and requested them to pre-order. The preorders were almost overwhelming for WHO. La Leche League International was amazing at marketing the booklet. Wellstart International, and all the mother-support groups in all regions did their part. IBFAN groups got governments in developing countries to order and, for them, the booklet would be free. Within a year, WHO said it was their top [selling] publication.

My main job was to organize a global meeting on infant and young child feeding to develop the basic policies and program. What should be the best policy and programs for breastfeeding promotion, protection, and support? The population office of USAID was really active and committed to promotion of breastfeeding as part of their family planning program. They had contracted with Georgetown University (Dr. Miriam Labbok and Peggy Koniz-Booher) to work on breastfeeding and amenorrhea. We formed the *Interagency Group for Action on Breastfeeding* with USAID, Swedish International Development Authority [SIDA], UNICEF, and WHO to organize this meeting in Innocenti [Italy]. It's this meeting that produced the *Innocenti Declaration for the Promotion, Protection and Support of Breastfeeding* (1990).

I managed the secretariat to prepare for the meeting, with three staff. The organization of that meeting was so political. Deciding who would organize the meeting, who would speak, who would be invited. The number of meetings we had to prepare for the meeting itself were so numerous... in Geneva, in London, in Washington. In the end my supervisor resolved the problem by stating this would be a UN meeting, with select governments participating. The NGOs and industry started putting on the pressure through their connections in UNICEF, WHO, USAID, SIDA, and even the World Bank. Each side wanted their interests to be covered and to participate. At the final preparatory meeting held in Geneva, we agreed to use the Triple A approach (Assess, Analyze, and then take Action). The UN meeting was arranged as follows: (1) An ASSESSMENT of what we knew about breastfeeding would be presented by WHO; they convened a couple of technical meetings just focusing on assessing the situation; (2) An ANALYSIS of what this data indicated would be presented by USAID; (3) Then UNICEF would present a proposed ACTION

based on the outcome of the assessment and analysis. This process eased the politics around participation. We agreed to invite only two NGOs as observers. The fight was: Do you have the activists, or do you go to industry? In the end there was a compromise and the industry went through the USAID (the American delegation). USAID was brilliant. [They said] "OK why don't we take one group that we fund to come and represent?" They picked Wellstart International, which was Dr. Audrey Naylor! SIDA said we shall send the Geneva Infant Feeding Association (GIFA). In the end we had top breastfeeding advocates. Those guys from USAID—Cloey O'Gara from the Nutrition Department, and Jim Shelton from Population, working with Miriam Labbok, were able to exclude industry. In any case, the country delegations would not have been happy with participation of the Baby Food Industry.

I spent a full year making a video preparing for this meeting and I figured global action could best be inspired by all the good/pro-breastfeeding actions that were already going on...shift the attention from what bad things industry was doing.... I had convinced the Communications group within UNICEF to produce the film. There was one young girl in the department, who seemed very talented but also bored. I went to them and said, "Why don't you help me make a film on breastfeeding?" She was very excited. We wrote the script. They did what they do. They even traveled to Honduras because Judy Canahuati was ready to have them document what she was doing there.... At one of UNICEF's preparatory meetings I invited all the people I wanted in the film: Ted Grenier, Michael Latham, Felix Savage, Marian Thompson (LLI), Barbara Heiser and so on. Of course, they interviewed leaders in UNICEF and WHO. You know, that little girl from the UN won an award for that movie and that was the movie I had used at the Innocent meeting to introduce the Action part.

We invited Health Ministers from governments that had the best pro-breastfeeding policies and programs. It was a high-level meeting. Executive Directors from three UN agencies attended! Jim Grant of UNICEF, Hiroshi Nakajima of WHO, and Nafis Sadiq of UNFPA [the United Nations Population Fund]. That was rare. The chairperson was Professor Ransome-Kuti, Health Minister in Nigeria, who had navigated some of the toughest WHA meetings in the issue. Very brilliant. We agreed that these governments, member states of the WHO and UNICEF Executive Board, were going to make the declaration: They were going to make the decision. The UNICEF leadership gave me the honor to present the action section on their behalf! That was such a vote of confidence and very nerve wracking because it was my presentation that would determine what the Action document would look like. My supervisors, Drs. Peter Greaves and Urban Jonsson, and my colleague,

Jean Rubanzibwa-Ngaiza, were such a source of encouragement.... I showed that 10-minute video. It was beautiful, well made. After that I made a fiery, inspiring speech (handwritten, not seen by anyone else prior).... By the end of my presentation everybody was "YES! We have to have a strong recommendation out of this!" I had convinced them that it must be 6 months exclusive breastfeeding; it has to be breastfeeding for 2 years and beyond. I had convinced them that we had enough mother-on-mother support groups in the world that would help us do this. My thing was to bring up what was already happening around the world. I showed them what IBFAN groups were doing all over the world.... It still ranks as... the best presentation I ever made and has had the most global consequences.

That is how we got the *Innocenti Declaration for the Protection, Promotion and Support of Breastfeeding*.... From then on, every document has talked of exclusive breastfeeding, continue breastfeeding for 2 years.... That meeting was in August 1990. In September was the first meeting of the UN focusing on children, the World Summit for Children, which Mr. Jim Grant had spent 5 years preparing. This meeting produced the *Convention on the Rights of the Child*... and, for the first time, breastfeeding was included, thanks to the Indonesian government and the intense lobbying that was mounted by NGOs, especially LLLI (Barbara Heiser).... From then on there was no stopping us.... I was doing my thing with UNICEF staff so that they could become effective supporters, developing program guidance to be used at country level. The 1990 UNICEF Nutrition strategy also included the Innocenti Declaration.

Then, in 1992, Mr. Jim Grant launched the *Baby Friendly Hospital Initiative*. Soon, regional directors were strolling to my office asking me for guidance. I panicked. My next instruction as the technical officer was to develop the implementation guidelines. I convened a meeting of three people: myself, Audrey Naylor, and Felix Savage. We met in London for 3 days to develop the first guidance. The 12 hospitals supported by Wellstart International were designated model hospitals. But, in the meantime, [we used] this network of people.... It was like weaving a basket. Bringing all the parts together.

KM: How long did you work in New York?

MK: My first tour of duty was from Sept 1987 to March 1994. We included support as a critical part of programming, thus recognizing the role played by mother support groups and health workers.

I was then posted to Pakistan, as Chief of Health and Nutrition Senior Program Officer in Nutrition; I was doing proper program work, managing money, health,

nutrition, immunizations. I was also the advisor for IBFAN and infant and young child issues in Asia. We had to have a lactation curriculum to support healthcare facilities and training health workers to understand lactation. We supported nursing and medical schools in developing that curriculum and putting it in [place]. If we had lactation consultants, we would say: "Hire lactation consultants so they can work in hospitals."... One of the issues, whenever we talked about breastfeeding promotion, was the tendency to dismiss this as a women's issue. I remember talking to Helen Armstrong, "How do you get nurses and doctors to pay attention to breastfeeding, how breastfeeding works?" I said, "Call it lactation management. Talk about the physiology of lactation." The first curriculum written by Helen Armstrong was a lactation management course for Africa. Once we called it that name, they were buying in.

KM: You are an amazing, amazing woman. I am so happy that I had this chance to speak with you. Would you like to give me a final comment?

MK: I feel like my own country, Uganda, is going backwards in breastfeeding practices. Where there is economic improvement, access to modern hospitals, it comes with all sorts of bad habits, such as separating mothers and babies at birth. I have made a decision: this is where I want to work. Over the last year I have gotten offers of jobs to go back and manage projects because the last 10 years of my life I was managing health and nutrition projects in Africa. However, I really want to work with mothers and children, one on one or in small groups.

ORCID iD

Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP  <https://orcid.org/0000-0001-9342-6833>

Resources

Kyenya-Isabirye, M., & Magalheas, R. (1990). The mothers' support group role in the health care system. *International Journal of Gynecology & Obstetrics*, 31(Suppl. 1), 85–90. doi: 10.1016/0020-7292(90)90084-X

Kyenya-Isabirye, M. (1992). UNICEF launches the Baby-Friendly Hospital initiative. *MCN, The American Journal of Maternal/Child Nursing*, 17(4), 177–179. doi:10.1097/00005721-199207000-00002

Marguiles, L., & Margaret Kyenya, M. (2019). Deep roots: Personal "herstories" of the nestle boycott, baby friendly hospitals and Innocenti Declaration. Roots and wings: Looking back, looking forward. *Breastfeeding and Feminism International Conference*, Raleigh, NC, USA.

United Nations. (1990). *World declaration on the survival, protection and development of children*. UNICEF. <https://www.unicef.org/wsc/declare.htm>

- World Health Organization. (1981). *International Code of Marketing of Breast-Milk Substitutes*. https://www.who.int/nutrition/publications/code_english.pdf
- World Health Organization and United Nations Children's Fund. (1989). *Protecting Promoting and Supporting Breastfeeding: The Role of Maternal Facilities*. <https://apps.who.int/iris/bitstream/handle/10665/39679/9241561300.pdf?sequence=1>
- World Health Organization and United Nations Children's Fund. (1990). *Innocenti Declaration: On the protection, promotion and support of breastfeeding*. <https://www.unicef.org/programme/breastfeeding/innocenti.htm>

Developing a Lactation Case Report or is it a Case Study?

Journal of Human Lactation
2020, Vol. 36(3) 404–409
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0890334420926936
journals.sagepub.com/home/jhl



Joan E. Dodgson, PhD, MPH, RN, FAAN¹ 

Keywords

breastfeeding, breastfeeding experience, breastfeeding promotion

Case reports are important contributions to the literature within the health sciences, predominately medicine and nursing; whereas case studies are more usual in the applied social sciences (e.g., social work, psychology). There are distinctly different approaches used in case reports and case studies.

Case reports are familiar ways of sharing events or efforts of intervening with single patients with previously unreported features . . . case study research encompasses a great deal more complexity than a typical case report and often incorporates multiple streams of data combined in creative ways. The depth and richness of case study description helps readers understand the case and whether findings might be applicable beyond that setting (Alpi & Evans, 2019, p. 1).

Although commonalities exist between case reports and case study guidelines and preferences for what is important, content varies within different fields. In developing the JHL guidelines that best suit the nature of what lactation care providers concern themselves with, we have taken into consideration the unique nature of clinical lactation practice, as well as the needs of clinical practitioners.

As the editorial team at JHL developed our guidelines for case reports/studies, it soon became apparent that our specialty field was unique for several important reasons. First, the subject of the case was not usually a single person, rather a dyad and family actively involved in both physiological and psycho-social processes over an extended period of time. Thus, physical and mental health domains had to be addressed in each case, often requiring inclusion of both quantitative and qualitative data. Second, multiple levels of licensed and unlicensed health care providers would most likely be involved in the care of the dyad and family. As teaching tools, case studies are valued by our readers as examples of lactation interventions that might be incorporated into their own practices; therefore, details about the education and counseling techniques are as valuable as are details about other types of interventions. Additionally, the social and

geographical environment within which the dyad, family, and lactation care providers operated is extremely important given our international readership, which comprises people who live in many circumstances very different from that of where the case took place. In lactation, each case may have commonalities with others but is a unique intersection among particulars of time, place, dyad, and family. It became clear that we would need to meld the most appropriate content from medicine and nursing case reports and from social science case studies into a lactation-specific case study format.

Case reports and studies are both types of descriptive observational research. Therefore, authors need to exercise more rigor in the conduct and reporting of this type research than would be expected of a personal narrative or story. A systematic and precise description of relevant information presented, using research terminology and methods, is required. Although case reports, as defined in the medical and nursing literature, are quantitative in nature; the mixed methods approach used in case studies is a better fit for the nature of work that lactation providers do. Lactation “practice is one of dynamic interaction with clients, with a particular focus on outcomes in the real world of physical, social, and spiritual participation” (Tomlin & Borgetto, 2011, p. 189).

Case reports are ranked low on the evidence-based pyramid established in the early 1990s by medical professionals to evaluate the relative reliability of evidence for use in their clinical practice (Smith & Rennie, 2014). Case studies, which were a later adaptation of the original evidence-based hierarchy, share the same ranking in the levels of evidence. “In contrast to other research designs, such as surveys or experiments, a key strength of case study is that it allows the researcher to adopt a holistic

¹Editor in Chief

Date submitted: April 27, 2020; Date accepted: April 27, 2020.

Corresponding Author:

Joan E. Dodgson, PhD, MPH, RN, FAAN, Editor in Chief.
Email: jhleditorinchief@gmail.com

Table I. JHL's Required Components of a Case Study.

Component	Content Within Each Component
Abstract (250 words)	<ul style="list-style-type: none"> Introduction—What is unique about this case and why is it important within the socio-cultural context of the breastfeeding dyad and family? Main issue—Major lactation issue including the important clinical findings Management—The actions taken and outcomes Conclusion—What are one or more “take-away” messages?
Introduction	<ul style="list-style-type: none"> Brief summary as to why this case is unique in the lactation literature using current evidence Socio-cultural context is important and described it clearly End this section with a statement about IRB approval^a
History & Observational Assessment	<ul style="list-style-type: none"> De-identified demographic and other relevant historical and observational information Main concerns and presenting signs and symptoms of the major issue for the breastfeeding/lactation issue for this family Relevant past intervention(s) and their outcomes End this section with a summary paragraph of the evaluation of the history and observational assessment
Management	<ul style="list-style-type: none"> Types of interventions with specific timeframes and rationales, including any referrals or consultations Changes made to the original management with their rationales Follow-up actions taken
Outcome(s)	<ul style="list-style-type: none"> Clinician and client assessment of outcomes. It is appropriate to use quotes, as needed. Adherence to and tolerance of the management regime Adverse and unanticipated events
Discussion	<ul style="list-style-type: none"> Critical analysis of the process and outcomes of the management Discussion of the relevant literature Strengths and weaknesses of the management approach Main “take-away” lesson(s) learned Rationale for your conclusions
Conflict of interest statement	<ul style="list-style-type: none"> Must be specified for each author Include any financial relationship that any author has with any sponsoring organization Include the for-profit interests the organization represents Include relationships with any for-profit product discussed or implied in the text of the article Include any commercial or financial involvements that might represent an appearance of a conflict of interest
References	<ul style="list-style-type: none"> Format according to APA Style Manual (7th Edition) All references should be the most current available (preferably no older than 5 years), with the exception of classic articles in the field
Timeline (required)	<ul style="list-style-type: none"> May use either a figure or a table format Create a chronological summary of the case in table or figure format to help readers understand the timeframes involved in this case See examples

Note. Specific directions for tables, figures, and photographs can be found in the JHL Author Directions. Adapted from: Riley et al. (2017); Rison (2013) and CARE Group (2017) CARE (CASe Report) case report guidelines <http://www.care-statement.org/resources/checklist>

^aInstitutional Review Board approval is not necessary for all case studies, but a statement about why it was or was not done it. A consent to publish is required, which is a statement acknowledging that the person or persons discussed in the case have provided their written consent for publication of the case, and have read and approved of the case as submitted to the Journal. This consent must remain with the author(s); however, it can be requested by the JHL Editor in Chief at any time (Barbour, 2016).

approach—rather than an isolated approach” (Fàbregues & Fetter, 2019, p. 1). Indeed, case studies often have been cited by our readers as one of the most useful types of articles we publish. In a practice profession where the first person to see the dyad and identify lactation issues often is an IBCLC (International Board Certified Lactation Consultant) or a lactation support person (e.g., peer counselor, nutrition counselor,

Certified Lactation Counselor), whose clinical experience may be limited to more common lactation issues, case studies offer important information about unusual, complex, or otherwise significant situations. A further layer of complexity is added when one acknowledges that lactation care providers may have professional licensure (e.g., MD, RN, RD, MBBS), which changes their scope of practice legally. The clinical lactation

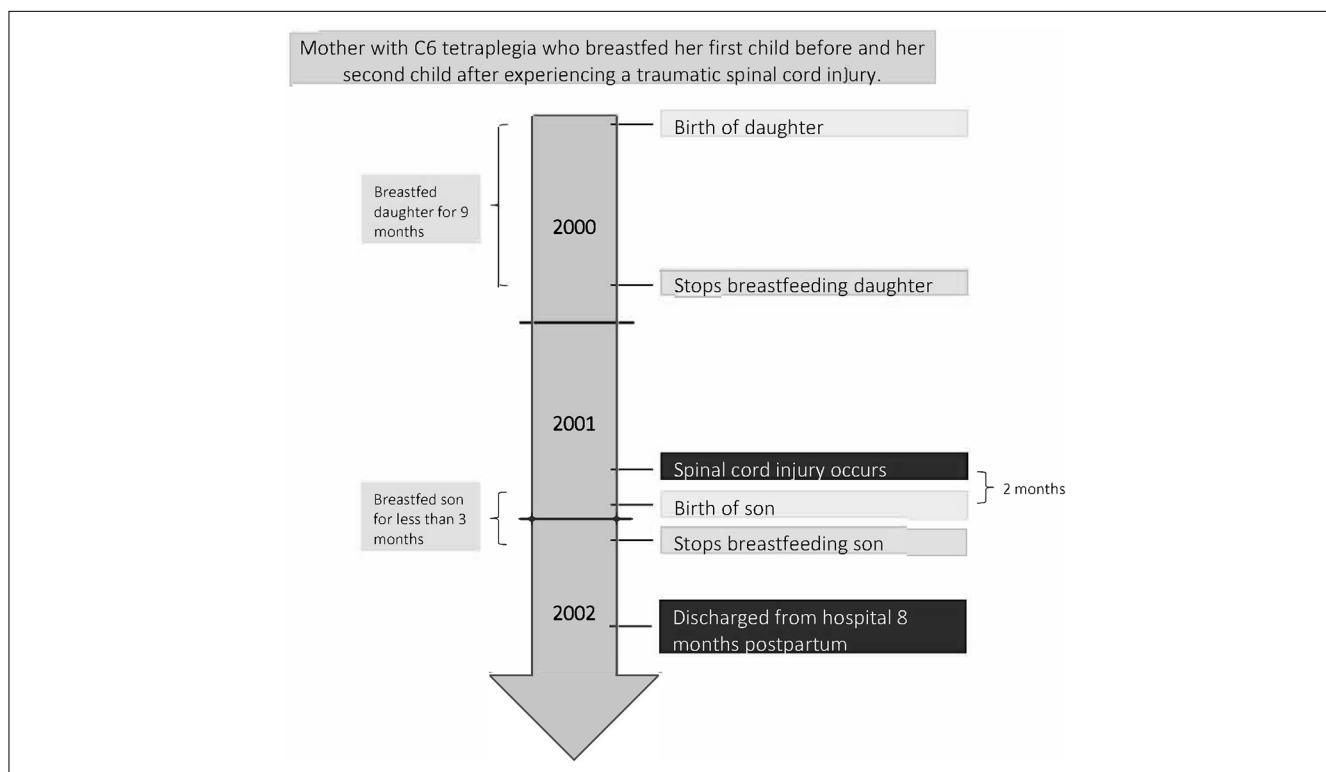


Figure 1. Breastfeeding and spinal cord injury timeline.

Note. This figure indicates the relative timing of the participants' two child deliveries, her spinal cord injury, and breastfeeding cessation (Lee et al., 2019).

field encompasses many different levels of knowledge and expertise, along with levels of practitioners, than does many other professions. One cannot assume a set body of knowledge or experience within any one practitioner.

Components of a Lactation Case Study

The research aim or purpose of a lactation case study is to describe the course of infant feeding within a specific dyad and family in order to explain an unusual situation and/or course of treatment. They are valuable learning tools for clinicians and educators because of the picture they paint of a single dyad's journey from before the issue to resolution of the issue. For researchers, the value of these learning tools lies in the identification of possible researchable questions. Therefore, a case study must contain enough contextual description and detailed specificity about the lactation issue to paint that picture.

In developing our author guidelines for lactation case studies, we started with adapting the international standard set by the CARE (CAse Report) Case Report Guidelines (CARE Group, 2017) by adding qualitative components necessary to understand the dynamics of the lactation situation. Our required content, along with the major components within cases' study manuscripts, are presented in Table 1. Unlike other research manuscripts, case studies need to have

a timeline, which can take the form of a figure or a table (see Figure 1 and Table 2). Due to the longitudinal nature of a case study, a clear visual representation of events over time helps the readers better understand the sequencing and timing of interventions and outcomes.

Ethical Considerations

There are two main ethical concerns to address in preparing a case study: (1) Does this research require approval by an accredited Institutional Review Board (IRB); and (2) Is the consent to publish required from the person(s) discussed in the case? For a case study submitted to JHL, a third ethical issue must also be addressed: (3) Is there compliance with the International Code for the Marketing of Breast-Milk Substitutes (IC). Each issue is addressed below.

The regulations about whether IRB approval is needed when conducting a case study vary considerably worldwide. There is no one unifying rule or guidance about this that is consistently recognized globally, except the Helsinki Declaration: Ethical Principles for Medical Research Involving Human Subjects (The World Medical Association, 2013). Although not legally binding, this document continues to guide the ethical conduct of research worldwide. As an international journal and given that IRB requirements vary among

Table 2. Example of a Timeline.

TIME-LINE	CARE LEVEL	HEALTH-CARE SETTING	HEALTHCARE INTERVENTIONS	▷	MOTHER'S SYMPTOMS, ACTIONS AND OUTCOME
1997 1 st week	Hospital Care BOY	Delivery room	Premature labor, 3 cm cervix dilation and labor induction	▷	Premature birth of son at 36 weeks
		Maternity ward	Mother-baby separation and bottle feeding of formula in hospital	▷	Difficulty initiating breastfeeding: Nipple confusion, refusal of baby to latch
2 weeks	Hospital discharge	Home	Mother equipped with electric breast pump, but no further instructions or support	▷	Bottle feeding formula and small amounts of expressed milk Attempts at breastfeeding
		Follow-up care	Lack of follow-up care Lack of breastfeeding support	▷	Unintentional weaning following decreased milk supply and persistent latch difficulties
2017 Up to day 2	Hospital care	Delivery room	Support of natural birth	▷	Term spontaneous birth of baby girl at week 41 after 1 hour of labor
		Maternity ward	Exclusion of tongue/lip tie Latch support in cradle and football positions Nipple shields as treatment of cracked and sore nipples	▷	Cracked and sore nipples from latching baby
Day 3	Hospital discharge	Home	Recommendation of herbal tea as natural remedy to increase milk supply Electric pump provided	▷	Breastfeeding difficulties: Perceived low supply, sore nipples
		Midwife home visits	Suggestion to omit nipple shields Before-after-weighing Introduction of formula with feeding schedule recommendation to reach birth weight	▷	Improved latching enables omission of nipple shields, though with some persisting pain 50-80ml of formula in 24h introduced, on top of expressed milk Baby reaches birth weight on day 18
Until week 3 GIRL	Community care	LLL leader	Suggests consulting an IBCLC Provides encouragement	▷	Mother contacts an IBCLC
		IBCLC home visit	Observes vasospasm Demonstrates BN and side-lying Develops 2 phase-intervention Follow-up e-mail offering further support as needed	▷	Pain-free latch Mother contributes to the 2-phase plan development Husband procures second pumping kit
Day 25	Community care	IBCLC follow-up	Frequent email exchange on plan implementation progress, encouragement	▷	Two consecutive days of power-pumping as immediate intervention Followed by unrestricted BN Re-gaining trust in breastfeeding abilities, reaching personal goal of unsupplemented breastfeeding by increased supply, adequate weight development and enjoyable breastfeeding
		Peer support group	Visit and exchange with peers and an educated group leader	▷	Continued peer support, information and exchange fosters breastfeeding exclusivity and duration; enabling the mother to reach her personal breastfeeding goals
Starting from week 6					

Note: Rosen, 2019.

countries, JHL adheres to the tenants of the Helsinki Declaration, respect for persons, beneficence, and justice. We require evidence of IRB approval if an individual or a group of individuals can be identified by what is written in the case study. Should IRB approval be deemed necessary, journals

may not collect a copy of the consent form, as this would violate confidentiality (Barbour et al., 2016). However, JHL editors will request a copy of the IRB approval letter, which is congruent with the COPE guidance (Barbour, 2016). Therefore, we welcome IRB approval but do not require it for

case studies, if authors can document that either an IRB approval has been deemed not necessary by an accredited IRB or by institutional policy. A statement about this needs to be included in the case study (see Table 1).

In 2016, the International Committee on Publication Ethics (COPE) published guidance in the form of best practices for journals concerning the consents needed from the person(s) about whom a case was written, regardless of an IRB approval (Barbour, 2016). JHL is a COPE member and operates in accordance with these COPE guidelines. Barbour (2016) stated "Consent to publishing a case report [study] addresses, specifically, the publication of the case and the possibility that the individual described in it could be identified" (see Definitions sections). This entails two separate consents, first the participant's written consent to be the subject of the case study before data are collected and, second, written consent acknowledging that the participant has read and approved the case study manuscript. "Individuals have the right to control the extent to which personal (including medical) information is revealed, and to whom" (Barbour, 2016, see Definition section). Consent to publish the case study is required by JHL; however, the signed consent is kept by and attested to by the author in a letter sent to the editor, with the understanding that the Editor in Chief can request a copy of this consent at any time (Barbour, 2016). The purpose of the consent to publish, signed by the person(s) whose case is presented, is to ensure that the case study's author(s) has adequately involved and protected the person(s) whom they have written about (Barbour, 2016). A risk of identification is always a possibility and it must be clear that the person(s) about whom the case has been written has been fully informed about and is comfortable with that risk no matter how small.

Lastly, everything that is published in JHL must adhere to the World Health Organization (1981). All manuscripts submitted to us are reviewed through the lens of the IC, as previously stated in the journal (Dodgson, 2016). We review the content of the case study and any funding the authors received, as well as any affiliations the authors may have.

Case studies are essential to advancing knowledge in a practice profession, and lactation is no exception. Case studies are also excellent venues for clinicians and novice researchers to share what works with the broader lactation community. We can all learn a lot from sharing the specifics of complicated or unusual situations that occur in our practices.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: None. The author is the Editor in Chief of the Journal of Human Lactation. This article was independently peer reviewed without an influence by the author.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Joan E. Dodgson, PhD, MPH, RN, FAAN  <https://orcid.org/0000-0003-2019-0561>

References

- Alpi, K. M., & Evans, J. J. (2019). Distinguishing case study as a research method from case reports as a publication type. *Journal of the Medical Library Association*, 107(1), 1–5. doi: 10.5195/JMLA.2019.615
- Barbour, V., & on behalf of COPE Council. (2016). Journals' best practices for ensuring consent for publishing medical case reports: Guidance from COPE. www.publicationethics.org. <https://publicationethics.org/resources/guidelines/journals-best-practices-ensuring-consent-publishing-medical-case-reports>
- CARE Group. (2017). CARE (CAse Report) case report guidelines. <http://www.care-statement.org/resources/checklist>
- Dodgson, J. E. (2016). Walking the talk. *Journal of Human Lactation*, 32(3), 414–415. doi:10.1177/0890334416653746
- Fabregues, S., & Fetter, M. D. (2019). Fundamentals of case study research in family medicine and community health. *Family Medicine and Community Health*, 7(2), e000074. doi:10.1136/fmch-2018-000074
- Lee, A. H. X., Wen, B., Hocaloski, S., Sandholdt, N., Hultling, C., Elliott, S. L., & Krassioukov, A. V. (2019). Breastfeeding before and after spinal cord injury: A case report of a mother with C6 tetraplegia. *Journal of Human Lactation*, 35(4), 742–747. doi:10.1177/0890334419844234
- Riley, D. S., Barber, M. S., Kienle, G. S., Aronson, J. K., von Schoen-Angerer, T., Tugwell, P., Kiene, H., Helfand, M., Altman, D. G., Sox, H., Werthmann, P. G., Moher, D., Rison, R. A., Shamseer, L., Koch, C. A., Sun, G. H., Hanaway, P., Sudak, N. L., Kaszkin-Bettag, M., . . . Gagnier, J. J. (2017). Care guidelines for case reports: Explanation and elaboration document. *Journal of Clinical Epidemiology*, 89(17), 218–235. doi:10.1016/j.jclinepi.2017.04.026
- Rison, R. A. (2013). A guide to writing case reports for the Journal of Medical Case Reports and BioMed Central Research Notes. *Journal of Medical Case Reports*, 7(1), 239. doi:10.1186/1752-1947-7-239
- Rosen, S. I. (2019). A Case Study of Biological Nurturing. *Journal of Human Lactation*, 35(2), 318–322. doi:10.1177/0890334419829044
- Smith, R., & Rennie, D. (2014). Evidence-Based Medicine—An Oral History. *Journal of the American Medical Association*, 311(4), 365–367. doi:10.1001/jama.2013.286182
- The World Medical Association. (2013). Helsinki Declaration: Ethical Principles for Medical Research Involving Human Subjects. *Journal of the American Medical Association*, 310(20), 2191–2194.

- Tomlin, G., & Borgetto, B. (2011). Research Pyramid: A New Evidence-Based Practice Model for Occupational Therapy. *American Journal of Occupational Therapy*, 65(2), 189–196. doi:10.5014/ajot.2011.000828
- World Health Organization. (1981). *International Code of Marketing of Breast-milk Substitutes*. Author. <https://apps.who.int/iris/bitstream/handle/10665/40382/9241541601.pdf?sequence=1>

Historical Research: The Origin of 'Formula': State of the Science, 1890s

Journal of Human Lactation

2020, Vol. 36(3) 410–413

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334420926950

journals.sagepub.com/home/jhl



Jacqueline H. Wolf, PhD¹ 

Abstract

In 1900, 13% of infants in the United States died before their first birthday, most of dehydration from diarrhea. As part of a nationwide effort to “save the babies,” pediatricians focused on several endeavors—experimenting with commercially made infant-food products; working with dairy farmers to clean up cows’ milk; lobbying to pass municipal and state legislation regulating the dairy industry; and devising mathematical “formulas” that represented instructions to chemists on how to “humanize” cows’ milk for the needs of a particular infant. Pediatricians dubbed the latter endeavor “percentage feeding” and, from the 1890s to the 1920s, they deemed percentage feeding a lifesaving scientific achievement. The complex, virtually infinite array of mathematical formulas that comprised this infant-feeding system is the origin of the word “formula” as used today to describe artificial baby milk.

Keywords

artificial food, artificial baby milk, breastfeeding, cows’ milk, infant mortality, public health, formula, pediatricians

Between 1900 and 1915, members of the American Pediatric Society presented 90 papers about infant feeding to attendees at annual meetings. No other topic commanded the attention of the first generation of American pediatricians more than what to feed infants who were not breastfed. These late 19th- and early 20th-century physicians focused on artificial food formulation to the exclusion of virtually everything else (Brennemann, 1938). For decades, they were so single-minded that, in the late 1930s, one physician predicted that “the pediatrician is a dying race” because artificial food had become significantly safer. The prognosticator contended that, with bottle-feeding no longer the principal cause of infant morbidity and mortality, future pediatricians would have nothing to do (Hess, 1954).

Pediatricians’ late 19th-century obsession was understandable. Thirteen percent of infants died before their first birthday in 1900 (Preston & Haines, 1991) and more than half the infants who died, died of diarrhea (Wolf, 2001). In 1910, the Chicago Department of Health estimated that bottle-fed babies, when compared to breastfed babies, were dying at a 15:1 ratio (Davis, 1910). With no pure food laws on the federal, state, and municipal levels, and, in an era before refrigeration and pasteurization, cows’ milk was a spoiled, adulterated product—a threat to the public’s health, but especially dangerous for infants.

For almost 40 years, urban newspapers joined public health officials and pediatricians in decrying babies “gone to a premature grave.... Could a proper death certificate be

made out many an entry of ‘cholera infantum’ [infant diarrhea] would be changed to starvation from being fed on watered milk (Chicago Milk, 1892).” Yet, water was the least offensive substance contributing to the contamination of milk. Assorted dyes tricked consumers into thinking that skim milk was still rich with cream. White powdered chalk was another customary additive—used to whiten milk exposed to dirt and dust (They Water and Color the Milk, 1894). And milk was commonly distributed to consumers from large vats with communal dippers for tasting, ensuring that diphtheria, typhoid, scarlet fever, and tuberculosis all became milk-borne diseases (Report of the Health Department Laboratories, 1906).

Cows’ milk had become a popular food for infants in the United States beginning in the late 1870s. Urbanization and industrialization brought broad cultural change that included the use of the mechanical clock, inspiring strict infant-feeding schedules that diminished mothers’ milk supplies. Complaining they did not have enough milk, mothers began

¹Department of Social Medicine, Ohio University, Athens, OH, USA

Date submitted: April 07, 2020; Date accepted: April 21, 2020.

Corresponding Author:

Jacqueline H. Wolf, PhD, Department of Social Medicine, 313 Grosvenor Hall, Ohio University, Athens, OH 45701, USA.
Email: wolfj1@ohio.edu

to wean infants by their third or fourth month; a few did not breastfeed at all (Wolf, 2001). The move from human milk to cows' milk had begun, to the detriment of infants' health (Wolf, 2001).

In their quest for, if not the perfect artificial infant food when mothers could not breastfeed, at least a non-lethal food, pediatricians employed an array of ventures. They toyed with using commercially made products, they worked alongside dairy farmers and public health workers to clean up the urban milk supply, and they devised the first "formulas" based on a dubious "scientific" theory. The term "formula" to describe an infant's first food originated during this era, when chemists worked at so-called milk laboratories to fill the mathematical formulas written by pediatricians, much like pharmacists fill prescriptions today. Yet, none of these undertakings proved ideal.

Powdered, commercial infant foods were the poorest of the alternatives, proving to be just as dangerous as cows' milk because most of the foods had to be mixed with cows' milk. To their credit, however, the infant food companies that devised the ads that peddled their wares never touted their product as desirable. Rather, their primary claim was only that their product was better than similar, plainly life-threatening foods. An advertisement for Eskay's Food, for example, began, "From three weeks to four months about every artificial food but ESKAY'S was tried and utterly failed, and the child wasted away to a shadow." Accompanying the ad was an illustration of a chubby child, "Alfred Long, 1014 Halsey Street, Brooklyn, N. Y." Initially suffering terribly for want of mother's milk, Alfred weighed less than 6 pounds at 5 months of age. Fortunately, "We then tried ESKAY'S FOOD and the improvement was immediate and continual. Now 17 months old, Alfred weighed an improbable 43 pounds" (Eskay's Food, 1905). An advertisement for Nestlé's food likewise claimed product superiority over other, inferior human milk substitutes, but for a different reason. Nestlé's was to be mixed with water rather than deadly cows' milk. Mothers using Nestlé's food thus avoided many threats to their infants, including the "danger of carrying consumption [tuberculosis] and other dread diseases to babies in cows' milk!" (Nestlé's Food, 1914).

While pediatricians had no vested interest in infant food companies—simply employing the products in dire situations—they were at the forefront of activities designed to clean up cows' milk. Beginning with New Jersey pediatrician Henry L. Coit in 1892, physicians organized "medical milk commissions" to certify that a particular farmer produced milk under the commission's stringent conditions (Kerr, 1909). The physicians working with the commissions not only set the standards for cooperating dairies, they also served as the enforcers, monitoring every step of dairy production, from the washing of dairy workers' hands; to the cleanliness of their clothing; to the sterilization of utensils; to the health status, feeding, and hygiene of dairy cattle; to the ventilation and sanitation of barns; to the pasteurization,

chilling, bottling, and transporting of milk (Abt, 1908; Freeman, 1907; Howe, 1919). Consumers could then purchase milk labeled "certified" by a milk commission and thus be assured the milk was safe for human, particularly infants', consumption. Medical charities also purchased certified milk—in bulk to give away at milk stations in congested urban neighbors as part of the broad national effort to lower infant mortality (Melvin, 1983; Pearson, 1908; Wasserman, 1972; Wile, 1909). Yet, the safe infant food development effort that most visibly legitimized pediatricians, a group that long had been maligned as inconsequential "baby doctors," was accessible only to middle- and upper-class families (Abt, 1944; Wolf, 2006).

Beginning in the 1890s, Thomas Rotch, a Harvard pediatrician, theorized that "to copy nature closely" cows' milk had to be "humanized" to suit the needs of each baby, just as a mother's milk was uniquely formulated by "nature" according to the daily needs of her infant (Rotch, 1896). To test the science that he dubbed "percentage feeding," Rotch deployed an infinite array of mathematical formulas. These formulas are the origin of the word formula when used to refer to artificial baby milk. Rotch explained that the "exact precision" provided by formula-writing was as vital to maintaining infants' health as instituting and enforcing sanitary practices in the dairy industry (1896, p. 276). The mathematical formulas that were soon being written by pediatricians around the country were comprised of many variables including, but not limited to, an infant's age, weight, pallor, overall health, consistency of stools, and an assortment of pertinent medical diagnoses. "Weak sugar digestion" was one example of many diagnosis variables used in formula writing (Rotch, 1896, Rotch, 1904, Rotch, 1910).

One Chicago pediatrician offered the following example of a Rotch-inspired formula in which "E" equaled "energy quotient," defined as "a proper amount of energy for the baby;" "M" equaled milk; "P" equaled protein; "S" equaled sugar; "W" equaled weight; "R" equaled ratio; and "r" equaled the ratio of food to be used (Allen, 1907, pp. 242–243). The pediatrician offered the following sample equation:

$$E = PR$$

$$M = WP/4$$

$$S = WP(R - r)$$

$$\text{Water} = 2 \text{ to } 3 W - M$$

He filled in the blanks for colleagues:

$$W = 12, P = 5, R = 7\frac{1}{4}, \text{ whole milk } r = 4\frac{1}{4}$$

$$E = 5 \times 7\frac{1}{4} = 36\frac{1}{4}$$

$$\text{Milk} = 12 \times 5/4 = 15 \text{ oz.}$$

$$\text{Sugar} = 12 \times 5 \times 3 = 1.8 \text{ oz.}$$

$$\text{Water} = 12 \times 2.5 - 15 - 15 \text{ oz. (Allen, 1908, p. 501)}$$

Although early formulas appeared to be complex, they grew even more byzantine over time. While initially protein, sugar, fat, and minerals were the only components of cows' milk to be altered by a chemist according to a specific mathematical formula, the components of each

component eventually became variables, too (Holt et al., 1915).

To create the infant food from the formulas, Rotch suggested that milk laboratories staffed by chemists be established in urban areas. The laboratories were touted as taking infant feeding “out of the hands of ignorant, money-making manufacturers” and placing the welfare of babies squarely in the hands of pediatricians and scientists (Churchill, 1897, p. 410). According to Rotch’s percentage system, chemists did not merely transform cows’ milk into a generic substance akin to human milk. Rather, they created humanized cows’ milk engineered according to the formula written by a pediatrician to suit the unique medical and nutritional needs of a specific infant patient (Rotch, 1893).

Every sizable city in the United States in the late 19th and early 20th centuries housed at least one milk laboratory; the most widespread franchise was Walker-Gordon. The first Walker-Gordon Milk Laboratory appeared in Boston in 1891 (Rotch, 1907). In keeping with pediatricians’ insistence that clean cows’ milk was of the utmost importance in infant feeding, Walker-Gordon used only certified milk when filling a pediatrician’s formula (Rotch, 1893). The extraordinary cost of percentage feeding—45 to 50 cents daily in late 19th century currency—put any product of a milk laboratory well out of the reach of all but the most well-off urban families (Chicago Medical Society Proceedings, 1897).

Milk laboratories eventually fell out of favor after a curious Boston physician analyzed samples made according to the dictates of assorted formulas and found that the percentage feeding method, which relied on precision, was decidedly imprecise. The physician could not find any product of a milk laboratory that matched its formula. Instead, he found “appreciable” errors in every component—most often lower fat and higher protein than a formula dictated. Sugar erred in both directions. Since Rotch based percentage feeding on the claim that even minute changes in the percentage of a component in cows’ milk affected infants’ health, the Boston physician’s findings put the efficacy of the entire venture in doubt (Wentworth, 1902a, 1902b). Some prominent pediatricians likewise began to voice their qualms about the system, worrying that percentage feeding was so “peculiarly complicated” that errors were inevitable (Brennemann, 1908, pp. 104–105).

While the milk laboratories that filled prescription-like mathematical formulas had largely disappeared by the end of the 1910s, hospitals kept the theory of percentage feeding alive for decades. In 1936, physicians at Chicago’s Presbyterian Hospital, for example, celebrated the opening of a milk laboratory with “at least 25 different formulas, sometimes more, in order to serve the individual needs of each small patient” (The Presbyterian Hospital, 1936). Indeed, the notion that “science” supported the work of the chemists toiling in milk laboratories had been so appealing to the public that the medical charities funding certified milk stations distributed not only certified milk to the poor free of

charge but also a variety of generic formulas made with certified milk (Chicago School of Sanitary Instruction, 1912).

Despite the doubts, until percentage feeding was wholly abandoned, formula-writing remained pediatricians’ central skill and they were thus required to spend the bulk of their pediatric apprenticeships learning how to write formulas. Not until 1938, on the occasion of the 50th anniversary of the creation of the American Pediatric Society, did Chicago pediatrician Joseph Brennemann write the epitaph for percentage feeding: “It became increasingly more complicated and involved...[until] some of the articles seemed terrifyingly like treatises on mathematics or higher astronomy.” Writing formulas became “a headache,” Brennemann explained. “The whole edifice finally collapsed because the superstructure was top heavy and the foundation weak, and because really simpler ideas came into play” (Brennemann, 1938, p. 65). The one size fits all, cows milk-based infant formula eventually triumphed.

By the late 1920s, thanks to pediatricians and public health workers fighting for decades for the passage of municipal and state legislation that regulated the dairy industry, cows’ milk throughout the United States was gathered under sanitary conditions, pasteurized, placed in individual, sterile bottles, and kept cold during shipping. All dairy cattle were tested regularly for bovine tuberculosis to prevent spread of the disease to humans (Wolf, 2001).

There was one unforeseen side effect of this public health triumph, however. Due to the decades of publicity generated by urban newspapers, medical milk commissions, medical charities, milk laboratories, and public health departments, by the time cows’ milk was safe to feed to babies, consumers had come to believe breastfeeding was unimportant. As the breakfast cereal entrepreneur, Dr. John Kellogg explained, cows’ milk had become “the choicest product of nature’s laboratory” (Kellogg, 1921, pp. 332–333). Science had seemingly triumphed, at least in regard to infant feeding. Formula in baby bottles, with no mention or memory of the history behind formula, became the symbol signifying normal, healthy infancy.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Jacqueline H. Wolf, PhD  <https://orcid.org/0000-0003-2019-0561>

References

Abt, I. A. (1908). Certified milk. *Chicago Medical Recorder*, 41–46.

- Abt, I. A. (1944). *Baby doctor*. McGraw-Hill Book Company. doi: 10.1097/00000441-194409000-00019
- Allen, T. G. (1907). Methods of calculating protein and energy in infant feeding. *Chicago Medical Recorder*, 232–246.
- Allen, T. G. (1908). Some observations necessary for successful infant feeding. *Chicago Medical Recorder*, 496–503.
- Brennemann, J. (1908). Remarks on the feeding of the healthy infant. *Journal of the American Medical Association*, 51(2), 101–105. doi:10.1001/jama.1908.25410020013002a
- Brennemann, J. (1938). Periods in the life of the American pediatric society: Adolescence, 1900–1915. *Transactions of the American Pediatric Society*, 50, 56–67.
- Chicago Medical Society Proceedings. (1897, June). *Chicago Medical Recorder*, 427–437.
- Chicago Milk. (1892, September 30). *Chicago Inter Ocean*, 4.
- Chicago School of Sanitary Instruction. (1912, August 3). *Bulletin* 15, 123.
- Churchill, F. S. (1897). Substitute feeding in infancy. *Chicago Medical Recorder*, 408–413.
- Davis, E. V. (1910). Breast feeding. *Bulletin Chicago School of Sanitary Instruction*, 13, 2.
- Eskay's Food. (December, 1905). *American Motherhood*. [Advertisement], 22.
- Freeman, R. G. (1907). Remarks on the development of dairy hygiene in the United States. *Proceedings of the 1st Annual Session of the American Association of Medical Milk Commissions*, Atlantic City, NJ. 17–18.
- Hess, J. H. (undated, circa 1954). A half-century of infant feeding. *Julius Hess Papers*, Department of Special Collections, University of Chicago Library.
- Holt, L. E., Angelia, M. C., & Fales, H. L. (1915). A chemical study of woman's milk, especially its inorganic constituents. *American Journal of Diseases of Children*, 10, 229–248.
- Howe, F. W. (1919, October 27–28). Production of certified milk. *Proceedings of the 13th Annual Conference of the American Association of Medical Milk Commissions*, New Orleans, LA. 202–218.
- Kellogg, J. H. (1921). The supreme importance of clean, uncooked milk for infants and children and the dangers of pasteurized milk. *Proceedings of the 15th Annual Conference of The American Association of Medical Milk Commissions*, Boston, Mass. 330–361.
- Kerr, J. W. (1909, June 7). The relation of the medical milk commission to the establishment and conduct of infants' milk depots. *Proceedings of the 3rd Annual Conference of the American Association of Medical Milk Commissions*, Atlantic City, NJ. 89–93.
- Melvin, P. M. (1983). Milk to motherhood: The new York milk committee and the beginning of well-child programs. *Mid-America*, 65(3), 111–134.
- Nestlé's Food. (1914, April). *American Motherhood* [Advertisement], 38, 79.
- Pearson, R. A. (1908, June). Development of dairy hygiene. *Proceedings of the 2nd Annual Session of the American Association of Medical Milk Commissions*, Chicago, IL. 70–71.
- Preston, S. H., & Haines, M. R. (1991). *Fatal years: Child mortality in late nineteenth-century America*. Princeton University Press.
- Report of the Health Department Laboratories for 1905. (1906). *Biennial Report of the Department of Health of the City of Chicago for the Years 1904–1905*, 6.
- Rotch, T. M. (1893, February). The value of milk laboratories for the advancement of our knowledge of artificial feeding. *Archives of Pediatrics*, 10, 97–111.
- Rotch, T. M. (1896). *Pediatrics: The hygienic and medical treatment of children*. J. B. Lippincott Company, 231.
- Rotch, T. M. (1904). Some considerations regarding substitute feeding during the first year. *Transactions of the American Pediatric Society*, 16, 41–55.
- Rotch, T. M. (1907). An historical sketch of the development of percentage feeding. *New York Medical Journal*, 85, 532–537.
- Rotch, T. M. (1910). The cardinal principles for the successful feeding of infants. *Interstate Medical Journal*, 17, 305–315.
- The Presbyterian Hospital of the City of Chicago. (January 1936). *New milk laboratory helps babies*. Bulletin 1.
- They Water and Color the Milk. (1894, August 9). *Chicago Tribune*, 7.
- Wasserman, M. J. (1972). Henry L. Coit and the certified milk movement in the development of modern pediatrics. *Bulletin of the History of Medicine*, 42, 359–390.
- Wentworth, A. H. (1902a). The importance of milk analysis in infant feeding. *Boston Medical and Surgical Journal*, 146, 683–686. doi:10.1056/NEJM190206261462602
- Wentworth, A. H. (1902b). The importance of milk analysis in infant feeding. *Boston Medical and Surgical Journal*, 147(1), 5–10. doi:10.1056/NEJM190207031470102
- Wile, I. S. (1909, November 11–12). Educational responsibilities of a milk depot. *Proceedings of Prevention of Infant Mortality Conference*, New Haven, Connecticut, 139–153.
- Wolf, J. H. (2001). *Don't kill your baby: Public health and the decline of breastfeeding in the 19th and 20th centuries*. Ohio State University Press.
- Wolf, J. H. (2006). The first generation of American pediatricians and their inadvertent legacy to breastfeeding. *Breastfeeding Medicine*, 1(3), 172–177. doi:10.1089/bfm.2006.1.172

Supporting Exclusive Breastfeeding Among Factory Workers and Their Unemployed Neighbors: Peer Counseling in Bangladesh

Journal of Human Lactation

2020, Vol. 36(3) 414–425

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334419871229

journals.sagepub.com/home/jhl



Rukhsana Haider, MBBS, MSc, PhD¹ 
and Virginia Thorley, PhD, IBCLC, FILCA² 

Abstract

Background: Thirty-six percent of females are employed in Bangladesh, many in the readymade garments manufacturing industry. Inadequate access to health information, care, and long working hours makes exclusive breastfeeding particularly challenging for these employed mothers.

Research aim: To describe the influence of a breastfeeding education and support program on breastfeeding patterns of mothers working in garment and other factories in Bangladesh.

Methods: A descriptive two-group prospective, mixed methods, longitudinal prospective study was conducted from May 2015 to March 2017. Peer counselors were trained to provide home-based counseling from 6 months of pregnancy until infants completed 6 months for pregnant and lactating factory workers and neighboring unemployed women. The total evaluation sample ($N = 304$) consisted of participants still employed ($n = 190$) and unemployed ($n = 144$). Peer counselors recorded socioeconomic information, weights, and infant feeding patterns. Descriptive statistical analyses examined the peer counselors' influence on breastfeeding practices.

Results: Initiation of breastfeeding within 1 hr was high in both groups, 173 (91%) among the employed, and 101 (89%) among the unemployed participants. Exclusive breastfeeding at 6 months was reported by 107 out of 125 (86%) of the employed participants versus 72 out of 76 (95%) of those unemployed.

Conclusions: Community-based peer counselors can help to inform, encourage, and support both factory workers and unemployed women with optimal breastfeeding patterns. Factories who have female workers should consider employing outreach peer counselors as part of their community social responsibility, and as a way to contribute to the sustainability of these programs.

Keywords

breastfeeding, breastfeeding support, exclusive breastfeeding, human milk expression, peer counselors

Background

The past decade's epidemiological and biological evidence-base has expanded the known benefits of breastfeeding for women and children, whether they are rich or poor (Victora et al., 2016). In addition to reductions in neonatal and child mortality, breastfed infants, when compared with formula fed infants, may have a lower prevalence of overweight and/or obesity and Type 2 diabetes, and higher performance on intelligence tests (Horta, Loret, & Victora, 2015). Equally important are the maternal benefits contributing to birth spacing, and to reductions in breast cancer (Continuous Update Project, 2018) and ovarian cancer (Sung et al., 2016). Researchers have reported that if breastfeeding is scaled up to a near universal level, 823,000 annual deaths of children

younger than 5 years, and 20,000 annual deaths of women from breast cancer could be prevented globally (Victora et al., 2016).

¹Training & Assistance for Health & Nutrition Foundation (TAHN), Dhaka, Bangladesh

²School of Historical and Philosophical Inquiry, The University of Queensland, QLD 4072, Australia

Date submitted: October 7, 2018; Date accepted: July 29, 2019.

Corresponding Author:

Rukhsana Haider, MBBS, MSc, PhD, Training & Assistance for Health & Nutrition Foundation (TAHN), House 120, 1st Floor, Road 13, Block-E, Banani, Dhaka 1213, Bangladesh.

Email: rukhsana.haider@gmail.com

The World Health Organization (WHO, 2018a) recommends that infants be exclusively breastfed for the first 6 months of life to achieve optimal growth, development, and health. Thereafter, to meet their increasing nutritional requirements, infants should receive nutritionally adequate and safe complementary foods, while continuing to breastfeed for up to 2 years and beyond. Exclusive breastfeeding (EBF) is when no other liquids or solids are given, not even water, the only exceptions being oral rehydration solution, vitamin or mineral supplements, or medicines (WHO, 2018a). It is recognized that virtually all new mothers can breastfeed successfully if they are provided with skilled help and support from the family, community, and health care system (WHO, 2018b). In addition, peer support can increase EBF in low, middle, and high income countries, and increase the early initiation of breastfeeding in middle and low income settings (Shakya, et al., 2017).

The World Bank estimates that the female labor force participation has increased from 23% in 1990 to 33% in 2017 (The Global Economy, 2018) and the Bangladesh Bureau of Statistics (BBS, 2017) records this figure at 36% (61 million) women of reproductive age (15–39 years). Of the 4 million Readymade Garment (RMG) workers, about 70% were women (Billah & Manik, 2017). The RMG sector contributes to more than 80% of the total export earnings of the country (Rahman & Siddiqui, 2015) and plays a vital role in providing employment opportunities, contributing to the alleviation of poverty, and empowering and making the female garment workers economically independent (Paul, Sarkar, & Naznin, 2016; Khatun, 2018). These benefits are counterbalanced by poor workplace conditions where scanty attention has been paid to the health and welfare of the workers (Mahmud, Rajath, Mahmud, & Jahan, 2018; Moazzem & Arfanuzzaman, 2018). Women are also employed in other types of factories (e.g., shoe, textile, and pharmaceutical factories), but their numbers are not readily available. In the last nationally conducted Bangladesh Demographic and Health Survey (BDHS) in 2014, about 1 in 3 children under 5 years of age were undernourished; and although EBF of infants aged 0–6 months was 55%, it was only 32% in the 4–5 months age group (National Institute of Population Research and Training [NIPORT], Mitra and Associates, & ICF International, 2016).

While it is well understood that family members influence breastfeeding practices (Pelto et al., 2015), other psychosocial factors are still being studied (Islam, Baird, Mazerolle, & Braidy, 2017). The delivery mode also has an influence on breastfeeding practices (Palla & Kitsantas, 2017). In Canada, women who underwent planned Cesarean sections were more likely to discontinue breastfeeding compared to those delivered vaginally (Hobbs, Mannion, McDonald, Brockway, & Tough, 2016). In Bangladesh, Cesarean sections have delayed the initiation of breastfeeding (Samad, Haque, & Sultana, 2017). For vaginal deliveries, the delivery room facilities, skin-to-skin contact, spontaneous crying of newborns, and

Key Messages

- Female factory workers in Bangladesh have long working hours, with inadequate access to health information and care, which has made it almost impossible for them to exclusively breastfeed their infants.
- Learning and practicing hand expression of their milk was a crucial factor enabling the employed participants to continue exclusive breastfeeding.
- The peer counseling model is an option that can be immediately adopted by factories, which would demonstrate that employers care for the welfare of their workers and families.

examination by health staff have been noted as influences on breastfeeding practices (Karim et al., 2018).

In Bangladesh, although health workers interact with women at maternity facilities or in non-government organizations' (NGOs) programs, they cannot access the factory workers. Breastfeeding duration is generally low among women employed outside the home, and reportedly worse among garment factory workers. In a survey commissioned by the United Nations Children's Fund (UNICEF, 2018) in two factories in Dhaka, only 17% of the factory workers were exclusively breastfeeding their infants at 2–6 months. In Ethiopia, Taddele, Abebe, and Fentahun (2014) reported the prevalence of EBF to be 44% among employed women and 65% among those unemployed, but no similar report was available in Bangladesh. Structural barriers to maintaining lactation by employed women have been identified internationally (Johnson, Kirk, & Muzik, 2015; Kozhimannil et al., 2016).

While employers complain that factories lose large numbers of skilled female workers after childbirth, they are generally unaware of the benefits they would obtain if facilities were provided to support breastfeeding. Internationally, these benefits range from less absenteeism due to infant illnesses, to lower labor turnover; therefore, less money is spent on hiring and training new employees, and increased productivity results as women with healthy infants can focus on their jobs (U.S. Department of Health & Human Services, 2018). In addition, supporting female employees with nutrition, health, and breastfeeding knowledge and skills creates a positive image for the public, foreign buyers, and suppliers (UNICEF & the International Labour Organization Country Office for the Philippines, 2015; Haviland, James, Killman, & Trbovich, 2015).

Due to the low contact with mothers at health facilities, a major need is for pregnant and lactating women to be counseled at community or household level. A community-based peer counseling project was very successful in Bangladesh

(Haider & Saha, 2016); and it has since been assumed that employed women would also benefit from similar support services.

The aim of our study, thus, was to describe the influence of a breastfeeding education and support program on the breastfeeding practices of women working in garment factories and other factories in Bangladesh.

Methods

Design

A descriptive two-group prospective longitudinal mixed methods study was designed. The rationale for the choice of design was that it would provide the most complete evaluation of the effectiveness of the peer support program (Rahman, 2015). Ethical approval was obtained from the Bangladesh Medical Research Council.

Setting

According to the BDHS 2014 survey (NIPORT, 2016), breastfeeding practices were not optimal in Bangladesh. The 2016 female literacy rate was 70.09% (UNESCO, 2017), yet many of those included as "literate" had learnt how to sign their name and read numbers but could not read information (e.g., messages promoting breastfeeding). The majority of household heads were men and the average household size was 4.5 persons (NIPORT, 2016). Women were influenced by what their older family members, neighbors, and husbands suggested, especially regarding infant feeding and care (Pelto et al., 2015; Sharmin, Chowdhury, Khatun, & Ahmed, 2016). Grandmothers and doctors could be barriers or facilitators for women who wished to practice EBF (Khatun et al., 2018). Only 1 in 3 pregnant women had antenatal contacts (ANC) with a health worker where, in general, only a few breastfeeding messages were given. About 62% of women delivered at home; 35.9% with skilled birth attendants (NIPORT, 2016). As there were no IBCLCs or specific posts for lactation support providers in the healthcare system, women were unaware of whom to consult for lactation problems.

The program areas were in southeast Bangladesh in Chattogram Division (formerly Chittagong), which is located between the Hill Tracts and the Bay of Bengal. The Bangladesh Garment Manufacturers and Exporters Association (BGMEA) suggested that we work in a specific area of Chattogram where there were several garment factories. Each peer counselor's coverage area was roughly 11,000 households in the urban area (Colonel Haat and Alankar More) and about 2,250 households in the rural area (Anowara). The employed participants were garment factory workers in the urban area and shoe factory workers in the rural area. Most of the factory workers in these areas were not local residents, but came there for employment from other districts of Bangladesh.

Traditionally, women seldom went outside the home to work, but the emergence of readymade garment factories has provided work for women in particular (Paul et al., 2016). Retaining a job was necessary for both partners due to poverty. The poverty level was estimated at 23% (World Bank Group, 2017), with factory women trying to avoid dismissal and consequent loss of income during pregnancy (Akhter, Rutherford, & Chu, 2017).

The Intervention

Women participating in the peer-counseling program constituted the target population. The total population was 591 (456 factory workers and 135 unemployed women). Exclusion criteria during pregnancy were: having more than three living children (as these were experienced mothers and unlikely to change their child caring practices); any serious maternal health problems (pregnancy related, chronic illness, cancer); residence more than 1 hr from the peer counselor's house; a planned return to the home village for delivery; or refusal of the peer counselor's services. After delivery, participants were excluded in cases of stillbirths or neonatal deaths, twins, or infants suspected of having a congenital problem. In addition, those lost to follow-up included 52 (11%) of the employed participants who resigned from the factory during their pregnancy, and 131 (36%) who resigned after childbirth. The size of the peer counseling program was calculated to be 450 for the employed women, which was the maximum number of women to whom seven peer counselors would be able to provide their services over 2 years (as per the funding agreement).

To recruit and train peer counselors (*ma o shishu jojno shohaiyok*), women were chosen from a pool of candidates suggested by local NGO workers and community leaders as per specific selection criteria (to have been a local resident for at least 5 years, have completed 10 years minimum of formal schooling, have had personal breastfeeding experience, be motivated to help other women, and have their family's consent to work). Their training was similar to that described elsewhere (Haider & Saha, 2016), using a locally adapted, simplified version of the Global Breastfeeding Counseling course and National Infant and Young Child Feeding (IYCF) training guidelines (WHO & UNICEF, 1993; Ministry of Health and Family Welfare [MOH&FW], 2015). Two 4-hr days were spent in the classroom, and 3 days were spent in the community to practice counseling skills with mothers and babies. The field team comprised seven peer counselors, one local supervisor, and one Field Manager. Refresher training was held twice a year to enhance the peer counselors' skills and for problem solving.

Each peer counselor visited and counseled approximately 50–60 pregnant and lactating program participants at any one point. Monthly visits were conducted after the 5th month of pregnancy until delivery. The next visits were scheduled within 2 days of delivery, between 6–8 days, and monthly

until infants were 18 months old. Peer counselors worked for 4 hr a day and were paid a small honorarium, approximately US\$60 a month.

Households were visited during evening hours after the workers (participants) had returned from the factories. Afternoon visits were conducted when they were on maternity leave or at home on public holidays. During pregnancy, the peer counselors encouraged standard maternity care (antenatal checks, hygiene, rest, safe delivery), counteracted misperceptions regarding human milk feeding, and provided essential information on optimal breastfeeding and care of infants to family members. They also emphasized the importance of eating a balanced diet with foods from the main food groups. After delivery peer counselors helped participants with correct positioning and attachment of the baby at the breast, demonstrated how to hand express and store the mother's milk, showed caregivers how to heat and feed the expressed milk with a small cup, discouraging use of bottles, encouraging fathers' involvement, and weighed the participants and infants. At each visit, the peer counselor tried to increase the participant's confidence so that she could continue to work and breastfeed, and requested family members to assist her. Peer counselors were monitored and supervised by a Field Manager and local supervisor. Program staff (from Dhaka) also conducted monitoring visits with peer counselors every 3–4 months.

Other aspects of the program included encouraging appropriate caring practices for the infants, regular immunization, and timely access to health care. Iron and folic acid supplements were provided during pregnancy and for the first 3 months of lactation. Community support group meetings were held with influential men (e.g., teachers, religious and community leaders, husbands of pregnant and lactating women) to increase awareness about the program and to obtain the men's support for their wives/daughters/daughters-in-law.

As this was our first intervention program with factory workers at community level, all households with pregnant factory workers (regardless of factory affiliation) in a peer counselor's catchment area were identified, as were any neighboring unemployed pregnant women. The rationale for including the latter was purely ethical: in a community where both employed and unemployed women were living, no one should be deprived of breastfeeding promotion and support services.

Sample

For the evaluation study at the end of the program, we had a sample of 190 participants still employed and 114 unemployed with infants between 0–6 months of age for a total of 304 study participants with complete data sets (Figure 1). Sample size calculation for the main outcome variable, namely EBF, was adequate (Rahman, 2015; Sharma, 2014).

Measurement

Demographic maternal variables and infant weights and feeding variables were collected. Each participant's age was ascertained from her national identity card wherever available or calculated from the year of liberation for Bangladesh (1971). Participants' education was defined as the years of formal school education. The number of previous children was the number of currently living children. Antenatal contacts were recorded if the participant attended a health facility for a check-up during pregnancy, or was visited by a health worker at home for this purpose. Delivery place, type, who delivered the infant, and the gender, were all recorded (see data collection tools # 1 in the online Supplementary File).

Infant feeding variables collected were breastfeeding initiation and infant feeding patterns. Initiation of breastfeeding was determined by asking the participants/accompanying family member who attended the delivery how many hours after birth the infant was first put to the breast and started suckling. Infant feeding patterns were based on 24-hr recall during a particular visit. Continued EBF from birth to 6 months was recorded if the participants reported never having given anything except their own milk to the infants during the period between monthly visits. (For the purpose of this article, all infants who received mother's milk exclusively are included as "exclusively" breastfed). If water, honey or sugar-water were fed in the first 3 days of life, or at any time during the first 6 months, the infants were categorized as predominantly breastfed. If other milk or solids were given they were categorized as partially breastfed (WHO, 2008).

Weights of infants and participants were measured using electronic scales, with 100 g precision (Tanita, Japan). Birth weights were recorded within 72 hr if participants and infants were visited at home, or obtained from discharge certificates if they born in a hospital or clinic. Subsequent weights were recorded on monthly birthdays. A participant and her infant were first weighed together, and then only the participant was weighed to obtain the infant's weight by subtraction. For each measurement, at least two readings were taken and the average weight noted. Weighing scales were standardized whenever the supervisors accompanied the peer counselors on household visits.

Data Collection

The study was conducted from May 2015 to March 2017. Prior to inclusion, the aims of the program were explained to the pregnant women and their families. They were assured of confidentiality and that their name would not be mentioned if any statements had to be shared with the factories. Verbal consent was obtained from the pregnant women and also from the head of their household (the husband, mother-in-law, or father-in-law), as this was culturally respectful. Peer counselors collected and recorded the required information during their household visits.

For the qualitative data collection, the narrative analysis approach (Lewis, 2015) was used to describe two specific

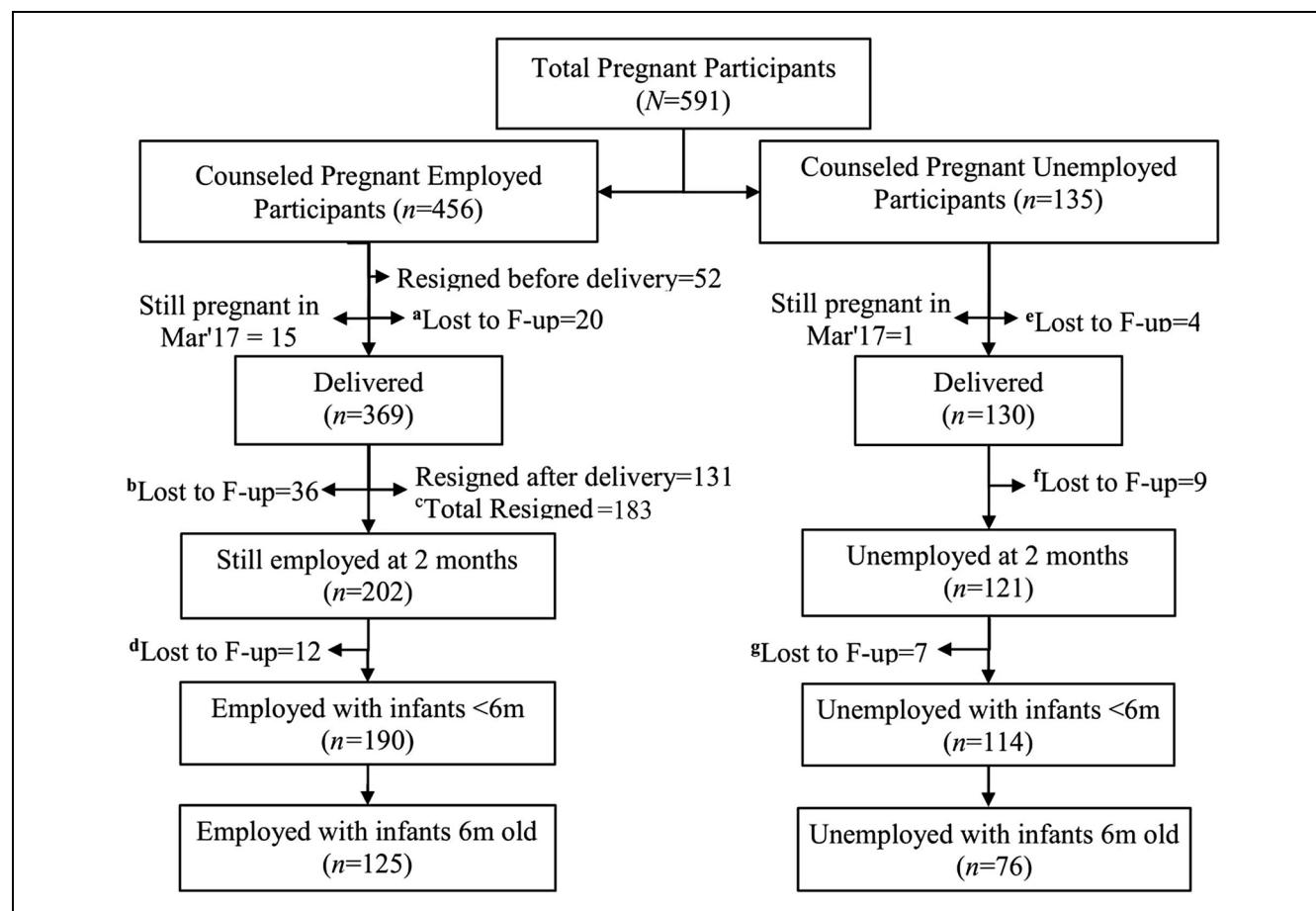


Figure 1. Flow chart of participants in the program.

^aEmployed participants lost to follow-up (F-up) during pregnancy = 20 (15 moved, 4 refused, 1 excluded a very sick child). ^bEmployed lost after delivery = 36 (17 stillbirths, 15 babies died, 4 moved). ^cEmployed total resigned = 183 (52 during pregnancy, 131 after delivery). ^dEmployed lost after 2 months = 12 (moved). ^eUnemployed participants lost to follow-up during pregnancy = 4 (moved). ^fUnemployed lost after delivery = 9 (4 stillbirths, 3 babies died, 2 moved). ^gUnemployed lost after 2 months = 7 (6 moved, 1 refused).

aspects: (1) how the employed participants managed to EBF with no/minimal facilities at their workplaces; and (2) why participants had to discontinue EBF. In-depth interviews were conducted to explore the lived experience during a typical day's feeding pattern in a randomly selected group of participants ($n = 30$). In-depth interviews also were conducted with participants who had discontinued EBF ($n = 18$). The interviews were held either in person or via phone calls, using a semi-structured interview guide (see #2 Data Collection Tool in the online Supplementary Materials). These were audio recorded by a Dhaka based staff member with a background in Anthropology and experience in conducting in-depth interviews, then transcribed verbatim in Bangla. Following analysis, the findings were translated into English by the first author.

Data Analysis

Timing of initiation of breastfeeding was estimated as the length of time in minutes and hours between delivery and the actual time when breastfeeding started. Prevalence of EBF

was determined from the 24-hr recall data during each monthly visit. Simple descriptive analyses included frequencies and contingency tables, means, and standard deviations. Pearson's chi-square test was used to determine the difference between the two groups, and a p value of $< .05$ was established as the level of significance. Data were analyzed using SPSS Version 17 (SPSS Inc., Chicago, USA).

A narrative analysis approach was used to analyze the interview data. Transcribed data were checked first by staff and then by the authors for common practices in the case of those who were practicing EBF, and for reasons that EBF had ended. The employees who resigned were compared with those who continued to be employed. While they continued to be counseled, we have excluded these participants from this evaluation study.

In qualitative research "reflexivity" is the awareness of how the self may affect the process and outcome of the research and the monitoring of this possibility (Berger, 2015; Dodgson, 2019). The principal investigator (PI) shared nationality, gender, religion, and language with the

Table 1. A Comparison of the Characteristics of Employed and Unemployed Participants on Enrollment in Pregnancy ($N = 304$).

Characteristics	Employed $n = 190$ M (SD)	Unemployed $n = 114$ M (SD)	t-test	p
Participants' age (years)	23.04 (3.24)	21.88 (3.10)	3.072	.002
Participants' education (years)	5.76 (2.96)	6.64 (3.22)	-2.434	.016
Number of previous children ^a	0.54 (0.56)	0.37 (0.58)	2.499	.013
Number of antenatal visits	3.28 (1.44)	2.93 (1.29)	2.131	.034

Note. Participants were enrolled between the 6th to 7th months of pregnancy.

^aNot all the participants had had children prior to the current pregnancy. The total number of prior children for all employed participants was 96, and 36 for unemployed participants.

participants, but was from a very different social class. However, the PI's previous projects with similar populations have fostered an ongoing familiarity with the situations of low-income women in the urban slums of Bangladesh, albeit through the lens of an outsider. The participants' immediate contacts within the study were with the peer counselors, who lived in their communities, and with an experienced interviewer who was not otherwise involved with the participants. Data analyzers were blinded to the participants names through the use of code numbers, which minimized bias.

Results

Characteristics of the Sample

Among the pregnant participants in the study ($N = 304$), almost all were in the 18–30 age group. The employed participants, however, were older and less educated than the unemployed (Table 1). Several participants said they were reluctant to attend health facilities because ANC conducted by a national NGO were no longer free, the BGMEA hospitals were too far, or treatment was unsatisfactory.

Home deliveries were most common in both groups of participants, and surgical deliveries (cesarean sections) were more common among those who went to health facilities for delivery (Table 2). Hospital practices after cesarean sections sometimes delayed or interfered with breastfeeding. A participant reported: "I had a cesar [cesarean section]. They kept my baby in a separate room in the hospital, gave her other milk—I don't know what it was."

The mean (SD) birth weight of infants of the employed participants was 2.96 kg (0.36) and that of infants of the unemployed participants was 3.0 kg (0.33). The mean weight of infants in the two groups at the end of 6 months was also similar at 7.61 kg (0.89) and 7.59 kg (0.68) respectively.

Breastfeeding Patterns

Initiation of breastfeeding within 1 hr of birth was similar in the two groups of participants (Table 2). Prevalence of EBF remained very high in both groups throughout the 6 months,

but was discontinued earlier by the employed participants (Figure 2).

How participants managed to feed infants their milk exclusively for 6 months is illustrated by the following quote:

I used to wake up at 5 am, and as baby was still sleeping, I would express my milk first and then breastfeed him after he woke up. I went to the factory at 6 am where I still work as a Machine Operator. At 12.30 pm, I expressed milk [with my hands] into a plastic container [which I brought from home] in the store room on my [factory] floor. I kept the container in the fridge on the same floor. At 3.30 pm I expressed milk into another container, kept it in the fridge and took both containers when I went home at 4.30 pm. I had shorter working hours allowed for mothers of babies below 6 months while others worked until 7 pm. On reaching home, I first breastfed the baby. Then I expressed again around 9 pm and kept it in the fridge. So I had 4 containers [maybe about 100 ml each] for the next day. I would breastfeed all night. My mother looks after and feeds the baby when I am at work. At 6 months, Apa [the peer counselor] said my baby's weight was 8.2 kg, and that he had grown well on my milk alone!

The peer counselors informed the first author that daily expression of mother's milk for feeding infants was previously unheard of in their areas and family members were initially worried about it being unsafe. As a participant's mother-in-law said: "I never knew such a small baby could drink from a cup, but see he does it so well," and according to the father-in-law:

We thank this *apa* [peer counselor] for teaching our daughter-in-law how she can provide her milk for the baby, even though she goes to work in the factory. Of course we know mother's milk is best for the baby and now we also save money, as we don't have to buy tin milk.

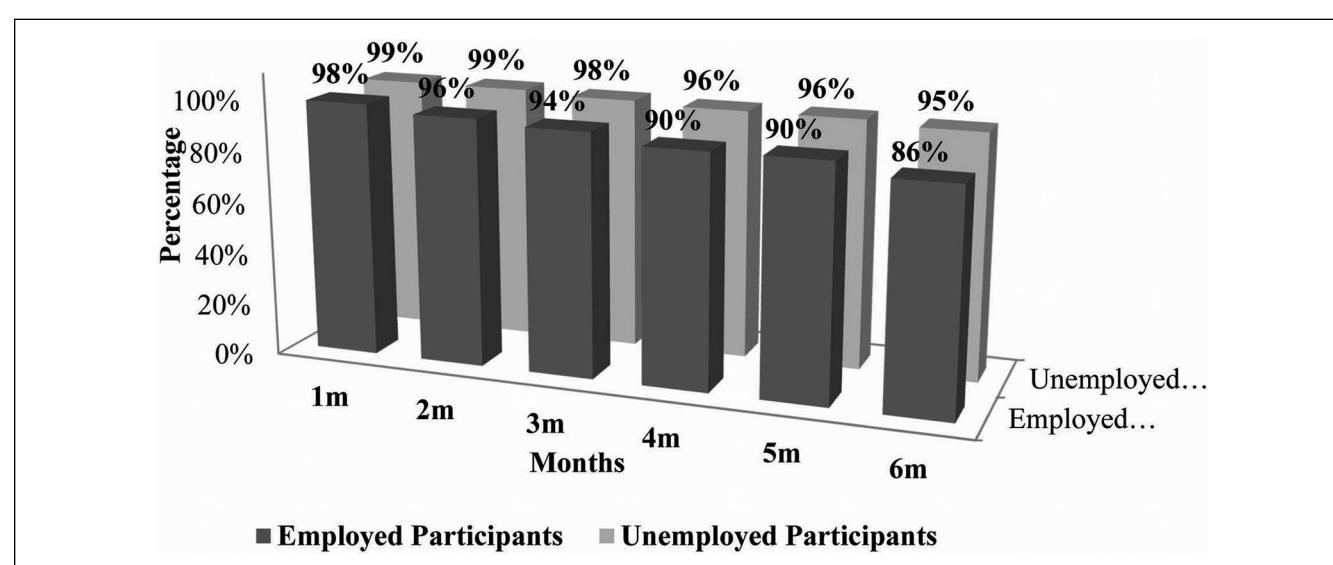
Only 18 (14%) of the employed participants reported an inability to continue EBF for 6 months. Their reasons included either personal or institutional constraints with regard to expression/sufficiency of expressed milk; mothers-in-laws' or other caregivers' unsupportive attitudes; reluctance to feed the expressed milk; real or perceived problems after delivery, or because the factory was located too far

Table 2. Delivery Details and Breastfeeding Initiation by Employed and Unemployed Participants ($N = 304$).

Variable	Employed Participants $n = 190$ $n (\%)$	Unemployed Participants $n = 114$ $n (\%)$	Chi-Square	p value
Delivery place				
Hospital or clinic	81 (42.6)	56 (49.1)	5.778	.056
Home	91 (47.9)	40 (35.1)		
Birthing hut ^a	18 (9.5)	18 (15.8)		
Delivery type				
Vaginal	164 (86.3)	91 (79.8)	2.220	.149
Surgical	26 (13.7)	23 (20.2)		
Delivered by				
Doctor or nurse ^b	99 (52.1)	76 (66.7)	8.895	.012
Trained birth attendant	73 (38.4)	25 (21.9)		
Untrained birth attendant ^c	18 (9.5)	13 (11.4)		
Gender				
Male	95 (50.0)	56 (49.1)	0.022	.906
Female	95 (50.0)	58 (50.9)		
Initiation of breastfeeding ^d				
Within 1 hr	173 (91.1)	101 (88.6)	0.483	.552
After 1 hr	17 (8.9)	13 (11.4)		

Note. The test statistic used was Pearson Chi-Square.

^aA birthing hut was a simple room in the community, similar to participants' houses, where a trained birth attendant conducted deliveries or referred the woman to a health facility if she identified a problem. ^bPhysician and nurse could not be differentiated if the staff wore a white coat. ^cAn untrained birth attendant was usually an older woman, relative, or neighbor who assisted deliveries. ^dInitiation of breastfeeding information was missing for 17 (4.6%) infants of employed participants and 4 (3.1%) infants of unemployed participants as they could not remember.

**Figure 2.** Prevalence of exclusive breastfeeding in infants of employed and unemployed participants over 6 months (24-hour recall).

away. One participant said: "I tried, but could not express any milk after 4 months." Another said:

I travel by bus—it takes one and a half hours to go and about 2 hours to return. I expressed my milk at 4 am, then breastfed the baby directly. I expressed once in the factory's canteen and kept [the milk] in a cooler [flask]. I could only express once in the factory because I did not get time. I expressed at home at night

before going to sleep. I gave only my milk till my baby was 3 months old, after which I could not get any milk on expression. Then I had to add tin milk. If my factory was close by, I could have fed her only my milk for 6 months, but traveling daily like this I used to feel very tired.

Unemployed participants, on the other hand, usually had no reason or inclination to practice milk expression, although

they were happy to learn about the technique from the peer counselors to use later if needed.

Workplace obstacles were commonly described as being detrimental for continuing EBF. For example: "I do not get time off the [factory] floor to express my milk," and "I had to do overtime at the factory. I felt tired and could not express enough milk." Another participant said: "My factory is far, and I do not come home for lunch. There is no room where I can express milk. I don't want to go to the toilet to do this."

In a few cases the household decision maker undermined EBF. "I cannot say anything to contradict [my] mother-in-law. She wants to keep my baby away from me. That's why she gives other milk. My husband does not say anything to her." Another participant stated: "My mother-in-law is the decision maker. She is the one who wanted to feed the baby other milk. . . She did not listen to anyone's suggestions for anything."

Caregivers' attitudes regarding the feeding of expressed milk were illustrated by the following quotes:

My neighbor did not want to heat the milk [that had been expressed and kept in the fridge] to feed my baby. I have no one who can look after [the baby].

My sister has two children of her own. Including mine there are three children in her house. I used to express my milk and leave it with her but she does not want to heat and feed this milk with a cup. She finds this to be a hassle and prefers to feed other milk by bottle.

Discussion

We believe this is the first time the influence of a community-based breastfeeding education and support program on the breastfeeding patterns of women working in factories has been documented. Our results were extremely encouraging. Peer counselors were able to influence the majority of factory workers and unemployed participants about the early initiation of breastfeeding compared to only 51% at national level (NIPORT, 2016). Early initiation is particularly important as it has been shown to decrease neonatal mortality (Takahashi et al., 2017; Smith et al., 2017; Phukan, Ranjan, & Dwivedi, 2018). Early initiation may also facilitate the subsequent practice of EBF, as was demonstrated in Indonesia, where early initiation was associated with 3.66 times higher likelihood of EBF (Parashmanti, Hadi, & Gunawan, 2016).

The peer counselor model empowered women to EBF during maternity leave and after they resumed work. The EBF prevalence was higher than the 17% exclusive breastfeeding rate reported for 2–6 month old infants of workers in two Dhaka factories (UNICEF, 2018), and higher than the national rates of 32% in 4–5 month old infants (NIPORT, 2016). Participants in previous research projects were more likely to practice EBF if they were aware of the definition, the recommended duration, and the health benefits (USAID, 2017). Our intervention included facilitating this awareness.

Ongoing peer counseling facilitated keeping the prevalence of EBF high throughout the 6 months.

As the in-depth interviews demonstrated, EBF was only possible when employed participants were able to express milk both at home and at the workplace, whether by hand expression or pump. However, this has not been a common practice (Rai, 2017; Okonya, Nabimba, Richard, & Ombeva, 2017). In our study, the peer counselors' convinced the majority of family members to accept the feeding of expressed mother's own milk. The husband's education level has been found to have a positive correlation with EBF among working women in Indonesia (Ratnasari et al., 2017); however, we did not collect husbands' education data. In our study, most participants managed to express at work (despite uncomfortable and unhygienic settings) and brought the expressed milk back when they returned home because they were very motivated. Participants' answers about how they managed to continue EBF after resuming work were similar, as were their barriers. Inability to express milk at factory, in addition to inability to come home during short lunch breaks, made it more problematic. Thus, the decline in EBF started for some participants soon after they resumed work, which is consistent with Kavle, LaCroix, Dau, & Engmann's (2017) systematic review, which showed moderate evidence for a negative association between maternal employment and exclusive breastfeeding.

Similarly high rates of EBF have been reported for previous programs conducted in Bangladesh and Vietnam, where participants (mostly unemployed) were provided with interpersonal counseling services in addition to mass media and community mobilization, (Haider & Saha, 2016; Menon et al., 2016). We have demonstrated that employed factory workers could also have high rates of EBF if they received adequate breastfeeding counseling and support. Since they did not receive any breastfeeding education and support services from their own factory medical staff or other NGOs, we cannot provide any other possible explanation for their breastfeeding patterns.

Factory workers in another study in Bangladesh remarked that although health services were available within the factory premises, they were reluctant to go there or to the government health facilities for ANC because of long working hours (Akhter et al., 2017). The national recommendations in Bangladesh are that pregnant women should have at least four ANC visits (MOH&FW, 2015), but these did not seem to occur for the majority of our participants. The WHO (2016) recommends a minimum of eight ANC contacts to reduce perinatal mortality and improve women's experience of care. The practice of using untrained birth attendants (*dais*) to deliver babies at home was consistent with practices within the country (Sarker et al., 2016); we could not record any resulting postnatal complications since the peer counselors were not trained to identify these. The higher number of cesarean sections among the unemployed participants may be because they were more educated and had gone to health

care facilities for delivery. Nationally, 23% of all births were reported to have taken place in a health care facility, 61% of which were by cesarean section (NIPORT, 2016). This rapid increase from only about 3% in 2000 has economic implications (Haider et al., 2018), apart from the negative influences of cesarean sections on breastfeeding, mentioned earlier.

Researchers have suggested that interventions to promote breastfeeding should use existing family structures, supportive cultural beliefs and practices, and promotion of infant-friendly environments (Nkrumah, 2016). Grandmothers, in particular, can be very influential (Negin, Coffman, Vizintin, & Raynes-Greenow, 2016). Our program incorporated these suggestions, which most likely had a positive influence on our results.

The high percentage of resignations from work among factory employees was surprising, but absence of paid maternity leave or a family member to look after the baby, or the family's objection to the participant resuming work, were mentioned as the determining factors. A woman's need to work outside the home, to balance family life and care for her children, should be recognized and addressed as a critical issue. Dinour and Szaro's (2017) systematic review suggested that a breastfeeding support program should be implemented by all employers according to their company's budget and resources. It is heartening that in Bangladesh a national program along with UNICEF, MoH&FH, the Ministry of Labor and Employment, and relevant stakeholders, has started campaigning for increasing maternity leave for workers in private employment, daycare/breastfeeding rooms at workplaces, and nursing breaks (UNICEF, 2016).

Soon after our study ended, the International Labor Organization's (ILO) Better Work Bangladesh program and UNICEF launched the *Participants@Work* initiative on 22 August, 2017 (ILO, 2017). Piloted in two RMG factories, the initiative was planned to roll out in 25 factories by the end of 2018. While this move is welcome, it is primarily factory-based. Without involving the families of the employed workers and providing knowledge and skills to support the female workers, these programs are unlikely to have the expected outcomes. Our community-based, peer counseling model, on the other hand, is a feasible option that could immediately fill this gap. Further research is required to assess if peer counselors employed by factories as outreach workers would be a feasible and sustainable option for staff welfare in other settings.

Limitations

The number of factory worker resignations was larger than anticipated, leaving us with a smaller sample of infants under 6 months of age by the time the program ended, which did not allow further statistical analyses. The location of participants' houses were quite spread out, which meant that the peer counselors and/or the supervisors could only visit a few households during the 4 hr that they worked. There may have

been bias in self-reporting by the participants, although it was countered to some extent by the supervisors asking family members and neighbors what the infant was fed in the participant's absence. Another limitation was that data had to be collected by the peer counselors during their scheduled household visits as we wanted to keep the program simple and replicable, using minimal staff. This meant that specific problems that might have emerged from careful probing may have been missed. Thus, apart from some in-depth interviews with participants, focus group discussions were not feasible (due to time and resource constraints), which may have given us further insight into the challenges at the factory and at home for continued breastfeeding. Husbands were often working late or in another part of the city, so were difficult to include in counseling sessions. Community support group meetings were difficult to organize due to lack of local men as facilitators (because of the perception that infant feeding was solely the women's responsibility). Finally, severe budgetary constraints affected the number of monitoring visits by senior supervisory staff (from Dhaka to Chattogram), which then had to be conducted mainly by the local supervisor.

Conclusions

The success of this intervention in achieving EBF demonstrated that peer counseling services along with family support could enable the majority of factory workers to start and continue EBF for 6 months. Advocacy will be required for provision of a space/room to enable women to express their milk at work. We suggest that peer counselors be employed by factories to provide sustainable outreach services to workers, and that their influence on breastfeeding practices be further studied.

Acknowledgments

The authors are extremely grateful to the participants and their family members for their willingness and cooperation in the program, and to the peer counselors for their motivation and sincere efforts. Additional thanks go to the office staff for training, supervision, and monitoring of the peer counselors, and to Shariful Islam for data management and preliminary analysis. Sincere thanks to the donors, World Alliance for Breastfeeding Action (WABA) colleagues, and especially to Ruhi Ahmed of Bangladesh Steel Re-Rolling Mills (BSRM) for believing that employed women need these kind of services, and for her encouragement and supportive actions to obtain funds for the program.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The

program was jointly funded by BSRM, IDLC Finance Ltd., WABA, and the first author's organization. The content is the sole responsibility of the authors, and does not necessarily represent the official views of the organizations listed above. The authors received no financial support for travel to the program site, authorship and/or publication of this article.

ORCID iDs

Rukhsana Haider  <https://orcid.org/0000-0001-5438-8192>
Virginia Thorley  <https://orcid.org/0000-0002-1305-5612>

Supplemental Material

Supplementary Material may be found in the "Supplemental material" tab in the online version of this article.

References

- Akhter, S., Rutherford, S., & Chu, C. (2017). What makes pregnant workers sick: Why, when, where and how? An exploratory study in the readymade garment industry in Bangladesh. *Reproductive Health, 14*(142), 1–9.
- Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning. (2017). Bangladesh statistics, Dhaka. Retrieved from http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b2db8758_8497_412c_a9ec_6bb299f8b3ab/S_Y_B2017.pdf
- Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research, 15*(2), 219–234. doi:10.1177/1468794112468475
- Billah, M. M., & Manik, M. R. I. (2017). Readymade garments (RMG) contribution in women empowerment: A study on Bangladesh perspective. *European Scientific Journal, 13*(29), 1857–7881.
- Continuous Update Project. (2018). Analysing research on cancer prevention and survival: Diet, nutrition, physical activity and breast cancer, 2017. World Cancer Research Fund and American Institute for Cancer Research. Retrieved from <http://www.aicr.org/continuous-update-project/reports/breast-cancer-report-2017.pdf>
- Dinour, L. M., & Szaro, J. M. (2017). Employer-based programs to support breastfeeding among working participants: A systematic review. *Breastfeeding Medicine, 12*, 131–141. doi:10.1089/bfm.2016.0182
- Dodgson, J. (2019). Reflexivity in qualitative research. *Journal of Human Lactation, 35*(2), 220–222. doi:10.1177/0890334419830990
- The Global Economy.com. (2018). Bangladesh: Female labor force participation. Retrieved from https://www.theglobaleconomy.com/Bangladesh/Female_labor_force_participation/
- Haider, R., & Saha, K. K. (2016). Breastfeeding and infant growth outcomes in the context of intense peer counseling support in two communities in Bangladesh. *International Breastfeeding Journal, 11*, 18. doi:10.1186/s13006-016-0077-6.
- Haider, M. R., Rahman, M. M., Moinuddin, M., Rahman, A. E., Ahmed, S., & Khan, M. M. (2018). Ever-increasing caesarean section and its economic burden in Bangladesh. *PLoS ONE, 13*(12): e0208623. doi:10.1371/journal.pone.0208623
- Haviland, B., James, K., Killman, M., & Trbovich, K. (2015). Supporting breastfeeding in the workplace. Retrieved from https://www.asphn.org/resource_files/657/657_resource_file2.pdf
- Hobbs, A. J., Mannion, C. A., McDonald, S. W., Brockway, M., & Tough, S. C. (2016). The impact of caesarean section on breastfeeding initiation, duration and difficulties in the first four months postpartum. *BMC Pregnancy and Childbirth, 16*, 90. doi:10.1186/s12884-016-0876-1
- Horta, B. L., Loret, D. M. C., & Victora, C. G. (2015). Long-term consequences of breastfeeding on cholesterol, obesity, systolic blood pressure and Type 2 diabetes: A systematic review and meta-analysis. *Acta Paediatrica, 104*(467), 30–37. doi:10.1111/apa.13133
- International Labor Organization. (2017). Better work supports maternity rights and breastfeeding in Bangladesh RMG sector. Retrieved from http://www.ilo.org/dhaka/Informationresources/Publicinformation/Pressreleases/WCMS_573867/lang--en/index.htm
- Islam, M. J., Baird, K., Mazerolle, P., & Braidy, L. (2017). Exploring the influence of psychosocial factors on exclusive breastfeeding in Bangladesh. *Archives of Women's Mental Health, 20*, 173–188. Retrieved from <https://link.springer.com/article/10.1007/s00737-016-0692-7>
- Johnson, A. M., Kirk, R., & Muzik, M. (2015). Overcoming workplace barriers: A focus group study exploring African American mothers' needs for workplace breastfeeding support. *Journal of Human Lactation, 31*(3) 425–433.
- Karim, F., Billah, S. M., Chowdhury, M. A. K., Zaka, N., Manu, A., Arifeen, S. E., & Khan, A. N. S. (2018). Initiation of breastfeeding within one hour of birth and its determinants among normal vaginal deliveries at primary and secondary health facilities in Bangladesh: A case observation study. *PLoS ONE, 13*(8):e0202508. doi:10.1371/journal.pone.0202508
- Kavle, A. J., LaCroix, E., Dau, H., & Engmann, C. (2017). Addressing barriers to exclusive breast-feeding in low and middle-income countries: A systematic review and programmatic implications. *Public Health Nutrition, 20*(17), 3120–3134.
- Khatun, F. (2018, March 8). Women's participation in the job market. *The Daily Star*. Retrieved from <https://cpd.org.bd/womens-participation-job-market-dr-fahmida-khatun/>
- Khatun, H., Comins, C. A., Shah, R., Islam, M. M., Choudhury, N., & Ahmed, T. (2018). Uncovering the barriers to exclusive breastfeeding for participants living in Dhaka's slums: A mixed method study. *International Breastfeeding Journal, 13*, 44.
- Kozhimannil, K. B., Jou, J., Gjerdingen, D. K., & McGovern, P. M. (2016). Access to workplace accommodations to support breastfeeding after passage of the Affordable Care Act. *Women's Health Issues, 26*(1), 6–13.
- Lewis, S. (2015). Qualitative enquiry and research design: Choosing among five approaches. *Health Promotion Practice, 16*(4), 473–475. doi:10.1177/1524839115580941.
- Mahmud, M. S., Rajath, V., Mahmud, R., & Jahan, M. N. (2018). Health issues of female garment workers: evidence from Bangladesh. *Journal of Population and Social Studies, 26*(3), 181–194.
- Menon, P., Nguyen, P. H., Saha, K. K., Khaled, A., Kennedy, A., Tran, L. M., & Sanghvi, T. (2016). Impacts on breastfeeding practices of at-scale strategies that combine intensive interpersonal counseling, mass media, and community mobilization: Results of cluster-randomized program evaluations in Bangladesh and Viet Nam. *PLoS Med, 13*, e1002159.

- Ministry of Health and Family Welfare. (2015). *Training guidelines for Infant and Young Child Feeding (IYCF)*. Ministry of Health and Family Welfare, Dhaka.
- Ministry of Health and Family Welfare, Bangladesh, Partnership for Maternal, Newborn & Child Health, World Health Organization, World Bank, & Alliance for Health Policy and Systems Research. (2015). *Success factor for women's and children's health, Dhaka*. Retrieved from <https://www.who.int/pmnch/knowledge/publications/successfactors/en/index2.html>
- Moazzem, K. G., & Arfanuzzaman, M. (2018, August 20). RMG workers: Minimum livelihood needs. *The Financial Express*. Retrieved from <http://www.thefinancialexpress.com.bd/views/rmg-workers-minimum-livelihood-needs-1534781373>
- National Institute of Population Research and Training, Mitra and Associates, and ICF International. (2016). *Bangladesh Demographic and Health Survey 2014*. Dhaka, Bangladesh and Rockville, Maryland, USA: NIPORT, Mitra and Associates, and ICF International. Retrieved from <https://dhsprogram.com/pubs/pdf/FR311/FR311.pdf>
- Negin, J., Coffman, J., Vizintin, P., & Raynes-Greenow, C. (2016). The influence of grandparticipants on breastfeeding rates: A systematic review. *BMC Pregnancy and Childbirth*, 16(91). doi:10.1186/s12884-016-0880-5
- Nkrumah, J. (2016). Maternal work and exclusive breastfeeding practice: A community based cross-sectional study in Efutu Municipal, Ghana. *International Breastfeeding Journal*, 12(10). doi:10.1186/s13006-017-0100-6
- Okonya, J. N., Nabimba, R., Richard, M., & Ombeva, A. E. (2017). Perceptions of mother's own milk expression practices among working participants. *African Journal of Midwifery and Women's Health*, 11(4), 169. doi:10.12968/ajmw.2017.11.4.169
- Palla, H., & Kitsantas, P. (2017). Mode of delivery and breastfeeding practices. *International Journal of Pregnancy & Childbirth*, 2(6), 167–172.
- Parashmanti, B. A., Hadi, H., & Gunawan, I. M. (2016). Timely initiation of breastfeeding is associated with the practice of exclusive breastfeeding in Indonesia. *Asia Pacific Journal of Clinical Nutrition*, 25 (Supplement 1), S52–56.
- Paul, G. K., Sarker, D. C., & Naznin, S. (2016). Present situation of women empowerment in Bangladesh. *International Journal of Mathematics and Statistics Intervention* 4(8), 31–38.
- Pelto, G., Lee, J., Akter, S., Porqueddu, T., Thuy-Co Hoang, C., Anwar, I., & Akhter, R. (2015). *Summary report: Infant and young child feeding and home fortification in rural Bangladesh—perspectives from a focused ethnographic study*. Global Alliance for Improved Nutrition (GAIN), International Centre for Diarrhoeal Disease research, Bangladesh (icddr,b), & Valid International.
- Phukan, D., Ranjan, M., & Dwivedi, L. K. (2018). Impact of timing of breastfeeding initiation on neonatal mortality in India. *International Breastfeeding Journal*, 13(27). Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6029033/pdf/13006_2018_Article_162.pdf
- Rahman, J. B. A. (2015). *Brief guidelines for methods and statistics in medical research*. Singapore: Springer.
- Rahman, M. H., & Siddiqui, S. A. (2015). Female RMG worker: Economic contribution in Bangladesh. *International Journal of Scientific and Research Publications*, 5(9), 1–8.
- Rai, S. (2017). Expressed mother's own milk: A less used option by working participants of India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 6(7): 2867–2873.
- Ratnasari, D., Paramashanti, B. A., Hadi, H., Yugistiyowati, A., Astiti, D., & Nurhayati, E. (2017). Family support and exclusive breastfeeding among Yogyakarta participants in employment. *Asia Pacific Journal of Clinical Nutrition*, 26(Suppl), S31–35.
- Samad, N., Haque, M. M., & Sultana, S. (2017). Pattern of delivery and early initiation of breastfeeding: An urban slum based cross cut study. *Journal of Nutrition Health Food Engineering*, 7(4), 332–335. doi:10.15406/jnhfe.2017.07.00244
- Sarker, B. I., Rahman, M., Rahman, T., Hossain, J., Reichenbach, L., & Mitra, D. K. (2016). Reasons for preference of home delivery with traditional birth attendants (TBAs) in Rural Bangladesh: A qualitative exploration. *PLoS ONE*, 11(1), e0146161. doi:10.1371/journal.pone.0146161
- Shakya, P., Kunieda, M. K., Koyama, M., Rai, S. S., Miyaguchi, M., Dhakal, S., Sandy, S., Sunguya, B. F., & Jimba, M. (2017). Effectiveness of community-based peer support for mothers to improve their breastfeeding practices: A systematic review and meta-analysis. *PLoS ONE*, 12(5): e0177434. doi:10.1371/journal.pone.0177434
- Sharma, A. (2014). Sample size calculations for research studies in ophthalmology. *Current Indian Eye Research* 1(2), 78–80
- Sharmin, L., Chowdhury, M. A. K., Khatun, S., & Ahmed, N. (2016). Barriers to exclusive breastfeeding among urban participants. *Journal of Enam Medical College*, 6(2). doi:10.3329/jemc.v6i2.27763
- Smith, E. R., Lisa, L., Chowdhury, R., Sinha, B., Fawzi, W., & Edmond, K. L., on behalf of the Neovita Study Group. (2017). *Delayed breastfeeding initiation and infant survival: A systematic review and meta-analysis*. Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0180722>
- Sung, H. K., Ma, S. H., Choi, Ji-Y., Hwang, Y., Ahn, C., Kim, B-G., Kim, Y-M., Kim, J.W., Kang, S., Kim, J., Kim, T.J., Yoo, K-Y., Kang, D., & Park, S. (2016). The effect of breastfeeding duration and parity on the risk of epithelial ovarian cancer: A systematic review and meta-analysis. *Journal of Preventive Medicine & Public Health*, 49:349–366. doi:10.3961/jpmph.16.066
- Taddele, M., Abebe, L., & Fentahun., N. (2014). Exclusive breastfeeding and maternal employment in Ethiopia: A comparative cross-sectional study. *International Journal of Nutrition and Food Sciences*, 3(6), 497–503.
- Takahashi, K., Ganchimeg, T., Ota, E., Vogel, J. P., Souza, J. P., Laopaiboon, M., Castro, C. P., Jayaratne, K., Ortiz-Panozo, E., Pisake Lumbiganon, P., & Moriet, R. (2017). Prevalence of early initiation of breastfeeding and determinants of delayed initiation of breastfeeding: Secondary analysis of the WHO Global Survey. *Scientific Reports*, 7, 44868. doi:10.1038/srep44868.
- Tariku, A., Alemu, K., Gizaw, Z., Muchie, K. F., Derso, T., Abebe, S. M., Yitayal, M., Fekadu, A., Ayele, T. A., Alemayehu, G. A., Tsegaye, A. T., Shimeka, A., & Bikis, G. A. (2017). Participants' education and ANC visit improved exclusive breastfeeding in Dabat Health and Demographic Surveillance Site, northwest Ethiopia. *PLoS ONE*, 12(6): e0179056. doi:10.1371/journal.pone.0179056.
- UNESCO (2017). *Education and literacy*. Retrieved from uis.unesco.org/country/BD

- UNICEF & ILO (2015). *Healthy beginnings for a better society. Breastfeeding in the workplace is possible: A toolkit*. International Labour Organization, ILO Country Office for the Philippines. Makati City: ILO. Retrieved from https://www.ilo.org/wcmsp5/groups/public/-asia/-ro-bangkok/-ilo-manila/documents/publication/wcms_493121.pdf
- United Nations Children's Fund Bangladesh (2016, November). *Workshop report on maternity protection and promotion at the workplace*. National Programme for the formal sector. An initiative of the Institute of Public Health and Nutrition, Ministry of Health and Family Welfare, ILO, WABA and UNICEF. (draft).
- United Nations Children's Fund (2018). Let's make it work!: Breastfeeding in the workplace—Using communication for development to make breastfeeding possible among working participants. New York: UNICEF. <https://www.healthynewbornnetwork.org/resource/lets-make-it-work-breastfeeding-in-the-workplace-using-communication-for-development-to-make-breastfeeding-possible-among-working-mothers/>
- U.S. Department of Health & Human Services (2018). What employers need to know. Why should businesses support breastfeeding moms at work? Washington, DC: Office on Women's Health. Retrieved from <https://www.womenshealth.gov/supporting-nursing-moms-work/what-law-says-about-breastfeeding-and-work/what-employers-need-to-know>
- USAID (2017). MCSP Nutrition Brief. Addressing barriers to exclusive breastfeeding: Evidence and program considerations for low- and middle-income countries. Retrieved from <http://www.mesprogram.org>
- Victora, C., Bahl, R., Barros, A., Franca, G. V. A., Horton, S., Krusevec, J., Murch, S., Sankar, M. J., Walker, N., & Rollins, N. C. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms and lifelong effect. *The Lancet* 387(10017), 475–490.
- World Bank Group (2017). Bangladesh continues to reduce poverty but at slower pace. Retrieved from <https://www.worldbank.org/en/news/feature/2017/10/24/bangladesh-continues-to-reduce-poverty-but-at-slower-pace>
- World Health Organization and Unicef (1993). *Breastfeeding counselling: A training course*. Retrieved from http://www.who.int/maternal_child_adolescent/documents/who_cdr_93_3/en/
- World Health Organization (2008). *Indicators for assessing infant and young child feeding practices. Part 2: Measurements*. Geneva, Switzerland. Retrieved from <http://www.who.int/nutrition/publications/infantfeeding/9789241599290/en/>
- World Health Organization (2016). *New guidelines on antenatal care for a positive pregnancy experience*. Retrieved from <http://www.who.int/reproductivehealth/news/antenatal-care/en/>
- World Health Organization (2018a). *Exclusive breastfeeding for optimal growth and development of infants*. Retrieved from http://www.who.int/elena/titles/exclusive_breastfeeding/en/
- World Health Organization. (2018b). *Health Topics: Breastfeeding*. Retrieved from <http://www.who.int/topics/breastfeeding/en>

Implementation of the Reimbursement Cost of Human-Milk-Based Neonatal Therapy in Polish Health Care Service: Practical and Ethical Background

Journal of Human Lactation

2020, Vol. 36(3) 426–435

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/08903344209815

journals.sagepub.com/home/jhl



Aleksandra Wesolowska, PhD^{1,2} , Urszula Bernatowicz-Lojko, IBCLC^{2,3,4},
Elena Sinkiewicz-Darol, PhD³ , Beata Pawlus, PhD^{2,5}, and Dominik Golicki, PhD⁶

Abstract

Background: A human-milk-based diet is the best option for nutritional therapy for preterm and/or sick newborns.

Research aim: The study aims were to restructure the reimbursement rates to hospitals in Poland for infants' tube feedings to favor the use of donor human milk over formula for newborns who required supplementation of expressed mother's milk and evaluate the results of the financing change during the first year of implementation (2018).

Methods: Financial data from hospitals were collected (2015–2016) by the Human Milk Bank Foundation using a data sheet designed by the Agency for Health Technology Assessment and Tariff System. We used data to restructure the reimbursement rates to hospitals for infants' tube feedings and implemented the changes in late 2017. The National Health Fund was requested to share reported data in 2018 concerning tube feeding services.

Results: More than half (61%) of NICUs introduced human milk tube feeding for newborns. It was provided to participants ($N = 5,530$), most frequently to seriously ill preterm infants (66.6%). Of these infants, 2,323 were fed donor human milk. Only 1,925 newborns received formula tube feeding. However, there were large differences in frequency of services reported among various parts of the country.

Conclusions: Based on our knowledge, Poland is the only European country where the reimbursement cost for human-milk-based nutritional therapy has been implemented in a manner intended to increase the quality of health care services for preterm newborns. Equal reimbursement for expressed mother's milk and donor milk did not appear to cause overuse of donor milk based on our analysis of the 2018 data.

Keywords

breastfeeding, health service research, human milk, infant nutrition, milk bank, prematurity

Background

One of the most important challenges in neonatal intensive care units (NICUs) is feeding the preterm infant. Systemic immaturity prevents the coordination of sucking, swallowing, and breathing and leads to impairment of digestive system functions and growth disorders. Hence, nutritional therapy is a key factor in newborn intensive care. In order to ensure that the dynamically changing nutritional requirements of preterm infants are met, parenteral feeding is established from the beginning (Brennan et al., 2016; Paul et al., 2018). However, it is recommended that preterm infants be introduced to enteral feeding (any way of providing food via the gastrointestinal tract), initially as

¹Laboratory of Human Milk and Lactation Research at Regional Human Milk Bank in Holy Family Hospital, Medical University of Warsaw, Department of Medical Biology, Warsaw, Poland

²Human Milk Bank Foundation, Warsaw, Poland

³Human Milk Bank, Ludwik Rydygier' Provincial Polyclinical Hospital in Toruń, Poland

⁴Department of Midwifery, Centre of Postgraduate Medical Education, Warsaw, Poland

⁵Regional Human Milk Bank, Neonatal Unit, Holy Family Specialist Hospital, Warsaw, Poland

⁶Department of Experimental and Clinical Pharmacology, Medical University of Warsaw, Warsaw, Poland

Date submitted: August 22, 2019; Date accepted: February 10, 2020.

Corresponding Author:

Aleksandra Wesolowska, PhD, Medical University of Warsaw, Department of Medical Biology, Laboratory of Human Milk and Lactation Research at Regional Human Milk Bank in Holy Family Hospital, Litewska 14/16 St., 00-575 Warsaw, Poland.
Email: aleksandra.wesolowska@wum.edu.pl

Key Messages

- Although feeding with human milk is a key factor in preterm newborns nutrition therapy, until recently it had not been included in the reimbursement cost of the treatment in neonatal intensive care units in Poland.
- Valuation of enteral tube feeding procedures according to food type, expressed mother's milk, donor human milk, and formula, has shown great price disparities in the costs of obtaining particular products.
- For ethical reasons, the Agency for Health Technology Assessment and Tariff System suggested the creation of two new products: donor milk and/or expressed mother's milk (40 euros per infant-day) and formula feeding (9.5 euros per person-day). This change in reimbursement rate was implemented in late 2017. Prior to the change, the amount of 23 euros was paid to the hospital for every day of an infant's tube feeding regardless of food type (mother's own milk, donor milk, formula).
- Preferential valuation of the product connected to human milk nutrition was so motivating that after one year more than half of providers (56%) reported enteral feeding with human milk. Especially high frequency was visible in patients with severe neonatal pathology.
- There was no impact of the presence of a milk bank on the frequency of reporting procedures to the National Health Fund in the first year of reimbursement

minimal enteral feeding (MEF), as soon as possible (Hay, 2018).

The method of infants' enteral feeding depends on the severity of prematurity, clinical condition, and ability to synchronize and generate an appropriate suck-swallow process, with respiration. There is usually a necessity to use tube feeding at the beginning (including orogastric and nasogastric most frequently and less frequently feeding tubes placed directly into the abdomen, such as a gastrostomy, gastrojejunostomy, or jejunostomy feeding tubes).

Clinically proven MEF benefits include improvements in enteral feeding tolerance, weight gain, systemic sepsis risk reduction, and hospitalization length of stay reduction (Manea et al., 2016). The type of food introduced as MEF strongly influences the improvement of newborn's medical condition and prevention of further complications, even such severe conditions as necrotizing enterocolitis (NEC; Hair et al., 2016; Sisk et al., 2017). The optimal enteral feeding is the infant's mother's own expressed milk (i.e., expressed mother's milk; EMM), or if it is not possible,

donor human milk (DHM) from a human milk bank (HMB; World Health Organization, 2011, pp. 16–19).

Feeding newborns in neonatal intensive care with only human milk is a rational choice from social, health, and financial points of view. Researchers have found that feeding with human milk starting the first day of life of a newborn, even an ill newborn, is a clinically effective intervention to prevent NEC (Quigley et al., 2019). NEC, both medical and surgical, results in very high treatment costs (Colaizy et al., 2016). The currently available evidence from a systematic review suggests that feeding preterm infants with formula instead of DHM, when EMM is insufficient, increases the risk of NEC nearly twice (relative risk ratio [RR] = 1.87, 95% CI = 1.23–2.85; Quigley et al., 2019). Moreover, newborns fed optimally in the hospital get fewer viral infections in the first year of life, which eliminates additional costs of doctors' appointments and drugs purchased (Dritsakou et al., 2016; Taylor, 2019).

Jegier et al. (2013) claimed that the cost of obtaining mother's milk is low in comparison to the risk of expenses connected to formula feeding and depends on milk expressing efficiency. The institutional cost for 100 ml of EMM varies depending on day of pumping from infant's birth and amount pumped per day. The median cost for 157 mothers of very low birth weight (VLBW) infants who pumped ≥ 700 ml per day was \$0.51 compared to \$7.93 for those who pumped <100 ml per day (Jegier et al., 2013). The total cost estimates included pump, pump kits, and milk container costs.

The National Health Fund (NHF) in Poland operates as the "single payer" in the health care system by financing public health care through agreements with hospitals, which are the system's beneficiaries and health care providers. The cost of a guaranteed medical procedure is fixed by the NHF and reimbursed at the same level to every hospital based on an annual agreement for the provision of health care services. Enteral feeding is a guaranteed service in Poland during hospital treatment, in cases of feedings given with a tube (referred to as tube feeding further in this text). Prior to the implementation of the restructured reimbursement rate for newborn tube feedings described in this article, the procedure of tube feeding was financed by the NHF as follows. The amount of 23 euros was paid to the hospital for every day of patients' tube feeding regardless of food type (mother's own milk, donor milk, formula). The study aims were to:

1. Restructure the reimbursement rates to hospitals in Poland for infants' tube feedings to favor the use of DHM over infant formula for newborns who required supplementation of EMM; and
2. Evaluate the results of the financing change during the first year, 2018, of implementation.

Method

Design

We conducted a process/implementation (also called formative) and outcome (also called summative) evaluation study (Polit & Beck, 2017, pp. 238–239) during the planning and implementation of restructured reimbursement rates for preterm infants' tube feedings in Poland. This type of evaluation yields descriptive data about the processes used to implement a new program, or improve an existing one, and to determine how the program works. The outcome aspect of this type of evaluation does not necessitate use of a rigorous experimental design. Instead, investigators determine the extent to which the intended outcomes occur (Polit & Beck, 2017, p. 239). At a later stage of the research program, the project team might conduct a study using a longitudinal design to evaluate intermediate or long-term project aims (e.g., a study of selected preterm infant outcomes in relation to extent of use of EMM and/or DHM compared to commercial cow milk or plant-based formulas).

Ethical Conduct of Study. Institutional review board approval of this study was determined to be unnecessary due to factors described in the following subsection and the data collection subsection. The local Ethics Committee at Warsaw Medical University did not raise any objections to the study based on the provided information about requirements and conditions of the evaluation study conducted.

Entities That Granted Permission for Use of Data for This Study. The data presented in the article came from two independent sources: first, the Agency for Health Technology Assessment and Tariff System (AGENCY; data concerning tariff [i.e., reimbursement] valuation of human milk enteral feeding), and second, the NHF (data concerning services of human milk enteral feeding).

The data concerning tariff (i.e., reimbursement) valuation were collected primarily by the Human Milk Bank Foundation (HMBF) and transferred to AGENCY based on an agreement between AGENCY and HMBF. These data are currently publicly available as an AGENCY Report only in the Polish language (AGENCY, 2016).

The data concerning the realization of the service of human milk enteral feeding were obtained based on an official request to the president of the Polish NHF made by the first author, as an employee of Warsaw Medical University, to be used for the purpose for this article. All authors of this article were working on the study on behalf of the HMBF.

Setting

Poland is in East-Central Europe and has a population of 38.4 million people. All Polish citizens have access to publicly financed health care services. In 2018 there were

Table 1. Abbreviations Used in Article.17 VLBW very low birth rate

Abbreviation	Explanation of abbreviation
AGENCY	Agency for Health Technology Assessment and Tariff System
DGR	Diagnosis related group
DHM	Donor human milk
EMBA	European Milk Bank Association
EMM	Expressed mother's milk
EU	European Union
GDPR	General Data Protection Regulation
HACCP	Hazard analysis and critical control points
HMB	Human milk bank
HMBF	Human Milk Bank Foundation
MEF	Minimal enteral feeding
NEC	Necrotizing enterocolitis
NHF	National Health Fund
NICU	Neonatal intensive care unit
PATH	Nonprofit organization that leads in innovating global health
VLBW	Very low birth weight

388,000 live births (Polish Demographic Yearbook [Polish], 2019). Preterm newborns comprised 20,000 births. In 2016, Poland introduced a support program for families, called For Life, that ensures the increase in quality and availability of medical services for women with a complicated pregnancy and their babies who are diagnosed with severe disabilities during the prenatal period or during labor. One of the aims of the For Life program is provision of better access to human milk for newborns and infants by creating the network of HMBs in Poland. This aim caused positive governmental reaction to actions of the HMBF, which since 2010 has been promoting the idea of human milk banking. In 2015 five HMBs operated under the patronage of the HMBF and the European Milk Bank Association (EMBA). Between 2016 and 2019, 11 additional HMBs were created with the support of Polish government's program For Life. Most of them operate regionally, one in most of the 16 provinces. However, three provinces opened two HMBs and three provinces did not open any HMB. Abbreviations used in this article, including names of Polish and international entities, are presented in Table 1.

Sample

Aim 1: Restructure Reimbursement Rates to Polish Hospitals for Infant Tube Feedings. Administrative data from the following two hospitals were used to develop cost estimates necessary to restructure reimbursement rates for infant tube feedings.

- Neonatal Unit and Human Milk Bank in Ludwig Rydygier Provincial Polyclinical Hospital in Toruń—data from January 1, 2015 to December 31, 2015
- Neonatal Unit and Regional Human Milk Bank in the Holy Family Specialist Hospital in Warsaw—data from January 1, 2016 to June 30, 2016

Aim 2: Evaluate the Results of the Financing Change During the First Year of Implementation, 2018. NHF provided administrative data concerning the 2018 provision of the service of tube feeding with DHM and/or EMM using restructured reimbursement rates, which were amended in October 2017. Data came from all 16 provinces in Poland, each of which has an assigned ID code (e.g., A1, B2). Data were provided by NHF according to hospitalization type (diagnosis related groups [DRG] abbreviated as N21–N26 and N31–N34), according to which service provision was checked in medical centers of average or high level of neonatal care (II and III level) in particular provinces.

Measurement

Aim 1 Measurement: Restructure Reimbursement Rates to Polish Hospitals for Infant Tube Feedings. The restructured reimbursement rates were determined based on quantitative data obtained from NICUs with HMBs as described in the Sample and Data Collection sections above and below, respectively. Four financial datasheets of cost were obtained. They included data about health care services costs concerning enteral tube feeding of newborns and infants who could not be breastfed.

Aim 2 Measurement: Evaluate the Results of the Financing Change. Administrative data we collected included the number of reporting medical centers, number of patients receiving benefits, number of patients receiving benefits per center, and median feeding time (in days).

Data Collection

Protection of Mother, Infant, and Donor Data. Throughout the study we did not have access to any personal identifying data regarding milk donors, donors' recipients, or recipients' mothers. Personal sensitive data in HMB services in Poland are protected under the General Data Protection Regulation (GDPR) in compliance with European Union (UE) regulations. In Polish milk banks, traceability is a part of the Hazard Analysis and Critical Control Points (HACCP) system, but anonymity of donors and recipients is guaranteed by a barcode system. When consenting to be a human milk donor or consenting for an infant recipient, the donor or parent is also consenting for the use of these data for statistical and research purposes. The only data we used in this article are the statistical data concerning milk donations and infant beneficiaries.

Aim 1 Data Collection: Restructure Reimbursement Rates to Polish Hospitals for Infant Tube Feedings. The valuation (i.e., of monetary worth) was performed using financial and accounting data and other nonfinancial information obtained from the two hospitals described in the Sample (Aim 1) subsection, which served as representative cost centers. The data transfer was voluntary and based on a partnership agreement between the HMBF and those hospitals. Final calculations included financial and accounting data from one additional hospital with an interior milk bank unit that is not a regional milk bank. Data were obtained by AGENCY with respect to the principle of transparency and equal treatment according to Art. 311c of the Act on Publicly Funded Healthcare Benefits of August 27, 2004 (J.L. 2015, item 581, as amended).

Financial datasheets were prepared by AGENCY according to the following incurred cost categories:

1. Fixed costs were the costs of human resources, purchasing, amortization, and maintenance of devices and space of provider and other costs concerning entities' functioning. Fixed costs were analyzed together with nonfinancial data concerning human resources and infrastructure engaged in service realization.
2. Variable costs were the costs of medical devices, drugs, and medical procedures. Financial calculation of this part of costs included the data concerning drug type, use of drugs and medical devices, and types of medical procedures provided within the service.

The above cost types were demonstrated in three categories of tube feeding: EMM, DHM, and formula. The parameters to be assessed within each of the three categories included the following:

1. HMB procedures: milk composition assessment, laboratory tests, human milk pasteurization (unit cost for HMB, number/usage and frequency/percentage), donor's eligibility visit, diagnostic tests, parental consent for administration of DHM, lactation counseling, medical devices, milk portion data (number of doses, food volume/ administration, feeding time)
2. Milk portioning: medical devices, milk enrichment—unit cost for HMB/ward, number/usage and frequency/percentage
3. Milk cooling and freezing—unit cost for HMB/ward, number/usage and frequency/percentage
4. Transport to the recipient—unit cost for HMB/ward, number/usage and frequency/percentage
5. Milk heating—unit cost for HMB/ward, number/usage and frequency/percentage
6. Staff engaged in pasteurization, portioning, enrichment, cooling and freezing the milk—staff category, number of people/time
7. Fortifying EMM or/and DHM with commercially available human milk fortifier (the only product on

- the Polish market is cow milk fortifier made by a company that does not comply with the International Code of Marketing of Breastmilk Substitutes)
8. General data—number of services/year, number of beneficiaries/year, number of donors/year
 9. Administrative costs and other

Aim 2 Data Collection: Evaluate the Results of the Financing Change. The effect of the change in financing was evaluated through the analysis of services favoring high-risk newborns, including the ones born prematurely (before 37th week of pregnancy) for whom supplementation of EMM was necessary. NHF provided data for 2018 concerning the number of reporting centers, number of patients with services, number of patients with services per center, and median feeding duration (in days). Data were presented according to hospitalization types (DRG) and provision in particular provinces was checked. The number of DHM beneficiaries in 2018 was obtained from HMB operators in response to HMBF request.

Data Analysis

Aim 1 Data Analysis: Restructure Reimbursement Rates to Polish Hospitals for Infant Tube Feedings. Taking into account the average consumption of feeding products at the level reported by providers (i.e., hospitals) in datasheets and the median number of feeding days per patient (8 days), the costs of every element of service for each food type were calculated.

Analysis of data delivered by providers (i.e., hospitals) in order to propose the tube feeding product with the restructured reimbursement rates was performed according to health care services tariffication methodology (Agency for Health Technology Assessment and Tarif System, 2016)

Aim 2 Data Analysis: Evaluate the Results of the Financing Change. Data obtained from the NHF were analyzed, in order to evaluate the tube feeding product with the restructured reimbursement rates, according to the frequency of tube feeding with donor milk or with expressed own mother's milk in particular DRG groups, with reference to the number of live births in each particular DRG group in 2018 (Polish, 2019). Descriptive statistics (mean, standard deviation, median, interquartile range) were estimated with the use of statistics software for biomedical and public health research (StatsDirect, version 2.8.0., 2013).

Results

Aim 1: Restructure Reimbursement Rates to Polish Hospitals for Infant Tube Feedings

Estimating Cost of Infant Tube Feedings Using EMM, DHM, and Commercial Formula. The costs of tube feeding per

infant—per day were estimated as follows: 15 euros (\$15.75) for EMM milk, 63 euros (\$66.15) for DHM milk, and 9.5 euros (\$9.97) for formula (Figure 1). Formulation of two new products in the tube feeding catalog was suggested: feeding with human milk (EMM and/or DHM—product I) and nonhuman milk formulas (formula—product II). The products were included in the catalog and are possible to add up for each relevant DRG (N21–N26 and N31–N34). The reimbursement point value for the product comprising human milk amounts to 3.42 points, which equals 40 euros per day for preterm infants' tube feedings. The value for formula tube feedings amounts to 0.82 point, which equals 9 euros per day. The previous overvalued reimbursement of feeding with formula was more than halved (59% reduction)—from 23 to 9.5 euros per infant-per day. The products were designed for ill newborn and preterm infants from birth until the fourth week of corrected age is reached. The new products were introduced by the Ordinance of National Health Fund president on September 27, 2017, and were available for use after 30 days from the date of signature.

Cost Estimates for 100 ml of EMM, DHM, and Commercial Formula. An AGENCY analysis indicated that obtaining 100 ml of EMM in Polish medical centers costs 7 euros. The cost of 100 ml of DHM was calculated by milk bank centers in Poland and costs range from 4 to 6 euros. Also, 100 ml of formula costs 0.4 euro for medical centers according to AGENCY estimation (Table 2).

Unethical practices that deeply reduced the price of infant formula for medical centers may even cause this cost underestimation (source of written expert's opinion on AGENCY Report; AGENCY, 2016). Unfortunately, the Code of Marketing of Breast-Milk Substitutes (World Health Organization, UNICEF, & IBFAN, 2018) has not, so far, been fully implemented in Polish law and violations have not been monitored and punished.

Aim 2: Evaluate the Results of the Financing Change

In 2017, the year before the new tube feeding valuation was operationalized, tube feeding was realized among 7,380 NICU newborns in Poland. In 2018, the first year in which financing depending on food type was introduced, 85 (61.6%) service providers (i.e., hospitals) out of 138 Polish hospitals with NICUs reported tube feeding with EMM and/or DHM milk in 5,530 patients. Of these, 2,323 newborns were fed DHM, not only by tube feeding but also as a supplement to mother's milk, provided by bottle when infants could not nurse from the mother's breast. This contrasts with 2015 when only 500 newborns used DHM. Only 1,925 newborns received formula tube feeding (source of data NHF). Hospital beneficiaries reported that 74% of infants who needed tube feedings were fed with human milk, exclusively or partially, during 2018.

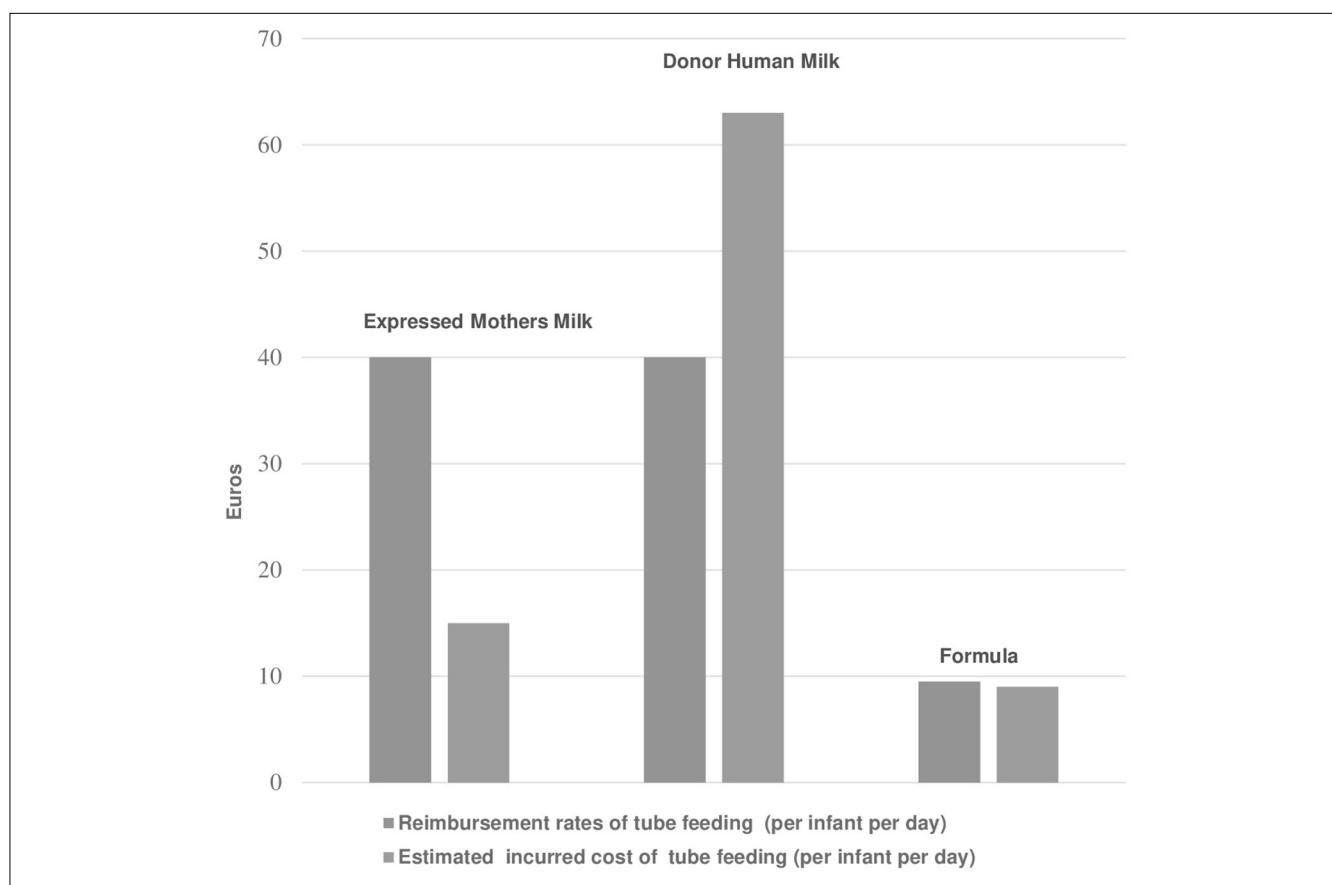


Figure 1. Comparison of Reimbursement Rates for Infant Tube Feedings and Estimated Incurred Cost of Tube Feedings.

Table 2. Comparative Costs by of Infant Feeding Methods.

Feeding costs	Polish estimates		Other available estimates ^{c,d}	
	Euros	\$	Euros	\$
Cost per volume (100 ml)				
EMM	7	7.74 ^b	7.18–46.1	0.51–7.93 ^d
DHM	4–6	4.42–6.63 ^b	10–12 ^c	11.05–13.26
EMM and/or DHM	7	7.74 ^b		
Formula ^a	0.4	0.44 ^b		
Cost of tube feedings^e				
EMM	15.0	15.75		
DHM	63.0	66.15		
Formula	9.5	9.97		

Note: Currency conversions are approximate because they were not all calculated on the same date. EMM = expressed mother's milk; DHM = donor human milk.

^aCommercial cow milk or plant-based formula.

^bEstimated by Agency for Health Technology Assessment and Tariff System in Poland of the cost of 100 ml of milk.

^cOther European countries (European Milk Banking Association, personal communication with first author, November 2018).

^dJegier et al. (2017); study setting Chicago, IL.

^eCosts of tube feeding per infant, per day for a median number of feeding days per patient (8 days) as reported by health care service providers (i.e., hospitals) in datasheets.

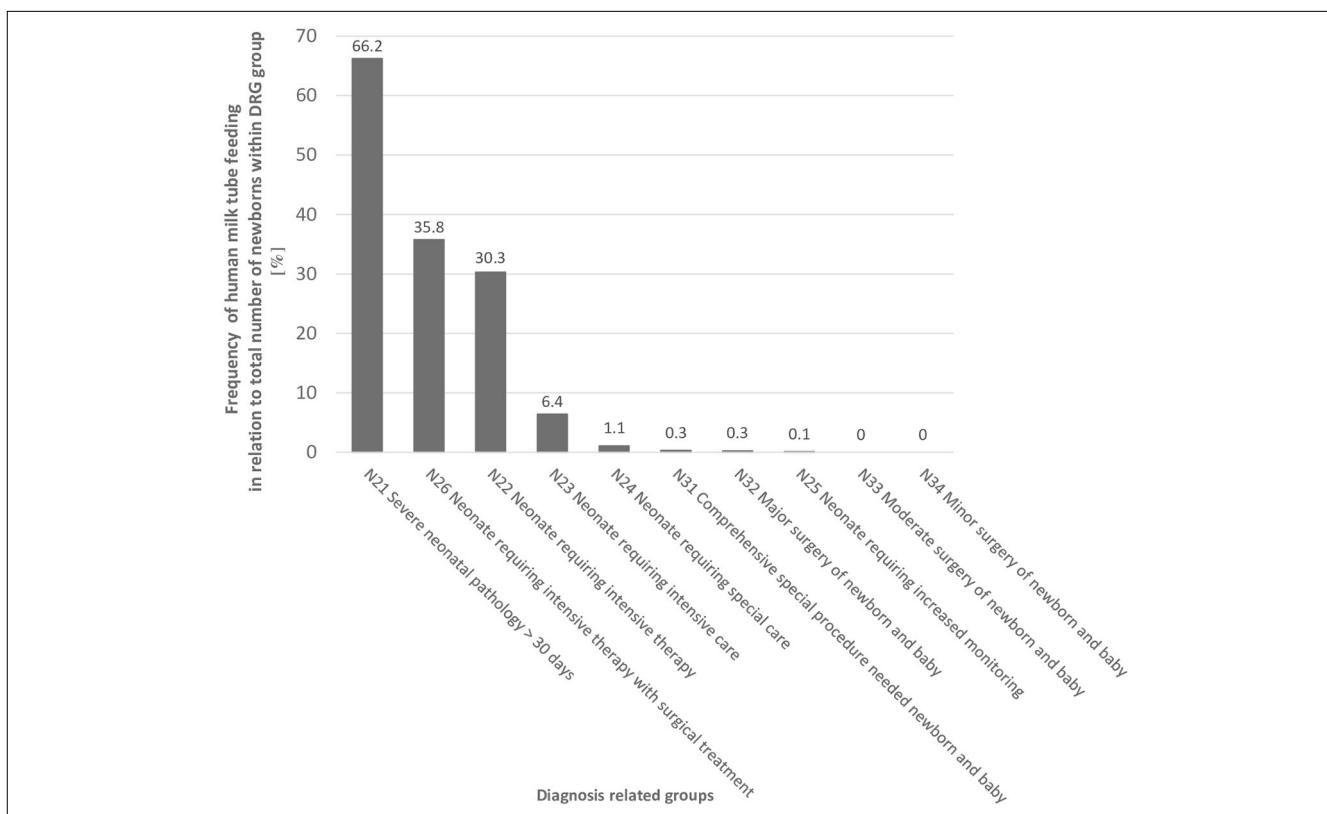


Figure 2. Percentage of Infants Who Received Human Milk Tube Feedings in Each Diagnosis Related Group.

Note: Percentage of infants who received human milk tube feeding is presented in relation to number of live births in each diagnosis related group N21–N26, N31–N34.

Individual centers reported from 1 to 599 patients with an average of 65 (SD 96) patients and median of 28 (IQR 8-92) patients. Centers reporting tube feeding with EMM and/or DHM for a minimum of 100 patients accounted for 23.5% of all centers (20 out of 85) and they were responsible for feeding 70% of patients ($n = 3,871$). Formula tube feeding was reported by 65 centers for 1,925 patients.

Tube feeding with EMM and/or DHM was reported for two-thirds of patients who were hospitalized within N21 DRG group (severe neonatal pathology > 30 days, 66.2%, average 36.5 feeding days); slightly over one-third of patients who were hospitalized within the N26 DRG group (neonate requiring intensive therapy with surgical treatment, 35.8%, average 22.1 feeding days); slightly under one-third of patients within N22 DRG group (neonate requiring intensive therapy, 30.3%, average 12.6 feeding days); and 6.4% of patients hospitalized within N23 DRG group (neonate requiring intensive care, average 8.8 feeding days). Reporting frequency of this procedure within other DRG groups is at a low level (Figure 2).

The frequency of human milk feeding per 1,000 live births in 2018 in particular provinces (Polish, 2019) is illustrated in Figure 3. The reporting frequency of enteral tube feeding with EMM and/or DHM in particular provinces (A1–P16) accounts for median 4.59 (IQR = 1.78-6.37) per 1,000 live births. The highest frequency rate of enteral tube feeding with EMM and/

or DHM was 7.94 and the lowest rate was 0.15 per 1,000 live births.

Discussion

Aim 1: Restructure Reimbursement Rates to Polish Hospitals for Infant Tube Feedings

The visible disproportion between cost of obtaining EMM and DHM (Figure 1) caused huge ethical controversies during the establishment of the reimbursement rates for the hospital beneficiaries. If higher reimbursement rates for DHM were set in accordance with the evaluated higher cost of obtaining it, in comparison to EMM, this might have resulted in over-use of donor milk because of enhanced reimbursement. It could have carried the risk of abandonment of adequate breastfeeding support of preterm infants' mothers by health care professionals in hospital settings. This is because obtaining EMM on NICUs requires devices, space and labor input of physicians, nurses, IBCLCs, if available, and preterm infants' mothers.

In order to avoid the risk of preference to use DHM, the decision was made that tube feeding with both EMM and DHM would be reimbursed at 40 euros per each infant—per day, regardless of the differences in costs between feeding with the two food categories. Taking into account that EMM is

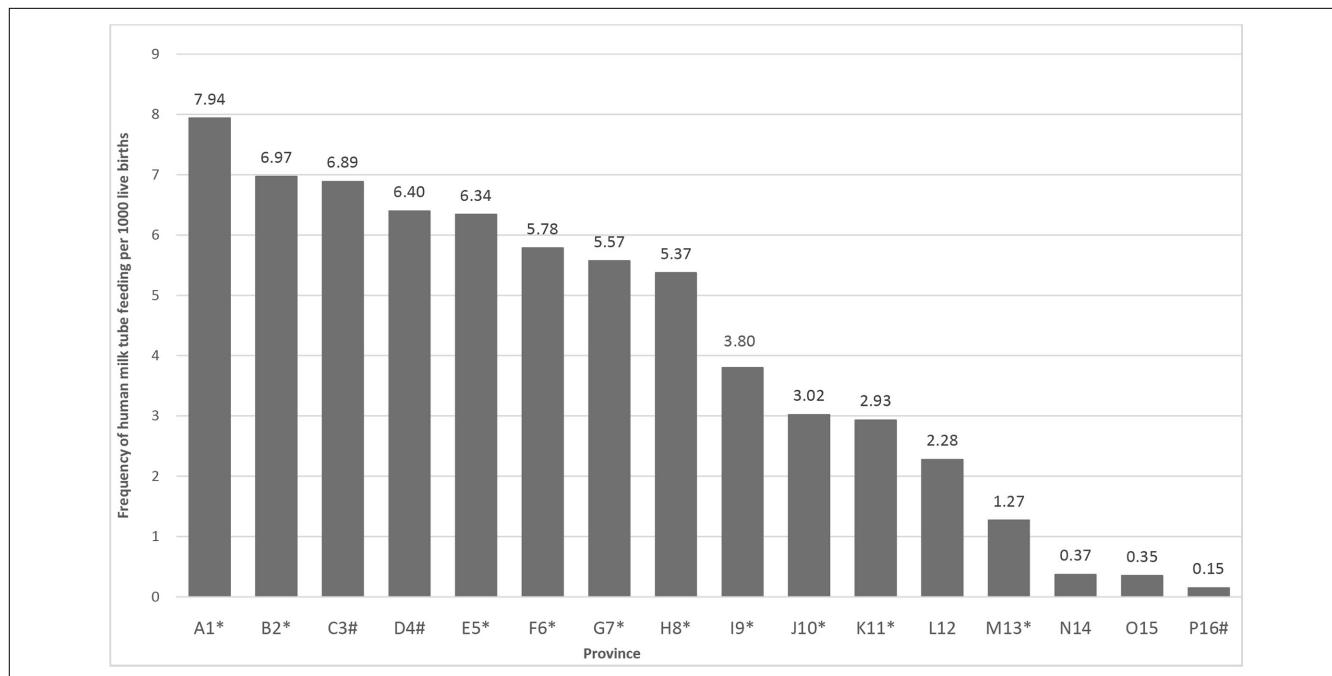


Figure 3. Number of Infants Receiving Human Milk Tube Feedings per 1000 Live Births in Each of 16 Provinces.

Note: Provinces are coded A1-P16. # Indicates two human milk banks in the province. * Indicates one human milk bank in the province. Three provinces have no milk bank currently.

always the first choice, higher financial valuation of DHM than EMM would be unethical, even if it would be proportional to the costs of obtaining the donor's milk compared to supplying mother's milk. The current financial valuation should cause an increase in the provision of a human-milk-based feeding procedure (EMM and/or DHM) because hospital beneficiaries are currently reimbursed a higher amount of money for infants fed entirely by tube with an exclusively human-milk-based diet. At the same time, the overvalued reimbursement of commercial formula was more than halved. The current financial valuation for commercial formula normalizes the amount of reimbursement for feeding with formula to the level of real costs of obtaining it (Figure 1).

The cost of 100 ml of DHM in other European countries is two times more than in Poland (European Milk Banking Association, personal communication, November 2018). The costs of feeding the infant with DHM are much higher than the costs of feeding with EMM.

However, the value of DHM (Table 2) calculated by DHM providers (i.e., HMBs) in Poland does not represent the real value that covers many elements (e.g., costs of personnel work) but only the part that represents participation of hospitals in costs borne by regional HMBs, which provide milk for the whole region (HMBF, personal communication, May 2014).

Even though the cost of obtaining 100 ml of EMM in Poland (7 euros) is coherent with calculations done in the United States (Jegier et al., 2010; Jegier et al., 2013), it is possible that the cost of tube feeding with expressed human milk may be underestimated because some costs needed for obtaining human

milk are stated theoretically. The costs of lactation counseling for preterm infants' mothers and providing of breast pumps at discharge are just estimates because they are not financed by Polish hospitals in any way.

Aim 2: Evaluate the Results of the Financing Change

The Aim 2 results reported above indicate that the total number of tube feedings reported to NHF is comparable pre- and post-implementation of the new reimbursement. This indicates that higher financial valuation of the human-milk-based tube feeding procedure is enough of a motivator to increase efforts connected with obtaining EMM or DHM.

Restrictions on reimbursement of human milk feeding only for those patients who need tube feeding may cause risk of overuse of those procedures in the group of patients for whom tube feeding is not justified. Due to this fact, the frequency of reporting tube feeding to NHF by hospital beneficiaries was analyzed in particular DRG groups. Figure 2 illustrates that the frequency of reporting human milk tube feeding was the highest in DRG group N21. This seems logical because infants in this DRG group had the most severe pathology (newborns below 1,000 g and before the 28th gestation week). High rates also were observed in newborns requiring intensive therapy with surgical treatment (N26) and newborns requiring intensive therapy (N22). The frequency of human milk tube feeding in particular DRG groups in relation to number of live births does not support concerns associated with change in reimbursement to hospital beneficiaries introduced in late 2017. A

larger percentage of seriously ill patients were fed by tube and for a longer time.

Due to high costs of obtaining DHM and reimbursement of only those who are fed by tube, there is a risk that patients requiring tube feeding will be the only ones qualified for DHM administration. It causes some ethical concerns, as medical procedure availability cannot be based only on its reimbursement. Medical indications for DHM administration are various and health benefits are not restricted to MEF or tube feeding (Hagadorn et al., 2016). Providing pasteurized DHM to term newborns, including healthy ones fed orally, is becoming increasingly widespread in hospitals. Such donor milk can be used as a bridge until the mother's supply comes in (Belfort et al., 2018; Drouin et al., 2019).

The experts of the global nongovernmental organization PATH have developed a resource toolkit and decision tree that helps health care providers to decide about prescribing DHM on the basis of criteria that are not only connected to the baby's clinical condition, but also to the psychophysical state of mother and the chance of lactation development (PATH, 2019).

Feeding with EMM and/or DHM should be a crucial element in policy and protection of breastfeeding. Researchers who have studied the relationship between the presence of HMBs in or near medical centers and the rates of feeding with mother's own milk have had mixed results (Williams et al., 2016). The reporting frequency of tube feeding with EMM and/or DHM to NHF was analyzed in each province, bearing in mind functionality of HMB in the region (Figure 3). Data indicate huge discrepancies in the reported procedure usage. The province with the highest rate of tube feeding with human milk reported the procedure to NHF 52 times more frequently than the province with the lowest rate.

Our results indicate no direct positive effect of the existence of a HMB on reported frequency of tube feeding with human milk to NHF. This is particularly obvious in one province (M13). There, the reported frequency of tube feeding with human milk is low, although a HMB has been working there many years. What is more, during the analyzed period a lot of patients received donor milk in this province. The number of infants in this province who have been fed by donor milk constitutes 14% of all DHM recipients in the whole country. This may mean that not all the patients fed by EMM/DHM by tube feeding were reported to NHF.

It is probably a matter of insufficient knowledge about the possibilities of reporting provision of those to NHF and reimbursement for this new tube feeding procedure by hospitals. Therefore, we believe there is a need for spreading the knowledge about practical and medical aspects of financing feeding with human milk procedure in Poland and worldwide.

Limitations

The main limitation of the study is our inability to compare current data, collected during 2018 concerning procedure reporting to NHF, to previous data. Because of the novelty of

the reimbursement services any comparison is not fully informative. Another weak point of the study was lack of access to data regarding health outcomes of a human-milk-based diet provision for newborns treated in medical centers with a high level of neonatal care in Poland. Those data have to be collected regionally, but analysis and monitoring should be done at government level.

Conclusion

Based on our knowledge, Poland is the only European country where the reimbursement cost for human-milk-based nutritional therapy has been implemented in a manner intended to increase the quality of health care services for preterm newborns. The above analysis indicates that preferential financial valuation of feeding with human milk (EMM and/or DHM) is ethically justified. Equal reimbursement for EMM and DHM did not appear to cause overuse of donor milk based on our analysis of 2018 data, collected after the change in reimbursement was made. The existence of local HMBs in 13 provinces in Poland did not appear to cause higher frequency in reporting of tube feeding procedures by hospital beneficiaries to NHF in the first year of the restructured reimbursement rate. Similar comparative analyses should be repeated in order to assess clinical, medical, and organizational benefits that derive from introducing this solution.

Acknowledgments

The authors acknowledge Elzbieta Lodykowska, PhD and Damian Ryznar from Regional Human Milk Bank in Warsaw, and Anna Ruminska from Regional Human Milk Bank in Torun for conscientious and efficient transfer of cost data concerning the work of human milk bank; Krzysztof Łanda, deputy minister of health in the years 2015–2017, for key decisions in implementation the financing for feeding newborns with human milk in Poland; Members of the Agency for Health Technology Assessment and Tariff System—Roman Trzmiel, Agnieszka Włodarczyk, and Director of Tariff Department, Gabriela Sujkowska—for cooperation while establishing the costs of enteral feeding procedure; Wojciech Zawalski, director of the Department of Health Care Benefits at the National Health Fund in the years 2017–2018, for stating the formula of financing milk banks in Polish system of mother and child care; and Andrzej Jacyna, president of the National Health Fund in the years 2016–2018, for openness to new solutions that ensure the highest quality of medical procedures concerning feeding of the youngest patients.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

- Aleksandra Wesolowska, PhD  <https://orcid.org/0000-0002-7270-5910>
 Elena Sinkiewicz-Darol, PhD  <https://orcid.org/0000-0002-4123-866X>

References

- Agencja Oceny Technologii Medycznych i Taryfikacji [Agency for Health Technology Assessment and Tarif System]. (2016). *Report setting the tariff rate of tube feeding with formula, donor milk or expressed mother's milk in population of preterms up to 4th week of corrected age and sick infants who are not able to be breastfed*. http://www.aotm.gov.pl/www/wp-content/uploads/taryfikacja/2016/projekty_taryf/raporty/41/WT.541.25.2016_zywienie_dojelit_raport_20161205.pdf
- Belfort, M. B., Drouin, K., Riley, J. F., Gregory, K. E., Philipp, B. L., Parker, M. G., & Sen, S. (2018). Prevalence and trends in donor milk use in the well-baby nursery: A survey of northeast United States birth hospitals. *Breastfeeding Medicine*, 13(1), 34–41. doi: 10.1089/bfm.2017.0147
- Brennan, A. -M., Murphy, B. P., & Kiely, M. E. (2016). Optimising preterm nutrition: Present and future. *Proceedings of the Nutrition Society*, 75(2), 154–161. doi:10.1017/S0029665116000136
- Colaizy, T. T., Bartick, M. C., Jegier, B. J., Green, B. D., Reinhold, A. G., Schaefer, A. J., Bogen, D. L., Schwarz, E. B., Stuebe, A. M., & Jobe, A. H., .., & Eunice Kennedy Shriver National Institute of Child Health and Human Development Neonatal Research Network. (2016). Impact of optimized breastfeeding on the costs of necrotizing enterocolitis in extremely low birthweight infants. *The Journal of Pediatrics*, 175, 100–105. doi:10.1016/j.jpeds.2016.03.040
- Dritsakou, K., Liosis, G., Valsami, G., Polychronopoulos, E., Souliotis, K., & Skouroliakou, M. (2016). Mother's breast milk supplemented with donor milk reduces hospital and health service usage costs in low-birthweight infants. *Midwifery*, 40, 109–113. doi:10.1016/j.midw.2016.06.015
- Drouin, K. H., Riley, J. F., Benjamin, C., Gregory, K. E., Sen, S., & Belfort, M. B. (2019). Donor milk policies for level 1 newborn care: A descriptive analysis. *Breastfeeding Medicine*, 14(8), 592–596. doi:10.1089/bfm.2019.0094
- Hagadorn, J. I., Brownell, E. A., Lussier, M. M., Parker, M. G. K., & Herson, V. C. (2016). Variability of criteria for pasteurized donor human milk use: A survey of US neonatal intensive care unit medical directors. *Journal of Parenteral and Enteral Nutrition*, 40(3), 326–333. doi:10.1177/0148607114550832
- Hair, A. B., Peluso, A. M., Hawthorne, K. M., Perez, J., Smith, D. P., Khan, J.Y., O'Donnell, A., Powers, R.J., Lee, M.L., & Abrams, S.A. (2016). Beyond necrotizing enterocolitis prevention: Improving outcomes with an exclusive human milk-based diet. *Breastfeeding Medicine*, 11(2), 70–74. doi:10.1089/bfm.2015.0134
- Hay, W. W. (2018). Nutritional support strategies for the preterm infant in the neonatal Intensive care unit. *Pediatric Gastroenterology, Hepatology & Nutrition*, 21(4), 234–247. doi:10.5223/pgxn.2018.21.4.234
- Jegier, B. J., Johnson, T. J., Engstrom, J. L., Patel, A. L., Loera, F., & Meier, P. (2013). The institutional cost of acquiring 100 mL of human milk for very low birth weight infants in the neonatal intensive care unit. *Journal of Human Lactation*, 29(3), 390–399. doi:10.1177/0890334413491629
- Jegier, B. J., Meier, P., Engstrom, J. L., & McBride, T. (2010). The initial maternal cost of providing 100 mL of human milk for very low birth weight infants in the neonatal intensive care unit. *Breastfeeding Medicine*, 5(2), 71–77. doi:10.1089/bfm.2009.0063
- Manea, A., Boia, M., Iacob, D., Dima, M., & Iacob, R. E. (2016). Benefits of early enteral nutrition in extremely low birth weight infants. *Singapore Medical Journal*, 57(11), 616–618. doi:10.1162/smedj.2016002
- PATH. (2019). Strengthening human milk banking: A resource toolkit for establishing and integrating human milk bank programs—A training curriculum template for hospital and human milk bank staff. <https://www.path.org/programs/maternal-newborn-child-health-and-nutrition/strengthening-human-milk-banking-resource-toolkit-4/>
- Paul, S. P., Kirkham, E. N., Hawton, K. A., & Mannix, P. A. (2018). Feeding growth restricted premature neonates: A challenging perspective. *Sudanese Journal of Paediatrics*, 18(2), 5–14. doi: 10.24911/SJP.106-1519511375
- Polish Demographic Yearbook [Polish]. (2019). <https://stat.gov.pl/> [Click on British flag for English version.]
- Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice*. Kluwer.
- Quigley, M., Embleton, N. D., McGuire, W., & Cochrane Neonatal Group. (2019). Formula versus donor breast milk for feeding preterm or low birth weight infants. *Cochrane Database of Systematic Reviews*, 20(6), CD002971. doi:10.1002/14651858.CD002971.pub5
- Sisk, P. M., Lambeth, T. M., Rojas, M. A., Lightbourne, T., Barahona, M., Anthony, E., & Auringer, S. T. (2017). Necrotizing enterocolitis and growth in preterm infants fed predominantly maternal milk, pasteurized donor milk, or preterm formula: A retrospective study. *American Journal of Perinatology*, 34(7), 676–683. doi:10.1055/s-0036-1597326
- StatsDirect. (2013). Version 2.8.0. <https://www.statsdirect.com/>
- Taylor, S. N. (2019). Solely human milk diets for preterm infants. *Seminars in Perinatology*, 43(7), 151158. doi:10.1053/j.semperi.2019.06.006
- Williams, T., Nair, H., Simpson, J., & Embleton, N. (2016). Use of donor human milk and maternal breastfeeding rates: A systematic review. *Journal of Human Lactation*, 32(2), 212–220. doi:10.1177/0890334416632203
- World Health Organization. (2011). *Guidelines on optimal feeding of low birth-weight infants in low-and middle-income countries*. World Health Organization.
- World Health Organization, UNICEF, & IBFAN. (2018). *Marketing of Breast-milk Substitutes: National Implementation of the International Code. Status Report 2018*. World Health Organization. https://www.who.int/nutrition/publications/infantfeeding/code_report2018/en/.

The Patterns and Social Determinants of Breastfeeding in 12 Selected Regions in China: A Population-Based Cross-Sectional Study

Journal of Human Lactation

2020, Vol. 36(3) 436–447

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334419868156

journals.sagepub.com/home/jhl



Zhe Fang, BM^{1,4}, Yuning Liu, MSc², Hanyu Wang, BA³,
and Kun Tang, PhD⁴ 

Abstract

Background: With rapid industrialization and urbanization, there is a growing need for women to enter the workforce, and affluent people are drawn to the infant formula market. The breastfeeding rates in China are below the optimal level. Large scale quantitative research studying breastfeeding practices after 2015 in China are lacking.

Research aim: We aimed to (1) explore the latest patterns and (2) identify the determinants of breastfeeding in China.

Methods: The study was a population-based, cross-sectional survey. A multi-stage sampling technique was adopted for the selection of participants. We recruited 10,408 mothers with children under 12 months old, in 12 regions of China, and conducted a questionnaire survey about breastfeeding patterns. The associations between social and biophysical determinants and breastfeeding outcomes were analyzed using a logistic regression model.

Results: The exclusive breastfeeding rate was 29.32% ($n = 3,052$) decreasing from 32.71% ($n = 3,404$) to 15.83% ($n = 1,648$) among children aged 0–5 months. Cesarean section had a negative association with early breastfeeding initiation (OR = .33, 95% CI [.30, .36]), exclusive breastfeeding (OR = .78, 95% CI [.69, .89]), and predominant breastfeeding (OR = .73, 95% CI [.65, .83]). Compared to participants with an annual household income lower than 40,000 Yuan (\$5,817 USD), those with over 100,000 Yuan (\$14,542 USD) had an OR of .78 (95% CI [.67, .90]) in exclusive breastfeeding. Compared with illiterate and unemployed groups, middle/high school education and a current work status, respectively, were associated with a lower likelihood of exclusive breastfeeding (OR = .73, 95% CI [.63, .84]; OR = .58, 95% CI [.37, .89]).

Conclusions: The prevalence of breastfeeding in 12 selected regions in China was low and interventions focusing on the targeted population should be strengthened.

Keywords

breastfeeding, breastfeeding practices, complementary feeding, feeding patterns

Background

Researchers have demonstrated diverse and compelling advantages of breastfeeding for infants, mothers, families, and society (Victora et al., 2016). Multilevel programs and interventions have been put into action to improve breastfeeding practices. Despite the initiatives, breastfeeding rates are still far below the international target (World Health Organization [WHO], 2017). Researchers previously estimated that in low-income and middle-income countries, only 37% of children under 6 months were exclusively breastfed, and the breastfeeding duration in more affluent countries was generally shorter than in poor countries (Victora, et al., 2016). The prevalence of breastfeeding in the industrialized East Asia region was demonstrated to be below optimal level. Researchers found that in Korea the exclusive breastfeeding rate was only 11.4% (Chung, Kim, Choi, & Bae,

2013), and in Japan it was 55.9% (Patel, Bansal et al., 2015). In a population-based survey in Hong Kong, the prevalence of early initiation was 67.0% (Wang, Lau, Chow, & Chan, 2014). In the relatively poor South Asia region, there were

¹School of Public Health, Peking University Health Science Centre, Beijing, China

²Department of Global Health and Population, Harvard T. H. Chan School of Public Health, Harvard University, Boston, MA, USA

³Institute for Medical Humanities, Peking University Health Science Centre, Beijing, China

⁴Research Center for Public Health, Tsinghua University, Beijing, China

Date submitted: October 29, 2018; Date accepted: July 17, 2019.

Corresponding Author:

Kun Tang, PhD, Research Center for Public Health, Tsinghua University, Haidian District, Beijing 100191, China.
Email: tangk@mail.tsinghua.edu.cn

positive trends in breastfeeding practices but disparities existed in different countries and socioeconomic groups (Benedict, Craig, Torlesse, & Stoltzfus, 2018). In a cross-sectional study conducted in 55 counties of 30 provinces in China, ever breastfeeding prevalence was 79.6%, and only 20.8% of 14,539 children surveyed were exclusively breastfed for 6 months (Yang et al., 2016).

Except for very few with severely limiting medical disorders, almost all women are biologically capable of breastfeeding (American Academy of Pediatrics, 2018). However, breastfeeding practices are not merely biological issues, but are influenced by multifactorial determinants, including historical, socioeconomic, cultural, and individual factors (Lou et al., 2014; Zhou, Yu, & Qian, 2018). In China, breastfeeding practices face unique challenges, due to the country's enormous population, political system, and historical concepts regarding breastfeeding. Regulations and legislation targeting infant formula are not well-formed in China, which is also a challenge for breastfeeding practices (Kent, 2015).

Researchers who have conducted population-based studies in China have mainly focused on rates of breastfeeding, use of infant formula, and the nutrition status of infants (Duan et al., 2018; Yang et al., 2016). Studies regarding social determinants of breastfeeding are mostly qualitative or community-based quantitative studies (Lou et al., 2014; Zhao, Zhao, Du, Binns, & Lee, 2017; Zhou et al., 2018). A recent study, based on a national-level survey in China involving 12 regions, explored the social determinants of breastfeeding. However, the survey focused on family health rather than breastfeeding, and the small sample size in the study was a limitation to conducting further analysis (Chen, Cheng, & Pan, 2017). Similar breastfeeding surveys in Asian regions have similar problems, including ignoring the social determinants (Benedict et al., 2018; Chung et al., 2013; Patel et al., 2015; Wang et al., 2014), being outdated (Chung et al., 2013; Patel et al., 2015; Wang et al., 2014), or having a non-representative sample (Patal, Bansal et al., 2015). Thus, an updated breastfeeding survey regarding the social determinants of breastfeeding in China could narrow the research gap in China and in Asia more generally. We aimed to (1) explore the latest patterns and (2) identify the determinants of breastfeeding in Chinese populations.

Methods

Design

Our study was a population-based, cross-sectional survey. Cross-sectional studies estimate the distribution of a variable at a point in time, which can be used to study the prevalence or risk factor at a relatively low cost compared to case-control and cohort studies (Satten & Grummer-Strawn, 2014). It was the appropriate study design to investigate current breastfeeding patterns. Institutional Review Board approval was obtained from the China Centre for Disease Control and Prevention.

Key Messages

- Only 29.32% ($n = 3,052$) of study participants in the 12 selected regions exclusively breastfed their infants for 6 months.
- The three leading reasons participants reported for discontinuing breastfeeding were insufficient human milk supply, their belief that it was time to discontinue breastfeeding, and returning to work or school.
- Interventions that seek to promote breastfeeding should focus on early weaning risk factors, including culture, and socio-demographic and biophysical variables.

Setting

The study was conducted in 12 regions of China. Due to rapid economic development in China, both the family income and education level of citizens have increased remarkably. Women have become an important part of the workforce for the national economy. Moreover, China has become the largest market for infant formula in the world (Tang, Binns, & Lee, 2015). That means mothers are more likely to be able to afford human milk substitutes and are more likely to return to work after delivery, which has a negative influence on exclusive breastfeeding (Zhang, Jin, Vereijken, Stahl, & Jiang, 2015). Maternal and child care is primarily obstetrician-led. Pregnant women are required to see an obstetrician every 4 weeks until 28 weeks of gestation, every 2 weeks until 36 weeks, and weekly until birth (Yang, Ip, & Gao, 2018). A breastfeeding education session focusing on the benefits of and skills for breastfeeding is offered freely to pregnant women registered in the hospital. It is delivered by nurses and generally lasts for approximately 1 hr. In the postnatal ward, mothers get detailed guidance for breastfeeding practices, including postures, nipple treatment, etc., given by obstetric nurses. Certified lactation support providers in China are rare and most of the care and education is delivered by nurses (Yang et al., 2018). Smartphone-based online antenatal and postnatal education is becoming more and more popular in recent years (Ke, Ouyang, & Redding, 2018).

Sample

The target population was Chinese mothers whose children were under 12 months. Women who had already delivered their children and those with children under 12 months were considered as possible participants. Only those who could speak and read Chinese were considered. The exclusion criteria included psychiatric disorders, inability to answer questions independently, and unavailability of informed consent. Multi-stage stratified random sampling was used to select participants. In the first stage, a population proportionate sampling (PPS) method was applied based on socioeconomic

Table I. Definition of Breastfeeding Indicators.

Measurement	Definition	Citation
Early initiation of breastfeeding	Infants born in the last 12 months were put to the breast within an hour of birth	WHO. (2008). Indicators for assessing infant and young child feeding practices: Conclusions of a consensus meeting held 6–8 November 2007 in Washington DC, USA: WHO.
Exclusive breastfeeding	Infants aged 0–5 months were fed exclusively human milk	Lung'aho et al. (1996). Tool kit for monitoring and evaluating breastfeeding practices and programs. Washington, DC: Wellstart International.
Predominant breastfeeding	Infants aged 0–5 months were predominantly breastfed: mainly comprised infants who were fed by human milk and water	Lung'aho et al. (1996). Tool kit for monitoring and evaluating breastfeeding practices and programs. Washington, DC: Wellstart International.
Ever breastfeeding	Infants born in the last 12 months who were ever breastfed.	WHO. (2008). Indicators for assessing infant and young child feeding practices: Conclusions of a consensus meeting held 6–8 November 2007 in Washington DC, USA: WHO.
Current breastfeeding	Any breastfeeding in the last 24 hr for infants under 12 months	Lung'aho et al. (1996). Tool kit for monitoring and evaluating breastfeeding practices and programs. Washington, DC: Wellstart International.

development status, population structure, and maternal and child health status. Participants in 12 regions were divided into urban and rural types (four megacities, four medium-sized cities, two countryside areas, and two poor rural areas), two resident status groups (permanent resident and floating population), and two age groups (0–5 months and 6–11 months). Because the floating population mainly gathered in cities, migrant participants were surveyed only at urban survey points. In the second stage, one district or county was chosen in each of the 12 regions using simple random sampling methods. In the third stage, a simple sampling method was implemented to select 4–8 communities or villages from the chosen district or county in each of the 12 regions. In the last stage, potentially eligible participants were selected and invited by local community health workers or village doctors. We took the prevalence of exclusive breastfeeding in the 2013 China National Nutrition and Health Survey (CNNHS) as our estimated prevalence. The sample size was calculated based on the equation $N = \text{deff} \frac{u^2 p(1-p)}{d^2}$ ($p = 20.8\%$, $r = 20\%$, $d = r \times p = 4.16\%$, $u = 1.96$, $\text{deff} = 2$, response rate = 90%). The adequate sample size was 9760. Eventually, 10,408 eligible participants were recruited.

Measurement

Four breastfeeding outcomes were analyzed, including early initiation of breastfeeding (EIB), exclusive breastfeeding under 6 months (EBF), predominant breastfeeding under 6 months (PBF), and ever breastfeeding (ever BF). Their definitions are presented in Table 1. EIB and ever BF were defined according to WHO indicators (WHO, 2008). The final calculation of EIB prevalence and ever BF prevalence was conducted among participants with children aged 0–12 months. EIB prevalence was defined as the proportion of

participants with children born in the last 12 months who were put to the breast within 1 hr of birth. Ever BF prevalence was defined as the proportion of infants born in the last 12 months who were ever breastfed. EBF and PBF were defined and evaluated according to Wellstart International's toolkit for monitoring and evaluating breastfeeding activities (Lung'aho, Huffman, Labbok, Sommerfelt, & Baker, 1996), using a 24 hr recall methodology. The 24 hr recall methodology to access EBF and PBF, and the method to access EIB and ever BF, were recommended by the WHO (2010) because these indicators represented the best option for estimating breastfeeding outcomes, were more sensitive to capturing change, had been used in some large-scale research projects (including the Demographic and Health Surveys [DHS] conducted in over 90 developing countries), and were seen as comparably reliable and valid (www.dhsprogram.com; Lung'aho et al., 1996; WHO, 2010). Participants were asked to recall the food they fed to their children in the last 24 hr, and the final calculation of EBF prevalence and PBF prevalence was conducted among participants with children aged 0–5 months. EBF prevalence was defined as the proportion of infants aged 0–5 months who were fed exclusively human milk. PBF prevalence was defined as the proportion of infants aged 0–5 months who were predominantly breastfed, which mainly comprised infants who were fed human milk and water (Lung'aho et al., 1996). Furthermore, to explore participants' current breastfeeding situation, we also implemented the indicator of current breastfeeding (CBF) prevalence, defined as any breastfeeding in the last 24 hr of infants under 12 months (Lung'aho et al., 1996).

Mother–infant indicators and family socio-demo-economic status were the two categories of covariates incorporated in the study. Mother–infant indicators included maternal age, pre-pregnancy BMI, gestational age, infant birth weight, infant sex, parity, nipple problems, delivery method, and

delivery place. Nipple problems included cracked nipples, abnormally shaped nipples, swollen breasts, mastitis, or duct blockage of breast. Family socio-demo-economic status comprised residence location, migration status, maternal education, paternal education, household income, and maternal working status. Residence location was classified into four categories including megacity, medium-sized city, countryside, and poor rural areas. We use the term megacity as defined by the Chinese government: a city with over five million permanent residents. Poor rural areas were identified through a list of national-level poor counties compiled by the Poverty Alleviation Group of the State Council. Migration status was according to the national definition of a migrant resident in the latest China population census: People who had not lived in their domicile counties (their registered place of residence) for the last 6 months were regarded as migrant residents. Education level was categorized into illiterate, primary school, secondary school (middle and high school), college/university, and above.

Data Collection

The data collection was led and conducted by the China Centre for Disease Control and Prevention from June–November, 2017. The original questionnaire (in Chinese) is included in the supplemental material for this article. After registration and giving their informed consent, participants answered questions asked by well-trained health workers using a smartphone-based questionnaire. The health workers entered participants' responses into the smartphone app. When asked why breastfeeding was discontinued or stopped, participants were asked to pick from multiple choice responses. Over 90% completed all the questions. Data was kept secure under the rigorous management of the National Institute for Nutrition and Health, China Centre for Disease Control and Prevention. Original data transmitted from smartphones were archived for quality control in the well-protected data system, and data in the smartphones were cleared. Only researchers who had authorization from the National Institute had access to the dataset. The data could not be utilized for commercial purposes. Any identifying information in the original questionnaire was replaced with serial numbers, and contact information was omitted in the dataset.

Data Analysis

Study Aim 1: Latest Patterns of Breastfeeding. Using quantitative analysis, descriptive statistics were applied to report the baseline characteristics of participants. Mother–infant indicators, family socio-demo-economic factors, breastfeeding practices, and breastfeeding-related environments were used in the analyses. We also examined the prevalence of breastfeeding indicators and the percentage of various self-reported reasons for discontinuing breastfeeding.

Study Aim 2: Determinants of Breastfeeding. The associations between determinants and breastfeeding outcomes were analyzed using a logistic regression model (Asfaw, Argaw, & Kefene, 2015; Mogre, Dery, & Gaa, 2016). All the odds ratios were presented with 95% CI. Logistic models were constructed, adjusting for maternal age, pre-pregnancy BMI, gestational age, infant birth weight, infant sex, parity, delivery method, delivery place, maternal education, paternal education, maternal working status, resident status, household income, maternal occupation, and region. All the analyses were conducted using SAS version 9.4 (SAS Institute, 2018).

Results

Characteristics of the Sample

Participants' basic characteristics are shown in Table 2. The mean maternal age was 29.15 ($SD = 5.11$) and the mean pre-pregnancy BMI was 22.26 kg/m^2 ($SD = 7.37$). The mean gestational week was 39.00 weeks ($SD = 1.41$). The mean infant age and birth weight were 5.95 months ($SD = 3.51$) and 3.36 kg ($SD = 0.66$), respectively.

Study Aim 1: Latest Patterns of Breastfeeding

The prevalence of breastfeeding practices among the study population are presented in Table 3. Figure 1 shows the current breastfeeding prevalence in infants aged 0–11 months, and exclusive breastfeeding prevalence in infants aged 0–5 months. It can be seen that the current breastfeeding rate decreased from 96.4% ($n = 10,033$) to 65.0% ($n = 6,765$) in infants aged 0–11 months, and the exclusive breastfeeding rate decreased from 32.71% ($n = 1,729$) to 15.83% ($n = 837$) among infants aged 0–5 months in the survey regions. Figure 2 shows the distribution of participants' self-reported reasons for discontinuing breastfeeding. Figure 3 presents the status of receiving complementary food described by age.

Study Aim 2: Determinants of Breastfeeding

Table 4 shows the factors associated with early breastfeeding initiation. Pre-pregnancy BMI, primiparous birth experiences, cesarean section, low birthweight, and gestational week less than 37 weeks were negatively associated with early initiation. The Table also shows that current employment and cesarean sections were negatively associated with both exclusive and predominant breastfeeding. In addition, annual household income and regions were also associated with exclusive breastfeeding. Low birthweight and nipple problems were negatively associated with predominant breastfeeding.

Discussion

We discovered that the prevalence of breastfeeding indicators decreased as infants grew up, and we presented the latest

Table 2. Basic Characteristics of the Study Population (N = 10,408).

Characteristics	n (%)	Characteristics	n (%)
Maternal age (year) ^a		Nipple problems	
15–23	1316 (12.64)	Yes	3978 (38.22)
24–34	7372 (70.83)	No	6430 (61.78)
35–53	1720 (16.53)	Parity ^d	
Pre-pregnancy BMI (kg/m ²)		Primiparous	4780 (46.01)
< 24.0	8129 (78.10)	Multiparous	5610 (53.99)
24.0–27.9	1675 (16.09)	Delivery method ^e	
> 28	604 (5.80)	Normal	6314 (60.78)
Gestational age (weeks)		Cesarean section	4074 (39.22)
< 37	541 (5.20)	Delivery place ^f	
37–42	9852 (94.66)	Home/ township hospital village clinic	297 (2.86)
> 42	15 (0.14)	County-level/prefectural/provincial hospital	
Maternal working status		Private hospital/other	9923 (95.63)
Non-working	5934 (57.01)	Region	
Working	4474 (42.99)	megacity	3614 (34.72)
Maternal education ^b		Medium-sized city	3381 (32.48)
Illiterate	85 (0.82)	countryside	1700 (16.33)
Primary	715 (6.88)	Poor rural	1713 (16.46)
Secondary	5661 (54.53)	Household income (Yuan)	
Higher education	3922 (37.77)	< 40,000	6195 (59.52)
Paternal education ^c		40,000–60,000	1172 (11.26)
Illiterate	29 (0.28)	60,000–100,000	1297 (12.46)
Primary	726 (6.99)	≥ 100,000	1744 (16.76)
Secondary	5832 (56.18)	Geographical region	
Higher education	3795 (36.55)	North China	1744 (16.76)
Infant age (month)		East China	2732 (26.25)
< 1	921 (8.85)	South China	838 (8.05)
1–3	2600 (24.98)	Northeast	1697 (16.30)
4–6	2580 (24.79)	Southwest	1690 (16.24)
7–9	2538 (24.39)	Northwest	855 (8.21)
10–12	1769 (17.00)	Central	852 (8.19)
Infant birth weight (kg)		Resident status	
< 2.5	458 (4.40)	Local	9071 (87.15)
2.5–3.0	2298 (22.08)	Migrant	1337 (12.85)
3.1–4.0	6994 (67.20)		
> 4.0	658 (6.32)		
Infant gender			
Male	5278 (50.71)		
Female	5130 (49.29)		

Note. BMI = body mass index; nipple problems included sore nipples, cracked nipples, abnormally shaped nipples, mastitis, or duct blockage in breast.

Conversion of Yuan to US dollars: 40,000 Yuan = \$5,817 USD; 60,000 Yuan = \$8,725 USD; 100,000 Yuan = \$14,542 USD.

Missing values: ^a31, ^b25, ^c26, ^d18, ^e20, ^f31.

Table 3. Breastfeeding Indicators in the Study Population (N = 10,408).

Breastfeeding Practices	n (%)	95% CI	p
Early initiation of breastfeeding	7481 (71.88)	71.01–72.74	.00*
Current breastfeeding	9052 (86.97)	86.31–87.61	.00*
Ever breastfeeding	10143 (97.46)	97.16–97.77	.00*
Exclusive breastfeeding	1550 (29.32)	28.09–30.54	.00*
Predominant breastfeeding	3166 (59.69)	58.37–61.04	.00*

Note. Exclusive and predominant breastfeeding practices had a sample size of 5,287.

*Z-test (null hypothesis = 0.5): p = <.01.

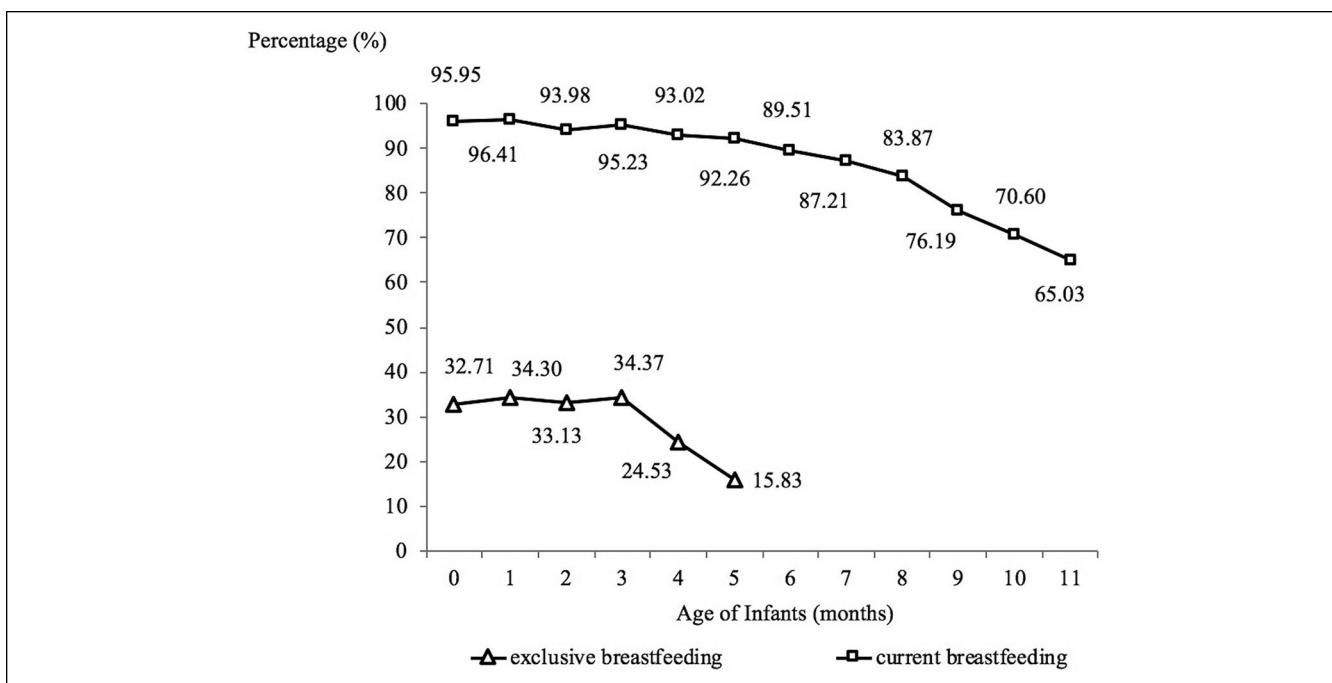


Figure 1. Exclusive and current breastfeeding prevalence in 12 selected regions, China, 2017.

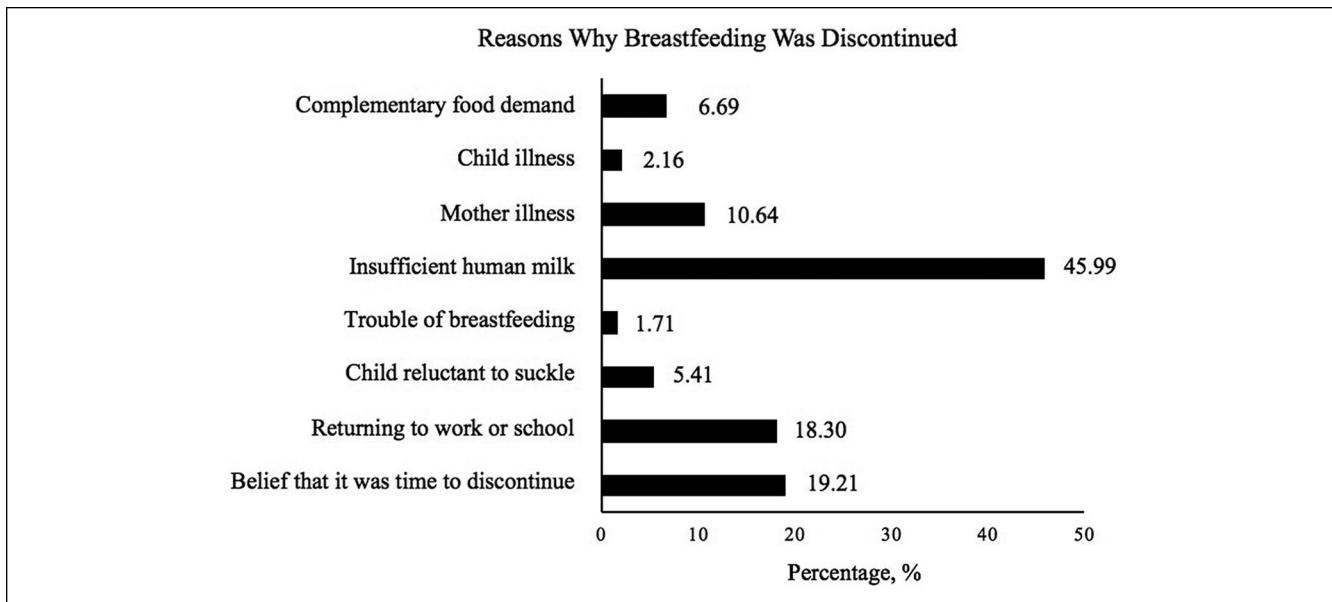


Figure 2. Self-reported reasons for stopping breastfeeding among infants under 12 months.

prevalence of exclusive breastfeeding in 12 selected regions in China. We have also shown the multiple complex determinants involving socioeconomic and biophysical factors associated with breastfeeding. It could be argued that participants failed to adhere strictly to the WHO recommendation of exclusive breastfeeding for 6 months on account of complementary food introduction (Benedict et al., 2018; Jiang et al., 2014). Sub-optimum breastfeeding resulted in a higher risk

of mortality in the first 2 years of life, children's infections and malocclusion, a delay in intelligence development, overweight, and diabetes (Victora et al., 2016). Participants with infants under 6 months stated that they began adding water, nutritional supplements, or infant formula to breastmilk mostly on the recommendation of acquaintances and doctors, perceived nutritional need, and insufficient lactation. Thus, we urge that knowledge dissemination occur during

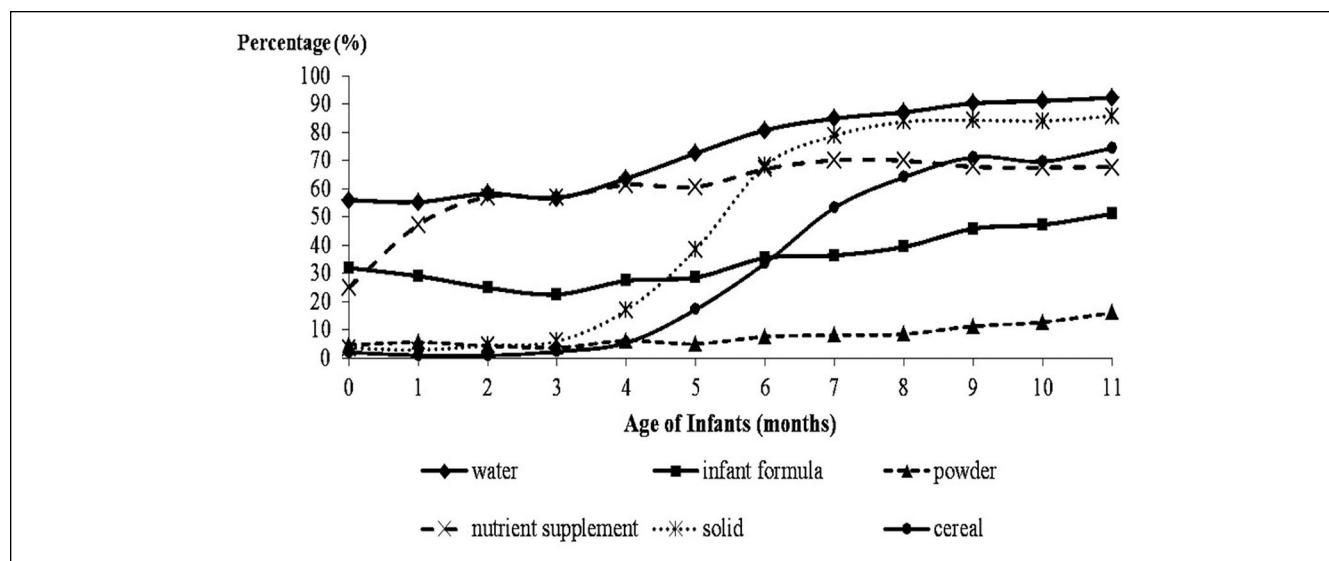


Figure 3. Complementary feeding by infant age in 12 selected regions, China, 2017.

antenatal and postnatal clinic visits, highlighting the benefits of exclusive breastfeeding and the harmful impacts of prematurely introducing complementary food.

The common reasons for ceasing exclusive breastfeeding in developing countries are a perceived insufficiency of human milk, traditional beliefs, maternal or child illness, and maternal employment (Brown, Dodds, Legge, Bryanton, & Semenic, 2014; Galipeau, Dumas, & Lepage, 2017). Among these factors, insufficient human milk supply tends to be the major reason for breastfeeding cessation (Brown et al., 2014; Zhang et al., 2015). Researchers demonstrated that only a small percentage of mothers were biologically unable to breastfeed and most of the insufficiencies of human milk were due to mothers' own perceptions (Galipeau, Baillot, Trottier, & Lemire, 2018; Galipeau et al., 2017). This perception often coincided with softness of breasts, babies growing slowly, poor knowledge of the lactation process, and technical difficulties in producing adequate human milk (Galipeau et al., 2018; Sun, Chen, Yin, Wu, & Gao, 2017). A mother's intention to breastfeed was strengthened by support from health professionals and social networks (Wray & Garside, 2018).

A variety of socio-demographic and biophysical factors were associated with breastfeeding indicators in this study. Researchers have found that older women in China were more likely to keep breastfeeding for a longer period than their younger counterparts (Tang, Lee, & Binns, 2015). A recent study in India, however, showed that maternal age was adversely associated with exclusive breastfeeding (Benedict et al., 2018). A negative association between maternal age and predominant breastfeeding was also found in this study. Discrepancies in exclusive breastfeeding among participants of different ages were not observed. It is possible that well educated women take the initiative to receive prenatal

education and are more accessible to advice from doctors or nurses (Pang et al., 2016). However, we found that exclusive breastfeeding prevalence was significantly lower among participants whose education level was middle/high school compared to participants who were illiterate. A systematic review conducted in China also found a negative association between breastfeeding indicators and maternal education. The review speculated that maternal leave, occupation, and incorrect traditional perceptions contributed to the negative association (Zhao et al., 2017). Consistent with a study using a 2013 survey in China (Duan et al., 2018), and a study conducted in India (Meena et al., 2018), participants in rural areas were more likely to exclusively or predominantly breastfeed compared to those in urban areas. This can be attributed to infant formula advertising extravagant claims of its superiority over breastfeeding, and the wider availability of human milk substitutes in urban regions (Tang et al., 2014; Zhang et al., 2015). In this study, when residential location was divided further, exclusive breastfeeding was more likely to be abandoned in medium-sized cities and poor rural areas than in megacities. This might be attributed to government interventions, relatively higher qualities of breastfeeding education, and more mother support groups and lactation facilities in megacities (Zhang et al., 2015; Zhang et al., 2018). While infant formula has been widely advertised in megacities, the government has also taken measures to promote efficient health education in the targeted population, and has established Baby-Friendly Hospitals, and developed community services.

Participants undergoing cesarean sections were observed to be more likely to delay initiation of breastfeeding and abandon exclusive and predominant breastfeeding than those who delivered vaginally. This factor has previously been shown to hinder breastfeeding and disrupt lactation (Hobbs,

Table 4. Multivariate Analysis for Factors Associated with Main Breastfeeding Indicators.

	Early Initiation (n = 10,408)	Exclusive Breastfeeding (n = 5,287)	Predominant Breastfeeding (n = 5,287)
	OR [95% CI]	OR [95% CI]	OR [95% CI]
Maternal age (year)			
15–23	1.42 [1.22–1.66]	1.14 [0.93–1.38]	0.99 [0.83–1.19]
24–34	1.00	1.00	1.00
35–53	0.95 [0.84–1.09]	0.87 [0.72–1.04]	0.75 [0.64–0.89]
Pre-pregnancy BMI (kg/m²)			
< 24.0	1.00	1.00	1.00
24.0–27.9	0.83 [0.73–0.93]	0.84 [0.71–0.99]	0.91 [0.78–1.07]
≥ 28	0.66 [0.55–0.79]	0.89 [0.68–1.16]	0.79 [0.63–1.00]
Gestational age (week)			
< 37	0.34 [0.28–0.42]	0.73 [0.52–1.01]	0.76 [0.57–1.00]
37–42	1.00	1.00	1.00
> 42	0.48 [0.16–1.39]	4.28 [1.17–15.62]	2.62 [0.55–12.51]
Maternal working status			
Non-working	1.00	1.00	1.00
Working	0.95 [0.86–1.05]	0.73 [0.63–0.84]	0.66 [0.58–0.75]
Maternal education			
Illiterate	1.00	1.00	1.00
Primary	0.82 [0.57–1.16]	0.80 [0.49–1.32]	1.29 [0.80–2.08]
Middle and high school	1.18 [0.85–1.62]	0.58 [0.37–0.89]	1.12 [0.74–1.71]
Higher education	1.66 [1.17–2.35]	0.63 [0.39–1.01]	0.93 [0.60–1.46]
Paternal education			
Illiterate	1.00	1.00	1.00
Primary	0.88 [0.58–1.35]	0.84 [0.47–1.51]	0.99 [0.57–1.73]
Middle and high school	0.94 [0.63–1.40]	0.79 [0.46–1.35]	0.95 [0.57–1.59]
Higher education	0.96 [0.63–1.46]	1.24 [0.71–2.18]	1.12 [0.65–1.90]
Infant birth weight (kg)			
< 2.5	1.00	1.00	1.00
2.5–3.0	1.82 [1.44–2.29]	0.98 [0.70–1.39]	1.45 [1.07–1.96]
3.1–4.0	2.25 [1.80–2.82]	1.05 [0.75–1.46]	1.55 [1.16–2.08]
> 4.0	2.14 [1.62–2.83]	1.04 [0.69–1.57]	1.39 [0.97–2.00]
Infant sex			
Male	0.94 [0.86–1.03]	0.98 [0.87–1.11]	0.91 [0.81–1.02]
Female	1.00	1.00	1.00
Nipple problems			
Yes	0.84 [0.76–0.93]	0.92 [0.81–1.05]	0.77 [0.69–0.87]
No	1.00	1.00	1.00
Parity			
Primiparous	1.00	1.00	1.00
Multiparous	1.31 [1.18–1.45]	1.14 [0.99–1.32]	1.08 [0.95–1.23]
Delivery method			
Normal	1.00	1.00	1.00
Cesarean section	0.33 [0.30–0.36]	0.78 [0.69–0.89]	0.73 [0.65–0.8]
Delivery place			
Home/township hospital/village clinic	1.11 [0.84–1.48]	1.37 [0.95–1.98]	1.16 [0.82–1.66]
County-level/prefectural/Provincial hospital	1.00	1.00	1.00
Private hospital/other	1.25 [0.86–1.84]	1.26 [0.83–1.91]	1.04 [0.69–1.57]
Region			
Megacity	1.00	1.00	1.00
Medium-sized city	0.47 [0.42–0.54]	0.64 [0.54–0.76]	0.96 [0.82–1.13]
Countryside	0.56 [0.48–0.66]	1.17 [0.95–1.45]	1.37 [1.12–1.68]

(continued)

Table 4. (continued)

	Early Initiation (n = 10,408)	Exclusive Breastfeeding (n = 5,287)	Predominant Breastfeeding (n = 5,287)
	OR [95% CI]	OR [95% CI]	OR [95% CI]
Poor rural	0.77 [0.65–0.91]	0.67 [0.54–0.84]	0.96 [0.79–1.18]
Household income (Yuan)			
< 40,000	1.00	1.00	1.00
40,000–60,000	0.95 [0.77–1.17]	1.23 [0.91–1.65]	1.14 [0.86–1.51]
60,000–10,000	0.87 [0.76–0.99]	0.93 [0.77–1.12]	0.98 [0.83–1.17]
≥ 100,000	1.02 [0.91–1.14]	0.78 [0.67–0.90]	0.96 [0.84–1.09]
Resident status			
Local	1.00	1.00	1.00
Migrant	0.86 [0.74–0.99]	1.06 [0.88–1.28]	1.01 [0.84–1.20]

Note. Exclusive breastfeeding = infants aged 0–5 months fed human milk exclusively; predominant breastfeeding = infants aged 0–5 months predominantly breastfed and fed human milk and water, too, adjusting for maternal age, pre-pregnancy BMI, gestational age, infant birth weight, infant sex, parity, delivery method, delivery place, maternal education, paternal education, maternal working status, resident status, household income, maternal occupation and region.

Mannion, McDonald, Brockway, & Tough, 2016; Patel, Bucher et al., 2015). After a cesarean delivery, pregnant women may still have spinal anaesthetization or suffer surgery pain and other complications. A poor physical state and mother–infant separation delays early breastfeeding initiation, further exerting an adverse impact on exclusive breastfeeding. In addition, caesarean sections are associated with postpartum depression (Eckerdal et al., 2018; Silverman et al., 2017). Anatomical, medical, and psychological issues were reported as reasons why overweight/obese women were less likely to breastfeed. Obese women often have large breasts and have practical difficulties attaching the infant to the breast. Overly large breasts are usually a sign of a true poverty of human milk (Ramji, Quinlan, Murphy, & Crane, 2016; Turcksin, Bel, Galjaard, & Devlieger, 2014). In general, multiparous participants were more likely to have early initiation after birth than primiparous ones. Research in Japan and Hong Kong has also found that multiparous mothers, especially those with past breastfeeding experiences, were more likely to breastfeed their children (Bai, Fong, & Tarrant, 2015; Kitano et al., 2016).

Nipple problems were reported as a negative factor for early initiation and predominant breastfeeding. Sore and cracked nipples were a barrier to successful breastfeeding, which may be caused by incorrect breastfeeding position, incorrect latching, and inappropriate nipple sucking (da Silva Santos et al., 2016; Puapornpong, Paritakul, Suksamarnwong, Sriswan, & Ketsawan, 2017). Most latch-on problems can be avoided if mothers are informed of techniques for appropriate attachment, positioning, and suckling through education and support from trained health professionals in the postpartum period (da Silva Santos et al., 2016; Degefa et al., 2019; Joshi, Magon, & Raina, 2016). Research has shown that effective breastfeeding technique has been associated with receiving breastfeeding technique counseling immediately after birth

and during at least two postnatal visits (Tiruye, Mesfin, Geda, & Shiferaw, 2018). In addition, many therapies for nipple treatment have been studied (Niazi et al., 2018). Untreated nipple problems lead to further lactation issues, mastitis, and psychological stress (Kent et al., 2015).

Based on our findings, we suggest that breastfeeding promotion should be targeted at overweight/obese women older than 35, with a middle/high school education level, who live in medium-developed cities. Those mothers were identified as the most vulnerable group at risk of abandoning exclusive breastfeeding. Appropriate infant feeding practices should be popularized vigorously, especially at antenatal clinics. Information regarding the superiority of exclusive breastfeeding and the inferiority of human milk substitutes should be disseminated among the population including not only mothers themselves but also their partners, and their mothers and mothers-in-law. They should be advised against the early introduction of water, other liquids, or complementary feeding. For mothers who return to work or school, supportive work environments, including the provision of a lactation room, paid maternity leave, and flexible work schedules, have been shown to have a significant positive influence on breastfeeding duration (Jantzer, Anderson, & Kuehl, 2018; Zhao et al., 2017). Social and family support should be strengthened with the aim of helping mothers reinforce positive breastfeeding skills, grow their confidence, and promote self-efficacy to prolong breastfeeding.

Health professionals in hospitals and in community primary health centers should support mothers, through in-person or online communication, to overcome breastfeeding challenges during postpartum hospitalization and shortly after they are discharged. In particular, mothers need to be taught that pain means that something is wrong with the way breastfeeding is happening and that they need to seek help from knowledgeable healthcare providers. Moreover, it is

expected that the caesarean section rate will decrease in the future: In a study using data from more than 6 million births in 438 large hospitals in China, the caesarean section rate declined from 45.3% in 2012 to 41.1% in 2016 (Liang et al., 2018). Government interventions include hands-on training for obstetrician and midwives, the revision of guidelines for the management of dystocia, public education on the advantages of natural birth, and restrictions for a maximum caesarean section rate (Li et al., 2017).

Interventions, including legislation, policy, and media and social mobilization, have been applied in both low- and high-income countries. For example, intensified interpersonal counseling, mass media, and community mobilization interventions delivered at scale in the context of policy advocacy in Bangladesh and Vietnam lasted for 6 years (Menon et al., 2016). In the US, lactation counseling is facilitated through mandatory insurance coverage, and breastfeeding in public is protected through legislation. In the UK, a full year of paid maternity leave is offered (Rollins et al., 2016).

This study mainly explored the patterns and social determinants of breastfeeding. Breastfeeding, however, is a complex issue influenced by biological, social, and cultural factors. Studies concerning genetics, generational differences, and other physiological factors are needed to explore the biological basis of breastfeeding. Qualitative studies exploring cultural influences are also needed. Meanwhile, in order to design cost-effective interventions to promote breastfeeding, large scale experimental research could be implemented.

Limitations

The sample size in the present study was large, providing access to a wide spectrum of participants of various socio-economic strata at one site. However, it was not without limitations in design, implementation, and interpretation. The first limitation was recall bias due to the retrospective nature of data collection, possibly resulting in over or under estimation of actual breastfeeding practices. We were not able to obtain some maternal variables, including smoking and alcohol consumption, contraceptive usage, pre-existing diabetes, and hypertension, which may have introduced confounding bias. In addition, evidence about breastfeeding in the four classifications of regions we used (megacities, medium-sized cities, countryside, and poor rural areas) was scant, so we failed to interpret differences in early initiation and exclusive breastfeeding between the regions.

Conclusion

We studied the latest patterns and practices of breastfeeding involving participants with diverse characteristics in 12 geographically dispersed regions throughout China. The prevalence of exclusive breastfeeding found in this study was far below the WHO recommended prevalence, demonstrating a

wide gap between desired and actual practice. Identifying and understanding the potential factors contributing to the low prevalence of breastfeeding in China can offer valuable insights into how to promote breastfeeding, not only in China but also in countries that have entered, or will enter, an era of rapid economic growth while still having unbalanced and inadequate development.

Acknowledgments

We would like to thank the Chinese Center for Disease Control and Prevention for providing the data.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was supported by the Bill & Melinda Gates Foundation and the China Development Research Foundation.

ORCID iD

Kun Tang  <https://orcid.org/0000-0002-5444-186X>

References

- American Academy of Pediatrics. (2018). *Breastfeeding: Support, challenges, and benefits*. Retrieved from <https://shop.aap.org/pediatric-collections-breastfeeding-support-challenges-and-benefits-ebook/>
- Asfaw, M. M., Argaw, M. D., & Kefene, Z. K. (2015). Factors associated with exclusive breastfeeding practices in Debre Berhan District, Central Ethiopia: A cross sectional community based study. *International Breastfeeding Journal*, 10(1), 23–23.
- Bai, D. L., Fong, D. Y. T., & Tarrant, M. (2015). Previous breastfeeding experience and duration of any and exclusive breastfeeding among multiparous mothers. *Birth*, 42(1), 70–77.
- Benedict, R. K., Craig, H. C., Torlesse, H., & Stoltzfus, R. J. (2018). Trends and predictors of optimal breastfeeding among children 0–23 months, South Asia: Analysis of national survey data. *Maternal & Child Nutrition*, 14, e12698.
- Brown, C. R. L., Dodds, L., Legge, A., Bryanton, J., & Semenic, S. (2014). Factors influencing the reasons why mothers stop breastfeeding. *Canadian Journal of Public Health-Revue Canadienne De Sante Publique*, 105(3), 179–185.
- Chen, C., Cheng, G., & Pan, J. (2017). Socioeconomic status and breastfeeding in China: An analysis of data from a longitudinal nationwide household survey. *The Lancet*, 390, S9.
- Chung, S.-H., Kim, H.-R., Choi, Y.-S., & Bae, C.-W. (2013). Trends of breastfeeding rate in Korea (1994–2012): Comparison with OECD and other countries. *Journal of Korean Medical Science*, 28(11), 1573–1580.
- Cody, R. (2018). *Learning SAS® by example: A programmer's guide* (2nd ed.). Cary, NC: SAS Institute Inc.
- da Silva Santos, K. J., Santana, G. S., de Oliveira Vieira, T., Santos, C. A. d. S. T., Giugliani, E. R. J., & Vieira, G. O. (2016).

- Prevalence and factors associated with cracked nipples in the first month postpartum. *BMC Pregnancy and Childbirth*, 16(1), 209.
- Degefa, N., Tariku, B., Bancha, T., Amana, G., Hajo, A., Kusse, Y., . . . Aschalew, Z. (2019). Breast feeding practice: Positioning and attachment during breast feeding among lactating mothers visiting health facility in Areka Town, Southern Ethiopia. *International Journal of Pediatrics*, 6. doi:10.1155/2019/8969432
- Duan, Y., Yang, Z., Lai, J., Yu, D., Chang, S., Pang, X., . . . Wang, J. (2018). Exclusive breastfeeding rate and complementary feeding indicators in China: A national representative survey in 2013. *Nutrients*, 10(2), 249.
- Eckerdal, P., Georgakis, M. K., Kollia, N., Wikstrom, A., Hogberg, U., & Skalkidou, A. (2018). Delineating the association between mode of delivery and postpartum depression symptoms: A longitudinal study. *Acta Obstetricia et Gynecologica Scandinavica*, 97(3), 301–311.
- Galipeau, R., Baillot, A., Trottier, A., & Lemire, L. (2018). Effectiveness of interventions on breastfeeding self-efficacy and perceived insufficient milk supply: A systematic review and meta-analysis. *Maternal & Child Nutrition*, 14(3), e12607.
- Galipeau, R., Dumas, L., & Lepage, M. (2017). Perception of not having enough milk and actual milk production of first-time breastfeeding mothers: Is there a difference? *Breastfeeding Medicine the Official Journal of the Academy of Breastfeeding Medicine*, 12(4), bfm.2016.0183.
- Hobbs, A. J., Mannion, C. A., McDonald, S. W., Brockway, M., & Tough, S. C. (2016). The impact of caesarean section on breastfeeding initiation, duration and difficulties in the first four months postpartum. *BMC Pregnancy and Childbirth*, 16(1), 90.
- Jantzer, A. M., Anderson, J., & Kuehl, R. A. (2018). Breastfeeding support in the workplace: The relationships among breastfeeding support, work-life balance, and job satisfaction. *Journal of Human Lactation*, 34(2), 379–385.
- Jiang, H., Li, M., Wen, L., et al. (2014). Effect of short message service on infant feeding practice: Findings from a community-based study in shanghai, china. *JAMA Pediatrics*, 168(5), 471–478. doi:10.1001/jamapediatrics.2014.58
- Joshi, H., Magon, P., & Raina, S. (2016). Effect of mother–infant pair’s latch-on position on child’s health: A lesson for nursing care. *Journal of Family Medicine and Primary Care*, 5(2), 309.
- Ke, J., Ouyang, Y.-Q., & Redding, S. R. (2018). Family-centered breastfeeding education to promote primiparas’ exclusive breastfeeding in China. *Journal of Human Lactation*, 34(2), 365–378.
- Kent, G. (2015). Global infant formula: Monitoring and regulating the impacts to protect human health. *International Breastfeeding Journal*, 10(1), 6.
- Kent, J., Ashton, E., Hardwick, C., Rowan, M., Chia, E., Fairclough, K., . . . Navarro, K. (2015). Nipple pain in breastfeeding mothers: Incidence, causes and treatments. *International Journal of Environmental Research and Public Health*, 12(10), 12247–12263.
- Kitano, N., Nomura, K., Kido, M., Murakami, K., Ohkubo, T., Ueno, M., & Sugimoto, M. (2016). Combined effects of maternal age and parity on successful initiation of exclusive breastfeeding. *Preventive Medicine Reports*, 3, 121–126.
- Li, H. T., Luo, S., Trasande, L., Hellerstein, S., Kang, C., Li, J. X., . . . Blustein, J. (2017). Geographic variations and temporal trends in cesarean delivery rates in China, 2008–2014. *Jama*, 317(1), 69–76. doi:10.1001/jama.2016.18663
- Liang, J., Mu, Y., Li, X., Tang, W., Wang, Y., Liu, Z., . . . Ronmans, C. (2018). Relaxation of the one child policy and trends in caesarean section rates and birth outcomes in China between 2012 and 2016: Observational study of nearly seven million health facility births. *BMJ*, 360, k817. doi:10.1136/bmj.k817
- Lou, Z., Zeng, G., Orme, J. G., Huang, L., Liu, F., Pang, X., & Kavanagh, K. F. (2014). Breastfeeding knowledge, attitudes, and intention in a sample of undergraduate students in mainland China. *Journal of Human Lactation*, 30(3), 331–339. doi:10.1177/0890334414526058
- Lung’aho, M., Huffman, S. L., Labbok, M. H., Sommerfelt, E., & Baker, J. (1996). Tool kit for monitoring and evaluating breastfeeding practices and programs. Washington, DC: Wellstart International.
- Meena, J. S., Sethia, S., Nagar, V., Thakur, A., Aarutagi, V., & Tiwari, S. (2018). A comparative study of breast feeding and complimentary food practices in catchment area of urban and rural health centres of Community Medicine Department, Gandhi Medical College, Bhopal. 2018, 5(8), 5. doi:10.18203/2394-6040.ijcmph20182971
- Menon, P., Nguyen, P. H., Saha, K. K., Khaled, A., Kennedy, A., Tran, L. M., . . . Alayon, S. (2016). Impacts on breastfeeding practices of at-scale strategies that combine intensive interpersonal counseling, mass media, and community mobilization: results of cluster-randomized program evaluations in Bangladesh and Viet Nam. *PLoS Medicine*, 13(10), e1002159.
- Niazi, A., Rahimi, V. B., Soheili-Far, S., Askari, N., Rahamanian-Devin, P., Sanei-Far, Z., . . . Askari, V. R. (2018). A systematic review on prevention and treatment of nipple pain and fissure: Are they curable? *Journal of pharmacopuncture*, 21(3), 139.
- Pang, W. W., Aris, I. M., Fok, D., Soh, S. E., Chua, M. C., Lim, S. B., . . . Godfrey, K. M. (2016). Determinants of breastfeeding practices and success in a multi-ethnic Asian population. *Birth-Issues in Perinatal Care*, 43(1), 68–77.
- Patel, A., Bucher, S., Pusdekar, Y. V., Esamai, F., Krebs, N. F., Goudar, S. S., . . . Saleem, S. (2015). Rates and determinants of early initiation of breastfeeding and exclusive breast feeding at 42 days postnatal in six low and middle-income countries: A prospective cohort study. *Reproductive Health*, 12(2), 1–11.
- Patel, D., Bansal, S., Nimbalkar, A., Phatak, A., Nimbalkar, S., & Desai, R. (2015). Breastfeeding practices, demographic variables, and their association with morbidities in children. *Advances in Preventive Medicine*, 892 825. doi:10.1155/2015/892825
- Puapornpong, P., Paritakul, P., Suksamarnwong, M., Srisuwan, S., & Ketsuwan, S. (2017). Nipple pain incidence, the predisposing factors, the recovery period after care management, and the exclusive breastfeeding outcome. *Breastfeeding Medicine*, 12(3), 169–173.
- Ramji, N., Quinlan, J., Murphy, P., & Crane, J. (2016). The impact of maternal obesity on breastfeeding. *Journal of Obstetrics and Gynaecology Canada*, 38(8), 703–711.
- Rollins, N. C., Bhandari, N., Hajeebhoy, N., Horton, S., Lutter, C. K., Martines, J. C., . . . Group, T. L. B. S. (2016). Why invest, and what it will take to improve breastfeeding practices? *The Lancet*, 387(10017), 491–504.

- Satten, G. A., & Grummer-Strawn, L. (2014). *Cross-sectional study*. Wiley StatsRef: Statistics Reference Online.
- Silverman, M. E., Reichenberg, A., Savitz, D. A., Cnattingius, S., Lichtenstein, P., Hultman, C. M., . . . Sandin, S. (2017). The risk factors for postpartum depression: A population-based study. *Depression and Anxiety*, 34(2), 178–187.
- Sun, K., Chen, M., Yin, Y., Wu, L., & Gao, L. (2017). Why Chinese mothers stop breastfeeding: Mothers' self-reported reasons for stopping during the first six months. *Journal of Child Health Care*, 21(3), 353–363.
- Tang, L., Binns, C. W., & Lee, A. H. (2015). Infant formula crisis in China: A cohort study in Sichuan Province. *Journal of Health Population and Nutrition*, 33(1), 117–122.
- Tang, L., Lee, A. H., & Binns, C. W. (2015). Factors associated with breastfeeding duration: A prospective cohort study in Sichuan Province, China. *World Journal of Pediatrics*, 11(3), 232–238. doi:10.1007/s12519-014-0520-y
- Tang, L., Lee, A. H., Binns, C. W., Yang, Y., Wu, Y., Li, Y., & Qiu, L. (2014). Widespread usage of infant formula in China: A major public health problem. *Birth-Issues in Perinatal Care*, 41(4), 339–343.
- Tiruye, G., Mesfin, F., Geda, B., & Shiferaw, K. (2018). Breastfeeding technique and associated factors among breastfeeding mothers in Harar city, Eastern Ethiopia. *International Breastfeeding Journal*, 13(1), 5.
- Turcksin, R., Bel, S., Galjaard, S., & Devlieger, R. (2014). Maternal obesity and breastfeeding intention, initiation, intensity and duration: A systematic review. *Maternal and Child Nutrition*, 10(2), 166–183.
- Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krusevec, J., . . . Rollins, N. C. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet*, 387(10017), 475–490.
- Wang, W., Lau, Y., Chow, A., & Chan, K. S. (2014). Breastfeeding intention, initiation and duration among Hong Kong Chinese women: A prospective longitudinal study. *Midwifery*, 30(6), 678–687.
- World Health Organization. (2008). *Indicators for assessing infant and young child feeding practices: Conclusions of a consensus meeting held 6–8 November 2007 in Washington DC, USA*. Washington: World Health Organization.
- World Health Organization. (2010). Indicators for assessing infant and young child feeding practices Part 2: Measurements. Retrieved from <https://www.who.int/nutrition/publications/infantfeeding/9789241599290/en/>
- World Health Organization. (2017). Tracking Progress for Breastfeeding Policies and Programmes. *World Health Organization*. Retrieved from <https://www.who.int/nutrition/publications/infantfeeding/global-bf-scorecard-2017.pdf>
- Wray, A., & Garside, J. (2018). Why do mothers stop breastfeeding before 6 months? A literature review. *Journal of Health Visiting*, 6(5), 240–246.
- Yang, X., Ip, W.-Y., & Gao, L.-l. (2018). Maternal intention to exclusively breast feed among mainland Chinese mothers: A cross-sectional study. *Midwifery*, 57, 39–46.
- Yang, Z., Lai, J., Yu, D., Duan, Y., Pang, X., Jiang, S., . . . Yin, S. (2016). Breastfeeding rates in China: A cross-sectional survey and estimate of benefits of improvement. *The Lancet*, 388, S47.
- Zhang, K., Tang, L., Wang, H., Qiu, L.-Q., Binns, C., & Lee, A. (2015). Why do mothers of young infants choose to formula feed in China? Perceptions of mothers and hospital staff. *International Journal of Environmental Research and Public Health*, 12(5), 4520–4532.
- Zhang, Y., Jin, Y., Vereijken, C., Stahl, B., & Jiang, H. (2018). Breastfeeding experience, challenges and service demands among Chinese mothers: A qualitative study in two cities. *Appetite*, 128, 263–270.
- Zhao, J., Zhao, Y., Du, M., Binns, C. W., & Lee, A. H. (2017). Maternal education and breastfeeding practices in China: A systematic review and meta-analysis. *Midwifery*, 50, 62–71.
- Zhou, W., Yu, Y., & Qian, Z. (2018). Challenges of breastfeeding in China under its universal two-child policy. *Journal of Maternal-Fetal Neonatal Medicine*, 32(16), 2780–2781 doi:10.1080/14767058.2018.1449197

Engaging African American Parents to Develop a Mobile Health Technology for Breastfeeding: KULEA-NET

Journal of Human Lactation

2020, Vol. 36(3) 448–460

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334420930208

journals.sagepub.com/home/jhl



Loral Patchen, CNM, PhD, IBCLC¹, Lindsey Ellis, NP, MPH, IBCLC¹ , Cherise B. Harrington, PhD, MPH², Tony Ma, MS³ , Rohini Mohanraj, MHA³, Virginia Andrews, MPH⁴, and William Douglas Evans, PhD⁴

Abstract

Background: African Americans breastfeed less than other groups, which has implications for health throughout the life course. Little is known about mobile health technologies to support breastfeeding.

Research aims: This study proceeded in two phases. The aim of Phase 1 was to identify ideal technological components and content of a mobile health intervention. The aim of Phase 2 was to determine the usability of a prototype, KULEA-NET, based on the Phase 1 findings.

Methods: For this mixed-methods study, we used community-based participatory research methods and user-centered technology design methods. We used open coding in NVivo 11 to organize data from focus groups and in-depth interviews, then we analyzed the data. We then developed a prototype and tested the prototype's usability with the System Usability Scale. Fifty pregnant and postpartum African Americans from the District of Columbia participated.

Results: Participants preferred an app with text messaging technology and identified areas for intervention: self-efficacy, parent-child attachment beliefs, social support, public breastfeeding and social desirability, and returning to work. Desired features included local resources, support person access, baby care logs, identification of public breastfeeding venues, and peer discussions. The System Usability Scale score was 73.8, which indicates above average usability.

Conclusions: A mobile health technology like KULEA-NET can be used to meet the breastfeeding needs of African Americans, build social desirability, and complement traditional health care. The appeal of an African American-specific intervention is unclear. Responding to mixed feeding practices is challenging. KULEA-NET is a mobile breastfeeding intervention guided by the preferences of African American parents and offers promising usability metrics.

Keywords

breastfeeding, access to care, breastfeeding support, cultural norms, focus group, qualitative methods

Background

Breastfeeding has numerous health benefits across the lifespan, and the Section on Breastfeeding (2012) recommends exclusive breastfeeding for the first 6 months. Yet, just one quarter of all U.S. infants are exclusively breastfed to 6 months, and there are disparities: fewer African American infants (20.7%) are exclusively breastfed to 6 months compared to white infants (29.1%; Centers for Disease Control and Prevention [CDC], 2019). Similarly, there are race/ethnicity disparities in many health outcomes, including conditions with which breastfeeding has been associated with reduced risk, such as heart disease (CDC, 2013). Increasing breastfeeding among African Americans has the potential to

reduce other health disparities across the lifespan and is a public health and social justice priority.

¹MedStar Washington Hospital Center, Washington, District of Columbia, USA

²North Carolina Central University, Durham, NC, USA

³Benten Technologies, Manassas, VA, USA

⁴George Washington University, Washington, District of Columbia, USA

Date submitted: October 25, 2019; Date accepted: May 06, 2020.

Corresponding Author:

Loral Patchen, MedStar Washington Hospital Center, 110 Irving St NW, Suite EB7113, Washington, DC 20010, USA.

Email: Loral.Patchen@Medstar.net

Authors of current literature about interventions to support breastfeeding among African Americans advocate for disseminating knowledge and building self-efficacy; enhancing personal, professional, and community support; and promoting breastfeeding culture. Findings from research on technology-based interventions to influence breastfeeding are promising. Lau et al. (2016) conducted a meta-analysis and concluded that electronic technologies (such as websites) significantly improved breastfeeding exclusivity at 6 months. However, there is insufficient research into *mobile* health (mHealth) technologies (Chen et al., 2018). At least 92% of Americans aged 18–49 own a smartphone and about one quarter rely on it for internet, especially non-white individuals (Pew Research Center, 2019). Mobile technology is a complement to traditional healthcare and allows for greater engagement—particularly among low-income parents who experience greater access barriers—and dissemination of information at the exact time of need (Guerra-Reyes et al., 2016). The LATCH trial enrolled predominately low-income, Hispanic mothers in Connecticut and found that 80% of participants read text messages, and messages effectively linked participants to counselors (Harari et al., 2018; Martinez-Brockman et al., 2018a). The intervention did not affect breastfeeding behavior at 2 weeks or 3 months, however (Martinez-Brockman et al., 2018b). MumBubConnect delivered weekly interactive text messages to predominately high-income, Anglo-Celtic Australians (Gallegos et al., 2014). Distress was responded to with a phone call. The intervention did significantly increase exclusive breastfeeding (Gallegos et al., 2014). Technology-based interventions do not generally serve support networks. Our literature review revealed one research-based mobile application (app) in development targeting fathers in Australia: The Milk Man (White et al., 2016). Results of an impact study are pending.

FeedFinder is an app with global positioning systems (GPS) technology that lists nearby venues that support breastfeeding. Users in the United Kingdom identified and rated these venues (Simpson et al., 2016). Telelactation connects a user to a lactation professional through a video call and is available from any location, at any time, and at reduced cost compared to traditional in-person lactation support (Uscher-Pines et al., 2017). The impact of these emerging technologies is unknown. There is no scientifically-based mobile health (mHealth) technology available that integrates these features and specifically supports African American individuals in achieving breastfeeding goals. This study proceeded in two phases. The aim of Phase 1 was to identify ideal components and content of a mHealth intervention, and the aim of Phase 2 was to determine the usability of a prototype based on the Phase 1 findings.

Theoretical Framework

Social cognitive theory and health branding provide a theoretical framework for the study. A health branding approach

Key Messages

- African Americans breastfeed significantly less than white Americans. Little is known about the role of mobile health technologies to support breastfeeding initiation and continuation among African Americans.
- We conducted Phase 1 focus groups and interviews with pregnant self-identified African Americans in Washington, DC, to identify key areas that a mobile health technology intervention should address. They identified low self-efficacy, parent-child attachment beliefs, social support, public breastfeeding and social desirability, and returning to work as important. They preferred an application (app) and text messaging technology. Desired features included local resources, support person access, baby care logs, identification of public breastfeeding venues, and peer discussions.
- In Phase 2 we created KULEA-NET, a prototype app and text messaging intervention to support breastfeeding among African Americans based on the preferences of our participants. Usability test results were promising.
- Feelings were mixed about the appeal of a mobile health technology intervention specifically for the African American community. Some conveyed skepticism since individuals of all races/ethnicities may experience breastfeeding challenges.

appeals to an individual's self-interest and emphasizes the cost/benefit of a health-promoting behavior in the hope that the individual will take up that behavior (Evans & Hastings, 2008). Social cognitive theory posits that individual behavior is influenced by the social environment (Bandura, 2004). An individual must know what to do and how to do it, and modeling by others makes success more likely (Bandura, 2004). How persons in an individual's environment respond to a health behavior matters, and expectations of a negative response can preclude a person from engaging in that behavior (Bandura, 2004). Self-efficacy—how confident persons are in their ability to successfully perform a behavior—also influences health behavior (Bandura, 2004).

Methods

Design

We conducted a mixed-methods study using community-based participatory research methods and user-centered technology design methods, both of which engage intended users at every step. These methods facilitated our goal to develop and conduct a formative evaluation of a culturally informed and impactful intervention.

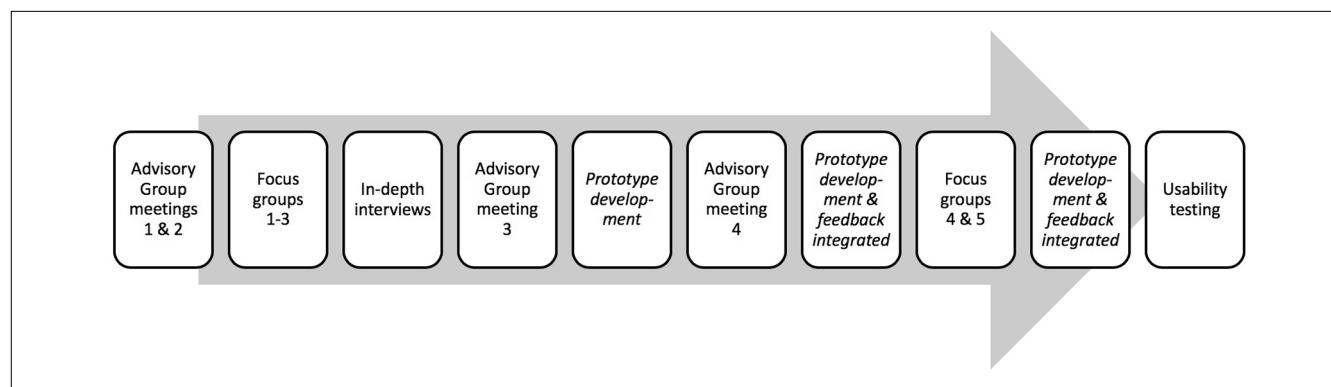


Figure 1. Graphic Representation of Study Design.

For Phase 1, we relied on focus groups and in-depth interviews with members of the African American community, as well as an advisory group of professionals who serve African American parents to co-create the content and technological components of the intervention. Findings from these discussions guided development and modifications of the KULEA-NET prototype. For Phase 2, our usability testing provided feedback about the content and technological components of KULEA-NET. See Figure 1 for a graphic representation of our study design.

Study Design 4.29.20

IRB Approval and Informed Consent. This study was approved by the Institutional Review Boards of the George Washington University and the MedStar Health Research Institute. Written informed consent was obtained from all participants. Potential focus group and in-depth interview participants were approached during an office visit or contacted by phone about the study. If interested, they selected a date and time to participate. The research team obtained consent on paper immediately prior to the group or interview. For usability testing, potential participants were approached during an office visit (prior to giving birth) or on the postpartum wards (after giving birth). If interested, consent was obtained on a digital consent form.

At least one International Board Certified Lactation Consultant (IBCLC®) and obstetrical health care provider were present at each focus group to answer questions and provide desired education. Each participant received a \$50 gift card at the end of the focus group or interview. Usability testing participants received a \$25 gift card at enrollment and a \$50 gift card at the end of the study. Advisory group members were provided a stipend of \$1250.

Setting

This study took place in the District of Columbia. Focus group and in-depth interviews occurred from January to July 2018 and participants were recruited from outpatient offices

affiliated with MedStar Washington Hospital Center (MWHC). Usability testing took place during December 2018 and participants were recruited from MWHC's outpatient offices and postpartum units.

Sample

Phase 1/Aim 1: Co-Creating the Prototype. Advisory Group. We formed an advisory group to guide the study. Six experts in lactation, pediatrics, nursing, midwifery, early parenting behavior, and infant development from the local community participated. Five participants identified as African American, four were healthcare providers, and three were IBCLCs®. All had at least 5 years' experience in service delivery to the African American community, and all were willing to attend at least four meetings and to provide feedback about the intervention.

Focus Groups and In-Depth Interview Participants. For focus groups and in-depth interviews, self-identified African American individuals aged 18–40 with no contraindications to breastfeeding were eligible for participation. For the first three focus groups, we included primiparas at least 28 weeks' gestation. For the last two focus groups, we included both primiparas and multiparas at least 24 weeks gestation. Three groups were limited to primiparas to capture their narrative without the potential confounding effect of experienced parents. In-depth interviews with new participants allowed for deeper probing and mitigation of “group-think” and response bias. Focus group participants were invited to suggest support people for in-depth interviews to include their perspective. Support people did not participate in focus groups. We recruited by purposive sampling.

Ultimately, 25 pregnant people participated in five focus groups, ranging from three to seven participants. Four pregnant individuals, none of whom had participated in a focus group, and two support people (one male partner and one mother) participated in in-depth interviews. Pregnant participants were an average of 26 years old and 31 weeks' gestation. Most (83.3%) were first-time parents.

Phase 2/Aim 2: Usability Testing. Eligibility criteria for usability testing were as follows: self-identification as African American, aged 18–40, possession of a smartphone, no contraindications to breastfeeding, between 38 weeks' gestation (antenpartum) and 8 weeks postpartum, and either "breastfeeding only" or "mixed feeding" statuses. Participants were recruited via purposive sampling.

Fourteen participants completed usability testing. Seventeen enrolled and three were lost to follow-up. None of them had previously participated in a focus group or interview. Two (11.8%) enrolled prior to giving birth, and 15 (88.2%) enrolled within 3 days after giving birth. Ten (58.8%) were first-time parents. Average age was 26.4 years.

Measurement

Phase 1/Aim 1: Co-Creating the Prototype. Advisory Group. During the first meeting, we oriented members to the project goals. The second meeting was used to determine content and guiding questions for focus groups and in-depth interviews. We convened the third meeting after focus groups and in-depth interviews to review findings and gather input on how to translate findings to prototype development. At the fourth and final meeting, members reviewed the prototype content in detail.

Focus Groups and In-Depth Interviews. After the first two advisory group meetings, we conducted three focus groups and all in-depth interviews. After an introduction to the study, review of ground rules, and an ice breaker, the first three focus groups and all in-depth interviewees were asked about technology and internet use, social media use, and preferred sources of information. Breastfeeding and health literacy were then explored through discussion of beliefs and attitudes about breastfeeding and baby care topics that impact breastfeeding, including introduction of solid foods, holding and spoiling babies, maternity leave and returning to work, human milk substitutes, infant sleep, and breastfeeding in public. Barriers to and facilitators of breastfeeding were explored, like time availability, stress, social support, social acceptability, and access to information. Last, participants were asked about their preferences for receiving informational and motivational content related to breastfeeding. The last two focus groups took place after development of the KULEA-NET prototype. These new participants provided feedback on the prototype and text messages by reviewing screenshots, visual mock-ups, sample content, and sample text messages via PowerPoint presentation. Focus group and in-depth interview topics are presented in greater detail in Table 1. Questions were adapted for support people who participated in in-depth interviews, but the topics were the same. Focus groups and in-depth interviews proceeded until saturation was reached on nearly all topics. The focus group facilitator was an ethnically concordant doctoral level behavioral scientist with expertise in both qualitative and quantitative methods and

studies addressing health disparities across the life course. This same individual facilitated all focus groups and in-depth interviews.

Phase 2/Aim 2: Usability Testing

Usability, in this context, is a measure of the user experience with an app. We assessed satisfaction, effectiveness, and quality of experience. In this formative phase, we focused on developing KULEA-NET for postpartum use and conducted usability testing among postpartum participants.

Prototype usability was measured with the System Usability Scale (SUS), the most common questionnaire used for this purpose. SUS is a highly reliable (Cronbach's alpha of 0.91) 10-item Likert scale that measures function, efficiency, effectiveness, and satisfaction with electronic tools (Bangor et al., 2008). Scores range from 0–100, with 0 indicating not at all usable and 100 indicating perfect usability. The average SUS score is 68; higher scores indicate greater-than-average usability. Sample size requirements are modest: 15 users identify approximately 97% of all usability issues (Bangor et al., 2008). See Table 2 for SUS measures.

Data Collection

Phase 1/Aim 1: Co-Creating the Prototype. Advisory Group. Meetings took place on-line and were recorded. Advisory group members also provided written feedback.

Focus Groups and In-depth Interviews. All focus groups took place in-person. All except one in-depth interview took place by phone. All discussions were audio recorded. Participants' confidentiality was maintained by asking them not to use their own or others' names. Informed consent documents were locked in a cabinet separate from recordings. Recordings and transcriptions were kept in password protected files only accessible to team members. Identifiers were stripped from transcripts.

Prototype Development. This activity began after the first three focus groups and all in-depth interviews. Our team outlined desired functions, drafted content, created visual mock-ups, crafted text messages, and developed a timeline to deliver messages. Advisory group members reviewed the resulting prototype, and we made modifications based on their feedback. We then conducted the last two focus groups to elicit feedback on the prototype and then again made modifications based on their feedback before usability testing.

Phase 2/Aim 2: Usability Testing. Following the completion of the Phase 1 activities, we conducted a usability test of the prototype. The KULEA-NET app was downloaded onto participants' smartphones and they used the app for 3 weeks. Participants then answered usability questions via an online link sent to them electronically.

Table I. Focus Group and In-Depth Interview Topics.

Focus group	Topic	Specific questions
Focus groups 1–3, in-depth interviews	Media & information sources	<ul style="list-style-type: none"> • Technology, internet, & social media use • Preferred sources of information • Pregnancy/breastfeeding websites • Text message services
	BF & health literacy	<ul style="list-style-type: none"> • Beliefs about BF • Beliefs about baby care topics that influence BF <ul style="list-style-type: none"> ◦ Introduction of solid foods ◦ Safety of human milk substitutes ◦ Holding and spoiling babies ◦ Emotional development ◦ Infant sleep ◦ Burden to mother ◦ Perceived difficulty & likelihood of failure
	Barriers to & facilitators of exclusive BF	<ul style="list-style-type: none"> • Maternity leave & returning to work • Human milk substitutes • Public BF • Time availability • Importance/value • Stress • Social support • Social acceptability • Access to information
	Preferences for receiving BF content	<ul style="list-style-type: none"> • Social media • Messaging • Videos • Other ideas from participants?
Focus groups 4 & 5	KULEA-NET prototype feedback	<ul style="list-style-type: none"> • App <ul style="list-style-type: none"> ◦ Visual mock-ups ◦ Educational material and eLearning videos ◦ Reminders ◦ Social and professional support features • Text message relevance and comprehension • Other desired content • Support network members • Delivery timing • Would you join and/or share? • Acceptable cost
	General feedback	

Note. BF = breastfeeding.

Data Analysis

Phase 1/Aim 1: Co-Creating the Prototype. All discussions were recorded, transcribed, and stripped of identifiers. Transcripts were analyzed using conventional content analysis, which is used to describe a phenomenon for which little research or theory exists through “inductive category development” (Hsieh & Shannon, 2005). Transcripts were reviewed using open coding in NVivo 11. Codes were refined, reduced, and categorized by conceptual similarity to create the final codebook, which was applied to all transcripts.

Phase 2/Aim 2: Usability Testing. The SUS data were analyzed using standard methodology that creates an index

using $(x-1)$ for odd and $(5-x)$ for even questions, summing the score, then multiplying by 2.5. The “x” represents a participant’s response to each item. This methodology is described in detail elsewhere (U.S. Department of Health and Human Services [HHS], 2019).

Results

Phase 1/Aim 1: Co-Creating the Prototype

Advisory Group. Advisory group members rejected references to popular media figures with African American identity, such as Beyoncé, and to popular films, such as *Black*

Table 2. System Usability Scale Questions.

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

Note. This is a Likert scale with five possible responses to each item ranging from strongly disagree [1] to strongly agree [5] (U.S. Department of Health and Human Services, 2019).

Panther. They alerted us that some messages could be perceived as sexualizing breastfeeding. They also assisted with language and terminology (e.g., “snap-back” to convey weight loss). Finally, members recommended inclusion of general pregnancy content, which would have broad appeal and enhance engagement.

Focus Groups and In-Depth Interviews. Participants identified key content areas that a mHealth intervention should address: low self-efficacy, parent-child attachment beliefs, social support, public breastfeeding and social desirability, and returning to work. They reported an unmet need for credible breastfeeding information and preferred an app and text messaging intervention. There were diverse views on whether an intervention should be tailored to African Americans.

Low Self-Efficacy. Participants expressed what can be best described as low self-efficacy. They perceived breastfeeding to be more difficult than human milk substitutes, and expected significant challenges with latch, milk supply, and pain. Many seemed to accept that they would not meet their breastfeeding goals, sharing anecdotes of others’ difficulties. A few felt that breastfeeding could be the easier option and shared anecdotes of others’ success, but this did not generate expectations for personal success. They desired guidance on selecting and feeding human milk substitutes.

Parent-Child Attachment. Many participants believed that breastfeeding could contribute to undesirable parent-infant attachment and promote unhealthy infant dependence. Breastfeeding past a certain age or being too available to an infant was perceived to inhibit social development and self-sufficiency that could last into adulthood. Participants felt nursing-at-the-breast and prolonged breastfeeding duration, therefore, was undesirable. Giving a bottle, even if filled with human milk, seemed to mitigate this concern.

Social Support. Many participants cited partners that were supportive of—and sometimes insistent on—breastfeeding. Modeling and support by non-partners, and participants’ mothers in particular, were also important. Others were discouraged by the lack of role models in their social circle. In choosing to breastfeed, they were breaking with tradition, making it necessary to seek out new sources of information and support. Supporters who participated in in-depth interviews expressed enthusiasm at being included in the intervention.

Public Breastfeeding and Social Desirability. Some participants expressed that they would be uncomfortable breastfeeding in front of others. For a few, this applied within their homes and around loved ones. Others expressed concern about the discomfort of *others* and the belief that they would receive unwanted, negative attention. Some felt that no public breastfeeding was acceptable and intended to breastfeed only at home and to give a bottle outside the home. Most felt a cover was necessary to breastfeed in public. Without a cover, the parent was being immodest and public ire might be justified. One participant framed uncovered public breastfeeding as an unwelcome act of social defiance. No one expressed intention to consistently breastfeed uncovered in public. One participant spoke about breastfeeding in public as a right. See Table 3 for illustrative responses. Breastfeeding did not seem to be the norm in their communities as evidenced by the rarity of seeing an infant nursing at the breast. One participant questioned “why we as a race decided not to breastfeed. Supposedly we had the best milk ... Even back in slavery we were breastfeeding, you know, the slave master’s children.” While participants’ perceptions of the impact of wet nursing among enslaved African Americans on current social desirability was not explored further in these focus groups or interviews, an integrative literature review by DeVane-Johnson et al. (2017) describes a number of negative historical reproductive health experiences including forced wet nursing and lack of choice among black women in America that contribute to current breastfeeding beliefs and behaviors.

Returning to Work. Participants feared the return to work as a breastfeeding parent. They were unsure how to find adequate time and facilities to express milk and how to store it. One participant spoke about being the first employee to request work accommodations. Superiors were uninformed and poorly prepared to support her. One participant identified the struggle of balancing work outside the home with breastfeeding and parenting.

Information Preferences. Participants desired breastfeeding information yet perceived it to be difficult to access. Healthcare providers were a trusted source, but participants expressed disappointment with the information received during prenatal care. Some were aware of lactation specialists but were unsure how to access them outside of the hospital. None had taken a breastfeeding class, and most did not plan to because of cost or uncertainty about availability.

Table 3. Breastfeeding in Public/in Front of Others Illustrative Participants' Responses.

Theme	Illustrative participant quotes
Will bottle feed in public	"I'm not comfortable going to the mall or to a restaurant and breastfeeding at the Table I'd rather just make a bottle at home and make sure I bring it with me."
Unacceptable to others and will elicit negative, unwanted attention	"It's not accepted. I just read an article called... this lady who got kicked out of [a restaurant] for breastfeeding."
Will cover to avoid negative, unwanted attention	"To answer your question umm no qualms with doing it. I plan on if and when I need to....I'm going to use cover ups just cuz I don't feel like dealing with the negativity that's out there."
Parent's responsibility to be modest, cover and put others at ease	"I have nothing against you breastfeeding your baby, but it's like...at least cover yourself... like common courtesy. Like we don't take you feeding your baby away from you, but still be mindful of other people's [comfort]."
Act of defiance	"I think people take it too far now...I've seen people that, because it's so controversial, everybody [is] pro-breastfeeding, which is great, they just like doing it to be spiteful. In my opinion, like 'I'm just going to do it right here,' no cover."
Will cover, but others' comfort not my concern	"I don't have a problem with it. I think there's enough devices now where you can cover yourself to do it. I think more and more people are becoming accepting...at the end of the day this is me and my child. I'm trying to feed my child. If it's disturbing you that much...get up and walk away. It's not like I'm gonna follow you around feeding my child so you have to be exposed to it."
Will breastfeed covered or uncovered	"I'm not gonna care. If my son's hungry, guess what—turn your cheek...I'll try to find a bathroom or, you know, something, but I'm not gonna be too concerned about that."

Participants liked information from a variety of sources: articles or forums, peers, and professionals. They appreciated information perceived to be factual and free of persuasion or judgment. Controversy surrounding infant feeding caused some to distrust information, so they wanted acknowledgement of limitations and gaps in science.

Mobile Health Preferences. Participants searched for online information most often on mobile phones. Apps, websites, and forums were desirable platforms. They shared mixed opinions about social media, with concerns about credibility and privacy. Most wanted text messages because they bring information to them and demand their attention. A frequency of one to three texts per week was optimal. Messages should guide them to more information or be interactive. In anticipation that they would have limited and unpredictable free time and attention, they wanted flexibility and control over when they access information.

African American Specificity. There was diversity in opinion about tailoring the intervention for African American parents. Participants wanted to see images of African Americans and welcomed information that might be more relevant to African Americans (e.g., safety of hair care products like relaxers). However, they noted that breastfeeding challenges were not specific to any one race/ethnicity, so targeting the African American community was inappropriate. Advisory group members rejected references to popular African American media figures. This suggests that efforts to be inclusive of African American parents was welcomed, but a focus on icons in African American culture requires a nuanced approach. Overall, participants assigned greater importance to geographic specificity than aligning the intervention to African American race/ethnicity. Table 4 shares illustrative responses.

Table 4. Illustrative Responses on Whether KULEA-NET Intervention Should be Specific for African Americans.

Theme	Illustrative participant quotes
In favor	"Having a dedicated place for things that could pertain to me would be helpful...so I'm not sitting here thinking...this study that they used was mainly Asian women so that's what they're reporting right now and it's not...for me. I think it would be helpful to know that it's specifically for black women."
Neutral	"If it says most black women have issues producing blah blah blah, try this, then I would try it because it is saying something specific for me."
Opposed	"No, it wouldn't make a difference, but I feel like it should be targeted to everybody. Like, not only black woman are struggling with breastfeeding."

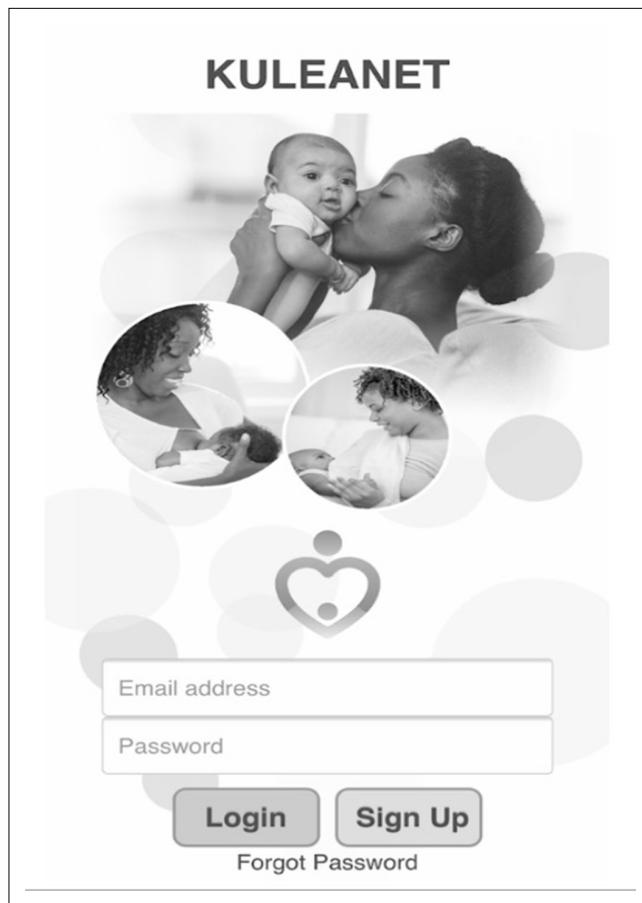


Figure 2. Screenshot of log-in.

KULEA-NET Prototype. The resulting KULEA-NET prototype was an app and text messaging intervention that supports African Americans to initiate and exclusively breastfeed for 6 months. Upon registering for the app, the user enters pregnancy information that allows for customized content. See Figure 2 for a screenshot of the log-in screen. The app includes four main sections: static content library, video content library, nearby resources, and log for feedings and diapering. The static content library contains printed information on a wide range of topics, including breastfeeding benefits, common challenges and solutions, public breastfeeding, and returning to work. Videos provide content that is best learned with visual aids, such as latching and positioning. Motivational videos that feature African American parents telling their breastfeeding stories were also included. The nearby resources section includes two parts: a geographically-specific registry of breastfeeding organizations and professionals and a crowd-sourced GPS map that will determine a user's geographic position and locate private lactation rooms and breastfeeding-friendly public spaces in the vicinity. Users rate the space on cleanliness, privacy, and comfort. Users and support persons can

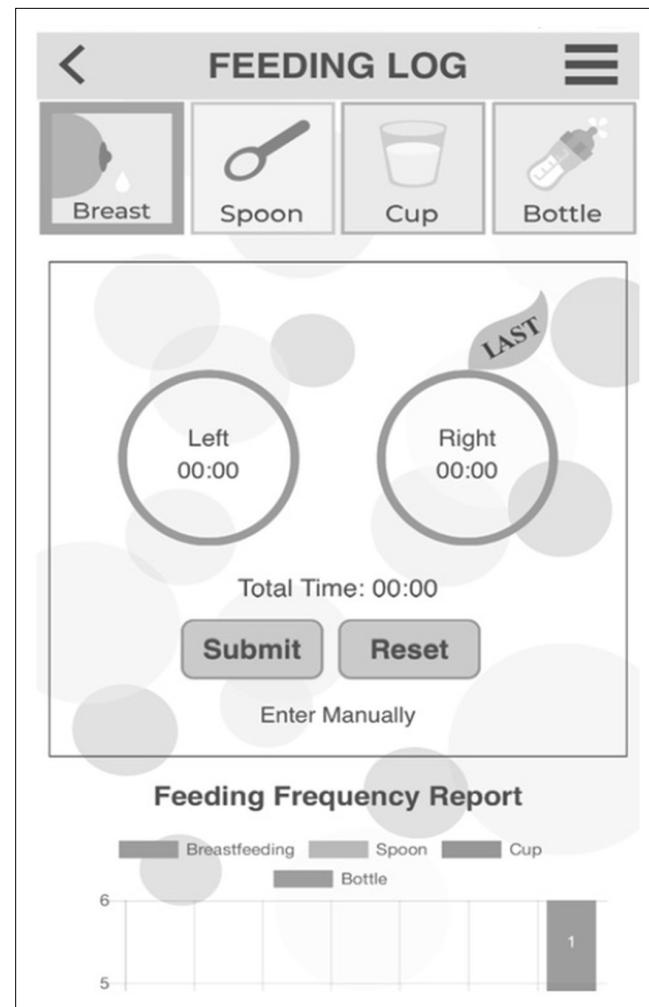


Figure 3. Screenshot of Feeding Log.

log details of feedings and diaper changes. See Figure 3 for a screenshot of the feeding log.

KULEA-NET users identify a support person upon registration. The support person has full access to the library content and can log feeds and diaper changes. Pop-ups invite the support person to send encouraging messages to the breastfeeding parent.

Text messages deliver timely information to a user's smart phone home screen and allow the user to tap to access expanded content in the libraries. Messages cover numerous topics, and key knowledge (e.g., the adequacy of colostrum and how to build and maintain milk supply) is emphasized with multiple messages. Messages are delivered at least three times per week on a timeline determined by the due date or delivery date. Our intention is for some messages to be interactive; by responding, a user could receive additional support. Examples of text messages are presented in Table 5.

Post-Prototype Focus Groups. Overall, participants responded positively to KULEA-NET's design and features. They were

Table 5. Examples of KULEA-NET Text Messages.

Content area	Text message
Benefits	Breastmilk is nature's super food. Did you know that your breastmilk is specially made for your baby and changes as your baby grows? Click here to learn more about why breastmilk rocks.
Pain & latch challenges	Breastfeeding can be a pain in the nipple! Sore nipples in the first week or so is normal. A good latch is important. Click here to learn what else to do to make breastfeeding as comfortable as possible.
Supply challenges	Got milk? Of course you do! The secret to making enough breastmilk is breastfeeding early and often. Avoid these common mistakes to keep your supply up.
Attachment & dependence	Worried about being booby-trapped? Many moms worry that breastfeeding will spoil or make it hard to leave baby with others. But that's NOT true!
Mixed feeding	Breast is best, but some moms will also give formula. We don't recommend that. If you are considering giving your baby both, check out this link.
Sociohistorical context	Did you know that African American women on the east coast are less likely to breastfeed than Caucasian women on the west coast? Let's change that fact!
Public breastfeeding	Are you worried about breastfeeding in public? Here are some tips for keeping your baby fed and yourself comfortable when out and about.
Return to work	Breastfeeding and work CAN work. How will I pump and store milk? Will my baby take a bottle? What about my milk supply? These are common working mom concerns, but we've got your back!
Interactive	Hey mom! Just checking in. If it seems like your baby doesn't want your breastmilk, text MILK to 555-555-5555.

Note. This is a sample of text messages. These messages were chosen because they address key content areas determined by focus groups and in-depth interviews, or because they demonstrate a feature of the KULEA-NET intervention. For important content areas, such as milk supply, our intent is for a user to receive multiple, different text messages. Text messages will be delivered on a time-line tailored to the pregnancy's gestational age and the infant's age.

most enthusiastic about tips on returning to work and logging feeds and diaper changes. They wanted content on infant growth and development to be added. They preferred videos that were no more than 5 min and that responded to their immediate learning needs. Participants liked inclusion of a support person and the crowd-sourced GPS map that identifies public places to breastfeed. Participants confirmed the relevancy of text message content and agreed that they would "tap" to access more information within the app. Some terms were not well understood, like "exclusive breastfeeding" and "nipple confusion." However, uncertainty with a term's meaning would prompt them to read more. Participants suggested additional features: listings for breastfeeding classes and mental health and family support services; logs to record infant anthropometrics, sleep, and parental mood; and reminders for healthcare appointments.

Modifications were made based on focus group feedback after each session, then we proceeded to usability testing. Usability testing did not include text messaging or the support person; the nearby resources feature was active.

Phase 2/Aim 2: Usability Testing

The mean KULEA-NET SUS score was 73.8 compared to the average SUS score across 500 studies of 68 (Sauvage, 2011). Individual KULEA-NET scores ranged from 67.5 to 90. Individual and average usability scores are presented in

Figure 4. Participants would recommend KULEA-NET to a friend and believed that it was a valuable tool.

Discussion

Phase 1/Aim 1: Co-Creating the Prototype

Key Factors that Influence Breastfeeding. Public disapproval and social undesirability are well-documented barriers to exclusive breastfeeding in the African American community (DeVane-Johnson et al., 2017; Hinson et al., 2018; Kim et al., 2017; Ware et al., 2014). Our findings revealed the magnitude and intensity of this barrier and elucidated nuances. Our participants felt that uncovered breastfeeding was unacceptable and immodest. Some were so uncomfortable with breastfeeding outside the home that they intended to use bottles of their own milk or human milk substitutes, which jeopardizes or precludes exclusive breastfeeding. Asiodu et al. (2017) and Gross et al. (2015) suggested circulation of positive images of African Americans breastfeeding to challenge these perceptions and build social desirability. Accordingly, KULEA-NET integrated the *It's Only Natural* breastfeeding campaign from the U.S. Department of Health and Human Services (2018) into the resource library. We hope that this may begin to shift perceptions and build comfort among parents themselves. However, community campaigns and systems-level interventions are needed to neutralize the negative attention

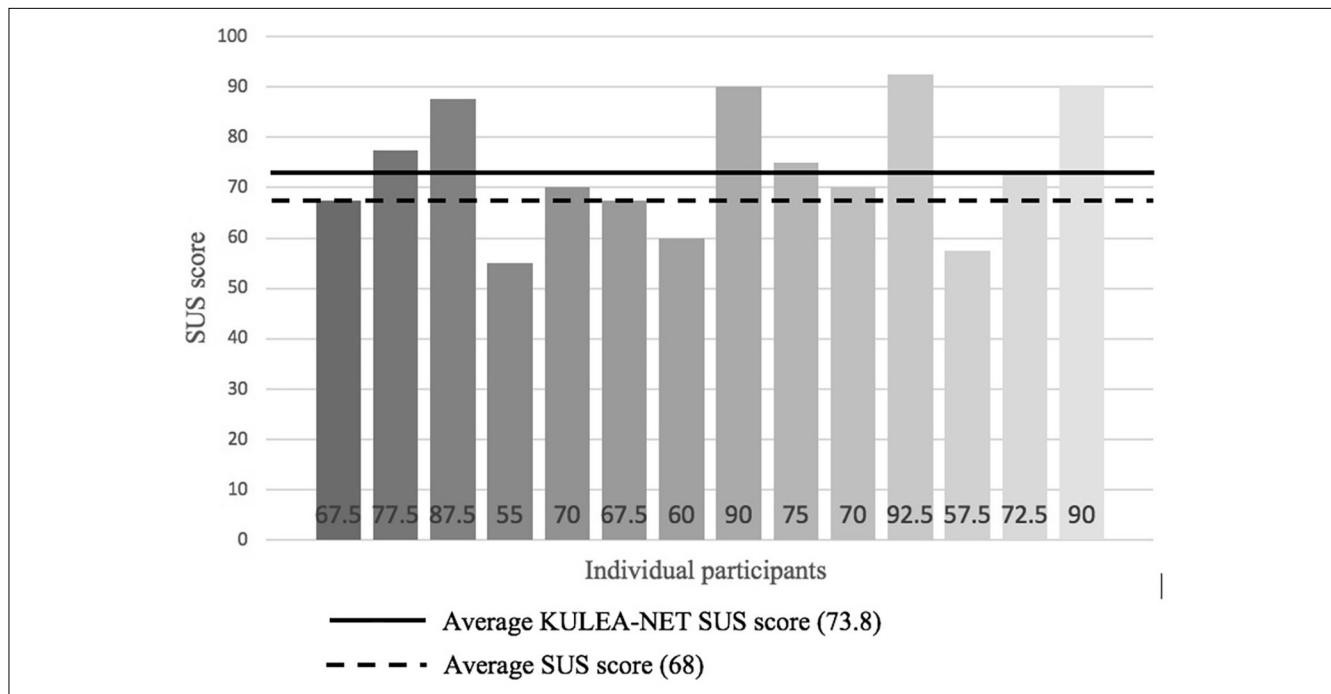


Figure 4. Individual and Average KULEA-NET System Usability Scale (SUS) Scores Compared to the Average SUS Score. Note. The average SUS score is based on the average score across 500 studies as reported in Sauro (2011), Feb. 2). Measuring usability with the System Usability Scale (SUS). Retrieved March 5, 2020 from <http://measuringu.com/sus/>

that breastfeeding parents experience, or expect to experience, from others. DeVane-Johnson et al. (2018) recommend that culturally sensitive interventions promote privacy for breastfeeding. KULEA-NET responded to this need by integrating the GPS feature that assists in finding public venues with private breastfeeding space.

The robust support of partners was important to our participants. Thomson et al. (2016) found that a mother is significantly more likely to breastfeed if the infant's father is supportive. Personal social supports, and the partner and grandmother in particular, should be a focus of intervention (Asiodu et al., 2017; Kim et al., 2017). Furman et al. (2016) successfully recruited urban, primarily African American fathers to participate in breastfeeding education. Subsequent iterations of KULEA-NET will fully develop recommended features to engage support persons.

Beliefs surrounding parent-child attachment also discouraged exclusive breastfeeding among our participants. This may be an example of the emphasis that individuals in the African American community place on child strength and independence as a consequence of slavery and oppression, and the need for resiliency and survival in a racist society as discussed by DeVane-Johnson et al. (2018). In-depth research is needed to assess the role that this history has on African American breastfeeding patterns. The same authors suggested that interventions expose African American women to these sociohistorical influences, and one of our participants did request such information. KULEA-NET does not include

this content but references demographic variations in breastfeeding rates.

Asiodu et al. (2017) advocated for information on mixed feeding as part of a culturally-informed intervention. Our participants requested information on human milk substitutes, which is a complex finding in the context of the goal to promote exclusive breastfeeding. KULEA-NET includes content on benefits of exclusive breastfeeding, common challenges to exclusive breastfeeding, and weaning from breastfeeding, but does not offer specific information on human milk substitutes or mixed feeding best practices. Future work is needed to determine how to thoughtfully accommodate these competing priorities.

Social cognitive theory and health branding concepts guided KULEA-NET development. The content libraries are included to teach users what to do and how to do it. Images of African Americans breastfeeding throughout the platform model the behavior for users to replicate. The app builds self-efficacy by boosting users' confidence in their ability to breastfeed. Text messaging, imagery, and videos portray breastfeeding as beneficial and attractive. Our goal was to brand breastfeeding the most socially desirable option.

African American-Specific Intervention. The desire for an intervention specific to an African American audience was mixed (e.g., the use the culturally-tailored imagery). Breastfeeding challenges are not unique to African Americans. However, rates of breastfeeding across racial/ethnic groups vary

significantly, suggesting that differences among individual and system-level supports exist. One interpretation of this complex finding is that default white culture has excluded the experiences and perspectives of people of color. Another possible interpretation is that public health practitioners have commonly “targeted” lifestyle choices or behaviors perceived to be problematic. In doing so, they have irresponsibly and incorrectly associated these behaviors only with communities of color, or, alternatively, they have failed to consider the context in which true disparities exist and persist. Although health disparities related to breastfeeding do exist, this may or may not warrant an ethnic/race-specific approach. However, our participants perceived that wanting to provide for one’s child is universal and should not require ethnicity/race-specific content. A possible reconciliation of these data is the notion that there may be concerns that are of greater magnitude to African Americans, and that these concerns must be incorporated. Images and language should be inclusive rather than specific. More fully integrating African American individuals into an intervention that is relevant and applicable to all may be the desired approach. An intervention specifically for African Americans might be perceived as further marginalizing. This finding was unexpected, and we were unable to reach saturation. Our team is planning additional in-depth interviews to better understand opinions on this topic.

Phase 2/Aim 2: Usability Testing and Next Steps

Future Prototype Development. Full-scale development of KULEA-NET will include additional features desired by participants, including a catalog of local breastfeeding classes, links to external resources, and a discussion forum. Other investigators of breastfeeding technologies also have identified these features as desirable (Abbass-Dick et al., 2017; Biediger-Friedman et al., 2016; Guerra-Reyes et al., 2016). Advisory group members and participants requested content and features relevant to pregnancy and infant care, but outside the scope of breastfeeding. We were unable to integrate all requests but understand that a comprehensive app is of interest and may maximize engagement. Gallegos et al. (2014) and Martinez-Brockman et al. (2018a) emphasized the importance of relevant and timely text messages. Our findings support the relevance of text messages and the next phase of KULEA-NET will assess timeliness of delivery. Features that were not fully functional or of limited content during the formative phase will be developed and tested. Although we enrolled only postpartum individuals in our usability study, our next iteration will engage individuals early in pregnancy.

Application to Lactation Practice. KULEA-NET complements traditional lactation supports. Consistent with our participants’ dissatisfaction with breastfeeding information provided at prenatal appointments, researchers have suggested

that African American individuals are less likely to receive support in the healthcare system (Gross et al., 2017; Johnson et al., 2016; Lind et al., 2014; McKinney et al., 2016). Mobile technologies like KULEA-NET may have particular influence among African Americans who are more likely to be marginalized in the health care system. None of our participants had taken a traditional class, underscoring the potential value of KULEA-NET. It may be most effective when integrated into traditional healthcare. Users engaged more in the Growing Health App if recruited by care providers (Laws et al., 2018).

Future Research. Our next step is to evaluate KULEA-NET’s effectiveness in supporting African Americans individuals to initiate and continue breastfeeding exclusively for the first 6 months. This will establish the value of an app and text messaging intervention to achieve breastfeeding goals. We also plan to evaluate the impact of introducing KULEA-NET at different time points, such as prenatally, at the time of birth, and postpartum. Additional research is needed to determine the most effective ways to enhance social desirability of breastfeeding. The role of sociohistorical stigma (slavery, forced wet nursing, and lack of choice) documented by DeVane-Johnson et al. (2018) in influencing our participants’ beliefs about parent-child attachment, breastfeeding outside of the home, and social desirability is uncertain. Best practices to promote exclusive breastfeeding in the context of wide-spread mixed feeding practices are also needed.

Limitations

Focus group and in-depth interview discussions were guided by our questions. Other themes may have emerged with different prompts. Group think and response bias may have influenced findings. Divergent views may have been missed, although this risk was mitigated with in-depth interviews. Our sampling method makes self-selection bias possible. The mean age of participants was 26, and they may have responded more favorably to a technological intervention than older parents.

Conclusions

The ideal mHealth breastfeeding intervention is an app with text messaging that is inclusive of, but perhaps not exclusive to, African American parents. Our participants expressed a desire to breastfeed, but anticipated challenges. Self-efficacy, parent-child attachment beliefs, public breastfeeding and social desirability, and returning to work were important barriers that KULEA-NET needed to address. The KULEA-NET prototype earned high usability scores and offers promise in its ability to engage African American individuals and support breastfeeding. Our next step is to develop content and features more robustly and conduct a randomized-controlled study to assess KULEA-NET’s influence on

breastfeeding initiation and duration among African Americans in an effort to narrow the race/ethnicity gap in breastfeeding and related health outcomes.

Declaration of Conflicting Interests

Loral Patchen discloses participation in the Diclegis Speakers Bureau for Duchesnay Pharmaceuticals. The other authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

We received funding from Grant 1R41MD012294-01 from the National Institutes of Health, National Institute on Minority Health and Health Disparities. Patchen, Ma, and Evans are the Principal Investigators on this grant.

ORCID iDs

Lindsey Ellis, NP, MPH, IBCLC  <https://orcid.org/0000-0003-3524-9271>

Tony Ma, MS  <https://orcid.org/0000-0003-3092-0572>

References

- Abbass-Dick, J., Xie, F., Koroluk, J., Alcock Brillinger, S., Huizinga, J., Newport, A., Goodman, W. M., & Dennis, C.-L. (2017). The development and piloting of an eHealth breastfeeding resource targeting fathers and partners as co-parents. *Midwifery*, 50, 139–147. doi:10.1016/j.midw.2017.04.004
- Asiodu, I. V., Waters, C. M., Dailey, D. E., & Lyndon, A. (2017). Infant feeding decision-making and the influences of social support persons among first-time African American mothers. *Maternal and Child Health Journal*, 21(4), 863–872. doi:10.1007/s10995-016-2167-x
- Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior*, 31(2), 143–164. doi:10.1177/1090198104263660
- Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An empirical evaluation of the system usability scale. *International Journal of Human-Computer Interaction*, 24(6), 574–594. doi:10.1080/10447310802205776
- Biediger-Friedman, L., Crixell, S. H., Silva, M., Markides, B. R., & Smith, K. S. (2016). User-centered design of a Texas WIC app: A focus group investigation. *American Journal of Health Behavior*, 40(4), 461–471. doi:10.5993/AJHB.40.4.8
- Centers for Disease Control and Prevention. (2013, November 22). CDC Health disparities and inequalities report—United States. *Morbidity and Mortality Weekly Report*, 62(3). <https://www.cdc.gov/mmwr/pdf/other/su6203.pdf>
- Centers for Disease Control and Prevention. (2019, August 1). *National Immunization Survey Results: Breastfeeding Rates*. https://www.cdc.gov/breastfeeding/data/nis_data/results.html.
- Chen, H., Chai, Y., Dong, L., Niu, W., & Zhang, P. (2018). Effectiveness and appropriateness of mHealth interventions for maternal and child health: Systematic review. *JMIR mHealth and uHealth*, 6(1), Article e7. doi:10.2196/mhealth.8998
- DeVane-Johnson, S., Giscombe, C. W., Williams, R., Fogel, C., & Thoyre, S. (2018). A qualitative study of social, cultural, and historical influences on African American women's infant-feeding practices. *Journal of Perinatal Education*, 27(2), 71–85. doi:10.1891/1058-1243.27.2.71
- DeVane-Johnson, S., Woods-Giscombé, C., Thoyre, S., Fogel, C., & Williams, R. (2017). Integrative literature review of factors related to breastfeeding in African American women: Evidence for a potential paradigm shift. *Journal of Human Lactation*, 33(2), 435–447. doi:10.1177/0890334417693209
- Evans, W. D., & Hastings, G. (2008). *Public health branding: Applying marketing for social change*. Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199237135.001.0001>.
- Furman, L., Killpack, S., Matthews, L., Davis, V., & O'Riordan, M. A. (2016). Engaging inner-city fathers in breastfeeding support. *Breastfeeding Medicine*, 11(1), 15–20. doi:10.1089/bfm.2015.0092
- Gallegos, D., Russell-Bennett, R., Previte, J., & Parkinson, J. (2014). Can a text message a week improve breastfeeding? *BMC Pregnancy and Childbirth*, 14(1), 374. doi:10.1186/s12884-014-0374-2
- Gross, T. T., Davis, M., Anderson, A. K., Hall, J., & Hilyard, K. (2017). Long-term breastfeeding in African American mothers. *Journal of Human Lactation*, 33(1), 128–139. doi:10.1177/0890334416680180
- Gross, T. T., Powell, R., Anderson, A. K., Hall, J., Davis, M., & Hilyard, K. (2015). WIC peer counselors' perceptions of breastfeeding in African American women with lower incomes. *Journal of Human Lactation*, 31(1), 99–110. doi:10.1177/0890334414561061
- Guerra-Reyes, L., Christie, V. M., Prabhakar, A., Harris, A. L., & Siek, K. A. (2016). Postpartum health information seeking using mobile phones: Experiences of low-income mothers. *Maternal and Child Health Journal*, 20(Suppl 1), 13–21. doi:10.1007/s10995-016-2185-8
- Harari, N., Rosenthal, M. S., Bozzi, V., Goeschel, L., Jayewickreme, T., Onyebeke, C., Griswold, M., & Perez-Escamilla, R. (2018). Feasibility and acceptability of a text message intervention used as an adjunct tool by WIC breastfeeding peer counsellors: The LATCH pilot. *Maternal & Child Nutrition*, 14(1), Article e12488. doi:10.1111/mcn.12488
- Hinson, T. D., Skinner, A. C., Lich, K. H., & Spatz, D. L. (2018). Factors that influence breastfeeding initiation among African American women. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 47(3), 290–300. doi:10.1016/j.jogn.2018.02.007
- Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288. doi:10.1177/1049732305276687
- Johnson, A. M., Kirk, R., Rooks, A. J., & Muzik, M. (2016). Enhancing breastfeeding through healthcare support: Results from a focus group study of African American mothers. *Maternal and Child Health Journal*, 20(Suppl 1), 92–102. doi:10.1007/s10995-016-2085-y
- Kim, J. H., Fiese, B. H., & Donovan, S. M. (2017). Breastfeeding is natural but not the cultural norm: A mixed-methods study of

- first-time breastfeeding, African American mothers participating in WIC. *Journal of Nutrition Education and Behavior*, 49(7 Suppl 2), S151–S161.e1. doi:10.1016/j.jneb.2017.04.003
- Lau, Y., Htun, T. P., Tam, W. S. W., & Klainin-Yobas, P. (2016). Efficacy of e-technologies in improving breastfeeding outcomes among perinatal women: A meta-analysis. *Maternal & Child Nutrition*, 12(3), 381–401. doi:10.1111/mcn.12202
- Laws, R. A., Denney-Wilson, E. A., Taki, S., Russell, C. G., Zheng, M., Litterbach, E.-K., Ong, K.-L., Lymer, S. J., Elliott, R., & Campbell, K. J. (2018). Key lessons and impact of the Growing Healthy mHealth Program on milk feeding, timing of introduction of solids, and infant growth: Quasi-experimental study. *JMIR mHealth and uHealth*, 6(4), Article e78. doi:10.2196/mhealth.9040
- Lind, J. N., Perrine, C. G., Li, R., Scanlon, K. S., & Grummer-Strawn, L. M. (2014). Racial disparities in access to maternity care practices that support breastfeeding—United States, 2011. *Morbidity and Mortality Weekly Report*, 63(33), 725–728.
- Martinez-Brockman, J. L., Harari, N., & Pérez-Escamilla, R. (2018a). Lactation advice through texting can help: An analysis of intensity of engagement via two-way text messaging. *Journal of Health Communication*, 23(1), 40–51. doi:10.1080/10810730.2017.1401686
- Martinez-Brockman, J. L., Harari, N., Segura-Pérez, S., Goeschel, L., Bozzi, V., & Pérez-Escamilla, R. (2018b). Impact of the Lactation Advise Through Texting Can Help (LATCH) trial on time to first contact and exclusive breastfeeding among WIC participants. *Journal of Nutrition Education and Behavior*, 50(1), 33–42. doi:10.1016/j.jneb.2017.09.001
- McKinney, C.O., Hahn-Holbrook, J., Chase-Lansdale, P.L., Ramey, S.L., Krohn, J., Reed-Vance, M., Raju, T. N. K., Shalowitz, M. U., & Community Child Health Research Network. (2016). Racial and ethnic differences in breastfeeding. *Pediatrics*, 138(2), Article e20152388. doi:10.1542/peds.2015-2388
- Pew Research Center. (2019, June 12). Mobile fact sheet. Retrieved December 13, 2019, <https://www.pewinternet.org/fact-sheet/mobile/>
- Sauro, J. (2011, February 2). Measuring usability with the System Usability Scale (SUS). Retrieved March 5, 2020, <https://measuringu.com/sus/>
- Section on Breastfeeding (2012). Breastfeeding and the use of human milk. *Pediatrics*, 129(3), e827–e841. doi:10.1542/peds.2011-3552
- Simpson, E., Garbett, A., Comber, R., & Balaam, M. (2016). Factors important for women who breastfeed in public: A content analysis of review data from FeedFinder. *BMJ Open*, 6(10), Article e011762. doi:10.1136/bmjopen-2016-011762
- Thomson, J. L., Tussing-Humphreys, L. M., Goodman, M. H., Landry, A. S., & Olander, S. E. (2016). Low rate of initiation and short duration of breastfeeding in a maternal and infant home visiting project targeting rural, Southern, African American women. *International Breastfeeding Journal*, 12(15), 15. doi:10.1186/s13006-017-0108-y
- U.S. Department of Health and Human Services. (2018, October 16). It's Only Natural. Retrieved December 13, 2019, <https://www.womenshealth.gov/its-only-natural>
- U.S. Department of Health and Human Services. (2019). System Usability Scale (SUS). Retrieved December 13, 2019, <https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html>
- Uscher-Pines, L., Mehrotra, A., & Bogen, D. L. (2017). The emergence and promise of telelactation. *American Journal of Obstetrics and Gynecology*, 217(2), 176–178. doi:10.1016/j.ajog.2017.04.043
- Ware, J. L., Webb, L., & Levy, M. (2014). Barriers to breastfeeding in the African American population of Shelby County, Tennessee. *Breastfeeding Medicine*, 9(8), 385–392. doi:10.1089/bfm.2014.0006
- White, B. K., Martin, A., White, J. A., Burns, S. K., Maycock, B. R., Giglia, R. C., & Scott, J. A. (2016). Theory-based design and development of a socially connected, gamified mobile app for men about breastfeeding (Milk Man). *JMIR mHealth and uHealth*, 4(2), Article e81. doi:10.2196/mhealth.5652

Discontinuation of Exclusive Breastfeeding in Ghana: A Longitudinal, One-Group Observational Study of Postnatal Mothers With Children 0–6 Months old

Journal of Human Lactation

2020, Vol. 36(3) 461–470

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334419871012

journals.sagepub.com/home/jhl



John Kuumuori Ganle, PhD^{1,2}  and Vanessa-Marie Bedwei-Majdoub, MD¹

Abstract

Background: Although exclusive breastfeeding of infants has several benefits, in Ghana only 52% of children under 6 months old are breastfed exclusively. However, researchers have not conducted longitudinal observational studies to examine exclusive breastfeeding discontinuation and determine risk factors.

Research aims: (1) To determine exclusive breastfeeding discontinuation, and (2) to examine those factors linked to discontinued exclusive breastfeeding.

Methods: A longitudinal, one-group observational study was conducted. A total of 322 mothers who had normal and full-term delivery at a district level referral hospital from January to December 2017 were recruited, followed-up every month, and subsequently interviewed after 6 months postpartum. Data were collected using validated questionnaires. Binary and multivariable Poisson regression analyses were the statistical analytical methods used.

Results: Respondents' mean age was 29.78 years ($SD = 5.20$). Among the 322 mothers who initiated breastfeeding with human milk at birth, 108 (34%) discontinued exclusive breastfeeding before 6 months postpartum. After controlling for possible covariates, attending antenatal care 4 or less times during pregnancy ($aRR = 6.54$; 95% CI [1.77–24.22]; $p = .005$); lack of support from family to breastfeed exclusively ($aRR = 2.41$; 95% CI [1.23–4.71]; $p = .010$), outside pressure to provide other food to the baby < 6 months postpartum ($aRR = 1.87$; 95% CI [1.01–3.46]; $p = .045$), and living in an urban area ($aRR = 2.10$; 95% CI [1.17–3.75]; $p = .013$) significantly increased the risks of discontinuing exclusive breastfeeding.

Conclusion: Universal exclusive breastfeeding may not be achieved without tackling the key determinants of discontinuation of exclusive breastfeeding. Health facility and community-based exclusive breastfeeding promotion interventions are therefore needed.

Keywords

breastfeeding, exclusive breastfeeding, Kangaroo Mother Care, postnatal, social support

Background

Before age 2 children's dietary quality is very important, as appropriate nutrition could enhance their physical and mental foundations (Victora et al., 2016). Initiating breastfeeding within an hour of birth, exclusively breastfeeding during the first 6 months after birth, as well as breastfeeding until the age of 2 or more, are all important optimum Infant and Young Child Feeding (IYCF) practices (Victora et al., 2016). Breastfeeding means that an infant is fed human milk and other feeds (solid or semi-solid), including non-human milk and formula milk (World Health Organization [WHO], 2017). Exclusive breastfeeding therefore implies feeding infants, from birth until 6 months postpartum, only human milk (not even water), albeit oral rehydration solution, vitamin syrups, and minerals, as well as medicines, are acceptable (WHO & UNICEF, 2018).

In low-income countries, exclusive breastfeeding has the potential to avert over 800,000 deaths annually among children under 5 years (Victora et al., 2016), and non-exclusive breastfeeding is estimated to cause 1.4 million deaths in the same age group (Black et al., 2016). Indeed,

¹Department of Population, Family and Reproductive Health, School of Public Health, University of Ghana, Legon, Accra, Ghana

²Stellenbosch Institute for Advanced Study (STIAS), Wellenberg Research Centre at Stellenbosch University, Stellenbosch 7600, South Africa

Date submitted: November 30, 2018; Date accepted: July 30, 2019.

Corresponding Author:

John Kuumuori Ganle, Department of Population, Family and Reproductive Health, School of Public Health, University of Ghana, P. O. Box LG 13, Legon, Accra, Ghana.

Email: jganle@ug.edu.gh

exclusively breastfed infants have a lowered risk to infections, including gastroenteritis and pneumonia (WHO & UNICEF, 2018). They are also 14 times more likely to remain alive than their non-exclusively breastfed counterparts (WHO & UNICEF, 2018). Exclusive breastfeeding may also protect infants against diarrhea by decreasing the risk of certain bacteria present in contaminated formula, other liquids, and complementary foods during the first 6 months of life, and through the conveyance of maternal antibodies present in human milk (Lenja, Demissie, Yohannes, & Yohannis, 2016). Additionally, exclusive breastfeeding may protect infants from obesity and diabetes in later life, and it may also reduce the likelihood that mothers will contract certain types of cancers (Victora et al., 2016). Mothers who exclusively breastfeed are less prone to postpartum depression and osteoporosis, and often bond better with their babies (Katsinde & Srinivas, 2016).

Indeed, breastfeeding in general, and exclusive breastfeeding with human milk in particular, have been recognized internationally as vital to attaining the child health-related Sustainable Development Goals (SDGs; WHO, 2017). Despite this recognition, worldwide, only 41% of infants under 6 months of age are exclusively breastfed (WHO & UNICEF, 2018). This proportion is far lower than the SDG's global exclusive breastfeeding target of 70% by 2030 (WHO & UNICEF, 2018). In Ghana, the most recent Demographic and Health Survey report showed that over 98% of infants are breastfed (Ghana Statistical Service [GSS], Ghana Health Service [GHS], and ICF International, 2015). However, only 52% of infants under 6 months were breastfed exclusively. The report also indicated that the proportion of children aged 0–5 months who are breastfed exclusively in Ghana has decreased from 63% in 2008 to 52% in 2014 (GSS et al., 2015). The average duration of exclusive breastfeeding for all children was 3.9 months, and this was slightly less than the 4.4 months reported in 2008.

Previous studies offer a host of factors to explain why exclusive breastfeeding may be discontinued before 6 months postpartum. The most important predictors of ceasing exclusive breastfeeding in Kinshasa were the confidence of the mother to breastfeed and whether or not her aim was to exclusively breastfeed (Babakazo, Donnen, Akilimali, Ali, & Okitolonda, 2015). The major barriers to exclusive breastfeeding in Ghana were mothers' perception of human milk alone being unable to meet their infants' nutritional requirements, shorter periods of maternity leave, and sociocultural pressures to give the child water and other foods (Ayawine & Ae-Ngibise, 2015; Diji et al., 2016). Other reasons for discontinuing exclusive breastfeeding were physicians' counseling and recommendations, exposure to advertisements about alternative infant feeding practices, and the production of inadequate human milk supply (either self-perceived or true; Thet et al., 2016).

Key messages

- Prospective cohort studies that involve following mothers from birth to 6 months postpartum to estimate rates of discontinuation of exclusive breastfeeding and determine risk factors are currently lacking in many low income settings.
- Making four or fewer antenatal care visits during pregnancy, not receiving support from family to breastfeed exclusively, feeling pressured to give baby other feed < 6 months postpartum, and living in an urban area, significantly increase the risk of discontinuing exclusive breastfeeding.
- Key determinants for the discontinuation of exclusive breastfeeding need to be addressed using integrated interventions, including community-based breastfeeding education and promotion programs that address misconceptions and sociocultural barriers to exclusive breastfeeding, as well as promote active involvement of husbands/partners and mothers-in-law.

In low-income settings, a number of researchers have examined the barriers to exclusive breastfeeding or breastfeeding in general (Thet et al., 2016; Kavle, LaCroix, Dau, & Engmann, 2017; Khatun et al., 2018). In Ghana, too, a number of researchers have explored awareness and knowledge about exclusive breastfeeding as well as the factors that influence exclusive breastfeeding (Ayawine & Ae-Ngibise, 2015; Diji et al., 2016; Dun-dery & Laar, 2016). These researchers have provided important insights into awareness, knowledge, and perceptions about exclusive breastfeeding as well as the risk factors for exclusive breastfeeding in Ghana. Nevertheless, many of these previous studies are cross-sectional in design and often take a retrospective approach. This makes it harder to determine the exact timing of initiation and discontinuation of exclusive breastfeeding, due to recall bias—an important limitation in such retrospective cross-sectional studies (Kavle et al., 2017; Khatum et al., 2018). Furthermore, previous researchers have largely neglected the determinants of discontinuation of exclusive breastfeeding. While "discontinuation of exclusive breastfeeding" is not conceptually different from "barriers to exclusive breastfeeding," a focus on discontinuation allows for the identification of specific risk factors that predispose women to stop exclusive breastfeeding. Also, due to sociocultural differences, the factors identified elsewhere may or may not be the same in our study context (Babakazo et al., & Okitolonda, 2015). Without a clear understanding of contextually-relevant risk factors, it may be difficult to implement appropriate interventions to support exclusive breastfeeding in different international contexts. The aims of this study were to (1)

determine exclusive breastfeeding discontinuation, and (2) examine those factors related to discontinued exclusive breastfeeding in a local district of Ghana.

Methods

Design

A longitudinal, one-group observational study was conducted. This design was chosen because previous researchers in Ghana have used retrospective cross-sectional study designs (see, for example, Ayawine & Ae-Ngibise, 2015; Diji et al., 2016; Dun-dery & Laar, 2016). A major limitation of these previous designs was the difficulty in determining the exact timing of initiation and discontinuation of exclusive breastfeeding (Kavle et al., 2017; Khatum et al., 2018). This difficulty arose mainly from participants' recall bias (Kavle et al., 2017; Khatum et al., 2018). To address this limitation in existing research in Ghana, we used a longitudinal, one-group observational study design, in which mothers were recruited at the birth of their child and followed-up every month to document the exact timing of initiation and discontinuation of exclusive breastfeeding.

The Ghana Health Service Ethical Review Committee gave ethical approval for this study (GHS-ERC Number: GHS-ERC 02/01/2017).

Setting

Empirical data were collected in Shai-Osudoku District, one of the administrative districts in the Greater Accra region of Ghana. The District has an estimated population of 59,658 (Shai-Osudoku District Health Directorate, 2017). Christianity and Islam are the most dominant religions. The majority of the population lives in rural communities where agriculture (subsistent farming and fishing) is the main livelihood source. The district is one of the poorest in the region.

The district shares similar sociocultural organizational characteristics to other parts of Ghana. Generally, patrilineal descent and clan ideologies inform the sociocultural organization of people in the district: property rights and succession to traditional positions are based largely on paternal ties. The extended family system remains a common practice, and most married couples live together, often in an extended family house or compound. Generally, men play important roles as heads of their households, custodians of their lineage, and bread winners. They also control land and other economic resources. Women are generally the primary caregivers within the domestic set-up, albeit decisions about family planning, child feeding, child spacing, and family size are often made by husbands and mothers-in-law. In general, perceptions about women are still negative and most of the communities follow strict gender role differentiation. Women take care of children in addition to performing more household chores

than men. The combined effect of this situation is that the majority of women have a lower socioeconomic status than their male counterparts.

In terms of health, the district's infant mortality rate in 2017 was 4.2 per 1000 live births (Shai-Osudoku District Health Directorate [DHD], 2017). The top five outpatient department morbidities in 2017 were malaria, upper respiratory tract infection, anaemia, diarrheal diseases, and rheumatism/other joint pains. The district has several health centers and clinics, which provide primary healthcare services including uncomplicated child birth services. In addition, several functional community-based health planning and services (CHPS) zones offer basic primary healthcare and other child welfare services on a regular, but not 24 hr, basis. These CHPS zones are also occasionally used to deliver outreach healthcare services in the community, including vaccination and child welfare services.

The Shai-Osudoku District Hospital is the main referral health facility in the district, where 24 hr comprehensive maternal and child healthcare services are provided (Shai-Osudoku DHD, 2017). A child welfare clinic is held on every weekday for mothers with children aged between 2 weeks and 2 years. At these clinics, parents receive breastfeeding information, including education about exclusive breastfeeding as well as information about general child health (Shai-Osudoku DHD, 2017). Complementary and supplementary feeding education and counseling is also provided during these clinic sessions (Shai-Osudoku DHD, 2017).

Sample

Mothers aged 15–49 years old who had normal and full-term delivery at the Shai-Osudoku District Hospital during the period January–December 2017 were recruited, followed-up every month via telephone and home visits in a few cases, to document initiation and discontinuation of exclusive breastfeeding. We excluded mothers with the following characteristics: twin births; preterm birth or complications requiring neonatal intensive care admission; infants with cleft lip, palate, or any other medical condition that could hinder sucking; and mothers who had medical or obstetric related conditions requiring admission after delivery, including mastitis, active tuberculosis, or breast abscess. Mothers who did not initiate breastfeeding with human milk for no apparent reason(s) were also excluded. Also, HIV-positive mothers (eight cases) were excluded as our initial engagement with midwives suggested that such mothers were often advised not to breastfeed because of the possibility of transmitting the virus to the infant via human milk.

A total of 375 women gave birth at the Shai-Osudoku District Hospital between January and December, 2017. After screening the 375 mothers, 48 mothers had characteristics that fit our exclusion criteria. Five mothers who met the inclusion criteria declined to participate. A total of 322 mothers who had initiated breastfeeding with human milk

at birth were therefore included in the study. Based on a recent systematic review of 48 studies, which examined barriers to exclusive breastfeeding in developing countries (Kavle et al., 2017), and other recent studies from Ghana (see Diji et al., 2016; Dun-dery & Laar, 2016), we believe our sample size is adequate for statistical associations to be meaningfully examined.

Mothers were conveniently sampled: They were first identified at the maternity unit of the Shai-Osudoku District Hospital immediately after giving birth. Two research assistants were trained and stationed at the maternity unit. Between January 1 and December 31, 2017, the research assistants visited the maternity unit every day. Working in collaboration with the principal midwife, mothers who had normal and full-term delivery and were discharged were approached by the research assistants. They were individually told about the purpose of the study, and the study procedures. Those who could read (in English) were immediately provided with information leaflets about the study. The research assistants took the names and contact details of the mothers they approached. Each mother was given 2 weeks to decide on participation. We re-contacted each mother via telephone or personal visit after the 2-week period. Those who agreed to participate were enrolled in the study and subsequently followed-up every month via telephone, and home visits in some cases. The main purpose of the follow-ups was to document the exact timing of exclusive breastfeeding initiation and discontinuation. After 6 months postpartum, each mother was re-contacted and tentative individual interview dates were arranged.

Measurements

Data were collected using structured questionnaires. The questionnaires were prepared using validated breastfeeding and infant feeding related questions from the 2014 Ghana Demographic Health Survey questionnaire. Other questions were extracted from the Food and Agriculture Organization's (2004) manual for assessing nutrition-related knowledge, attitudes, and practices. The questionnaires were, however, pre-tested on 20 mothers with children aged 0–6 months at Agomeda Health Centre, a public health facility located in the same district. All necessary corrections were made before the questionnaires were used to document background characteristics, breastfeeding practices, and the determinants for the discontinuation of exclusive breastfeeding. We tested the reliability of the questionnaire and realized a Cronbach's alpha coefficient of 0.89. This level of reliability or internal consistency of our data collection tool is considered in literature to be good (Tavakol & Dennick, 2011).

Regarding the measurements of variables, "Discontinuation of Exclusive Breastfeeding" was our main outcome variable, which we operationalized as the introduction of any solid or liquid meal/drink apart from human milk (excluding oral

rehydration salt, vitamins syrups, minerals, and medicines) before 6 months postpartum for mothers who initiated breastfeeding at birth. This was measured as a dichotomous outcome, and coded as "1" if exclusively breastfeeding and "2" if exclusive breastfeeding had been discontinued. A number of other variables were also defined and measured as follows:

- (a) Age in completed years of participants was measured as a continuous variable. For easy comparison, ages were reclassified into four categories: 18–24 years as 1, 25–29 as 2, 30–34 years as 3, and 35–39 years as 4.
- (b) Participants' highest educational status was defined as the highest formal education a participant had attained. It was measured and coded into four categories as follows: 1 if none or primary education, 2 if junior high school, 3 if senior high school, and 4 if tertiary. Participants' husband's/partner's educational status were similarly measured.
- (c) Participants' marital status was measured as married, single, divorced, separated, cohabiting and widowed. For ease of comparison however, we recoded this variable as 1 if single (comprising single, divorced, separated, and widowed), and 2 if married (comprising married and cohabiting).
- (d) Religion was measured and coded as 1 if Christianity, 2 if Islam, 3 if traditional religion (i.e., religious and spiritual worship of smaller gods and ancestral spirits), and 4 if other religion, including Hinduism, Buddhism, and Syncretism.
- (e) Area of residence: This was used as an indicator for accessibility to healthcare services and a marker of social change, and was measured and coded as a dichotomous variable: 1 if rural, and 2 if urban.
- (f) Participants' employment status: This was measured as a dichotomous variable, and coded as 1 if the participant was employed in the informal sector (i.e., self-employment or temporary employment in informal economic and social activities that either earns a daily wage or other in-kind benefits, without social security benefits), and 2 if the participant was in formal employment (i.e., employment in the public, private, or non-profit sectors that earns a monthly wage with social security benefits).
- (g) Parity: This was defined by how many children each woman had given birth to. It was measured and coded as 1 if the participant had one child, 2 if the participant had two children, 3 if the participant had three children, 4 if the participant had four children, and 5 if the participant had more than four children.
- (h) Number of antenatal care (ANC) visits. This was defined as the number of visits the woman made to health facilities to receive ANC during her most recent pregnancy before the survey. It was coded 1

- if the participant had had less than four visits, and 2 if the participant had had four or more visits.
- (i) Place of delivery: This was measured as a dichotomous variable, and coded as 1 if the participant delivered at home, and 2 if the participant delivered in a health facility.
 - (j) Exposure to media advertisement on formula milk: This was measured as a dichotomous variable and coded as 1 if the participant had seen or heard media advertisements on formula milk at least once after delivery, and 2 if the participant did not see or hear any.
 - (k) Support from family to exclusively breastfeed: This was measured as a dichotomous variable and coded as 1 if the participant received any family support including encouragement from spouses and mothers-in-law to exclusively breastfeed, and 2 if no support was received.
 - (l) Pressure to give the baby other feed: This was defined as a participant receiving pressure from peers and family members or being encouraged to give the baby other feed apart from human milk less than 6 months into the postpartum period. It was measured as a dichotomous variable and coded as 1 if the participant felt pressured, and 2 if the participant felt no pressure.
 - (m) Counseling/education received about exclusive breastfeeding during ANC: This was measured as a dichotomous variable and coded as 1 if the participant received any form of counseling/education from healthcare providers, and 2 if the participant did not receive any counseling/education.

Data collection

The data were collected between January, 2017 and May, 2018. Before their interview, each participant gave an informed written (signed or thumb printed) consent. Each participant was informed in a language she understood that participation was entirely voluntary and that they could withdraw their participation at any time.

All participants were interviewed just after 6 months postpartum. Actual data collection occurred alongside recruitment. This process continued until the last participant was interviewed around mid-May, 2018. Interviews were conducted at different places, including the homes of mothers, market centers, and child welfare clinics. The two research assistants conducted all interviews under the supervision of the second author. The questionnaires were designed in English but participants were interviewed in English and three other local dialects (Ga-Dangme, Ewe, and Twi). Participants who could read and write in English were given the questionnaires to read, record their responses by themselves, and return the completed questionnaire to the research assistants. For participants who only spoke

English but could not read or write in English, the research assistants read out the questions and recorded participants' responses in English. For all non-English speaking participants, the research assistants translated and asked the questions in Ga-Dangme, Ewe, or Twi depending on the dialect the participant spoke. Responses were then recorded on the questionnaires in English.

Confidentiality was maintained by interviewing participants in private spaces where no third-party persons could hear the conversation. Also, confidentiality was ensured by using unique study identification numbers for each of the participants. All the study records were stored with restricted access.

Data Analysis

Completed questionnaires were manually assessed and coded, and then independently entered in Epi info Version 7 by the two research assistants. The authors then independently compared the two data entries. Data completeness and accuracy were ensured by running and comparing frequencies on each variable from the two data sets. All errors were discussed and rectified, and a single database was created and agreed upon before the data were exported into Stata (Version 15.0; StataCorp, 2015) for further cleaning and analysis.

To achieve the study's first aim (i.e., to examine exclusive breastfeeding discontinuation), descriptive statistical methods including frequencies and proportions were used. To achieve the second aim (i.e., to examine those factors associated with discontinued exclusive breastfeeding), a bivariate analysis was first done using a chi-square test of independence to examine the relationship between discontinuation of exclusive breastfeeding and categorical variables. Binary and multivariable Poisson regression analyses with robust standard error tests were then used to estimate Relative Risk Ratios for discontinuation of exclusive breastfeeding. The confidence level was set at 95% and $p < .05$ was taken as demonstrating statistical significance.

Results

Background Characteristics of Respondents

Table 1 shows selected background information of the 322 participants. The age range was 18–39, and mean age was 29.78 ($SD = 5.20$).

Study Aim 1: Determining Discontinuation of Breastfeeding

This study's first aim was to determine exclusive breastfeeding discontinuation among the 322 participants who initiated breastfeeding with human milk after delivery. Results show that 108(34%) participants discontinued

Table 1. Socio-Demographic Characteristics of Respondents ($N = 322$).

Characteristics	n (%)
Age (years)	
18–24	56 (17.39)
25–29	95 (29.50)
30–34	106 (32.91)
35–39	65 (20.18)
Mother's education	
None/primary	51 (15.83)
Junior high school	137 (42.54)
Senior high school	55 (17.08)
Tertiary	79 (24.53)
Marital status	
Married	264 (81.99)
Single	58 (18.01)
Employment status	
Employed in informal sector	284 (88.20)
Employed in formal sector	38 (11.80)
Religion	
Traditional	18 (5.73)
Christianity	133 (41.26)
Islam	120 (37.26)
Others	51 (15.76)
Partner's education	
None/primary	21 (6.43)
Junior high school	96 (29.78)
Senior high school	93 (28.92)
Tertiary	89 (27.50)
Area of residence	
Rural	160 (49.68)
Urban	162 (50.32)

Note. Twenty-four (7.37%) participants had information missing about their partner's educational status. Formal employment = employment in the public, private-for-profit, and private-not-for-profit sectors that earns a monthly wage with social security benefits. Informal employment = self-employment or temporary employment in informal economic and social activities that either earns a daily wage or other in-kind benefits, without social security benefits. Traditional religion = religious and spiritual worship of smaller gods and ancestral spirits. Other religions include Hinduism, Buddhism, and Syncretism.

exclusive breastfeeding before 6 months. Age in months before exclusive breastfeeding discontinuation is represented in Figure 1. The mean age at which exclusive breastfeeding was discontinued was 3.6 ($SD = 1.27$) months.

Study Aim 2: Examining Factors Related to Discontinued Exclusive Breastfeeding

This study's second aim was to examine those factors that are related with discontinued exclusive breastfeeding. To do this, we first conducted chi-square tests of independence to determine associations between a total of 26 socio-demographic, maternal, health facility, home/family, and work-related factors and the discontinuation of

exclusive breastfeeding. From this initial analysis, 11 factors were statistically associated with the discontinuation of exclusive breastfeeding. These factors were further examined using binary and multivariable Poisson regression models with robust standard error analysis to determine factors that significantly predicted the discontinuation of exclusive breastfeeding after accounting for potential confounders. Table 2 contains the results. After accounting for potential covariates, making 4 or less ANC visits during pregnancy ($aRR = 6.54$; 95% CI [1.77–24.22]; $p = .005$); not having had support from family to breastfeed exclusively ($aRR = 2.41$; 95% CI [1.23–4.71]; $p = .010$), feeling pressured to give the baby other feed < 6 months postpartum ($aRR = 1.87$; 95% CI [1.01–3.46]; $p = .045$), and living in an urban area ($aRR = 2.10$; 95% CI [1.17–3.75]; $p = .013$) significantly increased the relative risks of discontinuing exclusive breastfeeding before 6 months postpartum. While the risk of discontinuation of exclusive breastfeeding appeared to decrease with an increase in age, the risk increased with increases in maternal education, albeit neither relationship was statistically significant.

Discussion

This study is one of the few to have used a longitudinal, one-group observational study design to examine the discontinuation of exclusive breastfeeding and associated determinants in Ghana. Several aspects of the results deserve further reflection. To begin, the rate of discontinuation of exclusive breastfeeding before 6 months postpartum is similar to other recent studies from Africa. For example, in the Democratic Republic of Congo, all 422 (100%) mothers initiated breastfeeding at birth but discontinuation before 6 months postpartum was 413 (97.2%; Babakazo et al., 2015). The discontinuation rate in this study is, however, lower than rates found in other recent studies in Ghana (Diji et al., 2016; Dun-dery & Laar, 2016). Together with previous research in Ghana and elsewhere, our results indicate that the WHO's recommendations for exclusive breastfeeding during the first 6 months after birth are not being realized in many contexts.

ANC attendance emerged as one of the strongest predictors for the discontinuation of exclusive breastfeeding. This is consistent with recent findings from northwest Ethiopia (Tariku et al., 2017). While the number of ANC visits may not always lead to the practice of exclusive breastfeeding, limited ANC attendance could affect breastfeeding in several ways. For instance, limited ANC attendance means that many of the interventions and services routinely provided to pregnant women at the ANC clinic could be delayed or completely missed (Ganle et al., 2019). In particular, education and counseling given on exclusive breastfeeding during ANC visits could be missed if mothers had limited contact with health-care providers. This is likely to be the case because previous studies showed that advice, education, and counseling about exclusive breastfeeding during ANC visits significantly

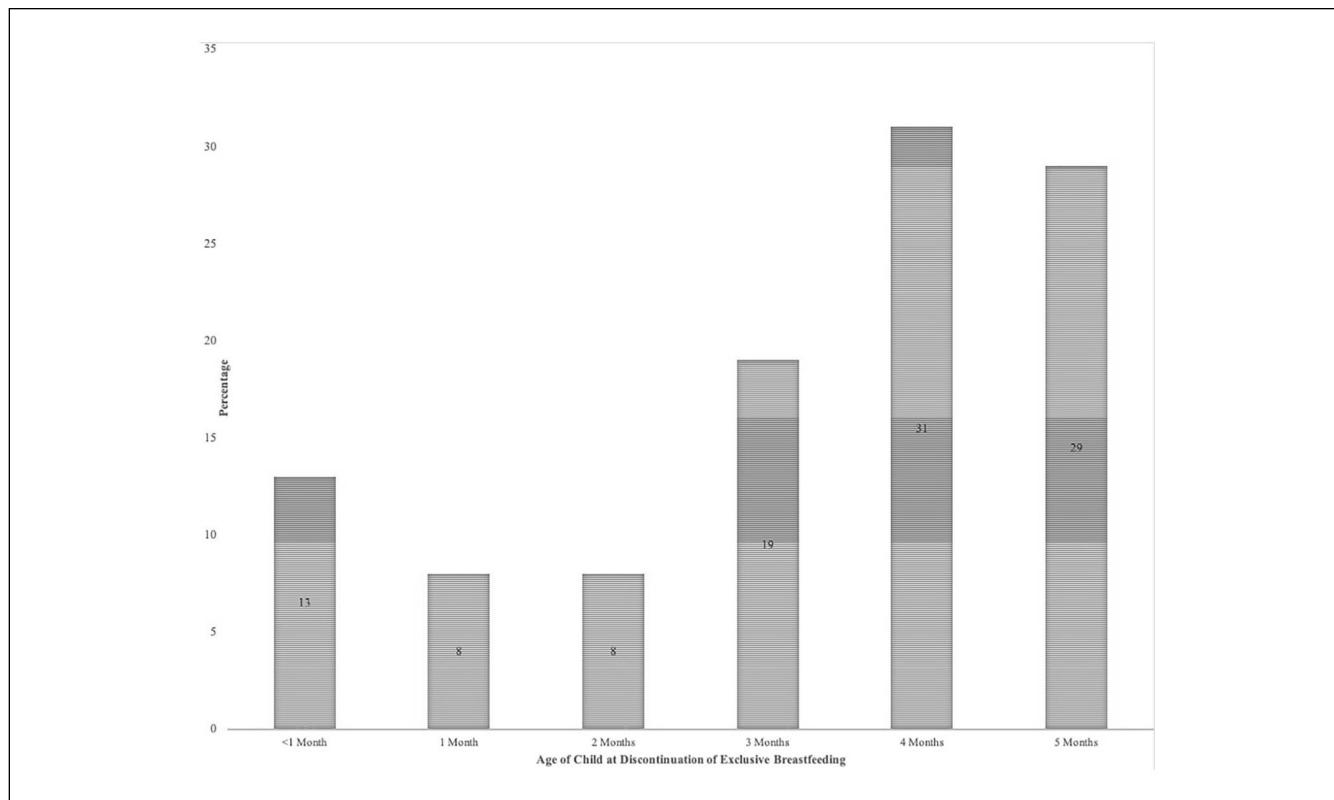


Figure 1. Age of child at discontinuation of exclusive breastfeeding among mothers who initiated breastfeeding at birth ($N = 108$).

improved breastfeeding (Shifraw, Worku, & Berhane, 2015). Similarly, mothers who received counseling about infant feeding were 2 times more likely to exclusively breastfeed compared to those who did not (Arage & Gedamu, 2016).

While more research is required in different contexts to fully understand the relationship between ANC attendance and exclusive breastfeeding, the results from our study indicate that encouraging mothers to have regular contact with the healthcare system during pregnancy may have positive benefits for exclusive breastfeeding. This is yet another good reason to support the implementation of the recent WHO's (2016) guidelines recommending eight ANC visits—an increase from the four contacts previously recommended. We acknowledge that increasing the number of ANC contacts may come with practical challenges, such as the need for additional financial and human resources. Similarly, health education and counseling about exclusive breastfeeding may not automatically lead to the desired behavior change. However, we think more ANC visits may help with mothers having a positive pregnancy experience. It may also provide an avenue for proper counseling to be carried out, especially in the presence of a spouse or other family members, and this could ensure that mothers exclusively breastfeed until 6 months postpartum.

Lack of family support to breastfeed exclusively, and pressure to give the baby other feed < 6 months postpartum were two interrelated factors that significantly increased the

relative risk of discontinuing exclusive breastfeeding. These findings are consistent with findings in other studies that showed that mothers who experienced lack of partner or family support had higher odds of stopping exclusive breastfeeding before the recommended 6 months postpartum (Ogbo et al., 2016). This suggests a need for health facility and community-level interventions in our study context to be targeted at educating not just mothers but also husbands/partners, and family members, especially mothers-in law, about the relevance of early initiation and continued exclusive breastfeeding for at least 6 months. In this connection, there is a need to address misconceptions and sociocultural barriers in our study context, including perceptions that babies may not be satisfied only on human milk or cultural practices that require giving water and other liquids or solid feeds to babies before 6 months postpartum.

Not surprisingly, mothers from urban areas had more than twice the risk of discontinuing exclusive breastfeeding compared to those from rural areas. While the quantitative nature of our study did not permit further exploration of this result, several mechanisms may work to explain this difference. Compared to rural areas, urban settings in Ghana and elsewhere are environments likely to be characterized by reduced extended family support, tight work schedules, and exposure to alternative infant feeding practices. These factors could easily lead to the discontinuation of exclusive breastfeeding. Also, mothers with better education and who are in paid

Table 2. Predictors of Discontinuity of Exclusive Breastfeeding (Multivariable Poisson Regression Analysis) (N = 322).

Characteristics	Discontinuity of Exclusive Breastfeeding		uRR [95% CI] p-value	aRR [95% CI] p-value
	No n (%)	Yes n (%)		
Age (years)				
18–24	33 (58.93)	23 (41.07)	ref	ref
25–29	61 (64.21)	34 (35.79)	0.98 [0.76–1.74] .515	0.95 [0.65–3.82] .319
30–34	70 (66.04)	36 (33.96)	0.95 [0.65–1.39] .786	0.89 [0.93–3.63] .081
35–39	50 (76.92)	15 (23.08)	0.64 [0.38–1.08] .098	0.86 [0.40–1.86] .706
Education (maternal)				
None/primary	41 (80.39)	10 (19.61)	ref	ref
Junior high school	80 (58.39)	57 (41.61)	1.55 [0.81–2.97] .186	1.45 [0.67–5.63] .219
Senior high school	38 (69.09)	17 (30.91)	1.58 [0.80–3.12] .191	1.52 [0.10–3.73] .599
Tertiary	55 (69.62)	24 (30.38)	2.12 [1.18–3.83] .013	3.53 [0.99–12.56] .052
Marital status				
Married	188 (71.21)	76 (28.79)	ref	ref
Single	22 (37.94)	36 (62.06)	2.52 [1.39–3.70] .001	1.90 [0.79–4.56] .152
Employment status				
Employed in informal sector	207 (72.89)	77 (27.11)	ref	ref
Employed in formal sector	7 (18.18)	31 (81.82)	6.66 [0.82–54.21] .076	1.94 [0.92–4.07] .080
Seen or heard media advertisement on formula milk at least once after delivery				
No	145 (68.40)	67 (31.60)	ref	ref
Yes	69 (63.30)	41 (36.70)	1.16 [0.85–1.59] .355	1.14 [0.38–1.45] .380
Number of antenatal care visits				
> 4	204 (69.63)	89 (30.37)	ref	ref
4	10 (34.48)	19 (65.52)	7.24 [1.77–24.22] .000	6.54 [1.77–24.22] .005
Place of delivery				
Home	12 (54.55)	10 (45.45)	ref	ref
Health facility	202 (67.33)	98 (32.67)	0.72 [0.44–1.17] .183	0.77 [0.34–1.72] .520
Mode of delivery				
Spontaneous vaginal delivery	135 (63.98)	76 (36.02)	ref	ref
Caesarean section	79 (71.17)	32 (28.83)	0.80 [0.57–1.13] .204	0.62 [0.26–1.48] .282
Had support from family to breastfeed exclusively				
Yes	174 (73.11)	64 (26.89)	ref	ref
No	40 (47.62)	44 (52.38)	2.55 [1.45–2.61] .000	2.41 [1.23–4.71] .010
Felt pressured to give baby other feed < 6 months postpartum				
No	152 (71.03)	62 (28.97)	ref	ref
Yes	62 (57.41)	46 (42.59)	2.68 [1.50–3.92] .003	1.87 [1.01–3.46] .045
Area of residence				
Rural	137 (85.62)	23 (14.38)	ref	ref
Urban	77 (47.53)	85 (50.47)	2.95 [1.33–4.69] .000	2.10 [1.17–3.75] .013

Note. uRR = unadjusted Relative Risk; aRR = adjusted Relative Risk; Ref = reference category.

formal-sector employment are likely to be residing in urban areas. Although educational attainment and employment status did not statistically predict discontinuation in this study, the relative risk of discontinuation tended to be higher for urban mothers and those employed in the formal sector. The discussion here would suggest targeting mothers in urban environments in our study context with supportive systems including long work break periods, extended paid maternity leave, and the creation of nurseries within workplace settings to facilitate continued breastfeeding. Also, other successful

interventions that have been implemented in similar urban contexts including the Ten Steps to Successful Breastfeeding, and the combined individual and group counseling approach (Ward, Williamson, Burke, Crawford-Hemphill, & Thompson, 2017) should be considered. Indeed, future research in Ghana could use experimental and quasi-experimental research designs to test whether implementation of the Ten Steps to Successful Breastfeeding or the Combined Individual and Group Counselling Approach, does increase the rate of exclusive breastfeeding in urban contexts.

Taken together, our findings have national and international policy and intervention delivery relevance. At the national level, the findings suggest a need for Ghana's Ministry of Health, Ghana's Health Service, and other stakeholders in Ghana's health sector, including United Nations Children's Fund (UNICEF) and United Nations Population Fund (UNFPA), to focus on addressing not only individual level factors like awareness and knowledge gaps in relation to exclusive breastfeeding, but also other health facility and community-level factors that increase the risk of discontinuing exclusive breastfeeding. Apart from interventions to promote more contact with healthcare providers during pregnancy, efforts to engage husbands/partners and mothers-in-law to increase support for exclusive breastfeeding are critical. Community-based breastfeeding promotion programs must remain a priority in our study context, with a continued emphasis on the exclusiveness and extended duration of breastfeeding. Educational interventions to address misconceptions and sociocultural barriers to exclusive breastfeeding in our study context are also essential.

Our results suggest that achieving the international exclusive breastfeeding target of 70% by 2030, as envisaged under the Sustainable Development Goals, may not be feasible without targeted interventions to improve exclusive breastfeeding in low-income settings like Ghana.

Limitations

This study has some limitations. Only structured questionnaires were used to collect the data. This did not permit further exploration and understanding of the mechanisms behind key predictors of the outcome. This suggests that qualitative studies might be considered in the future to complement findings from the present study. Recall bias may have been introduced as some information about breastfeeding was sought from the participants 6 months into the postpartum. Also, there was no sample size calculation, hence the results need to be interpreted with that in mind. Finally, although participants were generally told at the time they were recruited that the purpose of the study was to understand how they practice breastfeeding as well as the challenges they face, it is possible that this knowledge could have affected some participants' decision to practice exclusive breastfeeding.

Conclusion

This study provides further insights into the population level risk factors for the discontinuation of exclusive breastfeeding in a local district in Ghana. The results and discussion indicate that universal exclusive breastfeeding may not be sustainably achieved without tackling the key determinants for the discontinuation of exclusive breastfeeding identified in this study and elsewhere.

Acknowledgments

We are grateful to our two Research Assistants for their role in data collection. Thank you, too, to all the mothers who participated in this research.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The Stellenbosch Institute for Advanced Study (STIAS), South Africa, provided writing space for this manuscript through an Early Career Research Fellowship Award to the first author. We are grateful for this support.

ORCID iD

John Kuumuori Ganle  <https://orcid.org/0000-0002-8382-3437>

Supplemental Material

Supplementary Material may be found in the "Supplemental material" tab in the online version of this article.

References

- Arage, G., & Gedamu, H. (2016). Exclusive breastfeeding practice and its associated factors among mothers of infants less than six months of age in Debre Tabor town, Northwest Ethiopia: A cross-sectional study. *Advances in Public Health*, 2(3), 1–7.
- Ayawine, A., & Ae-Ngibise, K. A. (2015). Determinants of exclusive breastfeeding: A study of two sub-districts in the Atwima Nwabiagya District of Ghana. *The Pan African Medical Journal*, 22, 248–267.
- Babakazo, P., Donnen, P., Akilimali, P., Ali, N. M. M., & Okitolonda, E. (2015). Predictors of discontinuing exclusive breastfeeding before six months among mothers in Kinshasa: A prospective study. *International Breastfeeding Journal*, 10(1), 19.
- Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., de Onis, M., Ezzati, M., & Ogbonmwan, S. M. (2016). Prevalence and determinants of exclusive breastfeeding among adolescent mothers from Quito, Ecuador: A cross-sectional study. *International Breastfeeding Journal*, 10(1), 7–18.
- Diji, A. K., Bam, V., Asante, E., Lomotey, A. Y., Yeboah, S., & Owusu, H. A. (2016). Challenges and predictors of exclusive breastfeeding among mothers attending the child welfare clinic at a regional hospital in Ghana: A descriptive cross-sectional study. *International Breastfeeding Journal*, 12(1), 13–56.
- Dun-dery, E. J., & Laar, A. K. (2016). Exclusive breastfeeding among city-dwelling professional working mothers in Ghana. *International Breastfeeding Journal*, 3(6), 1–9.
- Food and Agricultural Organisation (2004). *KAP manual: Guidelines for assessing nutrition-related knowledge, attitudes and practices*. Rome: Food and Agricultural Organisation.
- Ganle, J. K., Mahama, S. M., Maya, E., Manu, A., Torpey, K., & Adanu, R. (2019). Understanding factors influencing home

- delivery in the context of user-fee abolition in Northern Ghana: Evidence from 2014 DHS. *International Journal of Health Planning & Management*, 1–17.
- Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF International. (2015). *Ghana Demographic and Health Survey 2014*. Rockville, Maryland, USA: GSS, GHS, and ICF International.
- Katsinde, M. S., & Srinivas, C. S. (2016). Breast feeding and the Sustainable Development agenda. *Indian Journal of Pharmacy Practice*, 9(3), 144–146.
- Kavle, A. J., LaCroix, E., Dau, H., & Engmann, C. (2017). Addressing barriers to exclusive breast-feeding in low- and middle-income countries: A systematic review and programmatic implications. *Public Health Nutrition*, 20(17), 3120–3134.
- Khatun, H., Comins, A. C., Shah, R., Islam, M. M., Nuzhat Choudhury, N., & Ahmed, T. (2018). Uncovering the barriers to exclusive breastfeeding for mothers living in Dhaka's slums: A mixed method study. *International Breastfeeding Journal*, 13, 44. doi:10.1186/s13006-018-0186-5.
- Lenja, A., Demissie, T., Yohannes, B., & Yohannis, M. (2016). Determinants of exclusive breastfeeding practice to infants aged less than six months in Offa district, Southern Ethiopia : A cross-sectional study. *International Breastfeeding Journal*, 4(3), 1–7.
- Ogbo, F. A., Eastwood, J., Page, A., Arora, A., McKenzie, A., Jalaludin, B., . . . Eapen, V. (2016). Prevalence and determinants of cessation of exclusive breastfeeding in the early postnatal period in Sydney, Australia. *International Breastfeeding Journal*, 12(1), 16–34.
- Shai-Osudoku District Health Directorate (2017). *Annual Health Report 2017*. Dodowa: Ghana Health Service.
- Shifraw, T., Worku, A., & Berhane, Y. (2015). Factors associated with exclusive breastfeeding practices of urban women in Addis Ababa public health centers, Ethiopia: A cross sectional study. *International Breastfeeding Journal*, 10(1), 4–9.
- StataCorp (2015). *Statistical software: Release 15.0*. College Station, TX: StataCorp LP.
- Tariku, A., Alemu, K., Gizaw, Z., Muchie, K. F., Derso, T., Abebe, S. M., & Bikls, G. A. (2017). Mothers' education and ANC visit improved exclusive breastfeeding in Dabat Health and Demographic Surveillance System Site, northwest Ethiopia. *PLoS ONE*, 12(6), 1–13.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's Alpha. *International Journal of Medical Education*, 2, 53–55.
- Thet, M. M., Khaing, E. E., Diamond-Smith, N., Sudhinaraset, M., Oo, S., & Aung, T. (2016). Barriers to exclusive breastfeeding in the Ayeyarwaddy region in Myanmar: Qualitative findings from mothers, grandmothers, and husbands. *Appetite*, 96, e62–69.
- Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krusevec, J., Murch, S., Sankar, J.M., Walker, N., & Rollins, C. N. for The Lancet Breastfeeding Series Group (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *Lancet*, 387(10017), 475–490.
- Ward, L. P., Williamson, S., Burke, S., Crawford-Hemphill, R., & Thompson, M. R. (2017). Improving exclusive breastfeeding in an Urban Academic Hospital. *Pediatrics* 139(2): e20160344.
- World Health Organization (2016). *WHO recommendations on antenatal care for a positive pregnancy experience*. Geneva: World Health Organisation.
- World Health Organization (2017). *Guideline: Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services*. Geneva: World Health Organization.
- World Health Organization, & UNICEF (2018). *Global Breastfeeding Scorecard, 2018: Enabling women to breastfeed through better policies and programmes*. Geneva & New York: WHO & UNICEF.

Factors Affecting the Behavior and Duration of Breastfeeding Among Physician Mothers

Journal of Human Lactation

2020, Vol. 36(3) 471–477

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334419892257

journals.sagepub.com/home/jhl



Gamze Ersen¹, Ismail Kasim¹, Ezgi Agadayı² ,
Aybuke Demir Alsancak³, Tijen Sengezer¹,
and Adem Ozkara¹

Abstract

Background: Increasing breastfeeding duration may help physician mothers better counsel their patients. To improve the breastfeeding duration of physician mothers, the factors that may influence their breastfeeding duration should be known.

Research Aim: To investigate the breastfeeding behavior and duration among physician mothers and to determine the factors that influence breastfeeding practices.

Methods: This was an online prospective cross-sectional self-report survey. A 26-item author-created data-collecting tool inquiring sociodemographic and work characteristics, medical history of delivery, and breastfeeding history was sent to female physicians who had infants between 12 and 60 months of age via an online social group, "Physician Mothers," with 11,632 members. Participants ($N = 615$) responded, and descriptive statistics were analyzed.

Results: Participants' mean duration of exclusive breastfeeding was 4.8 months ($SD = 1.9$). The total breastfeeding length was a mean 15.8 months ($SD = 7.6$). The rate of breastfeeding duration for at least 24 months was 17.8% ($n = 75$). The most common reason for weaning from breastfeeding was workplace-related conditions (23.6%, $n = 145$). Participants reported that the mean time of resuming night shifts after delivery was 8.6 months ($SD = 4.7$). The rate of participants who were unable to use their breastfeeding leave rights partially or completely was 43.6% ($n = 268$).

Conclusion: Although legislation is in place to allow working mothers to breastfeed their infants, these legal rights were not used properly. Physician mothers should be fully supported in using their breastfeeding leave rights, and workplace conditions should be improved to enable physician mothers to breastfeed their infants for extended periods.

Keywords

maternal behavior, breastfeeding rates, breastfeeding duration, breastfeeding practices

Background

Human milk is considered to be the most beneficial nutrient for the infant. Breastfeeding has several significant advantages, including the maintenance of the bond between the mother and infant, reduced morbidity and mortality rates, and the fact that mother's milk is a cheap and readily available nutrient without any preservatives.

The World Health Organization (WHO) and the United Nations International Children's Emergency Fund (2003) recommend that infants be fed solely with mother's milk throughout the first 6 months of life and that breastfeeding be continued for up to 24 months (WHO, 2009). In Turkey, improvements were achieved in initiating and maintaining breastfeeding, although according to recent data, the rates of exclusive breastfeeding (EBF) for ≥ 6 months were not at desired levels (Hacettepe University Institute of Population Studies, 2013). The health status of the baby and mother, the baby's weight, the attitude of the family members and peers

(if any), the rights given to the mother after the birth, the employer's attitude, and workplace conditions are factors that can affect the mother's initial breastfeeding behavior (Irmak, 2016). Many working mothers experience barriers to continue breastfeeding upon returning to work and, for this reason, stop breastfeeding early. Mothers experience various problems, including a lack of a dedicated lactation environment and breastfeeding breaks, supervisors' and colleagues' disapproving attitude, and needs requiring them to

¹Family Medicine Department, Ankara Numune Training and Research Hospital, Ankara, Turkey

²Family Medicine Clinic, Sivas Akincilar State Hospital, Sivas, Turkey

³Konya Provincial Health Directorate, Konya, Turkey

Date submitted: September 20, 2018; Date accepted: November 10, 2019.

Corresponding Author:

Ezgi Agadayı, Family Medicine Clinic, Sivas Akincilar State Hospital, Yeni Quarter, Akincilar, Sivas, 58550, Turkey.

Email: drezgiagadai@hotmail.com

return earlier from their legal leave. However, researchers have shown that continuation of breastfeeding while working is possible with proper arrangements in the working environment and breastfeeding support programs (Dinour & Szaro, 2017). A study by Sattari, Levine, Neal, and Serwint (2013) indicated that physicians who were more effective at advocacy had higher personal breastfeeding rates. There is a paucity of literature about breastfeeding among physicians. To improve physician mothers' breastfeeding behavior, more information is needed.

The Turkey Demographic and Health Survey (TDHS; Hacettepe University Institute of Population Studies, 2013) is the largest community-based research conducted in Turkey. This research has been repeated every 5 years since 1968. The latest published survey was done in 2013; TDHS 2018 is not published yet. According to the 2013 TDHS, Turkish mothers' mean duration of EBF was 2.7 months; the mean duration of any breastfeeding was 16.5 months; and the cesarean section rate was 48%. However, we could not find any information for physician mothers in Turkey. To increase the general population's breastfeeding frequency, the Turkish Ministry of Health (2015) carried out several beneficial activities, including breastfeeding training physicians and increasing the number of baby-friendly hospitals and family physician clinics. However, the success of these activities depends on the motivation of physicians. The aims of this study were to (1) explore the breastfeeding behavior and duration among physician mothers and (2) determine the factors that influence breastfeeding. We hope the findings in this study may guide the policy makers.

Methods

Design

This study was a prospective cross-sectional self-report online survey design. The ethics committee of the Ankara Numune Training and Research Hospital approved this protocol (approval date/number: 04/12/2017/E-17-1344).

Setting

The data were collected through an online survey distributed on a very active and reliable online social group, Doktor Anneler, which is translated to English as "Physician Mothers," which had 11,632 members at the time of the study. All members had been admitted to the online social group after verifying their physician identity. Breastfeeding was one of the most spoken topics in the group.

In Turkey, a government employee can request paid maternity leave for 16 weeks—8 weeks before and 8 weeks after the delivery—and unpaid leave for up to 24 months after delivery. After the end of maternity leave (16 weeks), the mother is permitted leave to breastfeed her child for 3 hours a day during the first 6 months and 1.5 hours a day

Key Messages

- It is important for physicians to be able to breastfeed their children since their breastfeeding behavior may affect the behavior of their patients.
- There is a limited number of studies about breastfeeding behavior and the factors affecting the breastfeeding behavior of physician mothers.
- Our participants stated that the main reason for weaning was related to the conditions of their working environments.
- To prolong their breastfeeding duration, physician mothers need to be able to use their existing legal rights (e.g., be able to use breastfeeding leave, be provided an appropriate facility to express milk, and have adequate time for pumping at work).

during the second 6 months. From the 24th week of pregnancy to 2 years after birth, no night shift may be assigned. Although this legal regulation was updated in 2016, the hours mentioned here had been in effect since 2011 (Resmi Gazete, 2016). These legal rights applied to all participants.

Sample

Our target population was physician mothers who were members of an online social group called Physician Mothers and were working in Turkey. All participants in the study had infants between 12 and 60 months of age. The mothers who had children >5 years of age were excluded, as they might not remember their breastfeeding practices. The mothers who never breastfed their babies or who had twins (or multiple births) were also excluded. Mothers who had more than one child were instructed to answer the questions based on their experiences with their youngest child. The sample size was calculated with a 95% confidence interval, and the level of significance was fixed at 0.05.

The determined sample size was 372. A total of 615 participants responded, and all were included in the study. The response rate was 0.053. We initially planned to conduct the study for 3 months, between April 1 and July 1, 2017. Although we were able to reach the target sample of 372 participants within 3 hours, we continued data collection for a week and finalized data collection after 1 week with a total of 615 participants.

Measurement

We asked participants their age, marital status, specialty, facility, professional position, and number of children in the survey's demographic data section. Due to participants' wide range of specialties, we divided the specialties into two groups as surgical and nonsurgical departments to make statistical comparisons. The surgical departments are

anesthesiology and reanimation, obstetrics/gynecology, ear nose and throat, ophthalmology, pediatric surgery, pulmonary surgery, general surgery, plastic and reconstructive surgery, neurosurgery, cardiovascular surgery, orthopedics, and urology. The nonsurgical departments are family medicine, pediatrics, general practitioner, psychiatry, internal medicine, emergency medicine, physical therapy and rehabilitation, neurology, pulmonary medicine, radiology, pathology, infectious diseases, dermatology, microbiology, public health, radiation oncology, biochemistry, nuclear medicine, cardiology, forensic medicine, medical genetics, workplace medicine, sports medicine, and hyperbaric medicine. We solicited the participants' facility types by grouping them as university hospital, research and training hospital, state hospital, private hospital, family medical center, and other health care facility. The professional position of the participants was grouped as academic, fellow/attending, resident, and general practitioner. EBF was defined as feeding the baby with only the mother's own milk, without other liquids, solid foods, or plain water. Total breastfeeding length referred to the entire breastfeeding duration.

A 26-item author-created data-collecting tool was used to collect the data (see supplemental material online). It consisted of questions about the mother's sociodemographic and work characteristics (six questions) and medical history of the delivery (three questions). We asked for the baby's first food after birth, the mother's antenatal goals for breastfeeding, how many months the mother exclusively breastfed her baby, how many months the mother breastfed her baby in total (currently breastfeeding mothers did not answer this question), how the mother gave her own milk to the baby (suckled, expressed, or both), current breastfeeding status, partner support of breastfeeding, smoking or alcohol use during the breastfeeding period, and the reasons to terminate breastfeeding, with nine questions. We also asked about the mother's working conditions with eight questions.

To test the survey's reliability, we conducted a test-retest with 30 participants before starting the main research. Performed analyses in the pilot application showed a significant correlation between all paired items ($p < .05$). The correlation coefficients of the items ranged from 0.696 to 1.000. After the study completed, we calculated the Cronbach's α value for testing the internal consistency ($R^2 = 0.30$). We concluded that our survey was not reliable. We decided to call this survey a "data-collecting tool." We did not use the total score but rather evaluated questions separately.

Data Collection

The data-collecting tool was publicized to the members of the social group (Physician Mothers) in an online form to which the participants responded. We shared information about the study and survey link in the social media group. In the survey, there were no questions that would reveal the personal identities of participants (e.g., names, institutions).

When they opened the survey link, there was an informed consent. After they clicked the button stating "I agree to participate in the study," the research questions opened.

Data Analysis

Descriptive statistics were used for the breastfeeding behaviors and characteristics of the participants. Frequencies for categorical variables and measures of central tendency (mean and standard deviation) for continuous variables were calculated. Since the values were not normally distributed, Wilcoxon's test was used for testing the differences between the participants' plans and total breastfeeding length (two dependent groups).

Descriptive statistics were used to determine the factors affecting breastfeeding. The Shapiro-Wilk test was used to determine if the data had a normal distribution, and nonparametrical analyses were used for data not normally distributed. The chi-square test was used to analyze the categorical data. For data with nonnormal distribution (e.g., the duration of EBF, the total length of breastfeeding, and the breastfeeding goal), the Mann-Whitney U test was used to compare independent groups (mother's own milk as the first nutrient after delivery, partner support, surgical/nonsurgical specialties, night shifts before the infant reaches the age of 2 years). The correlations between the duration of EBF and total breastfeeding/infant's age when the mother returned to work and the length of exclusive or total breastfeeding, which were not normally distributed, were analyzed with the Spearman rho correlation coefficient. The Kruskal-Wallis test was used for comparing multiple independent groups (methods of breastfeeding, groups of stress levels, participants' facilities, the attitudes of colleagues, and the attitudes of supervisors) and nonnormal distribution data (the duration of EBF and total breastfeeding length). A p value $<.05$ was considered statistically significant, with a 95% confidence interval. Data were analyzed with a statistics software package (IBM Corporation, 2011).

Results

Characteristics of the Sample

The mean age of the participants was 33.9 years ($SD = 0.1$) and ranged from 26 to 49 years. Most participants (98 %, $n = 603$) were married. The mean number of children was 1.4 ($SD = 1.0$). Professional characteristics and the distribution of participants according to their medical branches are summarized in Table 1.

Aim 1: Exploring the Breastfeeding Behaviors of Physician Mothers

Participants' mean planned breastfeeding duration before delivery was 21.7 months ($SD = 5.0$). The mean duration of

Table 1. Professional Characteristics of the Participants When Breastfeeding (N = 615).

Characteristic	n (%)
Facility they were working during the time of breastfeeding	
University hospital	153 (24.9)
Research and training hospital	164 (26.7)
State hospital	154 (25.0)
Private hospital/clinic	36 (5.9)
Family medical center	61 (9.9)
Community health center	15 (2.4)
Other health care facilities	32 (5.3)
Professional position at the time of breastfeeding	
Academic ^a	18 (2.9)
Fellow/attending	271 (44.1)
Resident	217 (35.3)
General practitioner	109 (17.7)
Specialty	
Nonsurgical	498 (81.0)
Family medicine	105 (17.1)
Pediatrics	79 (12.8)
General practitioner	56 (9.1)
Psychiatry	36 (5.9)
Internal medicine	32 (5.2)
Emergency medicine	25 (4.1)
Physical therapy and rehabilitation	22 (3.6)
Neurology	21 (3.4)
Pulmonary medicine	17 (2.8)
Radiology	17 (2.8)
Pathology	16 (2.6)
Infectious diseases	14 (2.3)
Dermatology	13 (2.1)
Microbiology	11 (1.8)
Other ^b	34 (5.5)
Surgical	117 (19.0)
Anesthesiology and reanimation	43 (7.0)
Obstetrics/gynecology	35 (5.7)
Ear, nose, and throat	11 (1.8)
Ophthalmology	8 (1.3)
Pediatric surgery	6 (1.0)
Other ^c	14 (2.3)

^aAssistant professor, associate professor, professor.^bPublic health, radiation oncology, biochemistry, nuclear medicine, cardiology, forensic medicine, medical genetics, workplace medicine, sports medicine, hyperbaric medicine.^cPulmonary surgery, general surgery, plastic and reconstructive surgery, neurosurgery, cardiovascular surgery, orthopedics, urology.

the EBF period and total breastfeeding length were 4.8 months ($SD = 1.9$) and 15.8 months ($SD = 7.6$), respectively. The gender of the child was not found to have a significant influence on the total breastfeeding length ($Z = -0.402, p = .688$). Although 70.6% ($n = 434$) of participants planned to breastfeed for at least 24 months during pregnancy, the rate of breastfeeding for at least 24 months was

Table 2. Breastfeeding Practices of the Participants (N = 615).

Breastfeeding practices	n (%)
Planned duration of breastfeeding period in months	
<12	15 (2.4)
≥12 and <24	166 (27.0)
≥24	434 (70.6)
Mother's own milk as the first food	
Yes	525 (85.4)
No	90 (14.6)
Duration of exclusive breastfeeding period in months	
None	43 (7.0)
<3	43 (7.0)
≥3 and <6	222 (36.1)
≥6	307 (49.9)
Duration of total breastfeeding in months ^a	
<6	45 (10.7)
≥6 and <12	96 (22.8)
≥12 and <24	205 (48.7)
≥24	75 (17.8)
Method of feeding human milk	
Suckled	329 (53.5)
Expressed	28 (4.6)
Both	258 (41.9)
Maternal habits during the breastfeeding	
Alcohol	2 (0.3)
Smoking	44 (7.2)
Medications	43 (7.0)
None	526 (85.5)

^aMissing values: n = 194.

17.8% ($n = 75$) among participants who stopped breastfeeding ($n = 421$). There was a significant difference between total breastfeeding length and participants' breastfeeding goals prior to delivery ($Z = -11.898, p < .001$). We found that the majority of participants (73.1%, $n = 308$) did not reach their planned breastfeeding duration. The breastfeeding-related practices of the participants are presented in Table 2.

Aim 2: Determine the Factors That Could Affect Breastfeeding

Of the participants, 80.3% ($n = 494$) delivered by cesarean section (c-section). A significant association was found between vaginal delivery and c-section on the infant's first nutrient being the mother's own milk ($\chi^2 = 13.299, p < .001$). While the rate of the participants who delivered via vaginal birth and fed their baby with their own milk was 95.9% ($n = 116$), this rate was 82.8% ($n = 409$) for those who delivered by c-section. Also, giving mother's milk as the first nutrient after delivery was associated with a longer total length of breastfeeding ($Z = 2.460, p = .014$). Mean total

length of breastfeeding was 16.2 months ($SD = 7.6$) and 13.6 months ($SD = 7.4$) if the mother's own milk was and was not the first food for the infant, respectively. There was a weak but significant correlation between the duration of EBF and the total length of breastfeeding ($r = .384, p < .001$). Participants who breastfed by suckling reported longer durations of EBF ($\chi^2 = 25.959, p < .001$) and total breastfeeding ($\chi^2 = 21.288, p < .001$).

A majority of the participants (88.9%, $n = 547$) felt that their breastfeeding was supported by their partner. While there was no significant difference between partner support and the total length of breastfeeding ($Z = -1.947, p = .052$), there was a significant relationship with the duration of EBF ($Z = -4.180, p < .001$). The mean duration of EBF was 4.8 months ($SD = 1.8$) and 3.7 months ($SD = 2.5$) in supported and nonsupported mothers, respectively. There was no significant difference in the participants' medical specialties (surgical/nonsurgical) regarding the duration of EBF ($Z = -0.590, p = .555$) or the total length of breastfeeding ($Z = -1.409, p = .163$).

Workplace conditions. The participants' responses regarding the workplace conditions that may have influenced their breastfeeding practices are presented in Table 3. No significant relationship was found between the total length of breastfeeding and the participants' work facilities at the time of breastfeeding ($\chi^2 = 11.103, p = .085$).

The participants' mean time for returning to work after birth was 5.6 months ($SD = 3.0$). Participants reported that the mean time of starting night shifts after delivery was 8.6 months ($SD = 4.7$). A weak but significant correlation was found between the infant's age when the mother returned to work and the duration of EBF ($r = .164, p < .001$) or total length of breastfeeding ($r = .161, p = .001$). There was a significant relationship between the total length of breastfeeding and working night shifts before the infant reached the age of 2 years ($Z = -2.549, p = .011$). Those who started working night shifts before the infant reached age 2 years had a shorter total length of breastfeeding ($M = 13.8$ months, $SD = 7.5$) as compared with those who did not work night shifts during that period ($M = 16.6$ months, $SD = 7.7$).

The colleagues ($\chi^2 = 13.372, p = .004$) or supervisors ($\chi^2 = 8.773, p = .032$) of the participants in nonsurgical specialties had significantly more tolerant attitudes toward using breastfeeding leave rights when compared with those in the surgical specialties. Between surgical and nonsurgical specialties, there was no significant relationship regarding having time to express milk ($\chi^2 = 0.312, p = .577$).

For those participants who had stopped breastfeeding at the time of study, no significant relationship was found between total length of breastfeeding and having suitable facilities for expressing milk at the workplace ($Z = -0.436, p = .663$) or having enough time to express milk at work ($Z = -0.698, p = .485$). There was also no significant relationship between total length of breastfeeding and the attitudes

Table 3. Workplace Conditions and Breastfeeding Practices of the Participants ($N = 615$).

Workplace conditions	<i>n</i> (%)
Infant's age in months when mother was back to work	
0	1 (0.2)
<4	100 (16.2)
≥4 and <12	429 (69.8)
≥12 and <24	70 (11.4)
≥24	15 (2.4)
Infant's age in months when mother resumed night shifts ^a	
<6	24 (9.6)
≥6 and <12	31 (12.4)
≥12 and <24	35 (13.9)
≥24	161 (64.1)
Exercised breastfeeding leave rights	
Fully exercised	347 (56.4)
Used fewer hours	122 (19.8)
Used fewer days	36 (5.9)
Not exercised	110 (17.9)
Have facility to express milk at workplace	
Yes	262 (42.6)
No	353 (57.4)
Have time to express milk at workplace	
Yes	208 (33.8)
No	407 (66.2)
Coworkers' attitude toward breastfeeding	
Always supportive	260 (42.3)
Occasionally supportive	123 (20.0)
Oppose	14 (2.3)
Neither	218 (35.4)
Supervisor's attitude toward breastfeeding	
Always supportive	208 (33.8)
Occasionally supportive	132 (21.5)
Oppose	32 (5.2)
Neither	243 (39.5)

^aMissing values: $n = 364$.

of colleagues ($\chi^2 = 1.929, p = .587$) or supervisors ($\chi^2 = 3.064, p = .382$) regarding breastfeeding at work. The reasons why participants stopped breastfeeding are given in Table 4.

Discussion

The mean duration of EBF was longer for Turkish physician mothers in this study than the general Turkish population. However, participants fell behind the general population on the mean total length of breastfeeding (Hacettepe University Institute of Population Studies, 2013). Riggins, Rosenman, and Szucs (2012) conducted a similar study with physician mothers in Indiana, and although the participants had higher breastfeeding rates at 6 months as compared with the general

Table 4. Participants' Reasons for Stopping Breastfeeding ($N = 615$).

Reasons	n (%)
Work-related conditions	145 (23.6)
Reduction of mother's own milk	134 (21.8)
Infant unwilling to suckle anymore	114 (18.5)
Mother's fatigue or stress	101 (16.4)
Infant reaching the age of 2	98 (15.9)
Mother's health problems	28 (4.6)
Infant was not satisfied or did not gain weight	21 (3.4)
Mother's decision that it was enough	14 (2.3)
New pregnancy	13 (2.1)
To adjust infant's sleep pattern	11 (1.8)
Other ^a	4 (0.6)

Note. Participants were allowed to check more than one reason; therefore, frequencies are not mutually exclusive.

^aTraveling abroad, infant refusing solid foods, infant reaching anal developmental stage.

population, they had also fallen behind in the first year. Participants described the reasons for this decrease in early weaning as being primarily related to the workplace. This suggests that problems experienced in the workplace are similar for different parts of the world for this population. Similarly, Sattari, Serwint et al. (2013) suggested that as the duration of maternity leave of the mothers increased, the total length of breastfeeding increased. In both studies, physician mothers stated that their reason for weaning included going back to work and experiencing difficulty in expressing milk at the workplace, resulting in participants not meeting their breastfeeding goals (Riggins et al., 2012; Sattari, Serwint, Shuster, & Levine, 2016).

Although, according to regulations in Turkey, no night shift may be assigned to mothers for 2 years after delivery, we found that participants did start night shifts before 2 years. The reasons for this situation should be investigated. If physician mothers have to do night shifts because there are insufficient numbers of physicians, opening nurseries for employees within their institutions could be a solution. In a qualitative study conducted by Halley et al. (2018) using a social media group in the United States, physician mothers stated that they felt punished for using their maternity leave rights.

Workplace conditions and using breastfeeding leave might be difficult for mothers working in most occupations (Dinour & Szaro, 2017). In our study, most participants indicated that their colleagues were always supportive of their breastfeeding. Even if the majority were supportive, the colleagues exhibiting less positive attitudes also were present. Reasons for their colleagues' negative attitude were that workloads might increase with greater physician burnout syndrome (Romani & Ashkar, 2014). In a qualitative study conducted by Yamazaki, Kozono, Mori, and Marui (2011) in Japan, physician mothers stated that they felt

guilty for doing a lighter job than their coworkers and saw themselves as a burden to their colleagues. In most countries, the number of physicians is insufficient (Organisation for Economic Co-Operation and Development, 2018). In this situation, physicians are forced to choose between their profession and motherhood. Future researchers should examine the views of the physician mothers and their colleagues to clarify these issues. Why we examined the factors that influence breastfeeding behaviors of physician mothers in particular was that physicians' personal breastfeeding behaviors have been associated with their clinical breastfeeding advocacy (Sattari, Levine et al., 2013). We assumed that to increase the general population's frequency and duration of breastfeeding, the physicians' and nurses' breastfeeding attitudes should be supported.

Another striking result of our study was the cesarean rates for physician mothers. In a study conducted in Sweden, cesarean delivery rates of gynecologists and midwives were not different from the general population (Sahlin, Andolf, Edman, & Wiklund, 2017). Although the international community health guidelines identified the ideal c-section rate as 10% to 15% (Betran, Torloni, Zhang, Gürmezoglu, & WHO Working Group on Caesarean Section, 2016), our participants' cesarean delivery rate was quite high at 80.3%, as compared with the Turkish population's rate of 48% (Hacettepe University Institute of Population Studies, 2013). Reported risks associated with cesarean delivery include disturbances in the mother-to-neonate transmission of specific microbial strains (Rutayisire, Huang, Liu, & Tao, 2016). Several researchers have suggested that allergic diseases, chronic immune diseases, and metabolic diseases are more common with cesarean delivery (Wampach et al., 2018). The reasons for the high c-section rates in this population should be researched further.

Limitations

The results of a study conducted online might be considered less reliable: researchers cannot reach participants who have no internet access, and individuals can lie about their information reported to online group moderators (Pedersen & Kurz, 2016). It is unclear if the physician mothers who participated in the online forum were a representative sample of all physician mothers in Turkey, so results cannot be generalized. It also is possible that participants in this study were different than members of the online group who chose not to participate. Recall bias was a possibility, particularly for participants who had older children. Additionally, we may not have gathered data on all relevant variables, which would have skewed our findings.

Conclusion

We explored the factors influencing a sample of Turkish physician mothers' breastfeeding behaviors. There has been limited

research focused on this population. Future researchers need to clarify why physician mothers have difficulty using their breastfeeding leave, explore the high cesarean delivery rate, and better understand the experiences of these mothers.

Acknowledgments

Thank you to all physician mothers who participated in this research.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Ezgi Agadayı  <https://orcid.org/0000-0001-9546-2483>

Supplemental Material

Supplemental material for this article is available online.

References

- Betran, A. P., Torloni, M. R., Zhang, J. J., Gürmezoglu, A. M., & WHO Working Group on Caesarean Section. (2016). WHO statement on caesarean section rates. *British Journal of Obstetrics and Gynaecology*, 123(5), 667–70. doi:10.1111/1471-0528.13526
- Dinour, L. M., & Szaro, J. M. (2017). Employer-based programs to support breastfeeding among working mothers: A systematic review. *Breastfeeding Medicine*, 12(3), 131–141. doi:10.1089/bfm.2016.0182
- Hacettepe University Institute of Population Studies. (2013). *Turkey Demographic and Health Survey*. Ankara, Turkey: Turkish Ministry of Health. Retrieved from http://www.hips.hacettepe.edu.tr/eng/TDHS_2013_main.report.pdf
- Halley, M. C., Rustagi, A. S., Torres, J. S., Linos, E., Plaut, V., Mangurian, C., . . . Linos, E. (2018). Physician mothers' experience of workplace discrimination: A qualitative analysis. *British Medical Journal*, 363, k4926. doi:10.1136/bmj.k4926
- IBM Corporation. (2011). *IBM SPSS Statistics for Windows* (Version 20.0). Armonk, NY: IBM Corp.
- Irmak, N. (2016). The importance of breastmilk and the factors that effect exclusive breastfeeding. *Journal of Turkish Family Physician*, 7(2), 27–31. doi:10.15511/tjfp.16.02627
- Organisation for Economic Co-Operation and Development. (2018). *Health care resources: Physicians*. Retrieved from https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_HCQI
- Pedersen, E. R., & Kurz, J. (2016). Using Facebook for health-related research study recruitment and program delivery. *Current Opinion in Psychology*, 9, 38–43. doi:10.1016/j.copsyc.2015.09.011
- Resmi Gazete. (2016, April 13). *657 sayılı Devlet Memurları Kanunu Genel Tebliği* (No. 29683). Retrieved from <http://www.resmigazete.gov.tr/eskiler/2016/04/20160413-10.htm>
- Riggins, C., Rosenman, M. B., & Szucs, K. A. (2012). Breastfeeding experiences among physicians. *Breastfeeding Medicine*, 7(3), 151–154. doi:10.1089/bfm.2011.0045
- Romani, M., & Ashkar, K. (2014). Burnout among physicians. *Libyan Journal of Medicine*, 9(1), 23556. doi:10.3402/ljm.v9.23556
- Rutayisire, E., Huang, K., Liu, Y., & Tao, F. (2016). The mode of delivery affects the diversity and colonization pattern of the gut microbiota during the first year of infants' life: A systematic review. *BMC Gastroenterol*, 16(1), 86. doi:10.1186/s12876-016-0498-0
- Sahlin, M., Andolf, E., Edman, G., & Wiklund, I. (2017). Mode of delivery among Swedish midwives and obstetricians and their attitudes towards caesarean section. *Sexual & Reproductive Healthcare*, 11, 112–116. doi:10.1016/j.srhc.2016.04.002
- Sattari, M., Levine, D., Neal, D., & Serwint, J. R. (2013). Personal breastfeeding behavior of physician mothers is associated with their clinical breastfeeding advocacy. *Breastfeeding Medicine*, 8(1), 31–37. doi:10.1089/bfm.2011.0148
- Sattari, M., Serwint, J. R., Neal, D., Chen, S., & Levine, D. M. (2013). Work-place predictors of duration of breastfeeding among female physicians. *Journal of Pediatrics*, 163(6), 1612–1617. doi:10.1016/j.jpeds.2013.07.026
- Sattari, M., Serwint, J. R., Shuster, J. J., & Levine, D. M. (2016). Infant-feeding intentions and practices of internal medicine physicians. *Breastfeeding Medicine*, 11(4), 173–179. doi:10.1089/bfm.2015.0151
- Turkish Ministry of Health. (2015). *Emzirme Danışmanlığı*. Ankara, Turkey: Author. Retrieved from <https://dosyaism.saglik.gov.tr/Eklenti/9281,emzirme-danismanligi-el-kitabi-in-tiklayinizpdf.pdf?0>
- Wampach, L., Heintz-Buschart, A., Fritz, J. V., Ramiro-Garcia, J., Habier, J., Herold, M., . . . Wilmes, P. (2018). Birth mode is associated with earliest strain-conferred gut microbiome functions and immunostimulatory potential. *Nature Communications*, 9(1), 5091. doi:10.1038/s41467-018-07631-x
- World Health Organization. (2009). *Infant and young child feeding: Model chapter for textbooks for medical students and allied health professionals*. Geneva, Switzerland: Author.
- World Health Organization & United Nations International Children's Emergency Fund. (2003). *Global strategy for infant and young child feeding*. Geneva, Switzerland: World Health Organization.
- Yamazaki, Y., Kozono, Y., Mori, R., & Marui, E. (2011). Difficulties facing physician mothers in Japan. *Tohoku Journal of Experimental Medicine*, 225(3), 203–209.

Book Review: Cesarean Section: An American History of Risk, Technology and Consequence

Journal of Human Lactation

2020, Vol. 36(3) 478–479

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334420925030

journals.sagepub.com/home/jhl



Wolf, Jacqueline. (2018). *Cesarean Section: An American History of Risk, Technology and Consequence*. Baltimore MD: Johns Hopkins University Press. 320 pp. ISBN: 978-1-4214-2552-8.
DOI: 10.1177/0890334420925030

Jacqueline Wolf has been sharing her keen historical insights on issues related to birth, motherhood, and maternity care from early on in her career. Her first book, *Don't Kill Your Baby: Public Health and the Decline of Breastfeeding in the 19th and 20th Centuries*, published in 2001, was, as the title implies, a clever as well as thoughtful examination of lactation history in America. Her second book, *Deliver Me from Pain: Anesthesia and Birth in America*, published in 2009, took the same approach to this central yet largely ignored part of history. And now we welcome this newest book, which builds on her work and her wisdom. The underlying philosophy in all of her work is a commitment to a deeply intelligent read of these contemporary biomedical practices organized around issues of gender.

Wolf is an historian, and her work brings a richness that we need, a contextualization that most medical anthropology and medical sociology, as well as most popular (non-academic) work on these issues, deals with in perhaps an introductory chapter. But the past is more than an introduction to the present, as Wolf shows. We would, in this area as in so many others, be wise to learn from history.

Cesarean Section has a long, though often denied or trivialized history. Its name alone calls that to our attention—how many contemporary medical procedures are named for classical figures? When something in medicine is named after a person, it is generally the doctor who “discovered” and laid claim to the condition or its treatment. Wolf mostly limits her discussion to the American history, and reports the various and somewhat contested stories of which doctor might have first performed a Cesarean Section, successful or not. Other accounts tell us of successful precedents, where both the mother and the baby survived. The telling of the story of an Irish midwife in the 1700s virtually always stresses that she was illiterate—as if somewhere there was a guidebook, if only she could read. Possibly, the first recorded Western Cesarean Section was earlier than that, performed by a Swiss man in the 1500s on/for his wife after many midwives were unable to help. Europeans in the 1800s observed African midwives,

specifically in Uganda and Tanzania, doing Cesareans and claiming a long midwifery history. It is, actually, pretty hard to imagine that midwives all over the world did not occasionally intervene with a knife, when there was no other way to save the mother or baby. But history, as is well known, is written by the victors, and the story of men, of “surgeons” doing these surgeries, is the tale that is passed down.

By the time there was an America, there was the start of the profession of medicine with professional societies certifying practitioners and regulating practice—and claiming expertise over and above that of midwives. The history of Cesarean Section in the United States therefore occurs very much within that medical control.

As Wolf shows, this surgery, like all surgeries, was not undertaken lightly. In the 19th century it was, as she titles a chapter on early cesareans, “The Epitome of Risk.” Even as the 19th century ended and the 20th first opened, and asepsis was practiced and anesthesia available, Cesareans were still understood as dangerous and risky interventions, to be used only when all else had failed. Wolf moves to the next chapter, covering the 1900s to the 1930s as “Still Too Risky.”

But then we begin the seismic shift outlined in the chapter on the mid-20th century, the 1930s to the 1970s, which asks “Risk or Remedy?” Cesarean Sections begin to be seen as a contribution, as something surgeons can offer. It is important to remember that while now obstetrics is understood to be in itself a surgical specialty, that was not always the case. Obstetrics and gynecology were separate specialties, not merged until 1930, making it, as Wolf shows us, one of the earliest and most popular of the increasingly common specialty areas in medicine. When birth was generally understood as a physiologically normal process, dare we say “natural” in some way, obstetrics was rather disparaged—what, after all, were they doing that some immigrant or African American midwife could not and did not do? The merger enabled the obstetricians to raise their status. And as Wolf notes, “The sensibility of the gynecologist, a specialist accustomed to surgically treating a host of gender-related pathologies, would

eventually overpower the instincts of the physiologically oriented obstetrician." (p. 83)

But history, as Wolf so carefully shows, operates on several fronts at once. Various forms of mass media, magazines, and newspapers, and the growing area of "women's magazines," all the predecessors to today's "social media," were reaching out, doing stories on women's issues and concerns, and bringing the idea of Cesarean Sections into the popular mind.

By the 1950s, it was less a question of a Cesarean itself as the risk, and more a matter of "Assessing Risk," as Wolf titles the post-war, 1950s to 1970s era. Birth had already moved into the hospital, in all but rural areas (most notably the rural South where the African American midwives still played an active role). Birth was increasingly understood, at its essence, as a medical procedure, with doctors "delivering" babies, and babies "coming home from the hospital".

With the flood of births that we now call the Baby Boom, hospitals became more and more factory-like in their management. Friedman's curve, the "graphicostatistical analysis of labor" went from a description of how long the various stages of labor took (in the decidedly un-physiological positions and conditions of hospitals), to prescriptive, how long they were permitted to take. Where dystocia was "traditionally defined as blocked labor caused by a rare physical anomaly" (p. 104) increasingly, any prolonged labor was diagnosed as dystocia: "Although the new dystocia had little in common with the old, both shared a crucial characteristic: The diagnosis called for drastic medical intervention" (p. 104). Cesarean Sections became a cure for this increasingly diagnosed condition.

And then came Jackie Kennedy. Her widely publicized cesarean sections brought the surgery into common knowledge. Her long-term heavy smoking remained hidden. Those were the years, the post-war era, in which the social emancipation of women opened up smoking for women. Wolf reminds us that the consequences of smoking were not widely known until a 1979 surgeon general's response. The consequences of smoking in pregnancy include miscarriage, placental abruption, stillbirth—just those experiences Jackie Kennedy endured, something I had never considered. I so admire Wolf's work because as much as I have devoted decades of my life to these issues, when I read her work, I learn new things, learn new ways of thinking of things. Reading this book I found myself blurting out my surprise repeatedly: How could I have been working in this area for so long and not seen, for example, the relationship between high rates of smoking in pregnant women of the 1950s and 1960s with the resultant complications, and the increase of medicalized, interventionist management? That experience of being faced with the "obvious"—things that were NOT obvious until a scholar goes back and carefully shows the pattern—is one of the distinct pleasures to be found in reading Wolf's work.

The last two chapters bring us to the contemporary management of birth, and the meaning of "Risk Society." These chapters look at this from the perspective of the providers,

"Operating in a Culture of Risk," and that of the birthers, "Giving Birth in a Culture of Risk." Fetuses are products of medical management, made visible, assessed regularly, "monitored" through pregnancy and birth. The data are clear, and Wolf provides it for us, that there is no evidence that "electronic fetal monitoring" improves "outcome" over listening—but it can be done at distance, and centralized, more efficiently. It also provides repeated opportunities to intervene with Cesarean Sections.

Wolf addresses the birth movements that arose to address the emotional, social, and physiological needs of birthing. The most successful parts of those movements in hospital settings have been what I call "interior decorating obstetrics," and what Wolf calls more "cosmetic than systemic" (p. 178). You can have a more private space, you can bring your own pillow, you can have someone hold your hand—and be wheeled right into the operating room.

Wolf asks us to bring back the skills of midwifery, to learn how to help people give birth. She is less radical than I am in this, concluding her book with the call that "every department of obstetrics and gynecology at a medical school should have certified nurse-midwives on their faculty" (p 207) and "that midwives should participate in the training of obstetric residents" (p. 207). I would say it is not the nurse-midwives we need, not the midwives who were themselves trained in those very settings, under the control of the surgical specialty that Obstetrics now is, but the other midwives, those who are bringing back the traditional and artisanal skills obstetrics tried to block.

However, we—birth activists of all sorts, scholars of birth and maternity—try to make change, to improve things, what we all need is to understand how we got here to this time in which Cesarean Sections are routine: We need to understand our history. For that, turn to Jacqueline Wolf. Her historical perspective enables her to see the waves of birth management that have passed across the American landscape, and to link those to changing views of womanhood, femininity, and the female body.

Barbara Katz Rothman
City University of New York, New York, USA
BKatzRothman@gc.cuny.edu

Declaration of Conflicting Interests

The authors have no conflict of interest to report. Dr. Mitchell is on the board of the *Ventura Coast Milk Bank*. Ms. Weinstein's previous place of employment is a collection site for the *Mother's Milk Bank*.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Barbara Katz Rothman  <https://orcid.org/0000-0003-2019-0561>

The “Lactation After Infant Death (AID) Framework”: A Guide for Online Health Information Provision About Lactation After Stillbirth and Infant Death

Journal of Human Lactation
2020, Vol. 36(3) 480–491

© The Author(s) 2020



Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0890334420926946
journals.sagepub.com/home/jhl



Katherine Carroll, PhD¹ , Debbie Noble-Carr, PhD¹, Lara Sweeney¹, and Catherine Waldby, PhD²

Keywords

breastfeeding, health services research, lactation education, maternal health, policy analysis

Background

Most parents who give birth to a stillborn infant, or who give birth then endure the death of their young infant, will encounter the onset of lactation (McGuinness et al., 2014). For breastfeeding parents who experience the death of their older infant, many will have established lactation or frozen stores of expressed human milk ([EHM] McGuinness et al., 2014). Despite this, lactation and EHM are rarely discussed with bereaved parents in healthcare settings (Britz & Henry, 2013; Carroll, Lenne, McEgan et al., 2014; Redshaw et al., 2014). As a result, many bereaved parents who have recently given birth are unprepared when they begin to lactate, and few are aware of the range of suppression, expression, or donation options that may be available to them (Carroll & Lenne, 2019; McGuinness et al., 2014; Welborn, 2012b). The lack of anticipatory guidance regarding lactation after infant death can be a significant source of distress for parents, exacerbating the emotional pain of their child’s death (Carroll & Lenne, 2019; McGuinness et al., 2014; Welborn, 2012b). This lack may also inadvertently compound the invisibility and ambiguity of parenthood experienced by many bereaved parents (Cacciatore et al., 2008; Layne, 2003; Oreg, 2019). Furthermore, parents bereaved as a result of giving birth to a stillborn infant or enduring their infant’s death are likely to experience breast engorgement, pain, and milk leakage (McGuinness et al., 2014) and, in the absence of reliable information, they may follow lactation management methods that prove ineffective or lead to mastitis or abscess. To prevent adverse outcomes, bereaved parents require anticipatory guidance or lactation support from qualified health professionals.

Discussing or making decisions about the suppression, expression, or donation of human milk with bereaved parents in the midst of grief can be a confronting and difficult task for

Key Messages

- There is a dearth of targeted online lactation health information provided to bereaved parents after stillbirth and infant death.
- We collated and critically reviewed international evidence-based lactation and bereavement information to devise a comprehensive framework on the diverse options for lactation management after stillbirth and infant death.
- We outline the development of the 25-point evidence-based Lactation AID Framework intended for use by health organizations that provide written online lactation health information to bereaved parents.

both health professionals and families (PATH, 2019). In addition to the general taboo that surrounds infant death and lactation in our society, health professionals may have limited knowledge, or lack the confidence to initiate or manage these conversations (Carroll & Lenne, 2019; Layne, 2003; Oreg,

¹School of Sociology, College of Arts and Social Sciences, Australian National University, Canberra, Australia

²Research School of Social Sciences, Australian National University, Canberra, Australia

Corresponding Author:

Katherine Carroll, PhD, School of Sociology, College of Arts and Social Sciences, Australian National University, Hayden-Allen Building (#22), Canberra, Australia.
Email: Katherine.Carroll@anu.edu.au

2019). Moreover, hospital staff are presented with the practical challenges of engaging in sensitive and timely lactation conversations with bereaved parents who may leave hospital after giving birth, but before lactogenesis II or changes to their lactation practices have occurred (Cole, 2012; McGuinness et al., 2014; Redshaw et al., 2014). In these circumstances, having ready access to quality evidenced-based written information that specifies lactation management and care options is vital (McGuinness et al., 2014).

Written information may be the most effective and sensitive way to convey the various lactation options—including suppression, sustained expression, or donation—available to bereaved parents (Welborn, 2012b). Written information can be consulted frequently and over time, and is particularly helpful for parents who may have difficulty understanding and retaining information whilst in a state of shock or grief (Flenady, Oats et al., 2018). Following their discharge from hospital, bereaved parents may be reluctant to seek lactation help from healthcare providers and they may turn to online health information ([OHI] Lariviere-Bastien et al., 2019; Sweeney et al., 2020). If it is reliable and evidenced-based, OHI can act to supplement the care received from health professionals (Gleeson et al., 2019; Iacovetto & Allen, 2015).

To date, there has been little exploration or consideration of the OHI available to bereaved parents about lactation after infant death. To address this gap, a study was conducted in 2019 to review the lactation information presented on the websites of 21 targeted Australian health organizations (Sweeney et al., 2020). To evaluate website content, the research team devised an evidenced-based tool that succinctly incorporates information required by bereaved parents to promote effective management of, and informed decision-making about, lactation after infant death. The development of this tool provided a timely opportunity to critically review the growing international research and available best-practice resources within the milk banking, bereavement, and lactation/breastfeeding sectors. In this article we outline the development of this tool, the Lactation After Infant Death (AID) Framework, and provide a description and justification for each of the Framework's 25 information criterion. The Framework's limitations and potential adoption by health organizations is also considered.

Developing the Lactation AID Framework

Numerous tools exist to guide the development, implementation, and evaluation of health policy or practice guidelines (Selva et al., 2017; Schünemann et al., 2014). Arguably, the most comprehensive and well regarded of these is the GIN-McMaster Guideline Development Checklist ([GDC] Morgan et al., 2018; Schünemann et al., 2014). Developed by Schünemann et al. (2014), the GDC is organized into 146 elements that span 18 topics, from guideline planning to implementation and evaluation (Morgan et al., 2018). The

GDC and associated resources offered valuable guidance to ensure our development process was systematic, rigorous, and evidence-based. As our Framework was not intended for health policy or clinical practice, we followed Schünemann et al. (2014) advice and used only the GDC items that were relevant to the intended focus and purpose of our Framework.

In accordance with the initial steps outlined in the GDC (Schünemann et al., 2014), the research team spent preliminary time planning and organizing roles, priorities, budget, and timelines for the Framework development. The GDC's Steps 3–6 (Schünemann et al., 2014) recommends support from a Stakeholder Advisory Group (SAG) to critically advise on Framework development. Researchers selected SAG members with expertise and/or extensive experience interfacing with bereaved parents who may experience lactation after infant death. The SAG included: IBCLCs, Neonatologists, Human Milk Bank Managers, an Infant Death Bereavement Educator, and an Infant Death Bereavement Counsellor. One member also had personal experience of infant bereavement. The SAG members were selected from three different Australian states and represented universities, neonatal intensive care units, human milk banks, and not-for-profit community organizations. The variety of professions and organizations represented assisted the research team to assess and address conflict of interest considerations (Step 7 of the GDC) and any bias that may be evident in member perspectives. SAG members provided advice at different stages of development, with early discussions confirming the lack of succinct guides or information currently at their disposal to assist organizations to develop appropriate lactation after infant death information materials.

Literature Search and Review

With initial planning conducted and a clear research aim established and agreed to by the SAG, the next steps of the GDC informed the need to search for, identify, and assess current best-practice guidelines. The research team consulted international best-practice guidelines governing: (a) stillbirth or infant bereavement care (including, Flenady, King et al., 2009, 2018; National bereavement care pathway for pregnancy and baby loss, 2018a, 2018b, 2018c, 2018d, 2018e; National Institute for Health and Care Excellence, 2019; Sands Stillbirth & Neonatal Death Charity [Sands], 2016); (b) bereaved donor milk donation (including National Institute for Health and Care Excellence, 2018; PATH, 2019; Welborn, 2012b); and (c) lactation management (including publications from the World Health Organization, 2019; Academy of Breastfeeding Medicine Protocols, 2019; and the Australian Breastfeeding Association, 2019). Although some exemplar documents were uncovered from within the milk banking policy and practice sector (see PATH, 2019; Welborn, 2012b), the search confirmed the need to develop a tool that could succinctly guide the presentation of OHI across the bereavement, milk banking, and lactation or breastfeeding sectors.

To ensure the tool reflected internationally emergent knowledge from this rapidly growing area of interest, it was necessary for the research team to also review scholarly and grey literature available on the topic. This ensured the proposed Framework encompassed evidenced-based health policy and practice information whilst also representing bereaved parents' experiences of lactation after infant death. Key search terms used within databases and search engines included: "lactation after loss;" "lactation after infant death;" "milk production after death;" "milk production after loss;" and a combination of "infant death" (and synonyms: "bereavement;" "loss;" "baby loss;" "pregnancy loss;" "miscarriage;" "stillbirth;" "still birth;" "neonatal death;" "neonatal loss;" "infant loss;" "loss of baby;" "death of baby") with "lactation;" "breastmilk;" "milk donation;" or "milk bank". This search uncovered a growing body of research that often incorporated bereaved parents' perspectives, and advocated for the need to improve lactation care and guidance for bereaved parents (e.g., Britz & Henry, 2013; Carroll & Lenne, 2019; Carroll, Lenne, McEgan et al., 2014; Cole, 2012; Ellis et al., 2016; Fry & Henner, 2016; Spatz, 2016).

Data Analysis

The completed literature review enabled the research team to identify information critical to bereaved parents' lactation care, and the Framework was drafted. SAG members provided feedback to review and refine the draft Framework, raising important points about the balance of information provided and ensuring it was appropriate to the current Australian healthcare context and climate. Further research team meetings were then held to review and finalize each of the Framework's criterion and to attend to the overall tone and language used. These reflective discussions considered the GDC's (Schünemann et al., 2014) recommendation to interrogate the values, equity, feasibility, and (un)intended consequences of the proposed Framework. The literature relating to the development and assessment of quality OHI was also helpful at this time, ensuring we considered whether the Framework would meet the imperatives of providing up-to-date, relevant, evidence-based, accurate, coherent, respectful, and sensitive information to the intended users (Beaunoyer et al., 2017).

In accordance with the final stages of the GDC (Schünemann et al., 2014), the research team and SAG will continually review, evaluate, and adapt the Framework to ensure its enduring applicability to health organizations and the bereaved parents that they aim to inform and support. The publication of this article is an important component of this stage, providing an opportunity for the necessary reporting and peer review of the Lactation AID Framework.

The Lactation AID Framework

Our review confirmed that bereaved parents experiencing stillbirth or infant death would benefit from access to written

information that: (a) provides anticipatory guidance regarding the production or presence of human milk after loss (Welborn, 2012a); (b) acknowledges the varied emotional responses and meanings that may be attached to this experience (Welborn, 2012b); (c) addresses and reduces the chances of ill-health associated with mismanaged lactation (McGuinness et al., 2014); and (d) provides sufficient information in regard to the full spectrum of possible lactation responses to ensure parents can make informed decisions about what to do with their milk (PATH, 2019; Welborn, 2012b).

To meet these needs the Lactation AID Framework (outlined in Table 1) consists of 25 criteria, cohered into seven overarching categories. To provide transparency and education to users of Table 1, a justification for the inclusion of each criteria and an overview of key supporting evidence is presented in Table 2. In this way, Table 2 acts as an audit trail by providing the evidence base for each of the Framework's 25 criteria. We now provide further transparency by highlighting how we responded to limitations or contradictions evident within the extant literature, and provide further guidance on the language and framing required for each criterion, particularly for those criteria that are novel, contentious, or complex.

Category A: Acknowledgement of Human Milk and Lactation after Infant Death

Our review confirmed that it remains commonplace for clinical standards or guidelines for perinatal bereavement care to neglect, or offer limited attention to lactation. Advice regarding if, and when, to expect lactation after infant death varies significantly across current guidelines, with advice often being directed to parents experiencing miscarriage or stillbirth, rather than to parents who experience an older infant death (for example, see variance in the National bereavement care pathway for pregnancy and baby loss, 2018a, 2018b, 2018c, 2018d, 2018e). Guidelines usually offered little specificity regarding the gestational period most likely to elicit lactation. Scholars suggest people at 16 weeks gestation may expect to produce and leak milk after loss (McGuinness et al., 2014). However, due to the inevitable variability in the onset of lactogenesis, our Framework advises that information be framed in general terms to simply acknowledge milk production can occur after early or late miscarriage, stillbirth, neonatal death, or infant death, thereby ensuring that no people are excluded from receiving information they may require.

The literature reviewed indicated that, when discussing lactation, the adoption of open and non-judgmental language is essential. Currently, lactation is often portrayed as being a physically and emotionally painful experience (Sweeney et al., 2020). Thus, human milk is rarely included as a suitable object for meaning or memory-making to

Table I. Lactation AID Framework for Online Health Information.

Complete Information
Category A: Acknowledgement of human milk and lactation after infant death <ol style="list-style-type: none"> 1. Acknowledges milk production can occur after early or late miscarriage, stillbirth, neonatal death, or infant death 2. Acknowledges emotional responses or changes may be associated with milk production after pregnancy loss, stillbirth, or infant death 3. Acknowledges that frozen or stored human milk may exist at the time of infant death: Can be discarded, kept as memento, or potentially donated
Category B: Breast changes commonly associated with milk production <ol style="list-style-type: none"> 1. Mentions breast engorgement 2. Mentions milk leakage
Category C: Advice on alleviation of symptoms: Discomfort, engorgement, leakage, and infection <ol style="list-style-type: none"> 1. Describes non-pharmacological means for symptom relief 2. Describes pharmacological pain relief options 3. Describes signs of infection and mastitis
Category D: Description of full range of suppression options, including: <ol style="list-style-type: none"> 1. Advice and techniques for milk suppression 2. That some people have found lactation suppression beneficial after infant death 3. What to do with milk from suppression process: Can be discarded, kept as memento, frozen 4. Advises pharmaceutical suppression only in consultation with a health professional
Category E: Description of sustained expression option, including: <ol style="list-style-type: none"> 1. Advice and techniques for milk expression 2. Sustained expression without donation 3. That some people have found this option beneficial after infant death 4. What to do with milk from expression process: Can be discarded, kept as memento, frozen
Category F: Description of milk donation option, including: <ol style="list-style-type: none"> 1. Donation from sustained expression 2. That some people have found this option beneficial after infant death 3. Describes what milk banks do with human milk 4. Describes donation process, including screening and eligibility requirements 5. Provides list of milk banks in your specified region. 6. What to do with milk: can be frozen before donation 7. Acknowledging informal milk sharing and associated risks
Category G: Recognition that additional bereavement and/or lactation support may be necessary <ol style="list-style-type: none"> 1. Provides links to other relevant websites or resources 2. Advises seeking advice of relevant healthcare professionals

Note. Adapted from "Lactation After Infant Death: An Analysis of Australian Health Care Agencies Online Health Information," by L. Sweeney, K. Carroll, D. Noble-Carr, & Waldbay, C. 2020. *Health Sociology Review*, 29(1), 45–61. <https://doi.org/10.1080/14461242.2019.1708206> Copyright 2020 by Taylor & Francis Ltd.

assist bereaved families' grieving (Sweeney et al., 2020). The omission of variable responses to lactation and human milk after loss is concerning, as it potentially reinforces the presumption that a bereaved parent should or would want nothing to do with their milk (Welborn, 2012b).

Category B: Information on Breast Changes Commonly Associated With Milk Production

Information about breast changes commonly associated with milk production are often minimally presented within the context of other physiological changes that can result from miscarriage or stillbirth (Sweeney et al., 2020). As a result, many parents who have miscarried or given birth to a stillborn infant can be surprised, unprepared, and distressed when they experience breast sensitivity, engorgement, leakage of milk, discomfort, and pain (McGuinness et al., 2014; Welborn, 2012b). Through our Framework we suggest that all bereaved new parents should be advised of the full range of potential breast changes they can expect.

Category C: Advice on Alleviation of Symptoms: Discomfort, Engorgement, Leakage, and Infection

It is important that bereaved parents are presented with options for the alleviation of symptoms or complications that may result from lactation. Various methods of pain control are outlined in currently available information. However, conclusive evidence on the effectiveness of both pharmacologic and nonpharmacologic treatment options remains elusive (Berens & Brodribb, 2016; Welborn, 2012b). Rather than simply providing parents with a long list of potential strategies, we advise that, where possible, the strength of evidence for each strategy or treatment be carefully considered and conveyed. Parents must also be informed that some measures currently promoted to address engorgement or leakage, for example binding or bandaging breasts that may be more present in particular cultures, may increase the risk of infection (Cole, 2012; Welborn, 2012b).

Table 2. Lactation AID Framework for Online Health Information: An Overview of Supporting Evidence.

Category	Criteria and Evidence-Based Rationale for Inclusion
A. Acknowledgement of human milk and lactation after infant death	<p>I. Acknowledges milk production can occur after early or late miscarriage, still birth, neonatal death, or infant death. It is important to physical health and emotional wellbeing that parents are aware that lactation can occur after late miscarriage, later-term abortions, stillbirth, and infant death, and are provided with lactation management information and are supported to make decisions about their human milk (Busta Moore & Catlin, 2003). Bereaved parents require this information at the time that their baby dies (Britz & Henry, 2013; Welborn, 2012a).</p> <p>2. Acknowledges emotional responses or changes may be associated with milk production after pregnancy loss, still birth, or infant death. Information should not presuppose any particular emotional response to the presence of human milk or lactation. There are variable meanings and emotional responses that bereaved parents may attach to lactation or the presence of human milk after infant death (Welborn, 2012a) that vary across individuals, families, religions, or cultures.</p> <p>3. Acknowledges that frozen or stored human milk may exist at the time of infant death: Can be discarded, kept as memento, or potentially donated. Where possible, parents should be presented with options to keep their milk, have it discarded, or be considered for donation (PATH, 2019; Stillbirth & Charity, 2016). Inclusion of human milk in memory making should also be considered (Stillbirth & Charity, 2016).</p>
B. Breast changes commonly associated with milk production	<p>1. Mentions breast engorgement: Bereaved parents who lactate may experience breast sensitivity, engorgement, and leakage of milk. Discomfort and pain with lactation, and even mastitis or abscess may result if these symptoms are left unattended (McGuinness et al., 2014; Oladapo & Fawole, 2012).</p> <p>2. Mentions milk leakage: Parents should receive information about why lactation may commence or continue after perinatal or infant death (Welborn, 2012b). Bereaved parents should be advised that it is normal for milk to be present for days, weeks, or even months after stopping breastfeeding or expressing (Neifert, 2009 cited in Welborn, 2012b).</p> <p>1. Describes non-pharmacological means for symptom relief: A range of nonpharmacological measures to alleviate discomfort and avoid engorgement are routinely advocated (Hernández-Aguilar et al., 2018), most commonly described as the gradual removal of enough milk from the breast in order to reduce pressure in the breasts, but not too much so as to stimulate milk production (Welborn, 2012b).</p> <p>2. Describes pharmacological pain relief options: Painful engorgement should not be experienced by bereaved parents, and analgesia can be taken for engorgement-related pain (McGuinness et al., 2014) including over-the-counter anti-inflammatory medications (PATH, 2019).</p> <p>3. Describes signs of infection and mastitis: It is critical that bereaved parents receive information and advice about signs of mastitis and its prevention (Stillbirth & Charity, 2016).</p>
C. Advice on alleviation of symptoms, discomfort, engorgement, leakage, and infection	(Continued)

Table 2. Continued

Category	Criteria and Evidence-Based Rationale for Inclusion
D. Description of a full range of suppression options	<ol style="list-style-type: none">Advice and techniques for milk suppression: There is currently no universal guideline on the most appropriate approach for suppressing lactation (Marcellin & Chantry, 2015; Oladapo & Fawole, 2012). Parents should be given information about the range of options to suppress their milk, and the advantages and disadvantages of each (Stillbirth & Charity, 2016). The full range of non-pharmacological options should be provided to alleviate discomfort and avoid engorgement, including coherent instructions and indicators for their use and efficacy (Cole, 2012; Hernández-Aguilar et al., 2018; Oladapo & Fawole, 2012; Royal College of Obstetricians & Gynaecologists, 2010; Stillbirth & Charity, 2016).That some people have found lactation suppression beneficial after infant death. Many parents who experience lactation as a painful reminder of their loss will want to promptly suppress lactation (Carroll & Lenne, 2019; Cole, 2012; Welborn, 2012b).What to do with milk from suppression process: Can be discarded, kept as memento, frozen. The timeline and process for involution will be different for every person (Welborn, 2012a). Parents should be advised that even if they choose to suppress their lactation, milk may be produced and they can make decisions to either discard this milk, keep it as a memento, or freeze it until they feel more ready to make a decision.Advises pharmaceutical suppression only in consultation with a health professional. There is a risk of rebound lactation and increased risks of thromboembolism, cerebral accident, and myocardial infarction reported with the use of pharmaceutical oestrogens and bromocriptine (Oladapo & Fawole, 2012). However, the Royal College of Obstetricians & Gynaecologists (2010) suggest pharmacological lactation suppression—and, in particular, dopamine agonists—are effective and well-tolerated by many. Where pharmaceutical suppression is advised, it must always be accompanied by the requirement to consult with an appropriate health professional to explain risks and side effects (PATH, 2019).
E. Description of sustained expression options	<ol style="list-style-type: none">Advice and techniques for milk expression: To facilitate sustained expression, information must instruct on how to express milk effectively either by hand or pump, and how to access an appropriate breast pump (Evans et al., 2014; Hernández-Aguilar et al., 2018; PATH, 2019; Welborn, 2012b, 2012b).Sustained expression without donation: Sustaining lactation is a viable lactation management option and potential grief alleviation strategy for bereaved parents (Cole, 2012; Oreg, 2019; Welborn, 2012a).Some people have found this option beneficial after infant death: “Continuing to lactate may be important for some women who may feel that lactation is a tangible link to their baby, be interested in the health benefits of lactation or wish to delay stopping lactation for other reasons” (Stillbirth & Charity, 2016, p. 238). For some parents pumping milk is a way to maintain a close connection to the baby and to develop a relationship with the deceased infant (Welborn, 2012a). Expressing milk may enable a bereaved parent to identify and validate their parenthood or act as a form of ritual to assist in the grieving process (Carroll & Lenne, 2019; Welborn, 2012a).What to do with milk from the expression process: Can be discarded, kept as memento, frozen. Parents should be reminded that they have the choice of discarding expressed milk, keeping it as a memento, or freezing it until they are ready to make decisions about its potential use or disposal. For bereaved parents who want to continue to express their human milk, the option to donate should be made accessible (Busta Moore & Catlin, 2003; Welborn, 2012b).

(Continued)

Table 2. Continued

Category	Criteria and Evidence-Based Rationale for Inclusion
F. Description of milk donation options	<ol style="list-style-type: none">1. Donation from sustained expression: Bereaved parents should be informed of all possible options for providing milk to a milk bank (PATH, 2019; Welborn, 2012b). This may include donating existing stores of expressed human milk obtained during the infant's life, expressed human milk obtained after infant death while working toward lactation suppression, expressed human milk obtained after infant death due to sustaining lactation, and human milk expressed for donation as a result of lactation also intended for a living infant (Carroll, Lenne, McEgan et al., 2014).2. That some people have found this option beneficial after infant death. Many bereaved parents experience milk donation as healing, comforting, positive, productive, agency-enhancing, and meaningful (Carroll & Lenne, 2019; Welborn, 2012a).3. Describes what milk banks do with human milk. Parents should also be informed as to how donor milk is used and why human milk is essential to infants in Neonatal Intensive Care Units (Welborn, 2012b).4. Describes donation process, including screening and eligibility requirements: Careful and sensitive guidance is required, as not all bereaved parents will be eligible or able to donate milk (Britz & Henry, 2013). When considering donation, comprehensive information about eligibility criteria, the requirements for milk expression and storage, and the availability of emotional or practical support is essential (National Institute for Health and Care Excellence [NICE], 2018). If bereaved donors do not meet eligibility criteria, they should be advised if they can donate their milk for research (Stillbirth & Charity, 2016; Welborn, 2012b).5. Provides list of milk banks in your specified region. When considering donation, comprehensive information about where and how to donate is essential (National Institute for Health and Care Excellence, 2018).6. What to do with milk: Can be frozen before donation. When considering donation, comprehensive information about the requirements for milk expression and storage and the availability of emotional or practical support available is essential (National Institute for Health and Care Excellence, 2018).7. Acknowledging informal milk sharing and associated risks: Given the prevalence of informal milk sharing and its prominence in online spaces health authorities should acknowledge peer-to-peer milk sharing and provide tailored practical support to ensure it is rendered as safe as possible (Akre et al., 2011).
G. Recognition that additional bereavement and/or lactation support may be necessary	<ol style="list-style-type: none">1. Provides links to other relevant websites or resources: Parents should know where and how they can access additional bereavement or lactation support that is suited to their own needs and preferences (Balkhbakhi et al., 2017). Parents should be provided with these contact details for additional support (PATH, 2019).2. Advises seeking advice of relevant healthcare professionals: Some parents may require follow up care from specialist care providers including IBCLCs who can answer questions concerning human milk or lactation (Cole, 2012; Welborn, 2012a). Many parents also find the practical and emotional support provided by bereavement counsellors or social workers of benefit (Cole, 2012; Welborn, 2012a, 2012b).

The risk of mastitis was highlighted by our SAG panel as requiring explicit attention in the Framework. Mastitis is a common condition affecting lactating parents (Amir, 2014). Mastitis and breast abscesses are largely preventable if early signs of engorgement or blocked ducts are treated promptly (World Health Organization, 2000). Given the risk of pain and complications, including infection, and that many parents may be unsure of how to respond to their lactation even after initial guidance (Chen et al., 2015), we advise health organizations to adopt proactive language. This may appear to be a conscious departure from the PATH (2019) resource that suggests “all mothers should be given the option to *do nothing* [emphasis added] about their milk supply, to suppress their milk supply, or to express their milk” (pp. 111–112). Although we support an approach that enables people to have choice over their own bodies and healthcare decisions, that necessarily includes to “*do nothing*,” we believe people must be actively informed of the potential harms and risk associated with this approach.

Category D: Description of Full Range of Suppression Options

There is currently no universal guideline on the most appropriate approach for suppressing postpartum lactation (Marcellin & Chantry, 2015; Oladapo & Fawole, 2012). Despite this, information on the full range of suppression options is rarely provided to bereaved parents (Chen et al., 2015). Cole (2012, p. 95) states that non-pharmacological measures which allow discomfort and engorgement to be minimized whilst people gently suppress their milk have become “the norm”. In contrast to this approach, the Royal College of Obstetricians & Gynecologists (2010) suggest that pharmacological methods of lactation suppression—and, in particular, dopamine agonists—are effective and well-tolerated by many. They further suggest that “women should be advised that almost one-third of those that choose non-pharmacological measures are troubled by excessive discomfort” (Royal College of Obstetricians & Gynecologists, 2010, p. 17). In light of this evidence and findings of qualitative studies with bereaved parents (Chen et al., 2015) we advocate in the Framework that all suppression options be fully presented to parents, along with coherent instructions and indicators for their use and efficacy, and referral to appropriate health professionals for further information or prescription.

We would also caution against brief ambiguous statements that can sometimes accompany information endorsing gentle suppression. Specificity in how to gently suppress milk supply, without making more milk, (see for example: PATH, 2019, p. 16.) is likely to be required by parents who may have little lactation experience and may not know how to confidently express for the purpose of suppression (Welborn, 2012a). In addition, parents should

always be presented with information about what they may like to do with human milk produced as a result of suppression techniques. It should not be assumed that parents who want to suppress as quickly as possible will not want to keep or donate their milk (Welborn, 2012a).

Category E: Description of Sustained Expression Option

There is currently very limited attention given to sustained expression after infant death in the extant literature directed to health professionals and bereaved parents (Sweeney et al., 2020). Lactation management options, including deliberately sustaining lactation for a period of time after infant death, can assist the transition to bereaved parenthood (Carroll & Lenne, 2019; Oreg, 2019; Welborn, 2012a). To enact this strategy, lactating parents will need guidance on how to express their milk. Academy of Breastfeeding Medicine Clinical Protocols prescribe that every mother receive instruction on the technique of expressing milk by hand and, if necessary, on how to use a breast pump in order to alleviate engorgement, increase or maintain milk supply, and obtain milk (Evans et al., 2014; Hernández-Aguilar et al., 2018). Bereaved parents may be forgotten as a category of people who may require this information. Bereaved parents would particularly benefit from tailored information that provides sufficient instruction on “how to express” that does not presume the presence of a living infant.

Category F: Description of Milk Donation Option

Milk donation is recognized as a viable option requiring better integration into the range of options presented to bereaved parents (Britz & Henry, 2013; Carroll, Lenne, McEgan et al., 2014; Spatz, 2016). Donation is facilitated if human milk banks provide services that can address the unique circumstances of bereaved parents (Carroll, Lenne, McEgan et al., 2014). Bereaved donors are currently excluded from donor profiles advertised on Australian milk banks’ online information (Sweeney et al., 2020). However, international resources, including PATH (2019) and Welborn (2012b), offer comprehensive guidance on how to present the option of donation to bereaved parents.

Whilst bereaved donation to human milk banks receives cursory attention in current discourse (Carroll, Lenne, McEgan et al., 2014; Oreg, 2019), informal milk sharing receives even less. Many health organizations appear reticent to acknowledge or present information on informal milk sharing that is often cast as a risky undertaking (Akre et al., 2011; Reyes-Foster & Carter, 2018). Whilst donation to a human milk bank is considered to be the safest method of milk donation, some parents are interested in exploring the possibility of donating or sharing their

human milk with known friends or family or through the use of internet and social networking sites (Akre et al., 2011; Cole, 2012).

Category G: Recognition That Additional Bereavement and/or Lactation Support May be Necessary

Although OHI has been lauded as empowering health consumers (Cotten, 2001; Lederman et al., 2014) there are potential dangers in relying too heavily on OHI (El Sherif et al., 2018; Iacovetto & Allen, 2015). Being mindful of this, and of the significant physiological and emotional challenges that lactation after infant death presents to parents (Chen et al., 2015; Cole, 2012), it was vital that information in our Framework advised that parents be offered information which enables them to seek out additional specialist lactation or bereavement support.

Discussion

The Lactation AID Framework for Online Health Information (Table 1) was developed as an analytical tool to review the breadth and quality of Australia's health organizations' online content on the topic of lactation after stillbirth and infant death. It offers an evidenced-based set of 25 information criteria cohered into seven categories (see Table 2) that guide the provision of much needed OHI to assist bereaved parents with lactation care, management, and decision making. In developing the Framework, researchers have considered and addressed some of the gaps and inconsistencies evident in the extant literature, and have offered guidance on how health organizations can, through the use of OHI, work towards redefining dominant discourses (Sweeney et al., 2020). Above all, our aim for the Framework is to promote an evidenced-based, transparent, and sensitive approach to OHI and support, ensuring that bereaved families are presented with comprehensive information that enables them to make informed choices about the full spectrum of lactation management options.

Health organizations aiming to provide this online content will need to be cognizant of additional design elements and language that may influence how users interpret or engage with online information. Given the sensitive nature of the topic the language and images used must adopt a tone of sensitivity and non-judgement (Beaunoyer et al., 2017; Flenady, King et al., 2009). Whilst our Framework deals solely with the subject of lactation after infant death, health organizations should also be mindful that people may experience lactation after loss as a result of varied circumstances including abortion, child protection removal, surrogacy, or adoption (Cole, 2012). People in these circumstances may also be searching for information about lactation management, but some of their choices

around suppression, expression, or donation may be constrained due to circumstances out of their control (Sweeney et al., 2020). Other equity issues, including the current lack of availability of human milk banks, must also be considered to ensure people are informed of the limitations of particular options applicable to their unique contexts and circumstances.

Public health guidance materials, including the Lactation AID Framework, are often limited by the extant body of evidence available on particular health problems, practices, or interventions (Payne et al., 2011), and the marginal input provided by the patients or service users (Selva et al., 2017). Despite drawing on international resources and research, the Lactation AID Framework was developed at a time when scholars have only recently recognized and begun to address the sensitive and somewhat vexed issue of lactation after infant death (Oreg, 2019). To date, there has been little research conducted on the issue. This Framework, developed within Australia, has been informed by predominantly Anglophone and western cultural resources and research, and thus exhibits a cultural bias in the fields of parenthood, lactation and milk donation, grief, and bereavement. In addition, there is a lack of evidence elicited directly from key potential users of the Framework (including health organizations and bereaved families) to help us understand what is required to best meet their needs and when, how, and by whom this information is best presented. The Framework necessarily needs adapting by stakeholders to suit local policy and custom and to reflect the diverse lactation, milk donation, and bereavement services and practices across the world.

In line with best practice standards that guide the development of health guidelines and OHI (Moult et al., 2004; Schünemann et al., 2014) further scholarly debate and discussion of the Lactation AID Framework is welcomed, particularly from outside western and Anglophone cultural practice. This will allow the Framework to be strengthened as the evidence base for lactation after infant death is advanced over time. Until this body of evidence is developed, the current Lactation AID Framework offers a useful and evidence-based guide for health organizations interested in providing OHI that meets the needs of bereaved parents.

Conclusion

Improving the quality of written information available to parents in anticipation of, and/or subsequent to, infant death is imperative (Carroll & Lenne, 2019). The Lactation AID Framework contributes to pursuing this goal by designating 25 OHI criteria to assist health organizations in providing comprehensive information to bereaved families so they can better understand and manage lactation and optimize their health and wellbeing. It is our sincere hope that this paper provokes further scholarly contributions from the international lactation and bereavement field, and

that relevant health organizations will give due consideration to the guidance provided by the Lactation AID Framework.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research is funded by an Australian Research Council Discovery Project (DP180100517).

ORCID iD

Katherine Carroll, PhD  <https://orcid.org/0000-0002-9110-1354>

References

- Academy of Breastfeeding Medicine. (2019). *Protocols*. <https://www.bfmed.org/protocols>
- Akre, J. E., Gribble, K. D., & Minchin, M. (2011). Milk sharing: From private practice to public pursuit. *International Breastfeeding Journal*, 6(1), 8. doi:10.1186/1746-4358-6-8
- Amir, L. H., & The Academy of Breastfeeding Medicine Protocol Committee. (2014). ABM Clinical Protocol #4: Mastitis, Revised March 2014. *Breastfeeding Medicine*, 9(5), 239–243. doi:10.1089/bfm.2014.9984
- Australian Breastfeeding Association. (2019). *Principles*. <https://www.breastfeeding.asn.au/policy-area/principles>
- Bakhbakhi, D., Burden, C., Storey, C., & Siassakos, D. (2017). Care following stillbirth in high-resource settings: Latest evidence, guidelines, and best practice points. *Seminars in Fetal and Neonatal Medicine*, 22(3), 161–166. doi:10.1016/j.siny.2017.02.008
- Beaunoyer, E., Arsenault, M., Lomanowska, A. M., & Guitton, M. J. (2017). Understanding online health information: Evaluation, tools, and strategies. *Patient Education and Counseling*, 100(2), 183–189. doi:10.1016/j.pec.2016.08.028
- Berens, P., & Brodribb, W. (2016). ABM Clinical Protocol #20: Engorgement, Revised 2016. *Breastfeeding Medicine*, 11(4), 159–163. doi:10.1089/bfm.2016.29008.pjb
- Britz, S. P., & Henry, L. (2013). Supporting the lactation needs of mothers facing perinatal and neonatal loss. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 42(Suppl. 1), S105–S106. doi:10.1111/1552-6909.12207
- Cacciatore, J., DeFrain, J., & Jones, K. L. C. (2008). When a baby dies: Ambiguity and stillbirth. *Marriage & Family Review*, 44(4), 439–454. doi:10.1080/01494920802454017
- Carroll, K., & Lenne, B. (2019). Suppress and express: Breastmilk donation after neonatal death. In C. Beyer & A. Robertson (Eds.), *Mothers without their children* (pp. 229–244). Demeter Press.
- Carroll, K. E., Lenne, B. S., McEgan, K., Opie, G., Amir, L. H., Bredemeyer, S., Hartmann, B., Jones, R., Koorts, P., McConachy, H., Mumford, P., & Polverino, J. (2014). Breast milk donation after neonatal death in Australia: A report. *International Breastfeeding Journal*, 9(23), 1–9. doi:10.1186/s13006-014-0023-4
- Chen, F. -H., Chen, S. -L., & Hu, W. -Y. (2015). Taiwanese women's experiences of lactation suppression after stillbirth. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 44(4), 510–517. doi:10.1111/1552-6909.12724
- Cole, M. (2012). Lactation after perinatal, neonatal, or infant loss. *Clinical Lactation*, 3(3), 94–100. doi:10.1891/215805312807022897
- Cotten, S. R. (2001). Implications of internet technology for medical sociology in the new millennium. *Sociological Spectrum*, 21(3), 319–340. doi:10.1080/027321701300202019
- El Sherif, R., Pluye, P., Thoér, C., & Rodriguez, C. (2018). Reducing negative outcomes of online consumer health information: Qualitative interpretive study with clinicians, librarians, and consumers. *Journal of Medical Internet Research*, 20(5), e169. doi:10.2196/jmir.9326
- Ellis, A., Chebsey, C., Storey, C., Bradley, S., Jackson, S., Flenady, V., Heazell, A., & Siassakos, D. (2016). Systematic review to understand and improve care after stillbirth: a review of parents' and healthcare professionals' experiences. *BMC Pregnancy and Childbirth*, 16(1). doi:10.1186/s12884-016-0806-2
- Evans, A., Marinelli, K. A., Taylor, J. S., & Academy of Breastfeeding Medicine. (2014). ABM Clinical Protocol #2: Guidelines for hospital discharge of the breastfeeding term newborn and mother: "The going home protocol" Revised 2014. *Breastfeeding Medicine*, 9(1), 3–8. doi:10.1089/bfm.2014.9996
- Flenady, V., King, J., Charles, A., Gardener, G., Ellwood, D., Day, K., & for the Perinatal Society of Australian and New Zealand (PSANZ) Perinatal Mortality Group. (2009). PSANZ Clinical Practice Guideline for Perinatal Mortality. (Version 2.2).
- Flenady, V., Oats, J., Gardener, G., Masson, V., McCowan, L., Kent, A., & for the PSANZ Care around the time of stillbirth and neonatal death guidelines group. (2018). *Clinical practice guideline for care around stillbirth and neonatal death*. NHMRC Centre of Research Excellence in Stillbirth.
- Fry, J. T., & Henner, N. (2016). Neonatal death in the emergency department: When end-of-life care is needed at the beginning of life. *Clinical Pediatric Emergency Medicine*, 17(2), 147–155. doi:10.1016/j.cpem.2016.04.001
- Gleeson, D. M., Craswell, A., & Jones, C. M. (2018). Women's use of social networking sites related to childbearing: An integrative review. *Women and Birth*, 32(4), 294–302. doi:10.1016/j.wombi.2018.10.010
- Hernández-Aguilar, M. -T., Bartick, M., Schreck, P., Harrel, C., & Academy of Breastfeeding Medicine. (2018). ABM clinical protocol #7: Model maternity policy supportive of breastfeeding. *Breastfeeding Medicine*, 13(9), 559–574. doi:10.1089/bfm.2018.29110.mha
- Iacovetto, M. C., & Allen, L. A. (2015). Transitioning into a digital world: Time for providers to recommend internet health

- information? *American Heart Journal*, 170(1), 1–2. doi:10.1016/j.ahj.2015.04.002
- Lariviere-Bastien, D., deMontigny, F., & Verdon, C. (2019). Women's experience of miscarriage in the emergency department. *Journal of Emergency Nursing*, 1–7.
- Layne, L. (2003). *Motherhood lost: A feminist account of pregnancy loss in America*. Routledge.
- Lederman, R., Fan, H., Smith, S., & Chang, S. (2014). Who can you trust? Credibility assessment in online health forums. *Health Policy and Technology*, 3(1), 13–25. doi:10.1016/j.hplt.2013.11.003
- Marcellin, L., & Chantry, A. A. (2015). Breast-feeding part II: Lactation inhibition - Guidelines for clinical practice. *Journal of Gynecology Obstetrics and Human Reproduction*, 44, 1080–1083.
- McGuinness, D., Coughlan, B., & Butler, M. (2014). An exploration of the experiences of mothers as they suppress lactation following late miscarriage, stillbirth or neonatal death. *Evidence Based Midwifery*, 12(2), 65–70.
- Moore, D. B., & Catlin, A. (2003). Lactation suppression: Forgotten aspect of care for the mother of a dying child. *Pediatric Nursing*, 29(5), 383–384.
- Morgan, R. L., Florez, I., Falavigna, M., Kowalski, S., Akl, E. A., Thayer, K. A., Rooney, A., & Schünemann, H. J. (2018). Development of rapid guidelines: 3. GIN-McMaster Guideline development checklist extension for rapid recommendations. *Health Research Policy and Systems*, 16(1), 1–12. doi:10.1186/s12961-018-0330-0
- Moult, B., Franck, L. S., & Brady, H. (2004). Ensuring quality information for patients: Development and preliminary validation of a new instrument to improve the quality of written health care information. *Health Expectations*, 7(2), 165–175. doi:10.1111/j.1369-7625.2004.00273.x
- National Institute for Health and Care Excellence. (2018). *Donor milk banks: Service operation*. Clinical guideline. Published: 24 February 2010. nice.org.uk/guidance/eg93
- National Institute for Health and Care Excellence. (2019). *End of life care for infants, children and young people*. Quality standard. Published: 12 September 2017. www.nice.org.uk/guidance/qs160
- National bereavement care pathway for pregnancy and baby loss. (2018a). *Miscarriage, ectopic pregnancy and molar pregnancy bereavement care pathway*. National Bereavement Care Pathway.
- National bereavement care pathway for pregnancy and baby loss. (2018b). *Neonatal death bereavement care pathway*. National Bereavement Care Pathway.
- National bereavement care pathway for pregnancy and baby loss. (2018c). *Stillbirth bereavement care pathway*. National Bereavement Care Pathway.
- National bereavement care pathway for pregnancy and baby loss. (2018d). *Sudden Unexpected Death in Infancy (SUDI) up to 12 months bereavement care pathway*. National Bereavement Care Pathway.
- National bereavement care pathway for pregnancy and baby loss. (2018e). *Termination of pregnancy due to fetal anomaly (TOPFA) bereavement care pathway*. National Bereavement Care Pathway.
- Oladapo, O. T., & Fawole, B. (2012). Treatments for suppression of lactation. Cochrane Database of Systematic Reviews 9 (Art. No.: CD005937).
- Oreg, A. (2019). Milk donation after losing one's baby: Adopting a donor identity as a means of coping with loss. *Social Science & Medicine*, 238, 1–8. doi:10.1016/j.socscimed.2019.112519
- PATH. (2019). *Strengthening human milk banking: A resource toolkit for establishing and integrating human milk banks—A counselling guide for engaging bereaved mothers*. PATH.
- Payne, N., Goyder, E., Chilcott, J., Sidwell, A., Ram, V., Buckley-Woods, H., Guillaume, L., & Paisley, S. (2011). "Surely there must be more evidence . . . !" Reviewing literature to support the development of evidence-based public health guidance by the National Institute for Health and Clinical Effectiveness. *Journal of Epidemiology and Community Health*, 65(Suppl 2), A3–A4. doi:10.1136/jech.2011.143586.7
- Redshaw, M., Rowe, R., & Henderson, J. (2014). *Listening to parents after stillbirth or the death of their baby after birth*. National Perinatal Epidemiology Unit.
- Reyes-Foster, B. M., & Carter, S. (2018). Suspect bodies, suspect milk: Milk sharing, wetnursing, and the specter of syphilis in the twenty-first century. In K. Nixon & L. Servitje (Eds.), *Syphilis and Subjectivity: From the Victorians to the Present* (pp. 91–112). Palgrave Macmillan.
- Royal College of Obstetricians & Gynaecologists. (2010). Late Intrauterine Fetal Death and Stillbirth: Green-top Guideline No.55. Royal College of Obstetricians & Gynaecologists..
- Schünemann, H. J., Wiercioch, W., Etxeandia, I., Falavigna, M., Santesso, N., Mustafa, R., Ventresca, M., Brignardello-Petersen, R., Laisaar, K.-T., Kowalski, S., Baldeh, T., Zhang, Y., Raid, U., Neumann, I., Norris, S. L., Thornton, J., Harbour, R., Treweek, S., Guyatt, G., . . . Akl, E. A. (2014). Guidelines 2.0: Systematic development of a comprehensive checklist for a successful guideline enterprise. *Canadian Medical Association Journal*, 186(3), E123–E142. doi:10.1503/cmaj.131237
- Selva, A., Sanabria, A. J., Pequeño, S., Zhang, Y., Solà, I., Pardo-Hernandez, H., Selva, C., Schünemann, H., & Alonso-Coello, P. (2017). Incorporating patients' views in guideline development: A systematic review of guidance documents. *Journal of Clinical Epidemiology*, 88, 102–112. doi:10.1016/j.jclinepi.2017.05.018
- Spatz, D. L. (2016). Breastfeeding in the context of palliative care. *MCN, The American Journal of Maternal/Child Nursing*, 41(6), 374. doi:10.1097/NMC.0000000000000288
- Stillbirth, S., & Charity, N. D. (2016). *Pregnancy loss and the death of a baby: Guidelines for professionals* (4th Edition). Tantamount on behalf of Sands, the stillbirth & neonatal death charity.
- Sweeney, L., Carroll, K., Noble-Carr, D., & Walby, C. (2020). Lactation after infant death: An analysis of Australian healthcare agencies' online health information. *Health Sociology Review*, 29(1), 45–61. doi:10.1080/14461242.2019.1708206

- Welborn, J. M. (2012a). The experience of expressing and donating breast milk following a perinatal loss. *Journal of Human Lactation*, 28(4), 506–510. doi:10.1177/0890334412455459
- Welborn, J. (2012b). *Lactation support for the bereaved mother: A toolkit—Information for healthcare providers*. Human Milkbanking Association of North America.
- World Health Organization. (2000). *Mastitis: Causes and management*. World Health Organization.
- World Health Organization. (2019). *Breastfeeding*. <https://www.who.int/topics/breastfeeding/en/>

International Perspectives Concerning Donor Milk Banking During the SARS-CoV-2 (COVID-19) Pandemic

Journal of Human Lactation
2020, Vol. 36(3) 492–497

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334420917661

journals.sagepub.com/home/jhl**Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP¹****Keywords**

breastfeeding, Coronavirus 2, donor milk, donor milk banking, European Milk Banking Association, Severe Acute Respiratory Syndrome Coronavirus-2, COVID-19, Human Milk Banking Association of North America

Background

On December 31, 2019 the first case of what is now known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was reported to the Chinese Center for Disease Control and Prevention. In late December 2019, in Wuhan, Hubei Province, China, clusters of patients with pneumonia of unknown cause, linked to a seafood and animal wholesale market there, began to surface. By January 3, 2020, 44 cases were reported in China. Chinese authorities isolated a novel coronavirus, on January 7, 2020, and shared its genetic sequence on January 12. It was identified in Thailand on January 13, Japan on January 15, and January 20 in Korea. Deaths were already being reported in China. The first case in the United States was reported on January 21, a U.S. citizen who had been in Wuhan. Human to human transmission was suggested by January 24, and by the 25th it had spread to Australia and France. By January 27 it was confirmed in 11 countries outside of China. On January 30, the World Health Organization (WHO) announced that the COVID-19 outbreak was a Public Health Emergency of International Concern. The first two cases were reported in Italy on January 31 (World Health Organization, 2020a). The spread continued, and on March 11 WHO characterized COVID-19 as a pandemic, acknowledging the disease's geographical spread. On March 16, the total number of cases and deaths outside China surpassed the totals in China. On March 24, 2020, the date of this writing, there are 395,647 confirmed cases and 17,240 deaths worldwide (Johns Hopkins University Medicine, 2020). These numbers will certainly be higher at publication.

The International Committee on Taxonomy of Viruses (ICTV) announced the name of this novel coronavirus as "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)" on February 11. This name was chosen because the virus is genetically related, but different, to the coronavirus responsible for the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 (World Health Organization, 2020b).

WHO shortened the name coronavirus disease 2019 to "COVID-19."

In addition to the concerns for the general public, there are heightened concerns for the more at risk populations: the elderly, those with comorbidities, and the immunosuppressed. Another population of concern is pregnant women. The other two well-known coronaviruses, severe acute respiratory syndrome (SARS-CoV) and Middle East respiratory syndrome (MERS-CoV) have both been documented as causing severe maternal and perinatal complications during pregnancy (Alfaraj et al., 2019; Wong et al., 2004). At this point there are sparse reports of COVID-19 in pregnant women. Chen et al. (2020) reported nine cases, all in their third trimester, from Wuhan in January 2020. All nine women delivered liveborn healthy infants via cesarean deliveries, with no significant complications. Amniotic fluid, cord blood, neonatal throat swabs, and milk samples from six of the mothers were tested for SARS-CoV-2, and all samples tested negative for the virus. We will come back to this finding.

COVID-19 and Human Milk

Liu et al. (2020) identified 13 COVID-19 positive hospitalized pregnant women officially reported by the central government of China outside of Wuhan between December 8, 2019 and February 25, 2020. Three women improved and

¹Department of Pediatrics, University of Connecticut School of Medicine, Division of Neonatology, Connecticut Children's Medical Center, Hartford, CT, USA

Corresponding Author:

Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP, Department of Pediatrics, University of Connecticut School of Medicine, Division of Neonatology, Connecticut Children's Medical Center, Farmington, CT 06030-1912, USA.
Email: kathleen.marinelli@cox.net

were discharged with ongoing pregnancies. The other 10 underwent cesarean deliveries because of complications, including preterm labor and one stillbirth. One mother developed multiple organ dysfunction syndrome, including acute respiratory distress syndrome (ARDS), and required extracorporeal membrane oxygenation (ECMO). At the time of publication of that article she was still on ECMO. The other nine mothers and eight liveborn infants were discharged home well. "There was no clinical or serologic evidence suggestive of vertical transmission of SARS-CoV-2" (Liu et al., 2020). But there was also no mention of evaluating the mothers' milk.

What do we know about transmission of coronaviruses into human milk? During the SARS outbreak, a pregnant woman who contracted SARS-CoV in the second trimester and required mechanical ventilation ultimately recovered and delivered a healthy 38-week infant. At approximately 130 days after illness onset, antibodies to SARS-CoV were detected in maternal serum, cord blood, and milk with no evidence of virus (Robertson et al., 2004). As mentioned above, the finding of Chen et al. (2020) testing the milk from six postpartum women from China all were found negative for the SARS-CoV-2 virus. That is all that is currently known.

To understand effects on milk banking and donor milk, we also need to understand what is being reported about breastfeeding. Current recommendations in this pandemic from the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2020a) are given for mothers who give birth during the pandemic:

Infants born to mothers with confirmed COVID-19 should be considered "persons under investigation" (PUIs). As such, infants should be isolated....To reduce the risk of transmission of the virus that causes COVID-19 from the mother to the newborn, facilities should consider temporarily separating (e.g., separate rooms) the mother who has confirmed COVID-19 or is a PUI from her baby until the mother's transmission-based precautions are discontinued....The risks and benefits of temporary separation of the mother from her baby should be discussed with the mother by the healthcare team... During temporary separation, mothers who intend to breastfeed should be encouraged to express their breast milk to establish and maintain milk supply. If possible, a dedicated breast pump should be provided. Prior to expressing breast milk, mothers should practice hand hygiene. After each pumping session, all parts that come into contact with breast milk should be thoroughly washed and the entire pump should be appropriately disinfected per the manufacturer's instructions. This expressed breast milk should be fed to the newborn by a healthy caregiver. If a mother and newborn do room-in and the mother wishes to feed at the breast, she should put on a facemask and practice hand hygiene before each feeding (Centers for Disease Control and Prevention, 2020a).

More information can be found at Centers for Disease Control and Prevention (2020b)

WHO (2020c) and UNICEF agree, and differ from the CDC. UNICEF states:

Considering the benefits of breastfeeding and the insignificant role of breastmilk in the transmission of other respiratory viruses, the mother can continue breastfeeding, while applying all the necessary precautions. For symptomatic mothers well enough to breastfeed, this includes wearing a mask when near a child (including during feeding), washing hands before and after contact with the child (including feeding), and cleaning/disinfecting contaminated surfaces... (UNICEF, 2020).

WHO writes: "Infants born to mothers with suspected, probable or confirmed COVID-19 infection, should be fed according to standard infant feeding guidelines, while applying necessary precautions for IPC" [infection protection and control] (WHO, 2020c, p. 13). This is consistent with the *Global Strategy for Infant and Young Child Feeding* (WHO, 2003) in which all infants should initiate breastfeeding within one hour of birth, or if unable in that time frame, then be supported to do so as soon as able. In addition, they state:

symptomatic mothers who are breastfeeding or practicing skin-to-skin contact or kangaroo mother care should practice respiratory hygiene, including during feeding (for example, use of a medical mask when near a child if with respiratory symptoms), perform hand hygiene before and after contact with the child, and routinely clean and disinfect surfaces which the symptomatic mother has been in contact with (WHO, 2020c, p. 14).

Finally, concerning mothers who are too sick to directly breastfeed, "...mothers should be encouraged and supported to express milk, and safely provide breastmilk to the infant, while applying appropriate IPC measures (WHO, 2020c, p. 14).

COVID-19 and Donor Milk Banking

How has this pandemic affected donor milk banking? One could envision, with the increasing numbers of confirmed COVID-19 cases, despite the relatively fewer numbers and less severe clinical courses of children affected so far (Dong et al., 2020), that the demand for donor milk would be at least as high as levels present before the onset of the pandemic. Through personal communications with colleagues in China, Italy, and my own donor milk bank in the United States, I have attempted to document what is currently happening.

I have been communicating for the past several days over social media with Professor Xihong Liu, Director of Clinical Nutrition, Department of Guangzhou Women and Children Medical Center, an affiliate of Guangzhou Medical University,

Guangzhou, China. She founded the first donor milk bank in China. Partially in English and partially through a translator, (Virginia Chi Cheng Tam, IBCLC, *Macau Breastfeeding and Nurturing Promotion Association*, Macau, People's Republic of China) Professor Liu has told me that both the supply and the demand of donor milk in China has decreased significantly with this infection. The milk banking processes were already quite strict prior to COVID-19, especially donor screening. However, screening has become "more careful and rigorous". Prior to the outbreak, donors could express milk in their homes and deliver it to the hospitals (where milk banks are located). Technicians would also sometimes make milk pickups from donor homes. Both have now stopped. All milk is expressed in person. A donor's temperature is taken, and she is required to fill out a questionnaire, including questions about whether she has herself been to or been in contact with anyone who has been to an epidemic area in the past 14 days. Almost every donor is asked to come to the hospital to donate, and all milk from home is refused. In some places, collections are made at the gates to communities from healthy, non-exposed donors. The containers are always supplied by the milk banks. As Professor Liu told me via text messaging on WhatsApp:

COVID-19 is affecting the world, [and is] also affecting the whole medical activity including donor milk banking. First, people are trying not to go outside, so [there are] fewer patients in the hospital, fewer patients come to the hospital, and fewer donors come to donate their milk. Of course, the demand and supply has been greatly reduced. We will decrease quantity but not quality. In the People's Republic of China, milk banks only provide donor milk to hospitalized patients, not even for outpatient departments, let alone infants in society. The demand has also come down for milk, because less people venture to go to the hospitals. Even when people are sick, they stay away from the hospitals, assuming healthcare facilities are filled with COVID-19. Folks with other sicknesses do not stay in the hospitals as much during the outbreak, therefore both supply and demand of donor milk have decreased (Professor Xihong Liu, personal communication, March 17, 2020).

I have also been in contact with two colleagues in Italy, Dr. Enrico Bertino, Head of the Neonatal Unit of Turin University, City of Health and Science of Turin, Turin, Italy, and President of the *European Milk Bank Association* (EMBA), and Dr. Guido Moro, President of the *Italian Association of Human Milk Banks* (AIBLUD). When asked about the donor milk banking situation in Italy on March 16, they replied by email:

As you probably know, in Italy, we are forced to live in our houses without any possibility to go out (we are permitted to go out only for buying foods in supermarkets), and all the activities of our country are completely blocked. We do not know how long the health system and the economy of

our country will be able to tolerate this situation. At the moment we are the only country in Europe with such extreme measures, but [we are] sure that in a couple of weeks also the other European country will be in a similar situation. Concerning your request, we can only tell you that donation of human milk has decreased a lot in this period: people cannot go out to bring the milk to the Banks, and even if theoretically they can be justified for their action of social value, mothers in this period prefer to stay as far as possible from hospitals. The other alternative is home milk collections from the banks, but also this activity has been reduced drastically because all the efforts of the hospitals are devoted to take care of people infected by COVID-19. In Milan we have a special system of home milk collection, called *Human Milk Link*, that is serving the three Human Milk Banks of the city of Milan. It is performed by a nurse, specialized in lactation, who is driving the car, collecting the milk and giving breastfeeding advices to the mothers. This service has been stopped exactly one week ago, Monday, March 9, 2020. So, donation of human milk in Milan has been practically suspended. This is the only information we can give you related to the situation of human milk donation and human milk banks in Italy in this period (personal communication, March 16, 2020).

I asked if an infant is in NICU and the mother is a person under investigations (PUI) or COVID positive, are they handling her expressed milk any differently? Are they decontaminating the outside of the containers her milk is expressed into, after she expresses it, before it is stored in the NICU refrigerators or freezers? They responded:

Indications in our country for PUI or COVID positive mothers who are expressing their milk are: they should utilize sterile containers (so no need for any specific treatment), should put on a facemask and practice a very careful hand hygiene before each feeding or other close contact with her newborn. The facemask should remain in place during contact with the newborn. These practices should continue while the mother is on transmission-based precautions in a healthcare facility (personal communication, March 16, 2020).

They sent me the document *Breastfeeding and SARS-CoV-2 Infection (Coronavirus Disease 2019—COVID-19; see Supplemental materials)* written by components of the Ministry of Health, Italian Society of Neonatology, and Italian Association of Human Milk Banks (2020), under which Italy is currently operating. It includes a table describing various scenarios of a mother's health and an infant's status, with breastfeeding or use of expressed milk. They are making every effort to ensure that mothers who can breastfeed do so and, if they cannot, that their milk is given to their infants.

I am the volunteer Co-Medical Director of the *Mother's Milk Bank of the Western Great Lakes*, a Human Milk Banking

Association of North America (HMBANA) non-profit milk bank located in Elk Grove Village, Illinois, USA (<https://www.milkbankwgl.org/>). I spoke by telephone with our Executive Director, Summer Kelly, MS, RN, IBCLC on March 16, about the effects coronavirus is having on our milk bank. She reported that we have not seen any effects yet on supply or demand. There is heightened anxiety in donors who must interact with the healthcare system to have their screening bloods drawn, or when they interact to drop off their milk at the milk bank, and with healthcare providers and recipients concerning the provision of the donor milk, i.e. "is it safe?". We are currently engaged in educating mothers that we have no evidence of coronaviruses transmission through human milk, and that previous coronaviruses, although also not found in human milk, have been destroyed by pasteurization.

In complying with social distancing, this milk bank is sending staff home who can work from home. Should any staff develop COVID-19, we have put an emergency plan into place to stagger staffing between several groups—one group would work in the milk bank to pasteurize for 2 weeks; the milk bank would be deep cleaned, then rotate to another group. For emergency preparedness we have ordered extra supplies. As face masks are in short supply in the United States, and we do not wear them to protect ourselves but to protect the milk, one of our staff members is sewing masks that we can launder daily if we run out of disposables. If we cannot use our delivery services for the milk (United Parcel Service, FedEx), then we will deliver the milk ourselves. We cover two states and, from our milk bank, that is a 6-hour drive in each direction. We have increased production, so we have pasteurized milk as opposed to raw milk in our freezers should the donor supply dwindle. We are reaching out to our donors now to request more milk before the situation worsens here. We use milk depots throughout our catchment areas to which donor mothers can deliver their milk close to home, and from which it is shipped to us. Should these be closed due to government orders to enforce social distancing, as long as shipping options remain, we can still receive milk from donors. We use Styrofoam coolers and Techni Ice reusable dry ice packs, so we do not even need to have access to dry ice.

There have been official statements from milk banking organizations. EMBA issued its COVID-19 statement on February 25. It upholds the importance of donor milk, the fact that it is still unknown if SARS CoV-2 can be found in human milk, and, that if it is, it will likely be destroyed by pasteurization. They recommend adding questions to donor screening concerning risk of exposure, temporarily suspending recruitment of new donors and not accepting donations from current donors who may have been exposed, for 2 weeks. An established donor who develops symptoms should suspend donation and be tested. If the culture is positive for SARS CoV-2, donation should be interrupted until a negative culture is found. If the culture is negative for SARS CoV-2, donation can be continued (European Milk Banking Association, 2020).

HMBANA issued its guidance on March 6. It reiterated the similarities to SARS and MERS viruses, which have been shown to be completely inactivated by Holder pasteurization, the method used by all HMBANA milk banks, and that SARS was not found in any human milk. Donors are "screened regarding international travel as well as recent illness history including family members in the home. Mothers are deferred based on responses" (Human Milk Banking Association of North America, 2020). Amy Manning Vickers, MSN, RN, IBCLC, Executive Director of *Mothers' Milk Bank of North Texas*, Fort Worth, Texas, and President of the *Human Milk Banking Association of North America* wrote:

As we all are, I am very concerned about how this crisis will unfold and impact nonprofit milk banking. It is very complex. I expect to see the supply of raw milk decrease as donors choose not to leave their homes and are reluctant [to] go into facilities to be lab tested. In anticipation of supply issues, we (my milk bank) have reached out to our recipient hospitals and asked them to more carefully prioritize the use of DHM [donor human milk] to the most vulnerable. We are also asking them to help us in identifying potential donors. We are also putting systems in place to pick up milk from donors safely without contact and are asking our depot sites to help by offering curbside drop off. We have sent a call to action to our current donors letting them know that donations are declining and that they can make an even bigger difference right now (personal communication, March 16, 2020).

On March 16, HMBANA sent a letter to its Executive Directors (personal communication, Summer Kelly, March 16, 2020). In it, the Guidelines Committee recommended a 28-day donating deferral for COVID-19 positive mothers, based on the US Food and Drug Administration advice to blood banks (U.S. Food and Drug Administration, 2020). This is not a requirement at this time, but a recommendation.

Conclusion

Where are we today with donor milk banking, as I finish writing, but the pandemic is swelling around us, showing signs of slowing where it began in China, but still increasing in many places in the world? Donor milk banking is predicated always on the *protection, promotion and support of breastfeeding*. We believe this deadly virus is not transmitted through mother's milk. We do not know if there is vertical transmission or not. As of this writing we are beginning to hear reports that the youngest among us may be a high-risk group, as they are with other viruses. As this is a novel virus, we, as a community, have not previously been exposed to it. There may not be specific immune factors against it in human milk, yet. But, as we know, there are so many immune factors in, and immune functions of, human milk, that its provision to our youngest and very

vulnerable must continue to be of paramount importance. We know of one infected mother who had anti-SARS-1 antibody in her milk postpartum (Robertson et al., 2004). The ability to provide support and to protect our breastfeeding mothers becomes extremely difficult where the virus is rampant. With social distancing, how do we provide the care, support, and protection these mothers need? In my discussions with my colleagues in Italy and China I heard the angst in their voices as they lamented their inability to see mothers and babies and provide this most basic of supports. If we cannot support breastfeeding, how will we ensure a supply of donor milk? In populations with large areas under quarantine or “lockdown”, how are we to move “safe” milk from the donors to the milk banks? In the bigger picture, what does this mean for the health of our children, as we may in fact see breastfeeding rates, and the supply and use of donor milk, decrease during this very unstable and concerning of times.

Acknowledgements

I wish to thank Professor Xihong Liu, Ms. Virginia Chi Cheng Tam, Dr. Enrico Bertino, Dr. Guido Moro, Dr. Maria Enrico Bettinelli (Milan, Italy), Ms. Summer Kelly and Ms. Amy Manning Vickers for the time and effort they have given me, despite the insurmountable odds they all face in this pandemic, to inform this article. Thank you for all your hard work here, and with those you serve. Be safe.

Editor's Note

The SARS-CoV-2 (COVID-19) Pandemic is evolving rapidly, not only in its spread, but in the speed with which doctors and scientists around the world have identified and characterized the virus, are reporting clinical data, and are developing and testing antivirals and vaccines. The information available to the medical world and the public is updated daily, if not hourly, and recommendations are changing equally quickly. The information in this article will undoubtedly have evolved by the time it reaches publication, and the recommendations may change as well. Please keep up to date by referring to the websites listed within. And, above all, be safe.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr. Marinelli serves as the Co-Medical Director in an unpaid capacity for the *Mother's Milk Bank of the Western Great Lakes*, a member of the *Human Milk Banking Association of North America (HMBANA)*. She also belongs to *HMBANA* and to the *European Milk Banking Association*.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Supplemental Material

Supplemental material for this article is available online.

References

- Alfaraj, S. H., Al-Tawfiq, J. A., & Memish, Z. A. (2019). Middle East respiratory syndrome coronavirus (MERS-CoV) infection during pregnancy: Report of two cases & review of the literature. *Journal of Microbiology, Immunology and Infection*, 52(3), 501–503. doi: 10.1016/j.jmii.2018.04.005
- Centers for Disease Control and Prevention. (2020a). *Interim considerations for infection prevention and control of coronavirus Disease 2019 (COVID-19) in inpatient obstetric healthcare settings*. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html>
- Centers for Disease Control and Prevention. (2020b). *Coronavirus disease 2019 (COVID-19)*. Pregnancy & breastfeeding. Information about coronavirus disease 2019. <https://www.cdc.gov/coronavirus/2019-ncov/prepare/pregnancy-breastfeeding.html>
- Chen, H., Guo, J., Wang, C., Luo, F., Yu, X., Zhang, W., Li, J., Zhao, D., Xu, D., Gong, Q., Liao, J., Yang, H., Hou, W., & Zhang, Y. (2020). Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: A retrospective review of medical records. *Lancet*, 395(10226), 809–815. doi:10.1016/S0140-6736(20)30360-3
- Dong, Y., Mo, X., Hu, Y., Qi, X., Jiang, F., Jiang, Z., & Tong, S. (2020). Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. *Pediatrics*. Pre-publication release online March 16, 2020. doi:10.1542/peds.2020-0702
- European Milk Banking Association. (2020, February 25). *COVID-19: EMBA position statement*. <https://europeanmilkbanking.com/covid-19-emba-position-statement/>
- Human Milk Banking Association of North America. (2020, March 6). *Milk banking and COVID-19*. <https://www.hmbana.org/news/statement-on-coronavirus.html>
- Johns Hopkins University Medicine. (2020). *Coronavirus Resource Center*. <https://coronavirus.jhu.edu/>
- Liu, Y., Chen, H., Tang, K., & Guo, Y. (2020). Clinical manifestations and outcome of SARS-CoV-2 infection during pregnancy. *Journal of Infection*, Epub 2020 Mar 4. doi:10.1016/j.jinf.2020.02.028
- Ministry of Health, Italian Society of Neonatology, and Italian Association of Human Milk Banks. (2020, February 28). *Breastfeeding and SARS-CoV-2 infection (coronavirus disease 2019—COVID-19)*.
- Robertson, C. A., Lowther, S. A., Birch, T., Tan, C., Sorhage, F., Stockman, L., McDonald, C., Lingappa, J. R., & Bresnitz, E. (2004). SARS and pregnancy: A case report. *Emerging Infectious Diseases*, 10(2), 345–348. doi:10.3201/eid1002.030736
- UNICEF. (2020). *Coronavirus disease (COVID-19): What parents should know. How to protect yourself and your children*. <https://www.unicef.org/stories/novel-coronavirus-outbreak-what-parents-should-know>
- U.S. Food and Drug Administration. (2020, March 11). *Updated information for blood establishments regarding the novel coronavirus outbreak*. <https://www.fda.gov/vaccines-blood>

- biologics/safety-availability-biologics/updated-information-blood-establishments-regarding-novel-coronavirus-outbreak.
- Wong, S. F., Chow, K. M., Leung, T. N., Ng, W. F., Ng, T. K., Shek, C. C., Ng, P. C., Lam, P. W., Ho, L. C., To, W. W., Lai, S. T., Yan, W. W., & Tan, P. Y. (2004). Pregnancy and perinatal outcomes of women with severe acute respiratory syndrome. *American Journal of Obstetrics and Gynecology*, 191(1), 292–297. doi:10.1016/j.ajog.2003.11.019
- World Health Organization. (2003). Global strategy for infant and young child feeding. <https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf>
- World Health Organization. (2020a). *Coronavirus disease (COVID-2019) situation reports*. World Health Organization. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
- World Health Organization. (2020b). *Naming the coronavirus disease (COVID-19) and the virus that causes it*. World Health Organization. [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it)
- World Health Organization. (2020c, March 13). Clinicalmanagement of severe acute respiratory infection when novel coronavirus (nCoV)infection is suspected.Interim guidance V 1.2. [https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)

Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic

Journal of Human Lactation
2020, Vol. 36(3) 498–501

© The Author(s) 2020



Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0890334420919083
journals.sagepub.com/home/jhl



Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP¹  and Robert M Lawrence, MD, FABM, FAAP²

Keywords

breastfeeding, breast pump, COVID-19: Human Milk Banking Association of North America, disinfection, donor milk, donor milk banking, European Milk Banking Association, milk expression, neonatal intensive care unit, Severe Acute Respiratory Syndrome Coronavirus-2, surface contamination

Background

The first case of a novel coronavirus, now known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or COVID-19, was reported to the Chinese Center for Disease Control and Prevention on December 31, 2019. It rapidly spread outside of China and was declared a pandemic on March 11, 2020 by the World Health Organization (WHO). The speed with which reports are now appearing in the literature is astounding. Most are clinical, many coming from China where there is the longest experience. We continue to see no evidence of vertical transmission. On March 31, 2020, the date of this last writing, there are 808,313 confirmed cases and 39,013 deaths worldwide (Johns Hopkins University Medicine, 2020). These numbers rise daily and will certainly be higher at publication.

Breastfeeding and COVID-19

There have been no further reports at this time looking for COVID-19 in human milk. The first and only report, thus far, of six milk samples from infected mothers in China were all negative (Chen et al., 2020). The World Health Organization (2020a) made its guidance on infection prevention and control, breastfeeding, and the coronavirus available in a much larger interim clinical guidance. Standing behind what is well known about the transfer of antibodies and other anti-infective factors through human milk they state: “Infants born to mothers with suspected, probable or confirmed COVID-19 infection, should be fed according to standard infant feeding guidelines, while applying necessary precautions for IPC [infection protection and control]” (World Health Organization, 2020a, p. 13). This recommendation is consistent with the *Global Strategy for Infant and Young*

Child Feeding (World Health Organization, 2003) in which all infants should initiate breastfeeding within 1 hr of birth, or, if unable in that time frame, then be supported to do so as soon as able. In addition, they state:

As with all confirmed or suspected COVID-19 cases, symptomatic mothers who are breastfeeding or practicing skin-to-skin contact or kangaroo mother care should practice respiratory hygiene, including during feeding (for example, use of a medical mask when near a child if with respiratory symptoms), perform hand hygiene before and after contact with the child, and routinely clean and disinfect surfaces which the symptomatic mother has been in contact with. (World Health Organization, 2020a, p. 14)

Of note here, mothers with COVID-19 are encouraged to practice skin-to-skin or kangaroo mother care, both of which help to increase human milk, and to breastfeed their infants. The World Health Organization (2020a) also tells us to disinfect surfaces the mother “has been in contact with.” Finally, concerning mothers who are too sick to directly breastfeed,

¹Department of Pediatrics, University of Connecticut School of Medicine, Division of Neonatology, Connecticut Children’s Medical Center, CT, USA

²Adjunct Clinical Professor of Pediatric Infectious Disease, University of Florida College of Medicine, Gainesville, FL, USA

Date submitted: March 23, 2020; Date accepted: March 25, 2020.

Corresponding Author:

Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP, Department of Pediatrics, University of Connecticut School of Medicine, Division of Neonatology, Connecticut Children’s Medical Center, Hartford, CT 06106, USA.
Email: kathleen.marinelli@cox.net

Key Messages

- With no evidence of virus in human milk, no guidance has been published concerning the disinfection of the outer surfaces of containers of expressed milk during the COVID-19 pandemic.
- COVID-19 virus contaminates surfaces from respiratory droplet spread, persisting on some including plastic. Those expressing milk need to wear respiratory masks and practice effective pre-expression hand washing. Containers must be disinfected after milk expression with viricidal agents or appropriate bleach solutions before storage in milk banks, hospital wards, day care centers, or similar locations.

“...mothers should be encouraged and supported to express milk, and safely provide breastmilk to the infant, while applying appropriate IPC measures (World Health Organization, 2020a, p. 14).

SARS-CoV-2 and Contaminated Surfaces

We do not know what the viral contamination load of SARS-CoV-2 looks like on the containers that mothers use when expressing milk using a pump or with their hands, and how that may vary between someone who is positive but asymptomatic, ill, or severely ill, or even when using the recommended preventive measures, a mask, and appropriate pre-expression hand washing practices. A recent paper reviewed the available data about the persistence of all known coronaviruses, including emerging SARS-CoV and Middle East Respiratory Syndrome (MERS-CoV), as well as veterinary coronaviruses on inanimate surfaces and the efficacy of various disinfectants. Volume of inoculation, material inoculated, temperature, and humidity all affect the viral lifespan. Ranges up to 9 days were seen, with higher ambient temperatures (above 30°C) decreasing viability. Glass contamination appeared in the range of 4–5 days,

while plastics were from 48 hr to 9 days (Kampf et al., 2020). van Doremalen et al. (2020) evaluated the stability of SARS-CoV-2 and SARS-CoV-1 in aerosols and on various surfaces. They found “SARS-CoV-2 was more stable on plastic and stainless steel than on copper and cardboard, and viable virus was detected up to 72 hr after application to these surfaces; although, the virus titer was greatly reduced” (van Doremalen et al., 2020). In another report from China, researchers took samples of multiple surfaces from the hospital rooms of symptomatic patients being treated for SARS-CoV-2. Many surfaces were positive in the room of the patient tested prior to disinfection. No surfaces were positive in the rooms of the two patients after disinfection (Ong et al., 2020). These reports tell us that this virus is present on objects in the environment of infected individuals, and it lasts for a while. A number of biocidal agents have been shown to inactivate coronavirus. The WHO recommends “that cleaning and disinfection procedures are followed consistently and correctly. Cleaning environmental surfaces with water and detergent and applying commonly used hospital disinfectants (such as sodium hypochlorite) is effective and sufficient” (WHO, 2020b, March 19, p. 3).

Handling of Containers of Expressed Human Milk During the SARS-CoV-2 Pandemic

Mothers express their own milk for many reasons. They express into a variety of containers, usually plastic, sometimes glass, for their own babies who are being cared for by others (e.g., daycare), to store for later, when they are ill and need others to feed their babies, and to donate to milk banks. In the midst of this SARS-CoV-2 pandemic, we cannot be certain who is currently infected if they have not been tested, and we have increasing numbers of pregnant and postpartum women, globally, presenting with symptoms and/or testing positive. As this virus is spread by respiratory droplets, and coronaviruses have been shown to survive for varying lengths of time on inanimate

Table 1. Recommendations for Handling Containers of Human Milk After Milk is Expressed.

Recommendations

- Receive containers from mothers or boxes of donor milk with gloved hands
- Wipe down the outside surface of the individual milk containers with disinfectant
 - suggest viricidal agents already in place at hospitals, donor milk banks, etc.
 - alternatively use “high level disinfection” of 0.5% solution, a dilution of 1:10 diluted bleach (sodium hypochlorite [NaOCl])
- Set wiped containers in a rack or on a tray to dry (wet to dry ensures time for viricidal effect) before storing in refrigerators or freezers
- For hospital wards and neonatal intensive care units, separate bins for each infant in the same refrigerator are fine once the containers have been wiped down
- Resume usual protocol

Note. Adapted from Centers for Disease Control and Prevention (2020); Kampf et al. (2020); Ong et al. (2020); van Doremalen et al. (2020); and.

Table 2. Preparing Disinfecting Bleach (Sodium Hypochlorite) Solution for External Plastic or Glass Container Surfaces.

Dilution of Bleach	% Bleach Solution ^a	Amount of Bleach ^c		Amount of Water ^c		Infectivity Reduction ^b (\log_{10})	Exposure Time
		English Measure	Metric Measure	English Measure	Metric Measure		
1:10	0.5%	1 cup (8 oz)	250 ml	9 cups (72 oz)	2250 ml	> 3.0	1 min
1:50	0.1%	1/3 cup (2.5 oz) (5 tbs)	100 ml	1 gallon (16 cups) (128 oz)	4900 ml	> 3.0	1 min
1:50	0.1%	4 tsp	20 ml	1 quart	980 ml	> 3.0	1 min

Note. Exposure time is defined as the time the bleach is in contact with the surface. In this case it equals drying time. We recommend high level disinfection of 0.5% solution, 1:10 dilution for disinfection of plastic and glass containers of human milk.

^aPercentage of Sodium Hypochlorite solution used for inactivation of coronaviruses in carrier tests (Kampf et al., 2020, p. 249).

^bMost common percentage concentration of sodium hypochlorite in household or commercial bleach products (5.25%–6.15%). Greater or equal to 1:10 dilution of sodium hypochlorite is a high-level disinfection product and a 1:50 dilution is an intermediate-level disinfectant per the Centers for Disease Control and Prevention for *Clean & Disinfect Interim Recommendations for US Households with Suspected/Confirmed Coronavirus Disease 2019 General Recommendations for Cleaning and Disinfection of Households with People Isolated in Home Care* (e.g. Suspected/Confirmed to have COVID-19; <https://www.cdc.gov/coronavirus/2019-ncov/prepare/cleaning-disinfection.html>).

^cMiddlesex London Health Unit Mixing of Chlorine (Bleach) Solution for Disinfecting (<http://www.healthunit.com/uploads/mixing-of-bleach.pdf>).

surfaces, it is now incumbent upon us all to ensure that we are not spreading the virus inadvertently when we transfer containers of precious mothers' milk from mothers to other locations, whether for feeding to that mother's own baby or for donation to a milk bank. We remind all to follow the World Health Organization (2020a, p. 14) recommendations for mothers who are expressing their milk, and to follow hand washing guidelines before and after expressing milk. Milk must be expressed into clean containers and, as recommended by the Centers for Disease Control and Prevention, "After each pumping session, all [pump] parts that come into contact with breast milk should be thoroughly washed and the entire pump should be appropriately disinfected per the manufacturer's instructions" (Centers for Disease Control and Prevention, 2020).

With this in mind, and in keeping with the previously mentioned recommendations for disinfecting surfaces in this pandemic, we are calling for all to clean and disinfect the outside of containers of mothers' milk (Table 1). We suggest the containers should be received from mothers themselves or, when opening boxes of donor milk, by others wearing gloves who then wipe down the outside surface of the individual milk containers with disinfectant before doing anything else with them. There are many virucides commercially available. For those who are hospital-based, we suggest using what your hospital uses already. Otherwise, the least expensive is diluted bleach (sodium hypochlorite [NaOCl]). We recommend the "high level disinfection" of 0.5% solution, a dilution of 1:10 (approximately 5000 ppm) for use in this context (Table 2). Wipe down the outside of the containers coming in—set them in a rack or on a tray to dry (wet to dry ensures time for viricidal effect) before storing in refrigerators or freezers. For hospital wards and neonatal intensive care units, separate bins for each infant in the same refrigerator are

fine once the containers have been wiped down. Then, in hospitals, milk banks or daycares, it is back to usual protocol. While these mothers are hospitalized around the birth, or if they are being treated for COVID-19, if at all possible they should have individual breast pumps for their personal use, which should be completely disinfected before being used by another mother after the index mother is discharged.

Both the European Milk Banking Association (2020, February 25) and the Human Milk Banking Association of North America (HMBANA; 2020) are deferring current donors who report possible exposure during screening, have symptoms, or test positive for the SARS-CoV-2 virus. Neither organization in their recent statements has addressed handling of the containers themselves. We urge them and other milk banks globally to adopt this procedure of disinfecting the outside of all containers of donor milk received because, although a thorough job of screening is being done, we do not know who is shedding with no symptoms at the time of donation and no known history of exposure. We reiterate there is no concern about the milk itself. Coronavirus has not been shown, to this point, to be found in human milk, and this virus is destroyed by the Holder pasteurization employed in donor milk processing (Human Milk Banking Association of North America, 2020).

Conclusions

The SARS-CoV-2 pandemic is continuing to spread. At this point we have not seen evidence of vertical transmission of the virus, or transmission in human milk. However, surface contamination is a real threat. Mothers, including ill mothers, are strongly encouraged, and should be supported, to breastfeed their newborns and

babies exclusively through 6 months of life, and then to continue with culturally appropriate complementary foods through 2 years of life and longer, especially during this time when protection from all infections is critical. Those mothers who need to express milk into containers, either for their own babies or for donation to milk banks, should be helped to do so, with mothers wearing respiratory masks and employing good hand washing practices before and after expression. We present the rationale for then disinfecting these containers with viricidal agents either already used in hospitals or made from common sodium hypochlorite to protect from spreading the virus from the surface of these containers. We call on hospitals, milk banks, and milk bank associations to adopt this policy throughout this pandemic, or until there is evidence that there is no need for concern.

Editor's Note

The SARS-CoV-2 (COVID-19) pandemic is evolving rapidly, not only in its spread, but in the speed at which doctors and scientists around the world have identified and characterized the virus, are reporting clinical data, and are developing and testing antivirals and vaccines. The information available to the medical world and the public is updated daily, if not hourly, and recommendations are changing equally quickly. The information in this article will undoubtedly have evolved by the time it reaches publication, and the recommendations may change as well. Please keep up to date by referring to the websites listed within. And, above all, be safe.

Declaration of Conflicting Interests

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Dr. Marinelli serves as the Co-Medical Director in an unpaid capacity for the Mother's Milk Bank of the Western Great Lakes, a member of the Human Milk Banking Association of North America (HMBANA). She also belongs to HMBANA and to the European Milk Banking Association.

Dr. Lawrence is an Adjunct Clinical Professor of Pediatric Infectious Disease at the University of Florida. He is co-editor of *Breastfeeding: A Guide for the Medical Profession* (Lawrence, R. A. and Lawrence, R. M. Elsevier Publishing, Philadelphia, PA, 2016).

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Kathleen A. Marinelli, MD, IBCLC, FABM, FAAP  <https://orcid.org/0000-0001-9342-6833>

References

- Centers for Disease Control and Prevention. (2020). Interim considerations for infection prevention and control of coronavirus disease 2019 (COVID-19) in inpatient obstetric healthcare settings. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html>
- Chen, H., Guo, J., Wang, C., Luo, F., Yu, X., Zhang, W., Li, J., Zhao, D., Xu, D., Gong, Q., Liao, J., Yang, H., Hou, W., & Zhang, Y. (2020). Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: A retrospective review of medical records. *Lancet*, 395(10226), 809–815. doi:10.1016/S0140-6736(20)30360-3
- European Milk Banking Association. (2020, February 25). COVID-19: EMBA Position Statement. <https://europeanmilkbanking.com/covid-19-emba-position-statement/>
- Human Milk Banking Association of North America. (2020, March 6). Milk banking and COVID-19. <https://www.hmbana.org/news/statement-on-coronavirus.html>
- Johns Hopkins University Medicine. (2020). Coronavirus Resource Center. <https://coronavirus.jhu.edu/>
- Kampf, G., Todt, D., Pfaender, S., & Steinmann, E. (2020). Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*, 104(3), 246–251. doi:10.1016/j.jhin.2020.01.022
- Ong, S. W. X., Tan, Y. K., Chia, P. Y., Lee, T. H., Ng, O. T., Wong, M. S. Y., & Marimuthu, K. (2020). Air, surface environmental, and personal protective equipment contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) from a symptomatic patient. *Journal of the American Medical Association*, <https://doi.org/10.1001/jama.2020.3227>. [Epub ahead of print].
- van Doremalen, N., Bushmaker, T., Morris, D. H., Holbrook, M. G., Gamble, A., Williamson, B. N., Tamin, A., Harcourt, J. L., Thornburg, N. J., Gerber, S. I., Lloyd-Smith, J. O., de Wit, E., & Munster, V. J. (2020). Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *New England Journal of Medicine*, Mar 17. <https://doi.org/10.1056/NEJMCo2004973>. [Epub ahead of print].
- World Health Organization. (2003). *Global strategy for infant and young child feeding*. <https://apps.who.int/iris/bitstream/handle/10665/42590/9241562218.pdf>
- World Health Organization. (2020a, March 13). *Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected*. Interim guidance V 1.2. [https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)
- World Health Organization. (2020b, March 19). Infection prevention and control during health care when COVID-19 is suspected: Interim guidance. <https://apps.who.int/iris/handle/10665/331495>

Editor's Note

The *Journal* has received several concerns that the bleach solution of 5000 ppm referenced in the table on the bottom of page 2 of this article is not safe for use with bottles containing human milk intended for infant consumption and is currently working with the authors to respond to these concerns, including by citing the current CDC recommendations regarding safe use of bleach. The *Journal* will publish the letters outlining the concerns as well as a fuller response to the letters to the editor by the authors, which further details their evidence-based rationales by April 24, 2020. Readers

Journal of Human Lactation
2020, Vol. 36(3) 502

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334420925081

journals.sagepub.com/home/jhl



are encouraged to access these materials once they have published on the *Journal's* website (<https://journals.sagepub.com/home/jhl>).

Marinelli and Lawrence's article: *Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic.*

Joan Dodgson, PhD, MPH, RN, FAAN

Editor-in-Chief

jhleditorinchief@gmail.com

The Role of *Staphylococcus aureus* in Mastitis: A Multidisciplinary Working Group Experience

Journal of Human Lactation

2020, Vol. 36(3) 503–509

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334419876272

journals.sagepub.com/home/jhl

Sara Giordana Rimoldi, MS¹ , Paola Pileri, MD¹,
Martina Ilaria Mazzocco, MD¹, Francesca Romeri, MS¹,
Giovanna Bestetti, MD¹, Nunziata Calvagna, MS¹,
Claudia Tonielli, MS¹, Lorenza Fiori, MS¹,
Anna Gigantiello, MS¹, Cristina Pagani, MS¹,
Paolo Magistrelli, MD¹, Alessandra Sartani, MD¹,
Annalisa De Silvestri, MS², Maria Rita Gismondo, MD¹,
and Irene Cetin, MD¹

Abstract

Background: Breastfeeding women are at risk of developing mastitis during the lactation period. *Staphylococcus aureus* has emerged as the community-acquired pathogen responsible for virulence (methicillin resistance and Panton-Valentine leukocidin toxin producing).

Research aim: The aim was to compare the microorganisms responsible for mastitis and breast abscesses during breastfeeding.

Methods: This observational study was conducted with a sample of women ($N = 60$) admitted to our hospital between 2016 and 2018. Participants affected by mastitis and breast abscess were studied and cared for by a multidisciplinary working group. A diagnostic breast ultrasound identified the pathology.

Results: Twenty-six participants (43.3%) were affected by mastitis and 34 (56.7%) by breast abscess. The most common microorganism identified was *Staphylococcus aureus* (*S. aureus*; mastitis, $n = 13$; abscesses, $n = 24$). Methicillin resistance was identified in 21 (44.7%) *S. aureus* strains: 17 (80.9%) cases of abscess and four (19.1%) cases of mastitis. The median number of months of breastfeeding was smaller in the methicillin-resistant *S. aureus* (MRSA) cases (median = 3, range = 1–20 months) than in the methicillin-sensitive *S. aureus* (MSSA) cases (median = 6.5, range = 3–21 months). The Panton-Valentine leukocidin toxin gene was detected in 12 (25.5%) cases (MRSA, $n = 8$, 66.7%; MSSA, $n = 4$, 33.3%). Hospitalization was required more frequently in MRSA ($n = 8$, 38%; five Panton-Valentine leukocidin positive) than in MSSA cases ($n = 5$, 19%; one Panton-Valentine leukocidin positive). Four women out of the eight MRSA cases (50%) that were Panton-Valentine leukocidin positive stopped breastfeeding during mammary pathologies, three (37.5%) participants continued breastfeeding until the follow-up recall, and one case was lost at follow-up.

Conclusion: Clinical severity was probably complicated by the presence of the Panton-Valentine leukocidin toxin, which required hospitalization more frequently.

Keywords

anatomy, breast, breastfeeding, human milk

Background

Breastfeeding represents a unique opportunity for both infant and maternal health, providing the physiological nutrition for healthy growth and development (Patel et al., 2017). Theoretically, every mother is able to breastfeed her child once she has received the correct education and assistance. Exclusive breastfeeding is recommended following birth up

¹ASST Fatebenefratelli Sacco–Polo Universitario, Milan, Italy

²Fondazione IRCCS Policlinico San Matteo, Pavia, Italy

Date submitted: November 14, 2018; date accepted: August 23, 2019.

Corresponding Author:

Sara Giordana Rimoldi, Laboratory of Clinical Microbiology, Virology and Bioemergency, ASST Fatebenefratelli Sacco–Polo Universitario, Via G.B. Grassi 74, Milan, 20157, Italy.

Email: sara.rimoldi@asst-fbf-sacco.it

to 6 months of age, as it is considered the best source of nourishment for infants and the best protection against infectious and chronic infant diseases (Mediano, Fernández, Rodríguez, & Marín, 2014; World Health Organization, 2009). Furthermore, breastfeeding contributes to the health and well-being of mothers, reducing the risk of ovarian and breast cancer (Unar-Munguía, Torres-Mejía, Colchero, & Gonzalez de Cosio, 2017).

Globally, researchers have reported an approximately 20% rate of developing mastitis during the lactation period (Cullinane et al., 2015; Yu, Sun, & Zhang, 2018). Breast abscess, a localized collection of pus within the breast, is often a complication of mastitis but may also occur without an apparent preceding mastitis. The incidence of breast abscess also varies widely, with most estimates coming from retrospective studies with participants who have had mastitis. Even though mastitis is a common and distressing condition among lactating women, little is known regarding the bacteria involved.

Together with *Streptococcus* spp., *Corynebacterium* spp., and *Enterococcus* spp., *Staphylococcus aureus* (*S. aureus*) is a colonizer of skin and mucosa (Fetsch, Roesler, Kraushaar, & Friese, 2016) responsible for methicillin resistance and the production of Panton-Valentine leukocidin (PVL) toxin, a cytotoxin capable of inducing the inflammatory response and the local necrotic process (Li, Zhou, Zhan, Huang, & Wang, 2018). *S. aureus* possesses many virulence factors, some of which enable it to manipulate the innate and adaptive immune responses of the host (Koymans et al., 2017). In particular, the development of skin abscesses in healthy individuals is associated with certain strains of community-acquired methicillin-resistant *S. aureus* (CA-MRSA) and community-acquired methicillin-sensitive *S. aureus* (CA-MSSA; Aung et al., 2016), which encode the PVL gene (Changchien, Chen, Chen, & Chu, 2016). Unfortunately, infections occur in settings that generally include close physical contact (e.g., breastfeeding), the sharing of clothes, and contact with other people (Changchien et al., 2016). The incidence of community-acquired skin and soft-tissue infection (SSTIs) due to *S. aureus* has increased worldwide during the past few decades (Alabi et al., 2018); it is the major cause of bovine mastitis (Hoekstra et al., 2018).

PVL and other virulence factors (e.g., phenol-soluble modulins, alpha toxin, arginine catabolic mobile element, and Protein A) have an important role in the severity, persistence, and increased transmission of the disease (Kale & Dhawan, 2016). PVL, the cytotoxin produced by some clones of *S. aureus*, causes leukocyte destruction and tissue necrosis. It is associated with infections ranging from uncomplicated skin and soft-tissue infections to life-threatening necrotizing pneumonia. The gene encoding for PVL is a virulence factor recognized in CA-MRSA and also associated with CA-MSSA (Chiu, Lo, & Wang, 2012). Data about *S. aureus* infections during the puerperium are lacking. The aim

Key Messages

- Given the poor data reported in literature about human mastitis in breastfeeding women, we wanted to investigate the circulating epidemiology and the bacteria virulence in the population in study, never described before in Italy.
- Furthermore, this study highlighted the importance of investigating Panton-Valentine leukocidin (PVL) toxin in *S. aureus*, considered the worst clinical severity due to the high prevalence of PVL positivity.
- The results obtained were made possible by a multidisciplinary collaboration between gynecologists, microbiologists, infectious disease specialists, and radiologists.

of this study was to compare the microorganisms responsible for mastitis and breast abscesses during breastfeeding.

Methods

Design

This is a longitudinal, prospective, observational design. It was the most appropriate design because little is known on this topic. All data used in the study previously had been anonymized, according to the requirements set by Italian Data Protection Code (Leg. Decree 196/2003) and by the general authorizations issued by the Data Protection Authority. Therefore, further approval of an institutional review board was not required.

Setting

The city of Milan is the main urbanized area in Lombardy region, in the North of Italy, with a population of 1,395,274. Out of 724,000 women, about 80,000 live in the L. Sacco Hospital area, and 20% are foreigners. The L. Sacco Hospital is located in an urban area characterized by a low socioeconomic level. This hospital has a Breastfeeding Unit dedicated to treating breastfeeding pathology with women referred from all over Milan, not only the areas neighboring the hospitals.

Although no UNICEF Baby-Friendly hospitals have been recognized since 2018 in Milan, L. Sacco Hospital follows UNICEF 10 steps to successful breastfeeding and has succeeded during the first phase evaluation for the Baby-Friendly hospital certificate process (the second phase is currently in process). In 2017, 1,215 children were born. The rate of breastfeeding at discharge in healthy children (according to UNICEF–World Health Organization [WHO] definition) in 2016 to 2018 was 81%.

L. Sacco Hospital has a shared breastfeeding policy accessible to everyone, and the Maternal-Neonatal Department staff are trained according to UNICEF-WHO to support breastfeeding. A space dedicated to welcoming new parents and children ("Moms, Dads, and Babies Space") and a multidisciplinary Breastfeeding Unit group was established to care for breastfeeding women in 2016.

Sample

Women ($N = 60$) affected by mastitis and breast abscess, referred to the Breastfeeding Unit, were the target population. Inclusion criteria were mastitis and/or breast abscess; exclusion criterion was breast engorgement. Mastitis was defined as a tender, hot, swollen, wedge-shaped area of breast associated with temperature of 38.5°C or higher, chills, flulike aching, and systemic illness (Amir & Academy of Breastfeeding Medicine Protocol Committee, 2014). Breast abscess was suspected if a well-defined area of the breast remained hard, red, and tender. All participants had a breast ultrasound to rule in or rule out abscess. Due to the observational design, no formal sample size calculation was previously performed. All 60 consecutive women with a diagnosis of mastitis and/or abscess were enrolled.

Milk specimens were collected prior to starting antibiotic therapy. In the case of mastitis, milk was collected through milk expression, and in the case of breast abscess, fluid or pus was collected by needle aspiration under ultrasound guidance. Human milk collection was obtained by a hand-expressed midstream sample into a sterile container (a small quantity of the initially expressed milk was discarded to avoid contamination). The patient or provider washed hands prior to milk expression and wore gloves. The nipple was cleaned prior to collection to reduce skin contamination and minimize false-positive culture results.

Measurement

Milk samples were introduced into blood culture bottles (BacT/ALERT, BioMérieux, Marcy L'Etoile, France) and cultured on selective agar plates if positive. The isolates identification was performed with MALDI-TOF (BioMérieux, Marcy L'Etoile, France) and antimicrobial susceptibility with the automated analyzer Vitek.2 (BioMérieux, Marcy L'Etoile, France), according to the European Committee on Antimicrobial Susceptibility Testing (2018) breakpoints. Genomic DNA extraction was performed using the UltraClean microbial DNA isolation kit (Mo Bio Laboratories, Carlsbad, CA), as described in the manufacturer's protocol. To confirm the presence of the *mecA* gene and to assess the presence of the *PVL* gene, DNA extracted from bacterial isolates was tested with the RealCycler SAMAPV Real-Time PCR (Progenie Molecular, Spain).

Data Collection

Maternal demographic characteristics, body mass index, smoking status, marital status, employment status, pregnancy variables, delivery characteristics, peripartum variables, neonatal outcomes, breastfeeding features in the hospital, time of onset of mammary pathologies, coexistence of mammary pathologies, antibiotic therapy, and surgical treatment were collected into a database.

Participants were admitted to the Breastfeeding Unit of the Obstetrics and Gynecology Unit of L. Sacco Hospital in Milan between January 2016 and January 2018. Participants were cared for by a multidisciplinary working group composed of a gynecologist, a microbiologist, an infectious disease physician, a neonatologist, and a radiologist trained in the clinical and therapeutic management of mastitis, according to a predefined clinical protocol. In our clinical protocol, the participants with a diagnosis of mastitis or breast abscess were empirically treated with amoxicillin-clavulanic acid, penicillin, clindamycin, or cephalosporin. Therapy was eventually shifted according to antibiogram results and/or after 24 to 48 hr of empiric therapy without improvement of the clinical symptoms. A weekly follow-up was performed until the end of the antibiotic therapy and the disappearance of symptoms. Written informed consent for routine diagnostic and medical procedures was obtained for each patient. Human milk samples were collected by the nurses and physicians by needle aspiration or under ultrasound guidance. All examined isolates were cultured as part of the routine diagnostics (standard care) and preserved according to local epidemiological surveillance regulations. Colonization by a *PVL* producing *S. aureus* was evaluated by nasal swab sampling.

Data Analysis

Descriptive statistics were performed on all variables. Breastfeeding continuation rates were calculated for median months and range. All descriptive variables were statistically analysed without significant differences. Categorical variables were displayed as frequencies. For convenience, participants were divided into an *S. aureus* group (SAG; $n = 47$, 78.3%) and a non-*S. aureus* group (NSAG; $n = 13$, 21.7%). Means (standard deviations) if normally distributed (as determined by the Shapiro-Wilk test) or medians (range) were calculated for microorganism variables. Stata Version 15.1 software (StataCorp, Chicago, USA) was used to analyze data.

Results

Characteristics of the Sample

Demographic, anthropometric, socioeconomic, smoking, and obstetric variables were similar between the SAG and NSAG (Tables 1 and 2). Rates of breastfeeding at delivery

Table 1. Demographic Characteristics of the Sample (N = 60).

Characteristic	SAG (n = 47)		
	MSSA (n = 26) n (%)	MRSA (n = 21) n (%)	NSAG (n = 12) n (%)
Ex-smoker	4 (15)	2 (9)	2 (16)
Pregnancy complications ^a	3 (11)	4 (19)	3 (25)
Primiparous	20 (77)	13 (62)	11 (92)
Cesarean section	3 (11)	3 (14)	3 (25)
Vacuum extractions	3 (11)	1 (4)	0
Inducing labor	9 (34)	4 (19)	3 (25)
Peridural analgesia	8 (30)	5 (24)	4 (16)
Postpartum complications ^b	0	1 (4)	0
Neonatal complications ^c	3 (11)	1 (4)	2 (16)

Note. SAG = *Staphylococcus aureus* (*S. aureus*) group; NSAG = non-*S. aureus* group; MRSA = *S. aureus* methicillin resistance; MSSA = *S. aureus* methicillin sensitive.

^aPregnancy complications included gestational diabetes (n = 5), preeclampsia (n = 1), HELLP syndrome (n = 1), cholestasis (n = 1), and intrauterine growth restriction (n = 2). ^bPostpartum complications included postpartum hemorrhage (n = 1). ^cNeonatal complications included jaundice (n = 4), frenulotomy lingual (n = 1), and moderately preterm birth (n = 1).

Table 2. Demographic Characteristics of the Sample (N = 60).

Characteristic	SAG (n = 47)		
	MSSA (n = 26) M (SD)	MRSA (n = 21) M (SD)	NSAG (n = 12) M (SD)
Maternal age, years	31.4 (4.5)	35.3 (4.8)	32.9 (5.4)
BMI, kg/m ²	21.3 (4.6)	19.8 (3.7)	20.9 (2.9)
Weight gain in pregnancy, kg	12.9 (3.9)	11.8 (3.9)	12.8 (5.3)
Gestational age at delivery, weeks	39.3 (1.0)	39.1 (1.8)	39.3 (1.5)
Birth weight, grams	3221.6 (347.5)	3231.5 (545.0)	3353.0 (534.0)
Hospital admission, postpartum days	3.2 (1.4)	3.5 (1.6)	3.7 (2.6)

Note. SAG = *Staphylococcus aureus* (*S. aureus*) group; NSAG = non-*S. aureus* group; MRSA = *S. aureus* methicillin resistance; MSSA = *S. aureus* methicillin sensitive; BMI = body mass index.

were the same for the SAG and NSAG (Table 3). The median number of months of breastfeeding was smaller in the MRSA-positive group (median = 3 months, range = 1–20) than in the MSSA-positive group (median = 6.5 months, range = 3–21) and the NSAG (median = 11 months, range = 0.1–15). Nipple excoriations and the use of nipple shields were more frequent in the SAG than in the NSAG (Table 3).

Breastfeeding was the exclusive feeding method in all NSAG participants (Table 3). The percentage of participants who stopped breastfeeding during therapy was higher, although not significantly, in the PVL-positive (50%) than in the PVL-negative MRSA cases (23%). Four out of eight PVL-positive MRSA participants stopped breastfeeding during mammary pathologies, three participants continued breastfeeding until follow-up recall (median = 3 months, range = 1–13), and one case was lost at follow-up. None of the women with PVL-positive MSSA stopped breastfeeding during treatment, and all breastfed until their children were 5 months old.

Pathology Distribution

The milk cultures collected from the 60 participants enrolled identified the presence of 69 different microorganisms: 10 (16.7%) were polymicrobial cultures, and 49 (81.6%) identified a single pathogen. Only 1 (1.7%) case showed a negative culture. As reported in Table 1, the most common microorganism identified was *S. aureus*. Distribution of SAG and NSAG bacterium according to mammary pathology is described in Table 4.

In NSAG cases, mastitis was the pathology most frequently reported, whereas breast abscesses were more frequent in SAG cases. *S. aureus* was methicillin resistant in 44.6% of cases. MRSA was responsible of 17 cases (50%) of breast abscess and four cases (15%) of mastitis. MSSA was detected in 14 cases (41%) of breast abscess and 11 cases (43%) of mastitis.

The presence of the PVL gene was reported in 12 SAG cases (eight MRSA and four MSSA) out of 47 cases

Table 3. Breastfeeding Patterns Grouped by Pathogen (N = 59).

Breastfeeding Pattern	SAG (n = 47)			Total n (%)
	MSSA (n = 26) n (%)	MRSA (n = 21) n (%)	NSAG (n = 12) n (%)	
Breastfeeding in hospital^a				
Exclusive breastfeeding	19 (73)	15 (71)	11 (92)	45 (76)
Breastfeeding	1 (4)	2 (9)	1 (8)	4 (7)
Nipple excoriations	13 (50)	9 (42)	3 (25)	25 (42)
Nipple shields	6 (23)	4 (19)	1 (8)	11 (18)
Breast pump	3 (11)	5 (23)	1 (8)	9 (15)
Breastfeeding at onset of mammary pathologies^b				
Exclusive breastfeeding	15 (58)	13 (62)	12 (100)	40 (68)
Breastfeeding	4 (15)	3 (14)	0	7 (12)
Recently stop breastfeeding	1 (4)	2 (9)	0	3 (5)
Nipple shields	1 (4)	4 (19)	3 (25)	8 (13)
Breast pump	10 (38)	8 (38)	7 (58)	25 (42)
Ongoing breastfeeding ^c	7 (27)	7 (33)	3 (25)	17 (29)
Neonatal complications ^d	0	0	0	0
Lost at follow-up ^e	7 (27)	5 (24)	0	12 (20)
Hospitalization ^f	5 (19)	8 (38)	3 (25)	16 (27)
Recurrent mastitis/abscess	4 (15)	3 (14)	2 (16)	9 (15)
Fistulization/ulceration	0	4 (19)	0	4 (7)

Note. SAG = *Staphylococcus aureus* (*S. aureus*) group; NSAG = non-*S. aureus* group; MRSA = *S. aureus* methicillin resistance; MSSA = *S. aureus* methicillin sensitive.

^aMissing values on Breastfeeding in hospital: MSSA (n = 6); MRSA (n = 4). ^bMissing values on Breastfeeding at onset of mammary pathologies: MSSA (n = 5); MRSA (n = 4). ^cBreastfeeding continued beyond the end of the study. ^dJaundice, diarrhea, cutaneous or subcutaneous infections, sepsis. ^eCases lost at weekly follow up and at the recall. ^fCases required hospitalization by the severity of the mammary pathologies.

Table 4. Distribution of Mammary Pathologies in the Sample (N = 60).

Mammary Pathology	SAG (n = 47) n (%)	NSAG (n = 12) n (%)
Mastitis	14 (29.8)	8 (66.7)
Abscess	28 (59.6)	3 (25.0)
Bilateral mastitis	1 (2.1)	1 (8.3)
Bilateral abscess	3 (6.4)	0 (0)
Purulent mastitis	1 (2.1)	0 (0)

Note. SAG = *Staphylococcus aureus* (*S. aureus*) group; NSAG = non-*S. aureus* group.

(25.5%) investigated. The clinical features of the 12 participants with PVL-positive *S. aureus* strains were as follows: MSSA PVL-positive strains were reported in mastitis (n = 2), purulent mastitis (n = 1), and abscess (n = 1); MRSA PVL-positive strains were reported in abscess (n = 5), bilateral abscess (n = 2), and purulent mastitis (n = 1).

All cases were clinically resolved with antibiotics and needle aspiration when required; despite the high percentage of benzyl-penicillin resistance identified in the microorganisms isolated (33 out of 47 *S. aureus* strains, 70%; nine out

12 PVL-positive *S. aureus* strains, 75%), a clinical resolution was obtained using clindamycin or ceftriaxone.

Among the SAG, MRSA cases (eight cases; five PVL positive, 62.5%) required hospitalization more frequently than MSSA cases (five cases; 1 PVL positive, 20%), although not significantly (Table 4). The presence of PVL toxin was detected in two cases of mastitis, six cases of abscess, three cases of bilateral abscess, and one case of purulent mastitis. Recurrent mammary pathologies were observed in four cases of MSSA, in three cases of MRSA, and in two cases in the NSAG. PVL-positive MRSA was detected in one case of recurrent mastitis.

No maternal or neonatal complications during therapy were reported in the sample. An allergic reaction occurred in two mothers without any influence on breastfeeding because they had already stopped breastfeeding. A perumbilical pustule was reported in the neonate of an abscess-affected mother who had PVL-positive MRSA, which developed prior to the onset of the mammary pathology. The neonatal cutaneous infection resolved with local antibiotic therapy. The participant chose to stop breastfeeding after the onset of the mammary pathology. One participant with a PVL-positive culture had inguinal pyodermitis prior to the onset of breast abscess. The 12 PVL-positive participants in the SAG screened for molecular detection by nasal swab were negative.

Discussion

Pérez, Orta, Padilla, and Mesquida (2013) have pointed out the rising frequency of CA-MRSA in puerperal infection (e.g., mastitis, abscesses, and wound infections). The incidence of *S. aureus* in puerperal mastitis has been reported around 40% to 50% (Contreras & Rodríguez, 2011), rising to 67% to 84% in the presence of breast abscesses (Ramakrishnan, Trichur, Murugesan, & Cattamanchi, 2017). However, data on MRSA incidence have been mostly reported in abscess cases, with great variability in different geographical areas (less than 5% in United Kingdom, 60% in United States). In our sample, rates of *S. aureus* were higher than previously reported, confirming an MRSA rate similar to the MRSA incidence reported in Italy and in the Lombardy region (Bellino et al., 2018). Our study was the first to evaluate the diffusion of CA-MRSA in puerperal mammary pathologies in Italy. The high rate of *S. aureus* infection was probably due to the selection of the sample, because particularly critical cases were referred to our attention.

Although recognizing the primary functions of mammary glands as immunologic support and protection of the infant during milk production (Cetin et al., 2014), in our study, half of the participants with this infection stopped breastfeeding. This finding suggests that in our population, breastfeeding did not have a protective role against CA PVL-positive *S. aureus* neonatal infections; however, additional research is needed to further explore this situation. In our sample, a mother-child transmission of soft-tissue infection due to PVL-positive MRSA, which has been described by Franck et al. (2017), was observed in only one case. Our findings require further microbiological investigation into the vertical transmission of *S. aureus* colonization.

We also studied for the first time the PVL toxin in mammary pathologies, which was elevated in contrast to the low rate (5%) previously reported (Bakthavatchalam, Nabarro, Ralph, & Veeraraghavan, 2017).

Clinical severity noted earlier was probably complicated by the presence of PVL toxin (Rimoldi et al., 2018). In our experience, all the women (PVL positive or PVL negative) affected by mastitis showed a clinical resolution following antibiotic treatment; therefore, we can affirm that the presence of PVL does not represent a limit in the clinical resolution. The role of this toxin in the clinical severity and in the therapeutic approach also needs further investigation.

Limitations

The small sample size was a limitation; therefore, larger studies are needed. The findings may have been influenced by the severity of the disease referred to our Breastfeeding Unit. Another potential limitation of this study is lack of data about the screening of *S. aureus* using nasal swab in the maternal and neonatal groups, limiting our ability to assess whether *S. aureus* at the site of infection was associated with a nasal colonization.

Conclusion

This is the first observational study reporting microbiological data of women affected by postpartum mastitis. The high percentage of participants with PVL-positive mammary pathologies during breastfeeding in absence of an outbreak should be considered when developing clinical protocols and starting proper therapy. Moreover, given the high recurrence and the difficulty in eradicating PVL-positive infections, further epidemiologic study and molecular analysis of *S. aureus* are required in recurrent infections in order to better understand the incidence and the spread of these *S. aureus* strains.

Authors' Note

Rimoldi and Pileri equally contributed to the work.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Sara Giordana Rimoldi  <https://orcid.org/0000-0003-1935-8750>

References

- Alabi, A., Kazimoto, T., Lebughe, M., Vubil, D., Phaku, P., Mandomando, I., . . . Bischoff, M. (2018). Management of superficial and deep-seated *Staphylococcus aureus* skin and soft tissue infections in sub-Saharan Africa: A post hoc analysis of the StaphNet cohort. *Infection*, 46(3), 395–404.
- Amir, L. H., & Academy of Breastfeeding Medicine Protocol Committee. (2014). ABM clinical protocol #4: Mastitis, revised March 2014. *Breastfeeding Medicine*, 9(5), 239–243.
- Aung, M. S., Zi, H., Nwe, K. M., Maw, W. W., Aung, M. T., Min, W. W., . . . Kobayashi, N. (2016). Drug resistance and genetic characteristics of clinical isolates of staphylococci in Myanmar: high prevalence of PVL among methicillin-susceptible *Staphylococcus aureus* belonging to various sequence types. *New Microbes and New Infections*, 10, 58–65.
- Bakthavatchalam, Y. D., Nabarro, L. E. B., Ralph, R., & Veeraraghavan, B. (2017). Diagnosis and management of Panton-Valentine leukocidin toxin associated *Staphylococcus aureus* infection: an update. *Virulence*. Advance online publication. doi:10.1080/21505594.2017.1362532
- Bellino, S., Iacchini, S., Monaco, M., Prestinaci, F., Lucarelli, C., Del Grosso, M., . . . Pantosti, A. (2018). AR-ISS: Sorveglianza dell'antibiotico-resistenza in Italia. Rapporto del quinquennio 2012–2016 [Antibiotic resistance Italian Health Institute: Surveillance of antibiotic resistance in Italy 2012–2016] (ISTISAN Report 18/22). Rome, Italy: Istituto Superiore di Sanità.
- Cetin, I., Assandro, P., Massari, M., Sagone, A., Gennaretti, R., Donzelli, G., . . . Davanzo, R. (2014). Breastfeeding during pregnancy: Position paper of the Italian Society of Perinatal

- Medicine and the Task Force on Breastfeeding, Ministry of Health, Italy. *Journal of Human Lactation*, 30, 20–22.
- Changchien, C. H., Chen, S. W., Chen, Y. Y., & Chu, C. (2016). Antibiotic susceptibility and genomic variations in *Staphylococcus aureus* associated with skin and soft tissue infection (SSTI) disease groups. *BMC Infectious Diseases*, 16(1), 276.
- Chiou, Y. K., Lo, W. T., & Wang, C. C. (2012). Risk factors and molecular analysis of Panton-Valentine leukocidin-positive methicillin-susceptible *Staphylococcus aureus* colonization and infection in children. *Journal of Microbiology, Immunology and Infection*, 45, 208–213.
- Contreras, G. A., & Rodríguez, J. M. (2011). Mastitis: Comparative etiology and epidemiology. *Journal of Mammary Gland Biology and Neoplasia*, 16(4), 339–356.
- Cullinane, M., Amir, L. H., Donath, S. M., Garland, S. M., Tabrizi, S. N., Payne, M. S., & Bennett, C. M. (2015). Determinants of mastitis in women in the CASTLE study: A cohort study. *BMC Family Practice*, 16(1), 181.
- European Committee on Antimicrobial Susceptibility Testing. (2018). *Breakpoint tables for interpretation of MICs and zone diameters Version 8.1, valid from 2018-05-15*. Retrieved from http://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/Breakpoint_tables/v_8.1_Breakpoint_Tables.pdf
- Fetsch, A., Roesler, U., Kraushaar, B., & Friese, A. (2016). Co-colonization and clonal diversity of methicillin-sensitive and methicillin-resistant *Staphylococcus aureus* in sows. *Veterinary microbiology*, 185, 7–14.
- Franck, K. T., Gumpert, H., Olesen, B., Larsen, A. R., Petersen, A., Bangsborg, J., . . . Bartels, M. D. (2017). *Staphylococcal aureus* enterotoxin C and enterotoxin-like L associated with post-partum mastitis. *Frontiers in Microbiology*, 7(8), 173.
- Hoekstra, J., Rutten, V., Sommeling, L., van Werven, T., Spaninks, M., Duim, B., . . . Koop, G. (2018). High production of LukMF in *Staphylococcus aureus* field strains is associated with clinical bovine mastitis. *Toxins*, 10(5), 200.
- Kale, P., & Dhawan, B. (2016). The changing face of community-acquired methicillin-resistant *Staphylococcus aureus*. *Indian Journal of Medical Microbiology*, 34(3), 275–285.
- Koymans, K. J., Goldmann, O., Karlsson, C. A., Sital, W., Thänert, R., Bisschop, A., . . . Medina, E. (2017). The TLR2 antagonist staphylococcal superantigen-like protein 3 acts as a virulence factor to promote bacterial pathogenicity in vivo. *Journal of Innate Immunity*, 9(6), 561–573.
- Li, X., Zhou, Y., Zhan, X., Huang, W., & Wang, X. (2018). Breast milk is a potential reservoir for livestock-associated *Staphylococcus aureus* and community-associated *Staphylococcus aureus* in Shanghai, China. *Frontiers in Microbiology*, 8, 2639.
- Mediano, P., Fernández, L., Rodríguez, J. M., & Marín, M. (2014). Case-control study of risk factors for infectious mastitis in Spanish breastfeeding women. *BMC Pregnancy and Childbirth*, 14(1), 195.
- Patel, S. H., Vaidya, Y. H., Patel, R. J., Pandit, R. J., Joshi, C. G., & Kunjadiya, A. P. (2017). Culture independent assessment of human milk microbial community in lactational mastitis. *Scientific Reports*, 7(1), 7804.
- Pérez, A., Orta, L., Padilla, E., & Mesquida, X. (2013). CA-MRSA puerperal mastitis and breast abscess: A potential problem emerging in Europe with many unanswered questions. *Journal of Maternal-Fetal and Neonatal Medicine*, 26(9), 949–951.
- Ramakrishnan, R., Trichur, R. V., Murugesan, S., & Cattamanchi, S. (2017). Analysis of the microbial flora in breast abscess: A retrospective cohort study conducted in the emergency department. *International Surgery Journal*, 4(7), 2143.
- Rimoldi, S. G., Pagani, C., Longhi, E., Cristo, V. D., Gregorio, A. D., Mancon, A., . . . Riva, A. (2018). Remitting infections due to community-acquired Panton-Valentine leukocidin-producing *Staphylococcus aureus* in the Milan area. *Journal of Infection and Public Health*, 11(2), 255–259.
- Unar-Munguía, M., Torres-Mejía, G., Colchero, M. A., Gonzalez de Cosio, T. (2017). Breastfeeding mode and risk of breast cancer: A dose-response meta-analysis. *Journal of Human Lactation*, 33(2), 422–434.
- World Health Organization. (2009). *Infant and young child feeding: Model chapter for textbooks for medical students and allied health professionals*. Geneva, Switzerland: Author.
- Yu, Z., Sun, S., & Zhang, Y. (2018). High-risk factors for suppurative mastitis in lactating women. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, 19(24), 4192–4197.

Appropriate Infant and Young Child Feeding Practices in an Emergency for Non-Breastfed Infants Under Six Months: The Rohingya Experience

Journal of Human Lactation
2020, Vol. 36(3) 510–518

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334420906838

journals.sagepub.com/home/jhl



Alice Burrell, MChem MSc^{1,2} , Anne M. Kueter, MSc^{1,2},
Sujan Ariful, BSc MSc², Habibur Rahaman, BSc MPH², Alessandro Iellamo, BSc¹,
and Golam Mothabbir, MBBS MPH²

Abstract

Background: Since 25 August, 2017 over 693,000 Rohingya have been forced from Myanmar due to mass violence, seeking refuge in neighboring Bangladesh. Nutritional surveys during 2017 revealed worrying levels of malnutrition and poor infant feeding practices, including high numbers of infants not exclusively breastfeeding. Infants under 6 months who are not exclusively breastfed are particularly vulnerable to morbidity and mortality and require specialized feeding support, especially in emergency contexts.

Research Aim: To describe Save the Children International's experiences supporting wet nursing, relactation, and artificial feeding for non-breastfed infants under 6 months in the Rohingya Response, Bangladesh.

Methods: A retrospective analysis was conducted of routine program data and documentation from Save the Children International's infant and young child feeding in emergencies interventions for the Rohingya Response, Bangladesh, from November 2017 to April 2018. The study population were infants under 6 months identified as not breastfed during the initial assessment ($N = 15$).

Results: Although wet nursing was attempted with all infants, it was successful with 6 (40%) of the infants. Additionally, 1 (6.7%) infant's mother was able to successfully relactate. The remaining infants ended up requiring feeding with human milk substitutes.

Conclusion: Gaps exist in operational guidance to support non-breastfed infants with wet nursing and relactation in emergency settings, as well as on how to operationalize safe human milk substitute programming in line with national policies and regulations. There is an urgent need to address this gap to protect the lives of non-breastfed infants in emergencies worldwide.

Keywords

breastfeeding, breastfeeding support, Global Strategy for Infant and Young Child Feeding, International Code of Marketing of Breast-Milk Substitutes, lactation counseling, relactation

Background

Breastfeeding, defined as infants receiving human milk, including milk expressed or from a wet nurse (World Health Organization [WHO], 2008) has been shown to be critical to the health of children and their mothers. It is estimated that breastfeeding could save the lives of over 820,000 children under 5 years of age and 20,000 women, annually (Victora et al., 2016). Non-breastfed infants have an increased risk of mortality (Horta, 2019; Sankar et al., 2015) with the youngest, the most vulnerable, having additional life-long consequences (e.g., a higher risk of developing non-communicable diseases; Kelishadi & Farajian, 2014). Additionally, early initiation of complementary feeding has been shown to cause

growth faltering and poor linear growth in children (Onyango et al., 2014). Breastfeeding is also important to the health of mothers, as it is associated with reduced risk of ovarian and breast cancer (Chowdhury et al., 2015).

¹Save the Children UK, London, UK

²Save the Children International Bangladesh, Dhaka, Dhaka District, Bangladesh

Date submitted: November 6, 2018; Date accepted: January 27, 2020.

Corresponding Author:

Alice Burrell, MChem MSc, Save the Children UK, 1 St John's Ln, Clerkenwell, London, EC1M 4AR, UK.
Email: burrella@hotmail.co.uk

The WHO and UNICEF Global Strategy for Infants and Young Child Feeding (World Health Organization & United Nations Children's Fund, 2003) recommendations are: Initiation of breastfeeding within the 1st hr after birth; exclusive breastfeeding for the 1st 6 months of life; and, thereafter, introduction of safe, appropriate, and timely complementary feeding, while breastfeeding continues for 2 years or beyond. In an emergency there is an increased risk that recommended infant and young child feeding (IYCF) practices will not be followed due to disrupted access to healthcare, food, water, sanitation and hygiene facilities, and privacy for breastfeeding. Additionally, exposure to traumatic and stressful experiences can affect mental health and infant and self-care practices of mothers. Stress can temporarily reduce milk let-down and slow the release of milk by inhibiting secretion of oxytocin. This slowing of milk release may change infant behavior and may be interpreted as milk insufficiency. If this is not addressed by appropriate breastfeeding support it may lead to long-term disruption of breastfeeding practices (Stuebe et al., 2013).

Early termination of exclusive or any breastfeeding, and inappropriate complementary feeding puts infants and young children at increased risk of morbidity, malnutrition, and mortality in emergencies (Sankar et al., 2015; Scherbaum & Srour, 2016; Victora et al., 2016). Interventions to protect, promote, and support recommended feeding practices are lifesaving. Interventions should align with the *Operational Guidance on IYCF in Emergencies* (OG-IFE; IFE Core Group, 2017), and comply with the *International Code of Marketing of Breastmilk Substitutes* (IC; WHO, 1981) and subsequent relevant World Health Assembly (WHA) Resolutions, including WHA63.0 and WHA71.9 (WHA 1981–2018).

The OG-IFE provides practical guidance on how to support, promote, and protect recommended IYCF practices in emergencies. The IC defines the required restrictions on marketing of human milk substitutes to ensure that mothers are not discouraged from breastfeeding, that substitutes are used safely only when needed, and that the products are manufactured in line with global quality standards. In emergencies, the IC is an important tool to hold individuals and organizations accountable for protecting infant and maternal health by ensuring that breastfeeding is not undermined and, when required, that human milk substitutes programs are conducted safely. A safe human milk substitute program mitigates and reduces the risks of human milk substitute use in an emergency in line with the guidance of the OG-IFE and IC, which include prevention of formula donations, controlling procurement and specifications of feeding-related products, ensuring access to feeding equipment and support, and targeted distribution of human milk substitutes (Gribble & Fernandes, 2018).

Management of the Non-Breastfed Infant in Emergencies

There has been very little in the way of documented experiences and guidance about the various management options for

Key Messages

- We have presented the Save the Children International team's experiences of trying to support non-breastfed infants during the Rohingya Response in Bangladesh.
- Challenges encountered in facilitating successful wet nursing and relactation are presented for consideration in future programs and guidance development.
- Our team's experiences highlight how limited existing guidance and tools were to front line workers who were supporting non-breastfed infants during this emergency.
- The protection, promotion, and support of breastfeeding are paramount during emergencies and existing guidance and tools are inadequate.

supporting non-breastfed infants in emergencies, including wet nursing and relactation. In regards to wet nursing, no published guidance specific to emergencies was found with most guidance focused on milk banks and human milk donations (Baumgartel et al., 2016; Sriraman et al., 2018; Moran & Gilad, 2007; Stevens et al., 2009). However, some published case histories do exist, the most significant is from 2007 in the Rohingya camps in Bangladesh. It documented the UNHCR's experience of supporting five orphaned infants through wet nursing (Sfeir, 2008). Their reported challenges were lack of acceptance by the wet nurse's husband, travel time for the wet nurse, and the practicality of managing night feeds. Unpublished accounts also existed, shared through an online forum for emergency nutrition experts. One respondent shared experience from Myanmar in 2008 reporting that women were willing to wet nurse motherless infants, but none of the infants were exclusively wet nursed. Challenges reported were other children to care for, and again time constraints and practicality of night feeds (Emergency Nutrition Network [ENN], 2018).

More guidance was available about relactation from the WHO's (1998) *Relactation: Review of Experience and Recommendations for Practice*. These guidelines, although detailed and useful, were not specific to the humanitarian context. Action Contre la Faim's (ACF) *Baby Friendly Spaces Manual* (de Brabandere et al., 2014) also included details about relactation; however, although this document was meant for use in a humanitarian context, it included no guidance for how to operationalize the described relactation methods in an emergency context. ACF International's *Guidelines for the Integrated Management of Severe Acute Malnutrition: In- and Out-Patient Treatment* 2011-12 (ACF International, 2012) also provided some details about relactation. However, the focus of this document was on relactation during inpatient care and no guidance was provided on community-based relactation in the emergency context. A study by Lelijveld (2012) in Malawi

described the use of supplementary suckling technique for relactation in an inpatient setting and found five thematic areas for facilitating factors or barriers. These were motivation of the mother and infant, breastfeeding views/culture, practicality, understanding of the technique, and perception of the intervention; the authors belief was that these themes were likely relevant for all settings.

The Rohingya Response: Bangladesh

Since August 25, 2017, over 693,000 Rohingya people have been forced from the Rakhine State, Myanmar, due to incidents of intense violence. They sought refuge in neighboring Bangladesh in an area called Cox's Bazar, within makeshift settlements and camps, heavily reliant on humanitarian assistance to fulfill their basic needs (Inter Sector Coordination Group [ISCG], 2018). The Nutrition Sector response was led by the Ministry of Health and Family Welfare (MoHFW) and UNICEF, which focused on treatment and prevention of acute malnutrition. Interventions were community management of acute malnutrition (CMAM) for children 6–59 months and pregnant and lactating women (PLW), IYCF-E and community management of acute malnutrition in infants (MAMI) for nutritionally vulnerable infants under 6 months.

During the first phase of the Rohingya response, Save the Children International (SCI) made major efforts to put in place interventions to protect, promote and support appropriate IYCF practices. SCI were a key partner for IYCF-E during the response, chairing the IYCF Technical Working Group for a time, and supporting capacity building initiatives. As part of the wider Nutrition response, SCI established Nutrition Centers providing Mother Baby Areas (MBA) offering IYCF-E support, including counseling, group education, and privacy for breastfeeding for caregivers of children under 2 years and pregnant women (ACF France, 2014).

Outpatient Therapeutic Feeding Program services for treatment of malnourished children aged 6–59 months (Institute of Public Health Nutrition et al., 2017), and MAMI services for management of nutritionally vulnerable infants under 6 months were also established (Emergency Nutrition Network (ENN), GOAL, London School of Hygiene and Tropical Medicine (LSHTM), & Save the Children, 2018). The aim of this paper was to share SCI's experiences and challenges in protecting, promoting, and supporting IYCF for non-breastfed infants under 6 months in the Rohingya response in Bangladesh between November 2017 and April 2018.

Methods

Design

This is a descriptive observational study using secondary data from routine program data and documentation. The study design selected was due to data being collected as part

of ongoing humanitarian programs; this study was retrospective and had no influence on the intervention. No prior ethical approval by an Institutional Review Board was obtained; Hussein & Elmusharaf (2019) reviewed the precedence for not obtaining ethical approval or informed consent during humanitarian interventions. They concluded that most reviewed articles did not obtain prior ethical approval. Regulations on seeking ethical approval vary among countries, "In the UK, the Health Research Authority (HRA), which coordinates and regulates ethical approval of research involving human subjects, specifically excludes projects from requiring ethical approval [for] . . . research and usual practice/surveillance work in public health" (Committee on Publication Ethics, 2014). The SCI team authoring this paper was based in United Kingdom and Bangladesh.

Setting

SCI's IYCF-E programs were implemented in the Rohingya camps and settlements of Cox's Bazar, Bangladesh. The location and target population were chosen based on coordination with nutrition partners and existing SCI operational areas. SCI provided nutrition services across 10 camps with a total population of 161,615 persons, of which an estimated 11,635 were aged under 2 years. Nutrition Centers were co-located with SCI's Health Clinics, where possible, with referral links established. Through these Nutrition Centers, SCI had contact with a large number of caregivers with children under 2 years and was able to identify non-breastfed infants in need of special feeding support.

The *Standardised Monitoring and Assessment of Relief and Transitions* (SMART) surveys (Action Against Hunger [ACF] Canada, 2002) that were conducted between October and November 2017 in the Rohingya camps found poor IYCF practices. For example, 17.9% of infants under 6 months were not exclusively breastfed in Kutupalong camp, 43.9% in makeshift camps, and 27.8% in Nayapara camp. Additionally, only a small percentage of 6–23-month olds were receiving a minimum acceptable diet in complementary foods; 8.8%, 6.4%, and 15.7%, respectively (ACF, 2017; Leidman, et al., 2018).

The prevalence of global acute malnutrition determined by weight-for-height z-scores (WHZ) was 24.3%, 19.3%, and 14.3% among children aged 6–59 months in Kutupalong, makeshift, and Nayapara camps, respectively; the prevalence of severe acute malnutrition was 7.5%, 3.0%, and 1.3%, respectively (World Health Organization (WHO), United Nations Commissioner for Refugees (UNHCR), International Federation of Red Cross (IFRC), and World Food Program (WFP), 2000). thresholds state that global acute malnutrition prevalence above 15%, or 10%–14% with aggravating factors, indicates a nutritional emergency. Aggravating factors were evident in Cox's Bazar (e.g., poor access to safe and clean water, and poor environmental health) indicating that a situation of nutritional emergency existed (Chan et al., 2018).

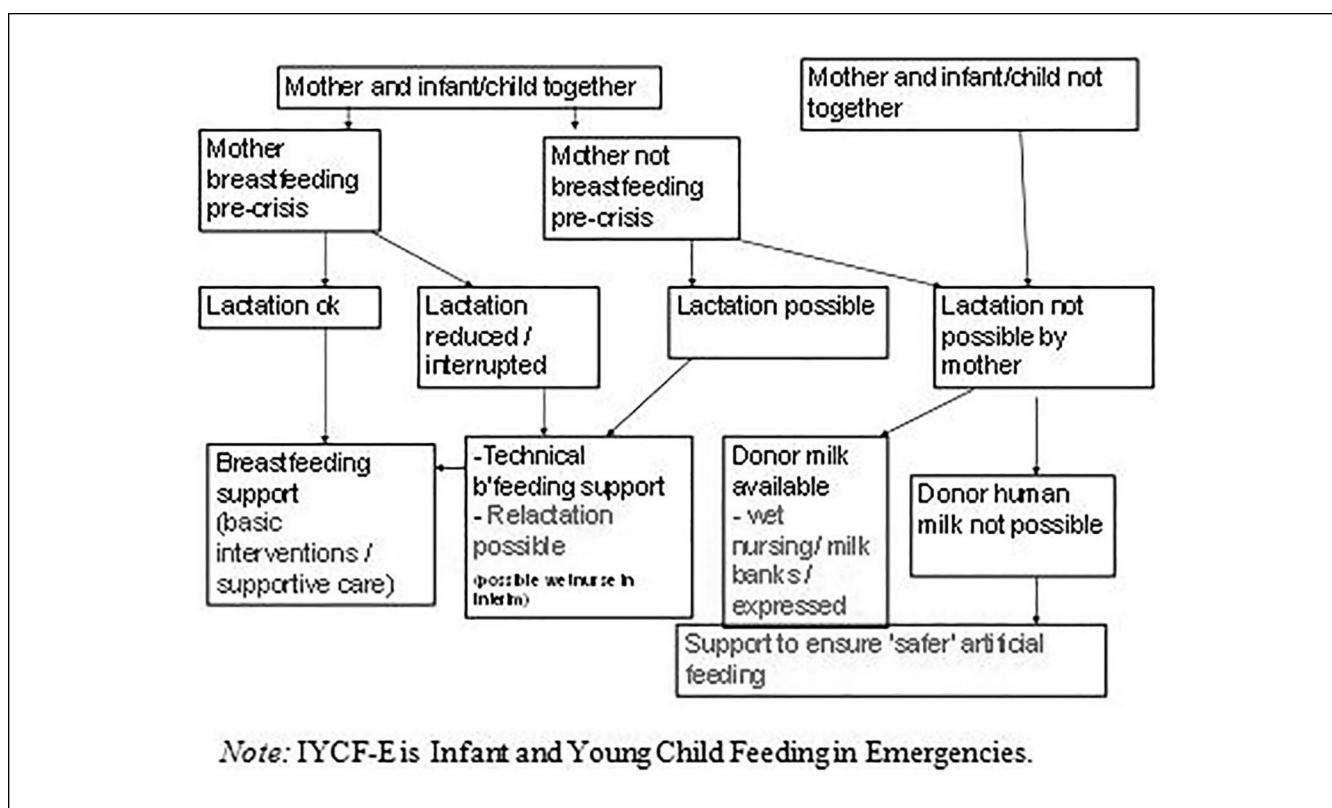


Figure 1. Decision tree to guide health staff on feeding support required for infants under 2 years of age following a humanitarian crisis.

Sample

The target population were children under 2 years and their caregivers residing in two registered camps and 27 other sites containing Rohingya refugees in Cox's Bazar. SCI teams conducted a rapid IYCF assessment for 13,749 caregivers with infants under 2 years in the timeframe of this study and 27% ($N = 3,713$) of these required further assessment and counseling.

The sample population were those with infants under 6 months identified as not breastfed. For inclusion in the study sample, infants had to have had their initial IYCF assessment between November 2017 and April 2018, be under 6 months of age and not breastfed. Mixed breastfed infants were excluded, as were infants over 6 months of age and those initially assessed outside of the study timeframe. Of the 3,713 caregivers with infants under 2 years requiring further assessment and support, 15 (< 1%) infants were included in this study. The sample size is small and opportunistic meaning it cannot be inferred to represent the total population; however it does enable us to exemplify important experiences.

Intervention

IYCF counsellors ($n = 63$) received technical training about IYCF-E counseling, including conducting IYCF assessments and data collection. Health and nutrition workers ($n = 165$),

volunteers ($n = 197$), and non-nutrition staff received orientation about referral criteria and key messages concerning IYCF-E. Infants and young children and their caregivers were identified by these health and nutrition staff and protection teams at facility/service level, and by the volunteers through household community screening. Referrals also occurred from other local services and community leaders.

The type of support provided was determined according to the IYCF-E decision tree (Figure 1). In general, if an issue was identified, one-on-one counseling was provided and follow-up visits scheduled to monitor progress. Breastfeeding support varied from ensuring proper attachment, positioning, relaxation techniques, breast stimulation, and addressing common misconceptions and beliefs. When a non-breastfed infant was identified, the first step taken was to discuss and seek agreement on feeding options within the family. Wet nursing and relactation were presented as the first line options.

For support with wet nursing, the family was asked whether any relatives or neighbors were breastfeeding. If not, the team would try to identify nearby breastfeeding women who had no current/history of serious illness. Once a potential wet nurse was identified, a meeting was scheduled with the infant's and wet nurse's families to agree upon arrangements. Wet nurses were referred to a supplementary feeding program for additional food rations. Follow-up visits were scheduled weekly at the MBA.

For support with relactation, the process of relactation and the Supplementary Suckling Technique (SST) were described to the infant's family (WHO, 1998; ACF International, 2012) and a kit was provided, which included feeding tubes, syringes, cup, medical tape, cleaning products, and a storage box. SST was then demonstrated, including cleaning procedures; soapy, hot, boiled water was squirted through feeding tubes using a syringe, then rinsed and stored in sealed hard plastic containers. Tubes were replaced weekly. All other equipment was washed with hot soapy water. Daily household visits were conducted in the initial weeks, reducing as confidence built. Caregivers were referred to supplementary feeding programs. If wet nursing or relactation were not possible or successful, human milk substitutes were presented as an option. The SCI team provided counseling on safe usage and provided the equipment required in line with OG-IFE (IFE Core Group, 2017).

Data Collection

Non-breastfed infants registered in SCI IYCF-E programs between November 2017 and April 2018 were identified through searches of IYCF program data that were collected over this time period. Details about individual infants were extracted from the IYCF full assessment and completed at the initial MBA visit by an IYCF counsellor during a one-on-one consultation, and the care plan was updated at each follow-up visit. Assessments recorded information about demographics, breastfeeding status, frequency, technique, complementary feeding, hygiene practices, and health and well-being.

Data concerning individual non-breastfed infants was extracted from assessments and care plans and then inputted into an Excel database. Challenges experienced in adoption of wet nursing or relactation practices were extracted from care plans and documents of the IYCF staff's experiences. Assessment forms and care plans were filed by ID number in the MBA. Data were stored by ID number, to ensure confidentiality and anonymity. All data were inputted by the first author, who was the program manager on the STC response team and therefore had access to all study data as part of her job. The Excel database was password protected to ensure data was secure and has not been shared.

During the initial assessments, mothers were informed of the purpose and activities of the program, and that their registration was voluntary (albeit highly recommended). As standard practice, risk assessments were conducted during the setup of the program design to mitigate any risks to physical or psychological wellbeing, and to avoid any coercion or exploitation of program participants.

Data Analysis

Microsoft Excel 2013 was used to calculate proportions of the categorical data. A summary table was created from the

Table 1. Demographic Characteristics of Non-Breastfed Infants at Initial Assessment ($N = 15$).

Characteristic	n (%)
Age of infant (months)	
0–1	6 (40.0)
2–3	7 (46.7)
4–5	2 (13.3)
Gender of infant	
Male	6 (40.0)
Female	9 (60.0)
Primary caregiver	
Mother	3 (20.0)
Father	2 (13.3)
Grandmother	3 (20.0)
Foster mother	7 (46.6)
Feeding type of infant at initial visit	
Wet nursing	2 (13.3)
Infant formula only	12 (80.0)
Infant formula & other foods/milks	1 (6.7)
Reason for feeding type	
Orphaned/ mother died	7 (46.7)
Given up	5 (33.3)
Medical reasons (TB, HIV+, flat nipples)	3 (20.0)

Note. TB = tuberculosis.

extracted information: Child ID, management option(s) tried (infant formula feeding, relactation mother, wet nursing with relactation, wet nursing no relactation), outcome (infant formula feeding, mother exclusive or non-exclusive breastfeeding, exclusive or non-exclusive wet nursing, and unknown), and challenges faced. Numbers were then totaled for each feeding option at initial stages and at outcome; proportions were calculated for outcomes. Challenges were grouped into categories and presented as narrative.

Results

The demographics of the study participants at initial assessment (Table 1) and the management options that were tried along with the final feeding option adopted (Table 2) have been summarized. Of the caregivers who attempted wet nursing, just under half ($n = 6$; 40%) adopted this practice fully. The main challenges encountered for wet nursing were: a) difficulty identifying a willing wet nurse if not available among close relatives; b) acceptance by infant's family of a wet nurse outside the family due to their beliefs about milk kinship, including that one cannot marry another who was breastfed by the same woman (EL-Khuffash & Unger, 2012); c) acceptance by the wet nurse's family and expectation of incentives in the form of material goods, which they could sell; d) re-location of the wet nurse; e) poor access to nutritious and adequate foods for the wet nurse; f) logistical arrangements between the families for breastfeeding on demand, especially night feeds; and g) preference to use human milk substitutes by the families.

Table 2. Tried and Adopted Management Options for Non-Breastfed Infants ($N = 15$).

Management Option	Caregivers Who Tried Option <i>n</i> (%) ^a	Adopted Option <i>n</i> (%) ^b
Relactation with mother	2	1 (50.0)
Wet nursing (by relactation)	4	2 (50.0)
Wet nursing (no relactation)	11	4 (36.4)
Use of infant formula	10	
Exclusive infant formula feeding		3 (30.0)
Mixed feeding ^c	-	4 (40.0)
Total	-	14 (100.0)

^aOptions tried are not mutually exclusive, more than one option could be tried.

^bMissing values = 1.

^cHuman milk and infant formula.

The SCI team were challenged by how to operationalize relactation guidance considering that support could not be provided in an inpatient setting. It was considered that SST should not be conducted with infant formula inside the MBA due to the risk of discouraging breastfeeding mothers by showing that infant formula was available; there were not enough cases to justify the establishment of a specialized space for this support. Given these considerations, SCI decided to pilot home-based SST support with a 20% ($n = 3$) success rate. The main challenges for success were: a) limited guidance about reducing supplementation as human milk production began; b) lack of availability of family members to support in home SST; c) maintaining motivation; d) poor hygiene practices, mainly not cleaning equipment immediately after use; e) adequate human resources to conduct regular follow-up household visits; and f) lack of capacity within the staff to support SST due to limited prior experience. Home-based support was also challenging for referrals from camps outside of SCI's operational areas.

Despite our best efforts to support relactation and/or wet nursing, seven (46.7%) of the caregivers adopted feeding by human milk substitutes (Table 2). The SCI team ensured families who needed this feeding option were using an appropriate infant formula in line with OG-IFE, had information on correct usage and the risks associated, were provided the tools and equipment for safe preparation and use, and had standard IYCF program follow-ups including regular growth monitoring.

The SCI team discussed with Nutrition Sector partners about how best to ensure that these few infants needing human milk substitute were being supported appropriately, whilst being in line with national laws and regulations. This was challenging as use of human milk substitutes was an important and sensitive issue that was of concern to partners, and national regulations contained no guidance on human milk substitutes in the humanitarian context. Dialogue with partners and authorities addressed some of these concerns and resulted in the development of an Operational Guidance for the non-breastfed infant for the Rohingya Response, which, at time of writing, was yet to be approved and finalized.

Discussion

When the need arose to support non-breastfed infants in the Rohingya response, it became apparent that guidance on supporting wet nursing and relactation in an emergency setting was limited. Our program was only moderately successful in facilitating caregivers adopting these preferable feeding practices. The SCI team's experiences in the Rohingya response was similar to other documented challenges faced in supporting wet nursing and relactation (ENN, 2018; Sfeir, 2008); however, for relactation we add to the documented experiences in terms of limited practical guidance, human resources, and experiences of staff, as well as poor hygiene practices when piloting home-based relactation support.

Krumme (1991) documented greater success with a relative as a wet nurse in a case study of a Ugandan refugee in Zaire in 1991. In attempts to increase the success of wet nursing, we tried to identify a wet nurse from within the family (to overcome the challenges with acceptance, milk kinship, and logistics of feeding), however, this, on occasion, required relactation support, which brought with it the noted challenges of relactation. As a means for increasing the acceptance of a wet nurse from outside of the family when religious beliefs were the barrier, Krumme (1991) enrolled the support of a religious leader, a method we could have tried when milk kinship was a barrier. He also documented incentivizing wet nurses with food; UNHCR also took this approach in its documented experiences in Bangladesh, linked with food programs (Sfeir, 2008). Where possible, we linked wet nurses to supplementary feeding programs; however, we were limited by whether these services were available in the area. We may have had more success if we were able to guarantee food incentives to all wet nurses. In terms of logistical challenges, the UNHCR documents the use of expressed mother's own milk as a solution to practical challenges with night-time feeds. UNHCR provided adequate storage containers and ice boxes and found this to be successful (Sfeir, 2008).

Despite limited guidance on how to operationalize SST support in the community, we employed this approach to overcome the challenge of a suitable facility to provide this

specialized support. Although hygiene standards remained a challenge, all households supported with SST had the ability to boil water and were provided with washing and storage materials. The challenge remained of practicing safe hygiene practices, for which we intensified counseling with successful outcomes. Although not the first choice for supporting relactation, there are situations where community support may be the only feasible option and is still safer than supporting use of human milk substitutes, for which hygiene risks exist along with the additional risks associated with human milk substitute use (previously discussed). Banupurmath et al. (2003) have reported success in relactation through outpatient support, with an 83.4% relactation success rate.

As well as strengthening interventions to support caregivers with relactation and wet nursing, programs to support safe use of human milk substitutes are needed, given that we found the majority of caregivers who were using human milk substitutes continued to use them despite our support provided for wet nursing and relactation. The provision of a human milk substitute as a last resort is recognized by international IYCF recommendations and guidance, but the systems to operationalize this in line with national laws may not be in place. This risks the delay of appropriate support to those infants who require it. In Bangladesh, both culturally and through official Acts like the *Bangladesh Act 2013* and the *National IYCF Strategy* (2007), breastfeeding was strongly protected, promoted, and supported, but national regulations lack any specific guidance for the uses of human milk substitutes within the humanitarian context.

Although a small proportion of non-breastfed infants were located in this context, there have been emergency contexts where higher proportions of non-breastfed infants have existed, for example in the Middle East (Alsamman, 2014; Darjani & Shaker-Berbari, 2014). The experiences presented here and other similar situations suggest broader implications for all emergency and humanitarian responses, with a need to ensure preparedness at all levels to protect, promote, and support recommended IYCF practices in the breastfed and non-breastfed child.

Given our findings, we encourage continued collection and documenting of the type of data presented in this study to enable future research to strengthen IYCF-E responses, for example exploring motivators and barriers for the uptake of wet nursing or relactation practices in humanitarian contexts. We encourage documentation of these experiences to enable better compliance with best practices and to inform operational guidelines and tools. We urge the development of operational guidelines, protocols, and tools for humanitarian workers that identify and manage infants who are not breastfed, with timely, specialized support. Guidance should cover the minimum requirements needed to implement each of the different management options, common challenges, and documented, viable solutions. Links to

relevant training materials should be included for each option. Guidance should be practical, for use by program staff. Relactation guidance should be expanded to include practical guidance about outpatient support. Wet nursing guidance should emphasize the importance of linking with food programs or equivalent incentives and linking with religious leaders when religious beliefs are found to be a barrier. Human milk substitute program guidance should provide guidance for when national systems are not in place to implement programs rapidly and safely.

We encourage nutrition partners and the UN agencies to strengthen protocols to enable timely and responsive mechanisms that support safe human milk substitute programming, as a last resort, in future humanitarian emergencies. And, lastly, we call on all agencies and governments to support and spearhead capacity-building activities to ensure skilled IYCF workers are available in country to respond to this specialized need for the most vulnerable children.

Limitations

The use of routine program data, including data from the very onset of the emergency response, means that initial data may contain inaccuracies and/or may not have been complete in some cases. An additional limitation is that at the start of the response staff had limited IYCF-E experience, meaning not all cases may have been identified or managed as per protocol. Data are also limited in that only basic caregiver information was collected; therefore, information about a caregiver's background and demographics was not available to identify other factors that may affect feeding and caring practices. Finally, this study was limited to a specific period, and SCI activities were focused in selected areas and did not cover the whole population, and therefore this study is not intended to be representative of the whole Rohingya population.

Conclusions

The protection, promotion, and support of breastfeeding are paramount during emergencies. The SCI team's experiences from the Rohingya response highlight that optimal feeding support of non-breastfed infants requires more attention. We found a lack of, and subsequent need for, practical operational guidance to support the establishment of an IYCF-E program that could offer quality support for wet-nursing, relactation and, as a last resort, support the use of human milk substitute in emergencies.

Acknowledgments

We acknowledge Save the Children's Bangladesh Office for their support and leadership on the Rohingya Response and the Team in Cox's Bazar for their continued hard work. We acknowledge the Humanitarian Nutrition Teams of Save the Children UK and Save the Children US for their technical guidance throughout.

Declaration of Conflict of Interest

The authors declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: All authors were, at the time of the study, employees of Save the Children and working on the Rohingya Response.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Alice Burrell  <https://orcid.org/0000-0003-1980-9064>

References

- Action Against Hunger. (2017). *Emergency nutrition assessment: Cox's Bazar, Bangladesh*. Cox's Bazar: Nutrition Sector of the Rohingya Response.
- Action Against Hunger Canada. (2002). *SMART Methodology*. <https://smartmethodology.org>
- Action Contre la Faim France. (2014). *Baby friendly spaces holistic approach for pregnant, lactating women and their very young children in emergency*. Paris: ACF International.
- Action Contre la Faim International. (2012). *Guidelines for the integrated management of severe acute malnutrition: In- and out-patient treatment*. Paris: ACF International.
- Alsamman, S. (2014). Managing infant and young child feeding in refugee camps in Jordan. *Field Exchange* (48), 85.
- Banapurmath, S., Banapurmath, C. R., & Kesaree, N. (2003). Initiation of lactation and establishing relactation in outpatients. *Indian Pediatrics*, 40(4), 343–7.
- Baumgartel, K., Sneeringer, L., & Cohen, S. (2016). From royal wet nurses to Facebook: The evolution of breastmilk sharing. *Breastfeeding Review*, 24(3), 25–32.
- Chan, E., Chiu, C., & Chan, G. (2018). Medical and health risks associated with communicable diseases of Rohingya refugees in Bangladesh 2017. *International Journal of Infectious Diseases*, 68, 39–43. doi:10.1016/j.ijid.2018.01.001
- Chowdhury, R., Sinha, B., Sankar, M., Taneja, S., Bhandari, N., Rollins, N., . . . Martines, J. (2015). Breastfeeding and maternal health outcomes: A systematic review and meta-analysis. *Acta Paediatrica*, 104(467), 96–113. doi:10.1111/apa.13102
- Committee on Publication Ethics. (2014, January 17). Guidance for Editors: Research, Audit and Service Evaluations. 1. <https://publicationethics.org/resources/guidelines-new/guidance-editors-research-audit-and-service-evaluations>
- Darjani, P., & Shaker-Berbari, L. (2014). Infant and young child feeding support in Lebanon: Strengthening the national system. *Field Exchange* (48), 20.
- de Brabandere, A., David, A., Dozio, E., & Bizouerne, C. (2014). *Baby friendly spaces. Holistic approach for pregnant, lactating women and their very young children in emergency*. Action Contre la Faim.
- Edmond, K., Zandoh, C., Quigley, M., Amenga-Etego, S., Owusu-Agyei, S., & Kirkwood, B. (2006). Delayed breastfeeding initiation increases risk of neonatal mortality. *Pediatrics*, 117(3), 380–386.
- EL-Khuffash, A., & Unger, S. (2012). The concept of milk kinship in Islam: Issues raised when offering preterm infants of muslim families donor human milk. *Journal of Human Lactation*, 28(2), 125–127. doi:10.1177/0890334411434803
- Emergency Nutrition Network. (2018). *Wet nursing guidance: Emergency contexts, infant and young child feeding interventions forum*. <https://www.en-net.org/question/3194.aspx>
- Emergency Nutrition Network, GOAL, London School of Hygiene and Tropical Medicine (LSHTM), & Save the Children. (2018). *C-MAMI Tool*. <https://www.ennonline.net/c-mami>
- Gribble, K., & Fernandes, C. (2018). Considerations regarding the use of infant formula products in infant and young child feeding in emergencies (IYCF-E) programs. *World Nutrition*, 9(3), 261–283. <https://doi.org/10.26596/wn.201893261-283>
- Harvard Humanitarian Initiative. (2009). KoBo Toolbox. <https://www.kobotoolbox.org/>
- Horta, B. (2019). Breastfeeding: Investing in the future. *Breastfeeding Medicine*, 14 (Suppl. 1), S-11–S-12. doi:10.1089/bfm.2019.0032
- Hussein, G., & Elmusharaf, K. (2019). Mention of ethical review and informed consent in the reports of research undertaken during the armed conflict in Darfur: A systematic review. *BMC Medical Ethics*, 20(1). doi:10.1186/s12910-019-0377-7
- IFE Core Group. (2017). *Infant and young child feeding in emergencies: Operational guidance for emergency relief staff and programme managers*. Emergency Nutrition Network. <https://www.ennonline.net/operationalguidance-v3-2017>
- Institute of Public Health and Nutrition, Directorate General of Health Services, Ministry of Health and Family Welfare & Government of Bangladesh. (2007). *National strategy for infant and young child feeding*. Institute of Public Health and Nutrition. <https://extranet.who.int/nutrition/gina/en/node/8025>
- Institute of Public Health Nutrition, Directorate General of Health Services, Ministry of Health and Family Welfare & Government of the People's Republic of Bangladesh. (2017). *National guidelines for community-based management of acute malnutrition*. Institute of Public Health Nutrition. <https://www.humanitarianresponse.info/en/operations/bangladesh/document/national-guidelines-community-based-management-acute-malnutrition>
- Inter Sector Coordination Group. (2018). *Bangladesh: Cox's Bazar refugee response 4W—20 April*. <https://reliefweb.int/report/bangladesh/bangladesh-coxs-bazar-refugee-response-4w-20-april-2018>
- Inter Sector Coordination Group. (2018). *Situation report: Rohingya refugee crisis. Cox's Bazar, 26th April*. https://reliefweb.int/sites/reliefweb.int/files/resources/20180426_iscg_sitrep.pdf
- Kelishadi, R., & Farajian, S. (2014). The protective effects of breastfeeding on chronic non-communicable diseases in adulthood: A review of evidence. *Advanced Biomedical Research*, 3(3). doi:10.4103/2277-9175.124629
- Krumme, B. (1991). Case study 17 in IFE: GIFA/ENN Project. *Relactation/wet nursing: Relactation in difficult circumstances: Rising to the challenge*. <https://www.ennonline.net/relactationwetnursing2>
- Leidman, E., Humphreys, A., Greene Cramer, B., Toroitich-Van Mil, L., Wilkinson, C., Narayan, A., & Bilukha, O. (2018). Acute malnutrition and anemia among Rohingya children in Kutupalong camp, Bangladesh. *The Journal of the American Medical Association*, 319(14), 1505–1506. doi:10.1001/jama.2018.2405

- Lelijveld, N. (2012). Qualitative study of supplementary suckling as a treatment for SAM in infants. *Field Exchange* (44), 21. <https://www.ennonline.net/fex/44/qualitative>
- Moran, L., & Gilad, J. (2007). From folklore to scientific evidence: Breast-feeding and wet-nursing in Islam and the case of non-puerperal lactation. *International Journal of Biomedical Science*, 3(4), 251–7.
- Onyango, A., Borghi, E., de Onis, M., del Carmen Casanovas, M., & Garza, C. (2014). Complementary feeding and attained linear growth among 6–23 month-old children. *Public Health Nutrition*, 17(9), 1975–1983.
- Sankar, M., Sinha, B., Chowdhury, R., Bhandari, N., Taneja, S., Martines, J., & Bahl, R. (2015). Optimal breastfeeding practices and infant and child mortality: A systematic review and meta-analysis. *Acta Paediatrica*, 104(467), 3–13. doi:10.1111/apa.13147
- Scherbaum, V., & Srour, M. (2016). The role of breastfeeding in the prevention of childhood malnutrition. *World Review of Nutrition & Dietetics*, 115, 82–97. doi:10.1159/000442075
- Sfeir, Y. (2008). Wet nursing for refugee orphans in Bangladesh. *Field Exchange*, 32, 25. <https://www.ennonline.net/fex/32/wet>
- Sriraman, N., Evans, A., Lawrence, R., Noble, L., & Directors, T. A. (2018). Academy of Breastfeeding Medicine's 2017 position statement on informal breast milk sharing for the term healthy infant. *Breastfeeding Medicine*, 13(1), 2–4. doi:<https://doi.org/10.1089/bfm.2017.29064.nks>
- Stevens, E., Patrick, R., & Pickler, R. (2009). A history of infant feeding. *The Journal of Perinatal Education*, 18(2), 32–39. <https://dx.doi.org/10.1624%2F105812409X426314>
- Stuebe, A., Grewen, K., & Meltzer-Brody, S. (2013). Association between maternal mood and oxytocin response to breastfeeding. *Journal of Women's Health*, 22(4), 352–61. doi:10.1089/jwh.2012.3768
- United Nations Children's Fund (UNICEF). (2011). Harmonised Training Package. *Module 13: Management of severe acute malnutrition*. Emergency Nutrition Network. <https://www.ennonline.net/httpv2module13>
- United Nations Children's Fund & World Health Organization. (2018). *Capture the moment: Early initiation of breastfeeding: The best start for every newborn*. UNICEF.
- United Nations High Commissioner for Refugees (UNHCR). (2018). *Bangladesh refugee emergency: Population factsheet*. Cox's Bazar: UNHCR.
- Victora, C., Bahl, R., Barros, A., França, G., Horton, S., Krusevec, J., . . . Lancet Breastfeeding Series Group. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms and lifelong effect. *The Lancet*, 387(10017), 475–490. [https://doi.org/10.1016/S0140-6736\(15\)01024-7](https://doi.org/10.1016/S0140-6736(15)01024-7)
- World Health Assembly. (1981–2018). *World Health Assembly resolutions and documents 1981 to 2018*. World Health Organisation. http://www.who.int/nutrition/topics/wha_nutrition_iycn/en/
- World Health Assembly. (2018). *World Health Assembly 71.9*. Geneva: WHA.
- World Health Organization. (1981). *International code of marketing of breast-milk substitutes*. Geneva: WHO.
- World Health Organization. (1998). *Relactation: Review of experience and recommendations for practice*. Geneva: WHO.
- World Health Organization. (2008). *Indicators for assessing infant and young child feeding practices: Part 1: Definitions*. Geneva: WHO.
- World Health Organization. (2010). *Indicators for assessing infant and young child feeding practices Part 2 measurement*. Geneva: World Health Organization (WHO).
- World Health Organization & United Nations Children's Fund. (2003). *Global strategy for infant and young child feeding*. Geneva: WHO.
- World Health Organization, United Nations High Commissioner for Refugees, International Federation of Red Cross & World Food Program. (2000). *The management of nutrition in major emergencies*. Geneva: WHO.

Ankyloglossia Identification, Diagnosis, and Frenotomy: A Qualitative Study of Community Referral Pathways

Journal of Human Lactation
2020, Vol. 36(3) 519–527

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334420887368

journals.sagepub.com/home/jhl



Crystal Unger, MA¹, Ellen Chetwynd, PhD, MPH, BSN, IBCLC^{1,2}, and Rebecca Costello, MPH, IBCLC³

Abstract

Background: Researchers and practitioners continue to debate the most appropriate assessment, diagnostic, and treatment practices for ankyloglossia (tongue-tie). Health care workers struggle to provide evidence-based care in the absence of consistent standards.

Research aim: The aims of this pilot study were to qualitatively (a) evaluate the knowledge of, and attitudes toward tongue-tie and (b) describe how they shaped referral pathways and the establishment of practice patterns of frontline practitioners (pediatric dentists, speech-language pathologists, pediatric chiropractors, and International Board Certified Lactation Consultants).

Methods: We recruited clinicians ($N = 9$) using nonprobability purposive sampling. Participants were interviewed using survey schedules adjusted to reflect their specialty area. Semistructured interviews were transcribed and coded using manual and inductive coding techniques common in grounded theory. Themes were iteratively developed using memoing techniques, in which observations and potential concepts were recorded using the aforementioned codes.

Results: Participants were familiar with a variety of protocols and assessment tools, but did not consistently use them. No formal training about the management of tongue-tie was received through their degree programs. Instead they pursued self-guided study. Interprofessional consensus guided opinions about tongue-tie best practices, and referral pathways reflected these consensuses. International Board Certified Lactation Consultants were viewed as pivotal to the care of infants with tongue-tie while primary care physicians—primarily pediatricians—were omitted from referral pathways.

Conclusion: Lack of formalized training, professional consensus about best practices, and insufficient resources for assessing and treating tongue-tie led participants to incomplete referral pathways and personal interpretations of the data through the lens of anecdotal evidence.

Keywords

access to care, ankyloglossia, breastfeeding, qualitative methods, referral and consultation, tongue-tie

Background

Ankyloglossia, or tongue-tie, is an important issue for breastfeeding mothers and babies. Anterior tongue-tie, and more recently posterior tongue-tie or submucosal tongue-tie, have been associated with maternal breast pain, insufficient infant weight gain, or complete loss of the breastfeeding relationship (Ghaheri, Cole, Fausel, Chuop, & Mace, 2017; Pransky, Lago, & Hong, 2015). Recent publications reveal that while many researchers and practitioners have come to agree that anterior tongue-tie may negatively influence breastfeeding, extensive debate remains concerning how to assess, diagnose, classify, and appropriately treat posterior tongue-tie within the United States and internationally (Douglas, 2017; Ghaheri & Cole, 2017; Jin et al., 2018; Kendall-Tackett, 2017). Researchers have used a range of

assessment techniques for anterior and/or posterior tongue-tie; however, low interrater reliability and lack of external consensus have added to the debate about appropriate

¹College of Agriculture and Life Sciences, Food, Bioprocessing and Nutrition Sciences, North Carolina State University, Raleigh, NC, USA

²Department of Public Health Education School of Health and Human Sciences, University of North Carolina at Greensboro, Greensboro, NC, USA

³Women's Birth and Wellness Center, Chapel Hill, NC, USA

Date submitted: January 30, 2019; Date accepted: October 17, 2019.

Corresponding Author:

Crystal Unger, MA, 675 Sharon Park Dr. Apt 230, Menlo Park, CA, 94025, USA.

Email: crystalunger@gmail.com

treatment strategies (Santa Maria, Aby, Trong, Thakur, & Rea, 2017). Furthermore researchers conducting an international survey demonstrated that few clinicians used assessment tools for diagnosis and that a lack of agreement about which assessment tools to use existed among those who did (Jin et al., 2018). Pediatric societies have recommended referral to breastfeeding support practitioners rather than advising about a specific assessment protocol (Rowan-Legg, 2015). Given the growing research and debate regarding tongue-tie assessment and intervention protocol, we aimed to qualitatively (a) evaluate the knowledge of, and attitudes toward tongue-tie assessment and (b) describe how they shaped referral pathways and the establishment of practice patterns of frontline practitioners (pediatric dentists, speech-language pathologists, pediatric chiropractors, and International Board Certified Lactation Consultants).

Method

Design

We designed a prospective cross-sectional qualitative study using semistructured interviews. This model allowed us to explore controversial and complicated clinical questions in detail with a small number of participants (Starks & Brown Trinidad, 2007). The Institutional Review Board of the University of North Carolina at Chapel Hill approved our study.

Setting

Interview participants practiced primarily in the Research Triangle region of North Carolina, an urban-suburban area encompassing the state capital and surrounding cities, including several large research universities. Due to difficulty locating participants, one dentist interviewed practiced in a different area of the state.

Sample

Sampling was not random as the pool of clinicians who work with tongue-tie infants in our area is small; therefore, we created a nonprobability purposive sample by identifying practitioners working with tongue-tie infants in our geographic area. Our sample was also purposive as we selected participants by clinician type. The final sample consisted of 9 clinicians: 2 International Board Certified Lactation Consultants (IBCLCs), 3 speech-language pathologists (SLPs), 2 pediatric dentists, and 2 pediatric chiropractors.

Data Collection

All participants were provided with and signed an informed consent. They were also informed that responses were voluntary, and that interviews could be terminated at any time.

Key Messages

- Practitioners who work with tongue-tied babies struggle to find consistency in the research and resources for treating this condition.
- A lack of formal training about posterior tongue-tie assessment tools, research outcomes, and treatment options in fields of medicine that address this condition in practice exists.
- Participants reported that IBCLCs are considered pivotal to treatment of tongue-tie, while pediatricians and body workers are sometimes excluded from referral pathways.

Surveys were conducted from February to April 2016. Email invitations were sent to two practitioners from each specialty. Of note, one of our invited SLPs works closely with another SLP and asked that we interview them together, resulting in three SLPs for our study. Invited participants were called twice if they did not respond to the email invite before being replaced with another practitioner.

Many of the questions focused specifically on posterior ankyloglossia; additional questions encompassed anterior ankyloglossia and how providers differentiate the two, and general treatment and referral practices for all ankyloglossia. We utilized a semistructured interview format, which allowed interviewers and participants to range beyond the set questions. Interview guides (included in supplemental materials) included 18 to 20 questions, adjusted to address the specific treatment practices within each specialty. Interviewers also employed free-listing techniques to identify to whom and from whom participants received referrals. Two IBCLCs (EC and RC) reviewed surveys for uniformity.

Interviews were conducted and recorded in person by two researchers, with the exception of one dentist who was interviewed by phone. Only the interviewers were aware of the identities of the participants. Interviews were transcribed and deidentified, with participants assigned codes to blind other researchers to their identities. Recordings were destroyed after transcriptions were completed. All materials were stored on secured computers.

Data Analysis

A researcher (CU), who was blinded to the original research questions, manually and inductively coded the interviews using a grounded theory approach, iteratively developing themes using memoing technique (Corbin & Strauss, 1990). CU also created visual representations of each participant's referral pathways based on their free listing exercise in order to identify common themes and referral practices. Themes were validated by two members of the team (EC and RC), using intercoder reliability techniques (Campbell, Quincy, Osserman, & Pedersen, 2013). Intercoder reliability was

determined by providing EC and RC sample pages from each interview and asking them to independently and inductively code the text. These codes were then reviewed by the full team for agreement. When agreement could not be reached, data were flagged and the team worked to create a new agreed upon theme. Research questions and corresponding themes were then generated and the full data set was uploaded into qualitative analysis software (NVivo, Version 11). This was used to conduct a round of deductive coding in order to confirm the inductive themes that the team members had generated. The resulting codebook was shared with the study team for final agreement, during which time EC and RC independently reviewed a random sample of text units to ensure appropriate assignment of themes—no discrepancies were discovered in this final round.

Results

Interviews lasted between 22 and 71 minutes, with an average duration of 49 minutes. We isolated three themes: knowledge (Table 1), attitudes and opinions (Table 2), and referrals (Table 3). We concluded participants' knowledge and attitudes and opinions regarding posterior tongue-tie research were the primary factors in determining how referrals were generated. Exemplar quotes for each theme and subthemes can be found in Tables 1 to 3.

Study Aim 1: The Knowledge of and Attitudes Toward Tongue-Tie Assessment

Knowledge/Training. None of our participants received formal training through their degree or certification program for assessing or diagnosing posterior tongue-tie. Participants' informal training was acquired due to personal interest in the condition, that is, having or knowing a child with ankyloglossia. The most common alternative educational opportunities (Table 4) included self-directed study, including webinars or independent reading, as well as professional relationships or mentorships (Q1). Only one provider had completed continuing education specific to tongue-tie.

Participants described self-guided training as standard practice within the field and claimed "years of experience" as their primary qualification (Q2). Interestingly, participants acknowledged the need for cohesive formalized posterior tongue-tie training, while expressing ease with self-study. They suggested that arbitrary instructions for identification and the limited number of controlled studies create impediments to their own incorporation of standardized assessment techniques (Q3).

Knowledge/Protocol or Standards of Care. Interviewers asked the participants whether they used formalized assessments when evaluating tongue-tie. Only two respondents mentioned a professional governing body's stance on posterior tongue-tie: the American Speech-Language-Hearing Association and

the Academy of Oral Motor Therapy (AOMT). Regarding AOMT, a dentist indicated that the academy does have a tool for measuring tongue-tie; however, the respondent rarely utilized it.

All 9 participants have developed parameters based on appearance and function for identifying posterior tongue-tie, but emphasized the need for patient-specific flexibility for variations in child temperament (Q4), or the child's history of oral trauma or aversion (Q5). All of our clinicians integrated personal experience with only some components of their tongue-tie training or education to develop protocol, often claiming that academic or research-based standards were out of touch with the needs of tongue-tie clinicians (Q6).

Knowledge/Tools and Techniques. Our clinicians demonstrated knowledge of available assessment tools. Each mentioned at least one of the following measurements: Hazelbaker (1993), Martinelli, Marchesan, and Berretin-Felix (2012), Kotlow (1999), or Coryllos, Genna, and Salloum (2004). However, none of our practitioners regularly utilized them, citing issues ranging from perceived problems in measuring oral motor function to low interrater reliability. A third of our practitioners suggested that formal tools like Hazelbaker (1993) and Kotlow (1999) are limited to a visual exam, or that some children who passed functionally on the Hazelbaker exam still presented with breastfeeding problems. Secondarily, participants suggested that the aforementioned measurements yielded low interrater reliability, and therefore could not be used consistently (Q7 & Q8). In one practice the clinicians had varying interpretations of Hazelbaker's functional assessment technique and were "consistently" measuring function differently from each other, saying, "We were blowing our own data" (SLP2). Ultimately, all 9 participants acknowledged the existence of formal assessment tools—particularly Hazelbaker—and did incorporate portions of it into their practice but did not employ their regular use.

Attitudes or Opinions/Research. Interviews revealed two conflicting relationships with available data; first, all 9 participants saw personal anecdotal evidence as contradicting existing research (Q9) and concluded certain procedures were ineffective. One IBCLC's statements demonstrated this conflict between data and personal experience indicating that she felt the research was not sound enough for her to refer her patients for revision, citing, "Maybe I've heard a couple horror stories about them [frenotomies], so I'm just really cautious" (IBCLC2). Second, either research was alluded to in order to support the participants' own opinions about posterior tongue-tie (Q10), or participants offered vague "they say" statements when discussing literature that did not support their methods. Interestingly, two participants used the phrase "that's the word on the street" when asked if posterior ties were regularly found behind anterior ties, yet both indicated they remained unconvinced. Other times, we encountered more overt "everyone says, but I disagree" statements (Q11).

Table I. Themes and Subthemes With Example Quotations for Knowledge of Assessment Practices and Protocol.

Theme/subtheme	Definition		Quotation	Example
Knowledge/training	How providers acquired assessment, diagnostic, or postoperative skills		Q1	"So at the beginning I did a lot of self-education. I have the old version of <i>Supporting Sucking Skills</i> which I used way back in the day. I have resources I have been collecting but I haven't sat down to pour through them. Hazelbaker did a webinar so that would have been '08 but it was recorded and I would have watched that within the last couple of years. I took tongue-tie training with [name removed]—she did a workshop. A lot of internet reading. I wouldn't really call it training, but looking and seeing what's going on." (IBCLC1)
			Q2	"Have we been trained on tongue-tie? No, but do we have better oral motor intervention practice and training and experience than a lot of typical speech pathologists? Absolutely." (SLP3)
			Q3	"I wouldn't mind if there was—I know there are different ways of assessing it [posterior tongue-tie], and different techniques, indications—classifications, if you will. We are not aligning [with] any particular one. Especially because everyone seems to be using their own anyways." (D1)
Knowledge/protocols or standards of care	Standards of care for assessment, diagnosis, or postoperative care, as determined by the practitioner, and if they are derived from organizations or memberships		Q4	"I touch people for a living and I think about the experience of touching someone for the first time when I was in school—and even a year out and two years out—and how much different my palpation skills are. So, when I put my finger in a child's mouth do you know how different it probably is from, I don't know, 99% of the people who put their fingers in people's mouths? Because I literally touch people all day and the small changes are so apparent—and that's the same for other chiropractors and people who work manually on people." (PC1)
			Q5	"I don't think you can assess babies' function at the breast without looking at the mouth and doing some kind of assessment. The only time I wouldn't do it—well don't do a full assessment—my definition of a full assessment, is if baby has had some sort of oral trauma aversion. So, let's say they've been heavily suctioned at birth and I'm thinking that maybe the latch issue is because of that, then I'm not going to go in and force my way around baby's mouth." (IBCLC1)
			Q6	"The problem for me is that I'm not in an academic world where I need to quantify things. I've done a master's thesis and I understand the concept. So if you're in the academic world and you're trying to objectively look at this you can look at Hazelbaker's or AOMT to screen for it [posterior tongue-tie] and it comes up with a number below it. It says for this number you should have it [posterior tongue-tie] and below this number you shouldn't have it [posterior tongue-tie]. I'm aware of them—I have used them on patients—but I don't routinely use them." (D1)
Knowledge/tools and techniques	Tools, measurements, or techniques employed to assess or diagnose		Q7	"We use a latch score—which I don't think is very good. I would kind of classify them as Cathy Genna's types, and with that I think the first two [types] are pretty easy, and then the three, four sublingual ones [types] I would be slower to clip and usually I would watch it longer. Usually they [Type 3 or 4] are not as obvious if they are having an impact." (IBCLC2)
			Q8	"What I got from the research I did was that none of the tools are really that foolproof. Like you can see a tongue-tie if you want to see a tongue-tie. So, the way I try to assess is to look at the feeding, and if there is a problem with the feeding, and if it could be related to the tongue." (IBCLC2)

Note. Q = quotations; # = participant number; IBCLC = International Board Certified Lactation Consultant; SLP = speech-language pathologist; D = dentist; PC = pediatric chiropractor.

Table 2. Themes and Subthemes With Example Quotations for Opinions and Attitudes.

Theme/subtheme	Definition	Quotation	Example
Opinions and attitudes/research	How practitioners talk about/perceive research regarding assessment tools, impacts of ankyloglossia on breastfeeding, as well as diagnostic rates	Q9 "I would like to see more research with the babies revised with laser versus scissors. There's a lot of information out there that says there's no difference—it's the provider skill. I feel—and I think there are some other people that feel this way locally—that we're seeing babies come out of the laser revision with more pain." (IBCLC1) Q10 "There's like a lot of stuff being published now about aerophagia and reflux, and is it really reflux or does the baby just have poor tongue function? Which is great! I've been seeing that for a hundred years but I just haven't published." (SLP1) Q11 [Referencing body position for assessment] "Everybody wants to do it this way. That's what the word on the street is—for lack of a better way to say it. And you can get a decent picture that way. But if I'm here [standing above at infant's head], I can't really see what the top of the mouth is doing. I always look at it in different ways to be honest." (PC1)	"I would like to see more research with the babies revised with laser versus scissors. There's a lot of information out there that says there's no difference—it's the provider skill. I feel—and I think there are some other people that feel this way locally—that we're seeing babies come out of the laser revision with more pain." (IBCLC1) "There's like a lot of stuff being published now about aerophagia and reflux, and is it really reflux or does the baby just have poor tongue function? Which is great! I've been seeing that for a hundred years but I just haven't published." (SLP1) [Referencing body position for assessment] "Everybody wants to do it this way. That's what the word on the street is—for lack of a better way to say it. And you can get a decent picture that way. But if I'm here [standing above at infant's head], I can't really see what the top of the mouth is doing. I always look at it in different ways to be honest." (PC1)
Opinions and attitudes/role of other professions	How practitioners perceive the roles of other providers outside their own profession? What do practitioners see as the scope of practice for other professions?	Q12 "I will refer out either to a LC [lactation consultant], or a dentist, or a speech-language pathologist if I feel like there is a questionable tongue-tie. So, I never diagnose that." (PC2) Q13 [Regarding growth in ankyloglossia diagnosis] "Yeah. There has been. I have made a conscious decision over the last six months to—unless I see something screaming 'tie'—I'm going to advise conservative management." (IBCLC1) Q14 "My goal is always to avoid the revision if we can. So, I try to do as much ahead of time to see what changes can happen and, you know, sometimes it resolves." (PC2)	"I will refer out either to a LC [lactation consultant], or a dentist, or a speech-language pathologist if I feel like there is a questionable tongue-tie. So, I never diagnose that." (PC2) [Regarding growth in ankyloglossia diagnosis] "Yeah. There has been. I have made a conscious decision over the last six months to—unless I see something screaming 'tie'—I'm going to advise conservative management." (IBCLC1) "My goal is always to avoid the revision if we can. So, I try to do as much ahead of time to see what changes can happen and, you know, sometimes it resolves." (PC2)
Opinions and attitudes/role of practitioner	How practitioner perceives his or her role in diagnosing and assessing: How does he or she perceive his or her scope of practice?	Q15 "Alright, so ideal course of action. That's a big question. But, I would say consultation with someone who specializes—whether that is a dentist that specializes in it, like me, or a lactation consultant who has experience in restriction, or the other third group that comes to mind would be like a chiropractor or somebody who does massage to help alleviate tension and tightness that can also help alleviate some of the symptoms. And I say that because whether they go to either of those groups, if there is good enough—if the networking is good enough or strong enough then when I see a case and I say, 'Well, there is some restriction here but there is also a lot of muscle tension so you might want to consider some bodywork, some massage, or chiropractic work to help alleviate tension before we do the treatment.' Or, likewise, start with that but if symptoms don't go away despite our best efforts to relax those muscles, it looks like we might need to do a restriction or refer to someone like me who actually takes care of the tissue." (D1) Q16 "So you start talking and then, see, lactation people have already looked at all this and I have one that I work with in private practice and she sends them [parents] in with the checklist saying what things are going on and so I know from when they walk in the door that she's already looked at the function so I'm the second eyes and I am just sort of reaffirming and reassessing what's going on and then I can tell them [parents] what the fix is." (D2) Q17 "There are a few I don't recommend because I think they have other problems. Or they think they have a problem and they really don't have a problem. Some parents think they got a problem and they don't, so I think they get sent here to hear it from somebody else." (D2) Q18 "There is a certain amount of professional respect you like to give people, and I've kind of had it with that whole idea that 'You need to go do this [tongue-tie revision] immediately or your baby will die.' That fear put in people." (PC1)	"Alright, so ideal course of action. That's a big question. But, I would say consultation with someone who specializes—whether that is a dentist that specializes in it, like me, or a lactation consultant who has experience in restriction, or the other third group that comes to mind would be like a chiropractor or somebody who does massage to help alleviate tension and tightness that can also help alleviate some of the symptoms. And I say that because whether they go to either of those groups, if there is good enough—if the networking is good enough or strong enough then when I see a case and I say, 'Well, there is some restriction here but there is also a lot of muscle tension so you might want to consider some bodywork, some massage, or chiropractic work to help alleviate tension before we do the treatment.' Or, likewise, start with that but if symptoms don't go away despite our best efforts to relax those muscles, it looks like we might need to do a restriction or refer to someone like me who actually takes care of the tissue." (D1) "So you start talking and then, see, lactation people have already looked at all this and I have one that I work with in private practice and she sends them [parents] in with the checklist saying what things are going on and so I know from when they walk in the door that she's already looked at the function so I'm the second eyes and I am just sort of reaffirming and reassessing what's going on and then I can tell them [parents] what the fix is." (D2) "There are a few I don't recommend because I think they have other problems. Or they think they have a problem and they really don't have a problem. Some parents think they got a problem and they don't, so I think they get sent here to hear it from somebody else." (D2) "There is a certain amount of professional respect you like to give people, and I've kind of had it with that whole idea that 'You need to go do this [tongue-tie revision] immediately or your baby will die.' That fear put in people." (PC1)

Note. Q = quotations; # = participant number; IBCLC = International Board Certified Lactation Consultant; SLP = speech-language pathologist; PC = pediatric chiropractor; D = dentist.

Table 3. Themes and Subthemes With Example Quotations for Referrals.

Theme/subtheme	Definition	Quotation	Example
Referrals/to and from whom	To whom practitioners refer and from whom they receive for second opinions or other interventions, and what factors drive these referrals	Q19	"I've tried to reach out [to] the other people who are familiar with these techniques. Especially when I really got really concerned that there was danger. That's when I really started to reach out and go, 'Hey! Guys! Somebody, help. I need more people to verify what I'm seeing, and are you guys seeing the same thing'—which is breast refusal concern after the laser procedure." (PCI)
Referrals/omissions	To whom practitioners refuse to give referrals, or practitioners who do not refer out, and the perceived factors that drive these omissions	Q20	"We have been told point blank from a number of local [pediatric] practices that they do not believe in body work, they do not believe in chiropractic, and they will not have us making any suggestions of referrals to chiropractic or body work to their patients. Point blank. And usually it's the lactation person [in a pediatric clinic] saying, 'Don't mention body work.'" (SLP3)
		Q21	"And the providers that do the clipping are not trained to assess function. And so if we're saying that tongue-tie is not just anatomy it's also function, but they can't evaluate function they're only evaluating anatomy, then I'm on the fence." (IBCLC1)

Note. Q = quotations; # = participant number; PC = pediatric chiropractor; SLP = speech-language pathologist; IBCLC = International Board Certified Lactation Consultant.

Table 4. Participants Training and Education Methods for Assessing Tongue-Tie.

Education method	n (%)	Examples
Self-directed study	7 (77.8)	Webinars; online tutorials; independent reading or research
Professional connections	6 (66.7)	Mentorships; shadowing; one-on-one instruction
Conferences	5 (55.6)	In-person seminars, conferences, or summits
Personal experience	5 (55.5)	Observation of patient outcomes
Continuing education	3 (33.4)	Laser training (not infant frenotomy specific); ankyloglossia course

Note. Participants listed methods for acquiring tongue-tie assessment training, which were consolidated into four categories.

Attitudes or Opinions/[of] Provider Roles. Participants placed themselves into one of two groups; those who can assess but not diagnose, and those who can diagnose and do the release. The chiropractors, IBCLCs, and SLPs in our study indicated their scope of practice only encompassed assessment (Q12), with an aim of preventing revision. Overwhelmingly, conservative management was the primary goal of these practitioners (Q13 & Q14). Dentists self-identified as being able to diagnose and release, yet their language was similarly conservative, and they viewed themselves as confirming the assessment of whichever practitioner placed the referral for evaluation of tongue-tie (Q15). In one instance, a dentist emphasized that he was not "surgery happy," and the other dentist responded similarly—indicating that he sometimes saw patients to affirm that they did not have posterior tongue-tie (Q16 & Q17). While secure in their own scope of practice, all 9 practitioners expressed concern that other clinicians did not always adhere to appropriate practice guidelines. They expressed frustration at what they perceived to be a lack of education or understanding about the relationship between tongue-tie and breastfeeding (Q18).

Study Aim 2: Describe Referral Pathways and Practice Patterns

Referrals. Free listing revealed three referral schemas of (a) referred to, (b) referred from, and (c) omissions. We created visual representations or maps of these referral schemas—placing each clinical specialty under one or more of the referral schemas based on the participants' free list. We then attached exemplar quotes to each specialty in order to reveal how a participant categorized each specialty (Supplemental Figures 1-8). The wide array of referrals yielded few consistencies—even within the same profession. The clearest pattern was based not on clinical specialty but instead on ideological agreement, as explained below.

Referrals/To and From Whom. Referral pathways were most often predicated on agreement or affirmation of the participants' assessments (Q19). In other words, clinicians referred to those who agreed with their assessment of what constituted appropriate posterior tongue-tie identification and intervention, rather

than referring based on standardized adherence to protocol. Participants indicated that they referred regularly to practitioners with whom they felt “comfortable,” or with whom they had “developed a great relationship.” Further, many of our respondents noted that they referred to a particular practitioner because they were able to communicate their assessment outcomes and received affirmation of their own assessment (e.g., the case between a SLP and an ENT): “We call him and tell him what our concerns are, and he calls us and tells us what he did and why—and that’s a great referral” (SLP1). In other instances, our participants allowed the preferences of the primary care physician to determine whom they would refer a client to, as demonstrated by two SLPs saying,

We have been told point-blank from a number of local practices that they do not believe in body work, they do not believe in chiropractic, and they will not have us making any suggestions of referrals to chiropractic or body work to their patients. Point-blank. (SLP2)

Other participants provided anecdotes about disagreements with practitioners, resulting in an end to that referral relationship: “I used to get referrals from one [craniosacral therapist] . . . but they don’t refer to me anymore, because I told [the parent] to wait and not get the revision immediately” (PC1). Interestingly, all of our practitioners placed value on relationships with providers who indicated they cannot diagnose tongue-tie, particularly with IBCLCs, who were seen as integral to effective treatment outcomes. The only consistent referral among all participants was to and from IBCLCs, while no other group was consistently represented across all the referral maps.

Referrals/Omissions. Professional agreement also drove what type(s) of practitioners our participants omitted from their referral structures. An omission refers to either the absence of our participants furnishing referrals to particular clinicians, or clinicians who do not furnish referrals to our participants. In both instances our practitioners omitted particular clinicians due to lack of agreement over assessment practices, disagreement over care plans, and perceived deficits in the omitted clinician’s posterior tongue-tie education. When questioned about whether they referred to pediatricians, all of our participants—including dentists—categorized them as an omission, with the exception of a single IBCLC who made pediatric referrals, but only when a patient needed the pediatrician to provide a primary care referral to an ENT. Participants thought that pediatricians needed more education regarding assessment of posterior tongue-tie, as well as its effects on breastfeeding. Further, several respondents laughed when asked if pediatricians ever make referrals for tongue-tie interventions. Others reported conflicts that had arisen with pediatricians over patient care plans: “This doctor was yelling at me because he said I told [a] mom she should go to a chiropractor—and you know MDs don’t like chiropractors” (SLP1). And yet, 6 of

the 9 participants’ referral maps indicated that they received referrals *from* pediatricians. Pediatric opinion also contributed to the omission of other practitioners. Bodyworkers—chiropractors and craniosacral therapists—were also regularly omitted. Five of our participants stated that pediatricians or IBCLCs from pediatric practices requested that bodyworkers not see infants (Q20).

Dentists and ENTs—when classified as omissions—were also assumed to lack education about posterior tongue-tie and were portrayed as assessing form alone rather than also including the function of the tongue during breastfeeding (Q21). Secondarily, there was a general lack of conviction that dentists would turn clients away when they did not, in fact, have a true tongue-tie requiring revision.

Discussion

This pilot study demonstrates that the lack of consensus surrounding anterior and posterior tongue-tie assessment tools, research outcomes, and treatment options creates inconsistencies in practice among professionals. Increasingly, researchers and clinicians in the field of lactation support have called for the creation of standardized tools for posterior tongue-tie identification (Jin et al., 2018; Lawrence, 2013; Todd, 2014; Walsh, Links, Boss, & Tunkel, 2017), and several have created new tools to supplement or replace existing assessment methods (Ingram, Johnson, Copeland, Churchill, & Taylor, 2015; Yoon et al., 2017). However, little agreement exists on a standardized assessment method. We found that these inconsistencies influenced our participants’ understanding of tongue-tie research, resulting in lack of use of guiding protocols to evaluate and manage tongue-tie within or across practice settings or types.

Our participants pieced together their own training curricula from existing literature and webinars; evidence-based methodologies and protocols were not part of their training. This practice was confirmed by Shaikh and Smillie (2008), who also have reported that the majority of surveyed physicians in breastfeeding clinics are educated via materials sought as a result of their own curiosity. Furthermore, Edwards and colleagues (2015) have suggested that frontline practitioners utilize free and convenient online resources, because time limitations, regional access, and financial limitations serve as barriers to formal continuing education. Our findings support Bin-Nun, Kasirer, and Mimouni’s (2017) supposition that there is not enough existing evidence to build diagnostic guidelines by demonstrating that a lack of cohesive protocol also encourages subjective selection of assessment techniques. Similarly, our other respondents demonstrate an understanding of the research, yet are keenly aware of the lack of consensus—a dichotomy most easily resolved by subjectively attaching personal experiences in support or opposition of the existing evidence. By regularly citing disagreements among researchers, our participants expressed comfort in creating their own identification

protocols, which is a practice others have reported about tongue-tie practitioners (Edmunds, Fulbrook, & Miles, 2013).

The majority of interviewed participants sought the advice of other professionals, suggesting that reliance on personal contacts laid the groundwork for a referral structure predicated on personal agreement, rather than standardized protocol. Consistently, our participants advocated for IBCLC support both before and after surgical and nonsurgical interventions—a practice upheld by others research (Benoitton, Morgan, & Baguley, 2016; Ingram et al., 2015; Pransky et al., 2015). However, the referral maps of our participants revealed that the clearest pattern was based not on participants' clinical specialty, but rather on consensus. This fosters an environment in which participants sought consensus on the local level through their referral practices and thereby created isolated networks that may have omitted clinicians who would have offered new perspectives and/or played a role in correcting breastfeeding issues caused by tongue-tie.

Of particular note is the hesitation around referrals to pediatricians. Six of our respondents expressed concern that pediatricians would not reinforce their assessments. All participants expressed a desire for pediatricians to receive additional education about tongue-tie identification, and this condition's influence on breastfeeding, a perception supported by several recent studies and reviews in which researchers demonstrated that pediatricians expressed confusion or disagreement in this area (Edwards et al., 2015; Pransky et al., 2015; Rowan-Legg, 2015; Wong, Patel, Cohen, & Levi, 2017). Omitting pediatricians from referral pathways could introduce problems in providing consistent pediatric care. Currently, pediatricians serve as gatekeepers to the network of care providers who can assist in tongue-tie interventions. Without better education for pediatricians regarding tongue-tie, and tongue-tie practitioners willing to collaborate with those pediatricians, we are left with a referral process that may impede parents' access to appropriate care. Parents also may receive conflicting messages from different specialties, for example, whether or not bodywork is indicated and safe.

Our study participants all referred to IBCLCs, suggesting that IBCLCs are considered important to breastfeeding care plans, yet IBCLCs are often excluded from U.S. insurance networks (Chetwynd, Meyer, Stuebe, Costello, & Labbok, 2013). The lack of IBCLC recognition by insurance providers means that parents, particularly those with limited financial resources, potentially lack access to the network of care used to remedy tongue-tie difficulties.

Evaluation of clinicians' lived experiences within their practice settings is paramount to fully understanding the need for stronger evidence in this field. While this study was specific to the U.S. health care model, similar patterns may arise in other health care systems. As a pilot study, we hope this work serves to highlight areas for future, larger-scale research. Our research raises concerns about practice variation and

referral pathways used to diagnose and treat tongue-tie. Larger-scale research might be conducted in a broader range of geographic locations, and include additional practitioner types (especially pediatricians and other physicians) as well as the perspective of nursing parents and other family members.

Limitations

We made every effort to eliminate bias in the design of the interview questions, but we recognize that our own notions about posterior tongue-tie may have affected the formulation of questions, and how the interview guides were implemented with respondents. We anticipated and mitigated coding bias by including a researcher for data analysis with little knowledge about this area of lactation support and the surrounding controversy.

Our findings must be interpreted within the limitations of our study design. Our study was small and local, limiting its generalizability; however, our design did allow for mapping of referral networks among clinicians working in the same geographic area. Not all tongue-tie practitioners were represented in our study sample. Future research could benefit from the inclusion of physicians and midlevel providers who perform frenotomies, as well as pediatric primary care providers.

Conclusion

A lack of consistent professional education and widely agreed-upon tools for assessment and diagnosis of tongue-tie, especially posterior tongue-tie, led to inconsistencies in practice patterns of participants, suggesting that practitioners may build referral pathways based on shared beliefs, potentially eliminating care providers, particularly primary care providers, from treatment plans. Further research is needed to determine whether this pattern is replicated in other communities.

Acknowledgments

The authors acknowledge Amber Christis, IBCLC; Amelia Fry, MS, CCC-SLP, IBCLC; Cheryl Malkin, CCC-SLP, IBCLC; and Amanda Petry, BSN, RN, IBCLC.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Crystal Unger  <https://orcid.org/0000-0003-4314-2773>
Ellen Chetwynd  <https://orcid.org/0000-0001-5611-8778>

Supplemental Material

Supplemental material for this article is available online.

References

- Amir, L. H., James, J. P., & Donath, S. M. (2006). Reliability of the Hazelbaker Assessment Tool for Lingual Frenulum Function. *International Breastfeeding Journal*, 1(1), 3.
- Benoitou, L., Morgan, M., & Baguley, K. (2016). Management of posterior ankyloglossia and upper lip ties in a tertiary otolaryngology outpatient clinic. *International Journal of Pediatric Otorhinolaryngology*, 88, 13–16. doi:10.1016/j.ijporl.2016.06.037
- Bin-Nun, A., Kasirer, Y. M., & Mimouni, F. B. (2017). A dramatic increase in tongue tie-related articles: A 67 years systematic review. *Breastfeeding Medicine*, 12(7), 410–414. doi:10.1089/bfm.2017.0044
- Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews. *Sociological Methods & Research*, 42(3), 294–320. doi:10.1177/0049124113500475
- Chetwynd, E., Meyer, A., Stuebe, A., Costello, R., & Labbok, M. (2013). Recognition of International Board Certified Lactation Consultants by health insurance providers in the United States: Results of a national survey of lactation consultants. *Journal of Human Lactation*, 29(4), 517–526. doi:10.1177/0890334413499974
- Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13(1), 3–21.
- Coryllos, E., Genna, C. W., & Salloum, A. C. (2004). Congenital tongue-tie and its impact on breastfeeding. *American Academy of Pediatrics Section on Breastfeeding*, 1–6.
- Douglas, P. S. (2017). Conclusions of Ghaheri's study that laser surgery for posterior tongue and lip ties improves breastfeeding are not substantiated. *Breastfeeding Medicine*, 12(3), 180–181. doi:10.1089/bfm.2017.0008
- Edmunds, J. E., Fulbrook, P., & Miles, S. (2013). Understanding the experiences of mothers who are breastfeeding an infant with tongue-tie: A phenomenological study. *Journal of Human Lactation*, 29(2), 190–195. doi:10.1177/0890334413479174
- Edwards, R., Colchamiro, R., Tolan, E., Browne, S., Foley, M., Jenkins, L., & Nordstrom, C. (2015). Online continuing education for expanding clinicians' roles in breastfeeding support. *Journal of Human Lactation*, 31(4), 582–586.
- Genna, C. W. (2008). *Supporting sucking skills in breastfeeding infants*. Sudbury, MA: Jones and Bartlett.
- Ghaheri, B. A., & Cole, M. (2017). Response to Douglas re: "Conclusions of Ghaheri's study that laser surgery for posterior tongue and lip ties improves breastfeeding are not substantiated." *Breastfeeding Medicine*, 12(3), 182–183. doi:10.1089/bfm.2017.0018
- Ghaheri, B. A., Cole, M., Fausel, S. C., Chuop, M., & Mace, J. C. (2017). Breastfeeding improvement following tongue-tie and lip-tie release: A prospective cohort study. *Laryngoscope*, 127(5), 1217–1223. doi:10.1002/lary.26306
- Hazelbaker, A. K. (1993). *The Assessment Tool for Lingual Frenulum Function (ATLFF): Use in a lactation consultant private practice* (Unpublished doctoral dissertation). Pacific Oaks College, Pasadena, CA.
- Ingram, J., Johnson, D., Copeland, M., Churchill, C., & Taylor, H. (2015). The development of a new breastfeeding assessment tool and the relationship with breastfeeding self-efficacy. *Midwifery*, 31(1), 132–137. doi:10.1016/j.midw.2014.07.001
- Jin, R. R., Sutcliffe, A., Vento, M., Miles, C., Travadi, J., Kishore, K., . . . Ma, L. (2018). What does the world think of ankyloglossia? *Acta Paediatrica*, 107(10), 1733–1738.
- Kendall-Tackett, K. (Ed.). (2017). Tongue-tie expert roundtable [Special issue]. *Clinical Lactation*, 8(3).
- Kotlow, L. A. (1999). Ankyloglossia (tongue-tie): a diagnostic and treatment quandary. *Quintessence International*, 30(4), 259–262.
- Lawrence, R. A. (2013). Tongue-tie—The disease du jour. *Breastfeeding Medicine*, 8(6), 467–468. doi:10.1089/bfm.2013.9976
- Martinelli, R. D. C., Marchesan, I. Q., & Berretin-Felix, G. (2012). Lingual frenulum protocol with scores for infants. *International Journal of Orofacial Myology*, 38, 104–112.
- NVivo (Version 11) [Qualitative data analysis software]. (2015). Melbourne, Australia: QSR International Pty Ltd. Available from <https://www.qsrinternational.com/nvivo/home>
- Pransky, S. M., Lago, D., & Hong, P. (2015). Breastfeeding difficulties and oral cavity anomalies: The influence of posterior ankyloglossia and upper-lip ties. *International Journal of Pediatric Otorhinolaryngology*, 79(10), 1714–1717. doi:10.1016/j.ijporl.2015.07.033
- Rowan-Legg, A. (2015). Ankyloglossia and breastfeeding. *Paediatrics & Child Health*, 20(4), 209–213. doi:10.1093/pch/20.4.209
- Santa Maria, C., Aby, J., Trong, M., Thakur, Y., & Rea, S. (2017). The superior labial frenulum in newborns: What is normal? *Global Pediatric Health*, 4. doi:10.1177/2333794X17718896
- Shaikh, U., & Smillie, C. M. (2008). Physician-led outpatient breastfeeding medicine clinics in the United States. *Breastfeeding Medicine*, 3(1), 28–33. doi:10.1089/bfm.2007.0011
- Starks, H., & Brown Trinidad, S. (2007). Choose your method: A comparison of phenomenology, discourse analysis, and grounded theory. *Qualitative Health Research*, 17(10), 1372–1380. doi:10.1177/104973207307031
- Todd, D. A. (2014). Tongue-tie in the newborn: What, when, who and how? Exploring tongue-tie division. *Breastfeeding Review*, 22(2), 7–10.
- Walsh, J., Links, A., Boss, E., & Tunkel, D. (2017). Ankyloglossia and lingual frenotomy: National trends in inpatient diagnosis and management in the United States, 1997–2012. *Otolaryngology-Head and Neck Surgery*, 156(4), 735–740.
- Wong, K., Patel, P., Cohen, M. B., & Levi, J. R. (2017). Breastfeeding infants with ankyloglossia: Insight into mothers' experiences. *Breastfeeding Medicine*, 12(2), 86–90. doi:10.1089/bfm.2016.0177
- Yoon, A., Zaghi, S., Weitzman, R., Ha, S., Law, C. S., Guilleminault, C., & Liu, S. Y. C. (2017). Toward a functional definition of ankyloglossia: Validating current grading scales for lingual frenulum length and tongue mobility in 1052 subjects. *Sleep and Breathing*, 21(3), 767–775. doi:10.1007/s11325-016-1452-7

Understanding the Challenges of Induction of Lactation and Relactation for Non-Gestating Spanish Mothers

Journal of Human Lactation

2020, Vol. 36(3) 528–536

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0890334419852939

[journals.sagepub.com/home/jhl](http://jhl.sagepub.com/home/jhl)

Gemma Cazorla-Ortiz^{1,2} , Paola Galbany-Estragués, PhD^{3,4} , Noemí Obregón-Gutiérrez, PhD^{1,2}, and Josefina Goberna-Tricas, PhD⁵ 

Abstract

Background: Induced lactation and relactation are the processes that enable breastfeeding in non-gestating mothers.

Research aim: The aim of this study was to describe and interpret the challenges faced by mothers who undergo induced breastfeeding and relactation for adopted infants, infants born via surrogacy, and infants born to same-sex female partners.

Methods: A qualitative study was performed using in-depth interviews conducted with Spanish women ($N = 9$) who had decided to undergo induced lactation or relactation. The data were collected between October 2014 and May 2017. The length of the study was due to the difficulty in locating and recruiting the sample. Interviews were transcribed and coded with the ATLAS.ti v.7.5.7 software. We performed a deductive thematic analysis, creating categories based on the interview questions, which we developed on the basis of previous literature about induced lactation and relactation.

Results: Participants described the following challenges: the physical hardships of the process; breastfeeding problems; difficulty with accessing information about induced lactation or relactation; and lack of support from health professionals. Breastfeeding periods lasted from 1.5 months to 4 years. Participants reported that breastfeeding increased the closeness between the mother and child and that this feeling of closeness tended to decrease after breastfeeding cessation.

Conclusion: We offer data and analysis that can improve our understanding of the lived experiences of women undergoing the process of relactation or induced lactation and may help guide intervention strategies to support women in this situation.

Keywords

breastfeeding, induced lactation, qualitative methods, relactation

Background

Human milk, as the normal food for infants, contains antibodies and a multitude of other immune factors needed for normal growth and development and the long-term protection from numerous chronic illnesses. It also reduces the mother's risk of breast and ovarian cancer, Type 2 diabetes, and postpartum depression (World Health Organization [WHO], 2017). Additionally, Gibbs, Forste, and Lybbert (2018) show that breastfeeding provides a strong foundation for the mother-child bond. Breastfeeding also serves as a social symbol of maternal identity (Marshall, Godfrey, & Renfrew, 2007; Schmied & Lupton, 2001; Williams, Kurz, Summers, & Crabb, 2012). The pressure to provide the best for one's baby, minimize the risk of illness, and meet social expectations is likely to affect the decision to breastfeed (Afflerbach, Carter, Koontz, & Grauerholz, 2013).

While most women who breastfeed do so with babies they have gestated, non-gestating mothers can still choose to breastfeed children who were adopted (Szucs, Axline, & Rosenman, 2010), born through surrogacy (Banapurmath,

Banapurmath, & Kesaree, 1993), or born to their female partner (Wilson, Perrin, Fogelman, & Chetwynd, 2015). For women who have not previously breastfed, this process is

¹Department of Public Health, Mental Health and Perinatal Nursing, Faculty of Medicine and Health Sciences, Universitat de Barcelona, L'Hospitalet de Llobregat, Barcelona, Spain

²Hospital Universitari Parc Taulí, Sabadell, Barcelona, Spain

³Research group on Methodology, Models, Methods and Outcomes of Health and Social Sciences (M3O) Faculty of Health Sciences and Welfare, University of Vic—Central University of Catalonia (UVic-UCC), Vic, Spain

⁴AFIN. Social and Cultural Department, Universitat Autònoma de Barcelona, Bellaterra, Spain

⁵Department of Public Health, Mental Health and Perinatal Nursing, Faculty of Medicine and Health Services, ADHUC—Research Center for Theory, Gender and Sexuality, Universitat de Barcelona, L'Hospitalet de Llobregat, Barcelona, Spain

Date submitted: May 1, 2018; Date accepted: May 4, 2019.

Corresponding Author:

Paola Galbany-Estragués, Faculty of Health Sciences and Welfare, University of Vic – Central University of Catalonia (UVic-UCC), C. Sagrada Família, 7, Vic, Barcelona 08500, Spain.

Email: paola.galbany@uvic.cat

called “induced lactation.” If they have previously breastfed, it is termed “relactation” (WHO, 1998). Mothers often decide to undergo induced lactation or relactation to strengthen the mother–child bond (Flores-Antón, García-Lara, & Pallás-Alonso, 2017).

Induced lactation and relactation have gained popularity in Spain over the past 15 years, as traditional families have given way to new family structures, under which children enter a family via adoption, surrogacy, or sperm donation. Adoption has become very common in Spain, where around 1000 children are adopted each year (Ministerio de Sanidad, Servicios Sociales e Igualdad, 2017a). When it comes to surrogacy, although the practice is illegal in Spain (Techniques of Assisted Human Reproduction Act, 2006), Spanish citizens often arrange surrogate pregnancies in countries where the practice is legal (Darnovsky & Beeson, 2015). Couples comprising two women can legally use insemination with donor sperm to achieve a pregnancy (Techniques of Assisted Human Reproduction Acts 2006, 2015).

In Spain, according to the most recent national health survey, 74% of infants aged 6 weeks are fed with human milk. This figure drops to 64% at 3 months and 39% at 6 months (Instituto Nacional de Estadística [INE], 2017). The main reasons for cessation of breastfeeding is perceived milk insufficiency and returning to work (Ramiro et al., 2017). There are no data available regarding the prevalence of induced lactation or relactation in Spain.

Much of the existing research about induced lactation and relactation concerns methods. In the pharmacological method, women take galactagogues or hormonal treatments (estrogen and progesterone). Hormonal treatments create a hormonal state similar to that which occurs during pregnancy. Both treatments have potential side effects, including weight gain, headaches, gastric problems, depression, and irregular periods. In addition to taking medication, women using the pharmacological approach must also undergo breast stimulation (Forinash, Yaney, Barnes, & Myles, 2012; Sabatini & Cagiano, 2006). Induced lactation and relactation can also be performed using non-pharmacological methods based on the frequent stimulation of the breasts. Herbal galactagogues (e.g., fenugreek and blessed thistle) are sometimes used to assist in relactation and induced lactation (Wittig & Spatz, 2008).

Researchers have identified success factors for induced lactation and relactation, including maternal motivation, positive attitude, frequent stimulation of breasts, sucking by the baby, family support (especially the partner’s), and support from health professionals (Gribble, 2004). Lommen and Brown (2015) concluded that the support that women received from breastfeeding services and their families enabled them to breastfeed their babies and face feelings of rejection, anger, stress, and failure. Flores-Antón et al. (2017) described a mother who managed to feed her adopted baby exclusively with her own milk and argued that motivation and confidence helped her succeed.

Key Messages

- The main motivation for undergoing induced lactation or relactation was to strengthen closeness between the mother and child through breastfeeding. Participants reported that breastfeeding cessation diminished this feeling of closeness.
- During the processes of induced lactation and relactation, the key challenges for women were physical difficulties, lack of information, lack of support from professionals, and doubts about whether they would have a successful outcome and be able to breastfeed their babies.
- Women who underwent induced lactation and were therefore breastfeeding for the first time experienced problems with their breasts. Women undergoing relactation did not have problems with their breasts.

As we have outlined, studies about induced lactation and relactation focus on methods and success factors. However, there is a lack of research about the experience of women who undergo these processes, which we divided into three phases: induction/relactation until the establishment of milk production; the breastfeeding of the infant; and breastfeeding cessation. As far as we know, our study was the first in which researchers examined, under a single lens, the three modes of reproduction in which women may choose lactation and relactation (adoption, surrogacy, and sperm donation). Specifically, we describe the challenges faced by women in Spain undergoing induced lactation and relactation. This research is important because new family models in Spain have increased cases of induced lactation and relactation, but little is known about how non-gestating women experience these processes. Our aim in this study was to describe the challenges faced by mothers who undergo induced breastfeeding and relactation for adopted infants, infants born via surrogacy, and infants born to same-sex female partners.

Methods

Design

This was a prospective and cross-sectional generic qualitative study. To explore the experiences of women who had undergone induced lactation and relactation, we deemed qualitative methods to be most appropriate, given that they allow researchers to understand participants experiences (Jiggins & Evans, 2016; Renate, 2014; Sandelowski, 2000). The research was approved by the Research Ethics Committee of the Health Corporation of Parc Taulí Hospital (reference 2015568) and the Bioethics Committee of the University of Barcelona (reference IRB00003099).

Setting

The research were based in Catalonia, Spain. Spain has a public health system providing universal, comprehensive, free care to citizens and foreign residents. Pregnancy, childbirth, and postpartum care are fully covered. Spain also has private hospitals offering pregnancy, childbirth, and postpartum care. Breastfeeding is encouraged and supported in both the public and private systems. In both systems, pregnant women receive breastfeeding education and support during pregnancy, immediately after childbirth, and during postpartum visits (Ministerio de Sanidad, Servicios Sociales e Igualdad, 2017b). Outside the health system, women can also receive breastfeeding support privately from lactation support providers and International Board Certified Lactation Consultants.

Sample

The target population was women living in Spain who had undergone induced lactation or relactation to breastfeed an adopted child, a child born through surrogacy, or a child born to the woman's same-sex partner through sperm donation. We define breastfeeding as the process by which a child consumes human milk (including expressed milk and milk from a wet nurse). The breastfed infant may also consume other food or liquid, including non-human milk and formula (Noel-Weiss, Boersma, & Kujawa-Myles, 2012). Inclusion criteria were: (1) women who had undergone induced lactation or relactation and were no longer breastfeeding their children; (2) women who, after undergoing induced lactation or relactation, were still breastfeeding; or (3) women who had undergone induced lactation or relactation and who were in the process of ceasing breastfeeding. All women participated voluntarily in the study. Sample exclusion criteria were: (1) < 18 years of age at the time of the study; (2) women who did not speak Spanish or Catalan; and (3) women outside Catalonia who were unable to perform the interview via videoconference. Participants were not required to have undergone induction or relactation within a certain timeframe.

Author 1 contacted breastfeeding support groups and lactation support providers to identify the first participant. The remaining participants were identified with snowball sampling. Ten women were identified, and nine of these met the inclusion criteria. We contacted these nine women via email to offer study details, provide a consent form guaranteeing data confidentiality, and to commit to informing participants of the study results. The sample was small due to the small population size and the difficulty of recruitment. We were able to recruit three participants each from the three situations in which induced lactation and relactation occur. We ceased recruiting participants when we reached data saturation.

Data Collection

All participants gave their consent before being interviewed. All data were collected between October 2014 and May 2017. The lengthy timeframe for data collection resulted from our difficulties in recruiting participants. Few women in Spain choose induction or relactation in the case of adoption, surrogacy, or a partner's pregnancy. Moreover, there is no database tracking the existing cases.

Semi-structured interviews were conducted using open-ended questions that addressed difficulties during the process, motivational and de-motivational factors, feelings and thoughts, and an evaluation of the entire process (Kallio, Pietilä, Johson, & Kangasniemi, 2016). We organized the interview guide (Table 1) around the three phrases of induction and relactation, and we developed the interview questions following classic studies in which researchers have laid the groundwork for understanding the experiences of women undergoing these processes (Auerbach & Avery, 1981; Hormann, 1977; Thearle & Weissenberger, 1984). This kind of deductive design is useful in ensuring that all areas the researchers wish to investigate emerge in the interviews (Percy, Kostere, & Kostere, 2015). Author 1 conducted in-person interviews with five participants and Skype interviews with four. Interviews were conducted in Catalan and/or Spanish and averaged 50 min (range = 40–160). They were recorded and transcribed in the original language and checked by Authors 1 and 2. A professional translator translated the examples from the original language into English.

To maximize the reflexivity of the research process (Buetow, 2019; Dogson, 2019), Author 1 kept a field diary in which she reported her impressions of each interview. In the interviews, she presented herself to study participants as a nurse–midwife and a student undertaking a PhD in nursing. Participants' awareness that Author 1 was a nurse–midwife may have led them to paint an overly positive picture of breastfeeding. However, their multiple descriptions of the difficulties they faced seems to discourage this interpretation.

Participants' names were substituted with the letter "P" (participant), followed by a number. Author 1 saved the transcribed interviews on a personal hard drive to maintain participants' confidentiality. Once the study is completed and published, transcripts will be destroyed.

Data Analysis

The analysis process is detailed in Table 2. Following Braun and Clarke (2006), we familiarized ourselves with the data, generating an initial set of codes that drew on the theoretical model and our interview guide. Then Authors 1 and 2 jointly read and coded the transcriptions using ATLAS.ti v.7.5.7 (Scientific Software Development GmbH, 2015). We then incorporated the emerging codes into our predetermined

Table 1. Interview Guide.

Stages of the Process of Induced Lactation / Relactation	Questions
1. Induced lactation / relactation	What difficulties or unpleasant aspects appeared during the process of induced lactation or relactation? (Difficulties during the process, motivational and de-motivational factors) What was your relationship with the health professionals during induced lactation or relactation? (Feelings and thoughts) What aspects would you have liked to have covered with the health professionals? Were you unable to discuss any of these with them? Why? (Difficulties during the process) Did you have any problems during the process? (Difficulties during the process) Did you feel supported during the process? Who provided you with the greatest support? (Feelings and thoughts, motivational and de-motivational factors)
2. Establishment of breastfeeding	Did you experience any problems with your breasts during breastfeeding? (Difficulties during breastfeeding) How was your experience breastfeeding? (Feelings and thoughts, motivational and de-motivational factors)
3. Breastfeeding cessation	Did you experience any problem during breastfeeding cessation? (Difficulties during breastfeeding cessation) How was your relationship with your child during breastfeeding cessation? (Feelings and thoughts)
4. Entire process	What would you say was your overall experience of this entire process? (Feelings and thoughts / difficulties during the process / motivational and de-motivational factors)

Table 2. Analysis Process.

Stage	Description of the process
Creation of categories	Creation of categories from the semi-structured interview questions, which were devised on the basis of previous literature on induction and relactation
Immersion in the data	Transcription of the interviews and reading of the transcribed data
Initial generation of codes	Grouping the quotes that repeat themselves in patterned ways, to create codes
Grouping the codes within the categories	Grouping the interrelated codes under the pre-established categories
Confirmation of categories	Re-reading of the data to confirm that the categories are correct
Definitive categories	Determining the definitive categories
Final report	Final report with the definitive categories and codes

categories (Table 3). We conducted team meetings to compare and contrast our interpretations of the data and to identify relationships among codes and categories (Dogson, 2019).

Results

The average age of the participants when undergoing induced lactation or relactation was 33 years (standard deviation [SD]: 3.87). The average age of the infants at the start of breastfeeding was 17 days (SD: 28.92) and the average length of breastfeeding was 17 months (SD: 17.06). In all cases, it was the first time that the participant underwent a process of induced lactation or relactation. Seven participants breastfed a single child, while two breastfed twins. Table 4 shows the demographic characteristics of the participants.

We organized our data into three categories: challenges of induced lactation or relactation; challenges of breastfeeding; and challenges of breastfeeding cessation.

Challenges of Induced Lactation or Relactation

Physical Challenges. Seven (78%) of the participants underwent the process of relactation or induced lactation before their child arrived. The remaining two (22%) participants, P-2 and P-3, began the process after the child arrived. The process of induced lactation or relactation required round-the-clock stimulation of the breasts, which often caused stress to participants. All participants reported that it was worth undergoing induced lactation or relactation to be able to breastfeed their children.

The stress that it can cause you at the beginning with your partner, with your family, and imposing those routines, because it is quite a tedious routine, every 2 or 3 hours and at night, whatever we do, having to go to the bathroom to pump milk, and touch my breasts for 10 minutes. (P-2)

The process not only affected their relationship with their partners but also their colleagues: "The most difficult was at work,

Table 3. Categories, Definitions of Categories, Codes, and Definitions of Codes.

Category	Definition of Category	Code	Definition of Code
<i>Challenges During Induction of Lactation or Relactation</i>	The participants experienced challenges during the period of induction of lactation or relactation, until they were able to produce milk	1. Hardship during the process of inducing lactation or relactation 2. Difficulty obtaining information from health professionals (midwives, RNs, and physicians) 3. Doubts and fears during the process of inducing lactation or relactation 4. Problems with the breast 5. Doubts about whether the amount of milk supplied was sufficient 6. The end of shared responsibility for breastfeeding with the partner 7. Reduced feeling of closeness	1. Routines, disciplines, stimulation both during the day and night, secondary effects of medication, stress 2. No access to information, inappropriate information, lack of information 3. Not being able to produce milk, insufficient milk supply 4. Cracked nipples, nipple blebs, blocked ducts, pain, suction problems 5. Insufficient milk supply for feeding the baby 6. In the case of couples comprising two women, the induced or relactating mother ceased breastfeeding before her partner 7. The end of breastfeeding diminished the mother's sense of closeness to the child
<i>Challenges During Breastfeeding</i>	The participants experienced challenges during the establishment of breastfeeding and the period of breastfeeding itself		
<i>Difficulties During Breastfeeding Cessation</i>	The participants experienced challenges during breastfeeding cessation		

Table 4. Demographic Characteristics of the Participants ($N = 9$)

ID	Maternal Age (years) ^a	Maternity without Pregnancy	Prior Pregnancy	Prior BF	Induction/relactation Method	Type of BF	BF Support	Child's age at start of BF	Child's age at BF cessation
1	29	Adoption	Full term	Yes	H, HG, S	Mixed	None	12 weeks	13 months
2	36	Partner's Pregnancy	No	No	HG, S, SNS	EBF	RN	6 weeks	7 months
3	38	Adoption	Full term	Yes	HG, S, SNS	Mixed	IBCLC	8 days	4 years
4	36	Adoption	Miscarriage 2nd trimester	No	HG, S	EBF	RN IBCLC	4 days	4 years
5	37	Surrogacy	None	No	H, HG, S	Mixed	Physician	From birth	6 months
6	30	Partner's Pregnancy	None	No	H, HG, S	EBF	Midwife IBCLC	From birth	15 months
7	28	Partner's Pregnancy	None	No	H, HG, S	Mixed	Midwife LSP	From birth	4 months
8	32	Surrogacy	None	No	H, HG, S	Mixed	None	From birth	10 months
9	38	Surrogacy	Miscarriage 1st trimester	No	H, HG, S	Mixed	IBCLC	1 months	1.5 months

Note. Abbreviations: BF = breastfeeding; EBF = exclusive breastfeeding; H = hormonal; HG = herbal galactagogues; IBCLC = International Board Certified Lactation Consultant; LSP = lactation support provider; mixed feeding = BF and formula; S = stimulation; SNS = supplemental nursing system, registered nurse (RN).

^aMaternal age at time of induction or relactation.

disappearing for 10, 15 minutes. It was very strange [to my colleagues] for me to disappear" (P-7). For P-2 and P-8, on medication during the process, side effects during hormonal treatments and galactagogues included weight gain, headaches, and decreased sexual desire. These participants did not interpret these symptoms negatively: "I gained a few sizes due to the medication, however, truthfully, I did not mind" (P-2). "The medication gave me a headache and very low sexual desire. But I knew why so I could live with it" (P-8).

Lack of Information From Health Professionals. Only P-5, who became a mother by surrogacy in 1999, said she felt satisfied with the support of her physicians during the process of inducing lactation. The other participants felt that the information and support provided by their midwives, nurses, and physicians was inadequate, which made them turn to the Internet: "I remember the phrase [from my family doctor]: 'You will not be able to breastfeed, not even an ant'" (P-1).

The pediatrician came and told us that I should not breastfeed the baby, that the mother who gave birth to him should. She said that the baby was unwell and that she did not know if the quality of my milk was good. (P-7)

"I have often met mothers wondering: 'Could I have done this?' And I respond: 'Yes, of course, if someone had told you!'" (P-1). "They [the health professionals] could have taken an interest and guided me" (P-3). Some participants, like P-2, felt that health professionals should be more informed about modern family structures and the possibility of induced lactation or relactation for babies raised by two women: "Is there anything missing? Well, that would be more training for health professionals about couples so they know that this is possible, positive, and that both of you can do it" (P-2).

Lack of Support From Close Family Members and Friends. Primary support came from participants' partners. All admitted to being questioned about their decision by their family and close friends: "At first, it is like: 'What is she doing?' And that is tough, at least in my case it was" (P-3). Participants admitted feeling questioned for undergoing induced lactation or relactation and about the quantity and quality of their milk: "Many people, friends, told me: 'Do you know that you are going to be a mother anyway, even if you do not breastfeed?' They felt it was a major complication" (P-9). "Later, when I produced milk they said: 'Ok, but is that milk real? Will it be of any use to the baby?'" (P-4). P-2, P-6, and P-7, participants who underwent induced lactation or relactation to breastfeed a child born by their female partner felt judged not only for wanting to be mothers, but also for wanting to breastfeed their babies.

Doubts About the Outcome. All participants experienced doubts about whether they would be able to induce lactation or relactation successfully. These doubts were due to the slow pace of inducing lactation and relactation, the long waiting period before results emerged, the fact that milk production sometimes plateaued, and their frustration during the process. "I saw that you came to a point at which it [the milk] did not increase any more, and it made me think: 'Oh my goodness, will that be enough?'" (P-1). They also feared that their babies would have difficulty breastfeeding or might reject the breast.

I did not know if all this effort was going to be worth it. At first, you feel full of hope, see if this will work, when you see it does, you get very excited, when you see that you really have milk. But it is also frustrating because I was scared my baby might not want it. (P-2)

Some participants linked the stress that they experienced while expecting a child to their own doubts about the success of the process as expressed by P-1, an adoptive mother: "The

chances of succeeding already are not great ... and in a process like adoption, which is really long, maybe you are not at your best" (P-1).

Challenges During Breastfeeding

Problems with Breast Health. P-1 and P-3 had had prior breastfeeding experience and did not experience any problems with their breasts during breastfeeding after relactation. However, the remaining participants, who had not breastfed before, reported problems including cracked nipples (P-6, P-9); nipple blebs or milk blisters (P-4, P-9); stiffened areas of the breast due to stimulation (P-2); the baby having problems with sucking (P-5); the baby having difficulty in latching on to the participant's breast, but not to the gestating mother's breast (P-7); and blocked ducts (P-8). These problems appeared during the first month of breastfeeding and were mostly resolved during the first month and a half, except for P-8, who, when back at work, again experienced blocked ducts, and P-7, who reported that her baby had difficulty latching on for the entire 4-month period of breastfeeding. To solve sucking problems, P-5's registered nurse taught her exercises to stimulate sucking. For P-4's nipple blebs and P-6's cracked nipples, lactation support providers taught them to perform postural changes when breastfeeding to drain all areas of the breast. One of P-6's twins required a frenotomy to correct a tongue-tie.

Doubts About Milk Supply. Participants reported doubts about whether their induced milk supply would be enough for their babies. Participants who had previously breastfed (P-1, P-3) acknowledged having more doubts about breastfeeding after relactation compared to previous experiences:

Considering that the baby was smaller, and that it was not breastfeeding immediately after birth, there was a doubt that the baby would have enough [milk], you know? I had that doubt, you know? More doubts. (P-1)

Challenges During Breastfeeding Cessation

The end of Shared Breastfeeding Responsibility With the Partner. P-2 and P-6 had shared breastfeeding with their female partners who had given birth to their babies. When these participants ceased breastfeeding, their partners continued breastfeeding. This change caused stress in the couples and shifted their responsibilities in caring for their children. P-6's partner went from feeding one of their babies to feeding both: "Sharing the burden is the least romantic part, but it is true that I also felt motivated to continue supporting my partner, because it was very tiring with the two of them" (P-6). Except for P-2, who decided to stop breastfeeding for personal reasons, all participants stopped breastfeeding because of the baby's disinterest in breastfeeding. The babies asked

to nurse less often, and the babies who received formula supplements (P-7 and P-9) preferred the bottle to the breast.

Reduced Closeness. P-4 and P-7 were still breastfeeding at the time of their interviews, while the other participants had already ceased breastfeeding or were in the process of doing so. All participants saw the end of breastfeeding as a loss and linked it to a decrease in the closeness between mother and child. This aspect made breastfeeding cessation particularly difficult for the participants, since the desire for closeness was the main reason they had undergone induced lactation or relactation in the first place. An example is P-2, whose female partner was still breastfeeding their child, even though P-2 herself had weaned:

There is a change, in the sense that no, they do not seek you out in the same way; there is not the dependency now that the child has with my partner, when it was more shared—and yes, it changes. For me, it changes. (P-2)

Discussion

Our study participants faced the same challenges, regardless of the mode of reproduction. The greatest challenge of induced lactation or relactation was physical. As also reflected in previous studies, the process required an effort that could be stressful but that was rewarded when the mother was able to breastfeed her baby (Da Rocha, Meneses, & Nazareth, 2014). The most difficult part of the process for our participants was the round-the-clock stimulation of the breasts (Shiva, Frotan, Arabipoor, & Mirzaaga, 2010). It should be pointed out, however, that induced lactation and relactation can also be achieved after the baby arrives by putting the baby to the breast (Abejide et al., 1997). This option should be kept in mind as a way of avoiding the onerous process that our study participants went through, and thus reducing stress.

Because of the physical difficulty of the process, external support is essential, and our participants expected that health professionals would provide relevant information and support. Other researchers have shown that health professionals often do little to promote induced lactation or relactation because they are unfamiliar with these processes (Da Rocha et al., 2014; Saari & Farahwahida, 2014). When our participants failed to receive professional support, they obtained additional information via the Internet, a strategy that, without supervision from a health professional, may lead to inappropriate conclusions (Hartzband & Groopman, 2015). While participants found that professional support was lacking, they reported receiving emotional support from their partners, which increased their willpower and sense of security, and assisted them through the challenges of the process. While participants reported good support from their partners, they agreed that they received very little support from friends, compared to women who breastfeed children to

whom they have given birth. We agree with Lommen and Brown (2015) that more support and a positive outlook would help encourage breastfeeding in non-gestating mothers.

The challenges of breastfeeding itself that our study participants faced were similar to those reported for gestating mothers: breast health and milk supply (Barbosa et al., 2017). Like previous researchers (Hackman, Schaefer, Beiler, Rose, & Paul, 2015), we show that participants who were breastfeeding for the first time often had more difficulty initiating breastfeeding than those who had breastfed previously. With respect to their doubts about milk supply, similar to other findings (Da Rocha et al., 2014; Saari & Farahwahida, 2014; Shiva et al., 2010), the type of feeding (i.e., exclusive breastfeeding, predominant breastfeeding, mixed feeding or bottle feeding), and the inability to exclusively breastfeed a child, did not negatively affect the participants. This finding coincides with their belief that the benefit to the mother-child relationship was significant regardless of how much milk was produced.

Finally, the participants agreed that their feeling of closeness with their child had been strengthened by breastfeeding and that this closeness weakened when they ceased breastfeeding. Although returning to work is often related to breastfeeding cessation (Li, Fein, Chen, & Grummer-Strawn, 2008), this factor did not affect participants in our study because they were all able to reduce their working hours or lengthen their leave.

Participants' motivation for breastfeeding was to improve their sense of closeness to their infants, and they reported that their expectations had been fulfilled. In future studies, researchers should compare sense of closeness to one's infant between non-gestating mothers who breastfeed their infants and those who do not.

Limitations

We included two study participants who were still breastfeeding and therefore who had not gone through the phase of breastfeeding cessation; as a result, our sample for this phase was limited to seven participants. Overall, the small size of our sample limits our ability to make definitive claims or generalize our results to other settings. The sample may appear to be skewed toward women with a high educational level. However, this characteristic is probably general to women who choose induced relactation or relactation, and therefore not a sampling error. Our use of snowball sampling may have skewed the sample toward women who were similar to each other. Finally, the authors' own positioning as nurses and nurse-midwives—and therefore recognizable as people in favor of breastfeeding—could have affected the participants' responses and the researchers' interpretations.

Conclusion

At a time when people use a range of modes of reproduction to create their families, health professionals need to know about induced lactation and relactation in order to provide proper guidance and assistance. Researchers and practitioners can use our study to better understand the lived experiences of women during induced lactation and relactation, and health professionals and lactation support providers can draw on it when they offer care during these processes.

Acknowledgments

The authors thank all women who have shared their experiences and have allowed the realization of this study. Furthermore, we would like to thank Dr Clara Juandó Prats for her research support, and Dr Susan Frekko, who translated the article from Spanish to English and provided feedback on several versions.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Gemma Cazorla-Ortiz  <https://orcid.org/0000-0002-2560-6856>
 Paola Galbany-Estragués  <https://orcid.org/0000-0003-3775-1695>
 Josefina Goberna-Tricas  <https://orcid.org/0000-0002-3531-9009>

References

- Abejide, O. R., Tadese, M. A., Babajide, D. E., Torimiro, S. E., Davies-Adetugbo, A. A., & Makanjuola, R. O. (1997). Non-puerperal induced lactation in a Nigerian community: Case reports. *Annals of Tropical Paediatrics*, 17(2), 109–114.
- Afflerbach, S., Carter, S. K., Koontz, A., & Grauerholz, L. (2013). Infant-feeding consumerism in the age of intensive mothering and risk society. *Journal of Consumer Culture*, 13, 387–405.
- Auerbach, K. G., & Avery, J. L. (1981). Induced lactation: A study of adoptive nursing by 240 women. *American Journal of Diseases of Children*, 135(4), 340–343.
- Banapurmath, C. R., Banapurmath, S., & Kesaree, N. (1993). Successfully induced non-puerperal lactation in surrogate mothers. *The Indian Journal of Pediatrics*, 60(5), 639–643.
- Barbosa, G. E., Silva, V. B., Pereira, J. M., Soares, M. S., Medeiros, R. D., Pereira, L. B., Pinho, L., & Caldeira, A. P. (2017). Initial breastfeeding difficulties and association with breast disorders among postpartum women. *Revista Paulista de Pediatria*, 35(3), 265–272.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Buetow, S. (2019). Apophenia, unconscious bias and reflexivity in nursing qualitative research. *International Journal of Nursing Studies*, 89, 8–13.
- Da Rocha, S., Meneses, I. M., & Nazareth, I. V. (2014). Narratives of lives of women who breastfed their adoptive children. *Revista Rene*, 15(2), 249–256.
- Darnovsky, M., & Beeson, D. (2015). Prácticas globales de subrogación. *Newsletter AFIN*, 77, 1–18.
- Dodgson, J. E. (2019). Reflexivity in Qualitative Research. *Journal of Human Lactation*, 35(2), 220–222. doi:10.1177/0890334419830990
- Flores-Antón, B., García-Lara, N. R., & Pallás-Alonso, C. R. (2017). An Adoptive mother who became a human milk donor. *Journal of Human Lactation*, 33(2), 419–421. doi:10.1177/0890334416682007
- Forinash, A. B., Yancey, A. M., Barnes, K. N., & Myles, T. D. (2012). The use of galactagogues in the breastfeeding mother. *Annals of Pharmacotherapy*, 46(10), 1392–1404.
- Gibbs, B. G., Forste, R., & Lybbert, E. (2018). Breastfeeding, parenting, and infant attachment behaviors. *Maternal and Child Health Journal*, 22(4), 579–588.
- Gribble, K. D. (2004). The influence of context on the success of adoptive breastfeeding: Developing countries and the west. *Breastfeeding Review*, 12(1), 5–13.
- Hackman, N. M., Schaefer, E. W., Beiler, J. S., Rose, C. M., & Paul, I. M. (2015). Breastfeeding outcome comparison by parity. *Breastfeeding Medicine*, 10(3), 156–162.
- Hartzband, P., & Groopman, J. (2015). Untangling the Web: Patients, doctors, and the internet. *The New England Journal of Medicine*, 362(12), 1063–1066.
- Hormann, E. (1977). Breast feeding the adopted baby. *Birth and the Family Journal*, 4(4), 165–173.
- Instituto Nacional de Estadística. (2017). *Encuesta Nacional de Salud*. Retrieved from http://www.ine.es/ss/Satellite?L=es_ES&c=INESeccion_C&cid=1259926457058&p=1254735110672&pagename=ProductosYServicios%2FPYSLayout¶m1=PYSDetalle¶m3=1259924822888
- Jiggins, K., & Evans, B. (2016). Qualitative descriptive methods in health science research. *Health Environments Research and Design Journal*, 9(4), 16–25.
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, 72(12), 2954–2965.
- Law No. 40. Law about Techniques of assisted human reproductive. *Boletín Oficial del Estado* No. 126, 27th May of 2006. Spain. Retrieved from <https://www.boe.es/buscar/act.php?id=BOE-A-2006-9292>
- Li, R., Fein, S. B., Chen, J., & Grummer-Strawn, L. M. (2008). Why mothers stop breastfeeding: Mothers' self-reported reasons for stopping during the first year. *Pediatrics*, 122(2), 569–575.
- Lommen, A., & Brown, B. (2015). Experiential perceptions of relactation: A phenomenological study. *Journal of Human Lactation*, 31(3), 498–503.
- Marshall, J. L., Godfrey, M., & Renfrew, M. J. (2007). Being a "good mother": Managing breastfeeding and merging identities. *Social Science and Medicine*, 65, 2147–2159.
- Ministerio de Sanidad, Servicios Sociales e Igualdad. (2017a). *Boletín de datos estadísticos de medidas de protección a la infancia: Boletín número 18* [Bulletin of statistical data on

- child protection measures: Bulletin number 18]. Retrieved from <http://www.msc.es/ssi/familiasInfancia/Infancia/pdf/Boletinproteccionalainfancia18accesible.pdf>
- Ministerio de Sanidad, Servicios Sociales e Igualdad. (2017b). *Informe Anual del Sistema Nacional de Salud 2017* [Annual Report of the National Health System 2017]. Retrieved from <https://www.mscbs.gob.es/estadEstudios/estadisticas/sisInfSanSNS/tablasEstadisticas/InfAnSNS.htm>
- Noel-Weiss, S., Boersma, L., & Kujawa-Myles, S. (2012). Questioning current definitions for breastfeeding research. *International Breastfeeding Journal*, 7(9), 1–4.
- Percy, W. H., Kostere, K., & Kostere, S. (2015). Generic Qualitative Research in Psychology. *The Qualitative Report*, 20(2), 76–85.
- Ramiro, M. D., Ortíz, H., Arana, C., Esparza, M. J., Cortés, O., Terol, M., & Ordobás, M. (2017). Prevalence of breastfeeding and factors associated with the start and duration of exclusive breastfeeding in the Community of Madrid among participants in the ELOIN. *Anales de Pediatría*, 89(1), 32–43.
- Renate, M. K. (2014). Generic qualitative approaches: Pitfalls and benefits of methodological mixology. *International Journal of Qualitative Methods*, 13, 37–52.
- Saari, Z., & Farahwahida, Y. (2014). Induced lactation by adoptive mothers: A case study. *Jurnal Teknologi*, 68(1), 123–132.
- Sabatini, R., & Cagiano, R. (2006). Comparison profiles of cycle control, side effects and sexual satisfaction of three hormonal contraceptives. *Contraception*, 74(3), 220–223.
- Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing & Health*, 23, 334–340.
- Schmied, V., & Lupton, D. (2001). Blurring the boundaries: Breastfeeding and maternal subjectivity. *Sociology Health Illness Journal*, 23(2), 234–250.
- Scientific Software Development GmbH. (2015). *Atlas ti Qualitative Data Analysis* (Version 7.5.7). [Computer software]. Retrieved from <http://www.atlasti.com>
- Shiva, M., Frotan, M., Arabipoor, A., & Mirzaaga, E. (2010). A successful induction of lactation in surrogate pregnancy with metoclopramide and review of lactation induction. *International Journal of Fertility and Sterility*, 3(4), 191–194.
- Szucs, K., Axline, S. E., & Rosenman, M. B. (2010). Induced lactation and exclusive breast milk feeding of adopted premature twins. *Journal of Human Lactation*, 26, 309–313.
- Thearle, M. J., & Weissenberger, R. (1984). Induced lactation in adoptive mothers. *Journal of Obstetrics and Gynaecology*, 24, 283–286.
- Williams, K., Kurz, T., Summers, M., & Crabb, S. (2012). Discursive constructions of infant feeding: The dilemma of mothers' guilt. *Feminism & Psychology*, 23(3), 339–358.
- Wilson, E., Perrin, M. T., Fogelman, A., & Chetwynd, E. (2015). The intricacies of induced lactation for same-sex mothers of an adopted child. *Journal of Human Lactation*, 31(1), 64–67.
- Wittig, L. S., & Spatz, L. D. (2008). Induced lactation. Gaining a better understanding. *MCN, The American Journal of Maternal/Child Nursing*, 33(2), 76–81.
- World Health Organization. (1998). *Relactation: Review of experience and recommendations for practice*. Retrieved from: http://www.who.int/maternal_child_adolescent/documents/who_chs_cah_98_14/en/
- World Health Organization (2017). *10 facts on breastfeeding*. Retrieved from <http://www.who.int/features/factfiles/breastfeeding/es/>

ILCA News Brief: Facilitating Member Support in 2020

DOI: [10.1177/0890334420922831](https://doi.org/10.1177/0890334420922831)

In July 2020, skilled lactation professionals from all over the world gathered online for ILCA's first ever fully online annual conference. The usual in-person conference scheduled in Houston, Texas, USA was cancelled due to COVID-19. The theme for this year was **Support**. Even with all educational sessions online, virtual attendees learned from leading experts around the globe, got the clinical skills needed to serve families in their communities, and connected with vendors. This theme is once again an apt reflection of ILCA's work over the past year. In this time, we have implemented countless processes and services to help support our members, so they, in turn, can better support the breastfeeding families in their community.

Education

Beginning in late 2019, ILCA made its Knowledge Center a member-only benefit. The annual ILCA conference will be available to members and non-members but, unless something is offered complimentarily, all educational offerings in the Knowledge Center will only be accessible by members. ILCA also began offering its three publications: Clinical Guidelines of Lactation Management, the Triage Tool, and the Spanish Breastfeeding Glossary, FREE to its members for download. Printed versions are still available for purchase. Overall, more education is offered by ILCA with over 32 Continuing Education Recognition Points (CERPs) included with membership (at the time of publication).

Advocacy

Over the last few years, ILCA has increased its advocacy efforts. In April of this year, we announced the addition of a new Advocacy Adviser, Lisa Mandell. Lisa joins the ILCA

staff with much experience within the organization, as she served multiple terms on the ILCA Board of Directors and served numerous years on the advocacy committee. We are excited to see how Lisa helps the organization advance its advocacy agenda.

COVID-19 is in full-swing at the time of writing this brief. ILCA has worked tirelessly to keep its members updated through a resource offered on the ILCA website. Additionally, ILCA has kept close contact with the World Health Organization to ensure that its membership needs and concerns are communicated, and contact has also been made with several country/region specific health agencies to ensure the members were well supported and represented. Please check the ILCA website at www.ilca.org for all the latest details.

Promotion of the Lactation Profession

ILCA launched a new website in March 2020. The new website is user friendly and easy to navigate with all member services and benefits being available in one section. Members no longer have to search the full website to find what they are looking for.

ILCA's Find a Lactation Directory continues to have great presence and thousands of visits every week. The directory now features more information for parents and promotes ILCA members more than it has done in the past. You can check the directory out at www.findalactationconsultant.com.

Support

In closing, and on behalf of the ILCA Board of Directors, thank you for your continued membership and support. We hope that the support this organization has provided the lactation profession is evident and helpful to your day-to-day needs. If at any time you think of ways that ILCA could better support you, please let us know.

Jessica Lytle
Assistant Executive Director, International Lactation
Consultant Association
operations@ilca.org

Baby-Friendly Hospital Initiative Network News: Moving Forward With Step 2 Competency Tools

DOI: 10.1177/0890334420926947

On our last brief, published in the February 2020 edition of *JHL*, we reported that several BFHI Network members, in conjunction with volunteers from other global breastfeeding support organizations (the Step 2 Task Force), had embarked on a project in collaboration with WHO and UNICEF. The mission was to help countries move forward with adopting the standards described in the 2018 *Baby-Friendly Hospital Initiative (BFHI) Implementation Guidance* (World Health Organization, 2018).

A dramatic change in the 2018 *BFHI Implementation Guidance* is the revision of Step 2, which now reads "Ensure that staff have sufficient knowledge, competence, and skills to support breastfeeding" (World Health Organization, 2018). This is a significant paradigm shift from the original requirement of training hours as an indicator of competency assessment. Shifting the goal of Step 2 to assuring competency is a more rigorous measure of actual performance in clinical practice. Full competency is attained through combining knowledge and skills with sound clinical judgment and a positive attitude. Training programs, however excellent, do not assure the combination of knowledge, skills, clinical judgment, and positive attitude. Competency is verified through direct observation of clinical practice. In order to smoothly accomplish this paradigm shift, countries must be provided with a robust set of tools.

The Step 2 Task Force engaged in a comprehensive process, comparing competencies from several recognized sources with the 20 listed in the *BFHI Implementation Guidance*. Competencies were analyzed according to each of

the Ten Steps to Successful Breastfeeding. Care was taken to ensure the measurability of each competency. Each was assigned a verification method based on the classification of knowledge, skill, and/or attitude (K-S-A). Feedback was obtained from 20 experts from 15 different countries. A package of materials consisting of a competency tool, an examiners manual, and a set of implementation tools, was the result of this effort. The materials have been submitted to the WHO and UNICEF for review, production, and dissemination.

In lieu of face-to-face training, which was cancelled due to the COVID-19 pandemic, BFHI country coordinators received preliminary training on these materials conducted virtually throughout the summer. A rescheduled face-to-face training is planned for late 2020 or early 2021.

Trish MacEnroe
Baby-Friendly USA, Inc., Albany, NY, USA
tmacenroe@babyfriendlyusa.org

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Trish MacEnroe  <https://orcid.org/0000-0003-2019-0561>

References

World Health Organization. (2018). *Implementation guidance: Protecting, promoting, and supporting breastfeeding in facilities providing maternity and newborn services—The revised Baby-friendly Hospital Initiative*. (License: CC BY-NC-SA 3.0 IGO). <https://www.who.int/nutrition/publications/infantfeeding/bfhi-implementation-2018.pdf>

IBFAN News Brief: Third World Breastfeeding Conference, Rio de Janeiro, Brazil

DOI: 10.1177/0890334420926958

The third IBFAN World Breastfeeding Conference (WBC) "Breastfeeding and Healthy Complementary Food: Human

Rights to be Protected for Life," held in Rio de Janeiro, November 2019, was a historic event. To set the focus for the conference, the organizers brought together 1000 breastfeeding mother–baby pairs who simultaneously breastfed at the beautiful Museum of Modern Arts, a special architectural piece by the famous Oscar Niemeyer. For all who witnessed the momentous celebration it was a moving introduction to why we were gathered for IBFAN's third WBC.

The third global WBC in Rio de Janeiro, South America, brought together nearly 2000 delegates from 56 countries, and was a continuum from the first in Delhi, India, 2012,

with over 800 participants from 83 countries, and the second in Johannesburg, South Africa, 2016, with close to 500 participants from 55 countries.

We met as breastfeeding advocates, together with Brazilian state universities as well as Brazil's Minister of Health, globally renowned scientists and researchers, civil society organizations, representatives from UNICEF, WHO, PAHO, international breastfeeding support organizations, ILCA, LLLI, WABA, academics, students, and public interest groups. This enormous task of organizing venues, sessions, speakers, and exhibits was all accomplished without funding from baby foods industries and organizations that have conflicts of interest with optimal breastfeeding and complementary feeding policies and practices.

The three days of intensive workshops, as well as pre-conference sessions, round tables, and key presentations, gave opportunity to learn, discuss, connect, and, above all, inspire us to renew our commitment in support for mothers and children. We heard from the world's leaders about their groundbreaking research on the importance of breastfeeding in saving lives.

Cesar Victora recounted his 40 years of research, his pioneering study, in the 1980s, that demonstrated for the first time the protection that exclusive breastfeeding provides against infant mortality, especially from diarrhea. This study was one of the scientific bases for Innocenti's Declaration, in 1990, on the promotion of exclusive breastfeeding in the first 6 months of life. We heard about the critical bonding and breastfeeding from the researchers in Colombia who gave us the initial studies on the now routine Kangaroo Care. We heard from those working on the numerous Code, BFHI, Codex, WBTi, milk banking programs, clinical management, and counselling techniques to move the obstructing

barriers of breastmilk substitute and artificial feeding marketing, progress in birthing and breastfeeding supports, and the clinicians who shared their research and practices on addressing infant and young child feeding needs. We wrote a "Call to Action" to all governments and citizens of the world to join us in working towards the goals we set forth (Supplemental Material)

As a final celebration to what our colleagues of IBFAN Latin America and IBFAN Brazil accomplished, the carnival spirit of Rio ended with us all dancing to the sounds of Latino music.

Stay tuned for the next World Breastfeeding Conference planned for Egypt in 2023 to be organized by IBFAN Arab World.

Elisabeth Sterken
INFACT Canada/IBFAN North America
elisabethsterken@gmail.com

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Elisabeth Sterken  <https://orcid.org/0000-0003-2019-0561>

Supplemental Material

Supplemental material for this article is available online.

LEAARC News Brief: Lactation Education Accreditation and Approval Review Committee News

DOI: 10.1177/0890334420916138

Lactation Accreditation and Approval Review Committee (LEAARC) now offers the option for both Clinical Internship Programs and Clinical Instructors to apply for **LEAARC Endorsement**, which entails going through a peer-review process of self-evaluation. This new offering will provide clinics and clinicians globally a chance to

advance the global development of quality lactation education by ensuring clinical programs are meeting outlined standards and criteria.

For the **Clinical Internship Program**, applicants must meet the following criteria:

- Offer a wide variety of clinical experiences.
- Ensure their mission is consistent with providing a quality internship program and assisting aspiring IBCLCs to pass the IBLCE certification exam.
- Clinical instructors identify, monitor, and respond to changes in the needs and expectations of interns.
- Programs are encouraged to include interns from diverse backgrounds.

For the **Clinical Instructor Recognition**, applicants must meet the following criteria:

- The instructor must be a certified lactation consultant.
- The instructor must have been precepting interns for a minimum of one year and graduated at least one intern.
- The instructor must offer a minimum of 100 clinical instruction hours.
- The instructor should ideally have training specific to mentoring lactation interns.

To learn more about these new clinical offerings, visit our website at www.LEAARC.org, or email info@LEAARC.org.

Laura Sieckmann, BA
LEAARC Executive Director
laura@leaarc.org

World Alliance for Breastfeeding Action (WABA) News

DOI: 10.1177/0890334420922838

WABA News Brief: Breastfeeding for a Sustainable World

The COVID-19 pandemic has affected the world and we must all do our part to curb the spread and minimize suffering. The World Alliance for Breastfeeding Action (WABA) has compiled useful resources related to COVID-19 and breastfeeding: <https://waba.org.my/coronavirus-disease-covid-19-and-breastfeeding/>. As new information becomes available, guidance may be updated, so please keep track of the World Health Organization (WHO) website: <https://who.int>

WABA was formed on 14 February 1991. We have grown, over the years, both in terms of the network and the range of topics covered. After an extensive governance review, we have now started a new organizational model involving affiliates and partners. We believe that this will make our work more effective and efficient. More information about how you can become part of the new WABA structure will be available in the near future: <https://waba.org.my/>

World Breastfeeding Week 2020 (#WBW2020)

WABA coordinates the global World Breastfeeding Week (WBW) campaign every year. The slogan for #WBW2020 is “Support breastfeeding for a healthier planet” and focuses on the need to support breastfeeding in light of the challenges facing our planet and its people.

WABA will also be offering several #WBW2020 seed grants to encourage local innovative activities. WABA aims to increase online engagement over the year in light of the COVID-19 outbreak. Look out for information on seed grants and resources relevant to the #WBW2020 campaign: <https://worldbreastfeedingweek.org>

Empowering Parents Campaign

Women perform almost 3 times more unpaid care and domestic work than men, which is likely to have increased during the COVID-19 crisis. Breastfeeding is one example of unpaid care work. The lack of social protection, family-friendly policies, and gender equality need to be addressed urgently. The International Labour Organization (ILO) and UNICEF have issued specific guidance for how governments and employers can support families in the context of work, both in the formal and informal sector. See https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_740217/lang--en/index.htm or https://www.ilo.org/global/topics/coronavirus/impacts-and-responses/WCMS_739048/lang--en/index.htm

Supporting parents at work is a prerequisite for optimal breastfeeding, distributing care work, and transforming social norms. Read more about the Empowering Parents Campaign here: <https://waba.org.my/epc/>

Warm Chain of Support for Breastfeeding

The Warm Chain of Support for Breastfeeding campaign places the breastfeeding dyad at the core and follows the first 1,000 days timeline. The need for collaboration between the health-care, workplace, and community sectors is all the more important during the ongoing COVID-19 crisis. This will help ensure a coordinated response with consistent messages and referrals. Breastfeeding counselling and other support for families are essential. WABA is exploring how to best support Warm Chain country teams through training and targeted communication messages. Read more about the Warm Chain of Support for Breastfeeding here: <https://waba.org.my/warm-chain/> as well as the first 1,000 days here: <https://thousanddays.org/>

More information on the next Breastfeeding Advocacy and Practice (BAP) course will be available in June 2020. Find out about the BAP course here: <https://waba.org.my/bap/>

Nisha Kumaravel
Special Projects Consultant, World Alliance for Breastfeeding Action (WABA), Penang, Malaysia
nisha@waba.org.my

ORCID iD

Nisha Kumaravel  <https://orcid.org/0000-0001-7203-9594>

Response to: Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic (Marinelli and Lawrence, 2020)

DOI: 10.1177/0890334420923364

Dear Dr. Joan E. Dodgson,

We write this letter encouraging retraction of the article; *Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic*, (Marinelli & Lawrence, 2020).

Instituting recommendations promoted in this publication that are not evidenced based such as: non-infected mothers at home or in hospital wearing a mask during milk expression, using chemicals to wipe down bags or bottles of freshly expressed milk, mothers' own frozen milk, frozen donated raw milk at a milk bank, or of pasteurized donor milk on receipt in the hospital, could have unintended consequences and are in conflict with current recommendations for food safety measures regarding safe human milk handling (1). Hospitals vary in their sanitizing protocols and assumptions about safety of chemicals that could gain access into milk feedings for newly born or fragile premature infants. We recommend caution until more is known about the true risk of SARS-CoV-2 transmission in this manner. Additionally, adding unsubstantiated fear or impediments to human milk feeding at this time may restrict breastmilk feeding when it is most critical for infant health.

We agree that following good handwashing guidelines for all infant care during this time is sound practice. COVID-19 infected mothers in the hospital should be given clear guidelines for cleaning pumping and infant feeding equipment. Draconian cleaning measures that are not evidenced based may have unintended consequences and are ill advised.

Sincerely,

Lisa Stellwagen, MD FAAP
Clinical Professor of Pediatrics, University of California,
San Diego Health, Executive Director, University of
California Health Milk Bank, La Jolla, CA, USA
lstellwagen@ucsd.edu

Christina Chambers, PhD, MPH
Co-Director, Center for Better Beginnings, Professor
Division of Dysmorphology and Teratology, UC San
Diego, Department of Pediatrics, 9300 Campus Point Drive,
MC 7774, La Jolla, CA 92037, USA
chchambers@health.ucsd.edu

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Lisa Stellwagen, MD FAAP  <https://orcid.org/0000-0002-8319-8643>

References

- Marinelli, K. A., & Lawrence, R. M. (2020). Safe handling of containers of expressed human milk in all settings during the SARS-CoV-2 (COVID-19) pandemic. *Journal of Human Lactation*. doi:10.1177/0890334420919083

Concerns Regarding the Article Entitled ‘Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19)’

DOI: 10.1177/0890334420922580

Dear Editors of *JHL*,

We are writing to express our concerns regarding the article entitled ‘*Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19)*’ published April 3, 2020 (Marinelli & Lawrence, 2020). Our concerns are as follows:

1. The authors lead readers to believe that breastmilk is contaminated with SARS-CoV-2; however, standard Holder Pasteurization techniques utilized by Human Milk Banking Association of North America milk banks reach temperatures that kill the virus (Chin et al., 2020). In addition, milk banks employ strict handling policies that prevent transmission of pathogens to recipients of donor milk (HMBANA, n.d.). The authors do not cite evidence for why they feel bottles of donor milk should be cleaned differently now than in the past.
2. The authors do not provide evidence to corroborate why they believe transmission of the SARS-CoV-2 will occur via bottles of breastmilk. No reports exist regarding an asymptomatic mother handling bottles of breastmilk and subsequently infecting her infant or other people. If an asymptomatic mother washes her hands prior to pumping and does not cough, no evidence exists that she would transmit SARS-CoV-2 to external surfaces of bottles (CDC, 2020).
3. The authors discuss their concerns regarding surface contamination. However, the Centers for Disease Control states clearly that the virus spreads via respiratory droplets from direct person-to-person contact. The CDC emphasizes that the virus does not preferentially spread through surfaces (CDC, 2020). If an asymptomatic mother is otherwise caring for her infant without a face mask, no evidence exists that she should wear a mask only while pumping milk.
4. The authors do not cite any recommendations that reflect those of the Human Milk Banking Association of North America (HMBANA), the World Health Organization (WHO), or the Centers for Disease Control (CDC).

Overall, no evidence exists that the measures recommended by the authors would reduce the transmission of SARS-CoV-2. Unfortunately, their recommendations may create undue alarm regarding the known safety of lifesaving donor milk. Increased formula use may follow, causing unnecessary long-term harm to mothers and babies.

Katrina B. Mitchell, MD, IBCLC
Ridley Tree Cancer Center at Sansum Clinic,
Santa Barbara, CA, USA
kbm9002@me.com

Sarah R. Weinstein, MN, CNM
Tucson, AZ, USA
sarahrweinstein@gmail.com

Author's note

Ms. Weinstein has recently relocated to Arizona from New Mexico, where her previous affiliation was Dar a Luz Birth and Health Center. She currently is on maternity leave and does not yet have a local affiliation in Arizona.

Declaration of Conflicting Interests

The authors have no conflict of interest to report. Dr. Mitchell is on the board of the *Ventura Coast Milk Bank*. Ms. Weinstein’s previous place of employment is a collection site for the *Mother’s Milk Bank*.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Katrina B. Mitchell, MD, IBCLC  <https://orcid.org/0000-0001-8070-9201>

References

- Centers for Disease Control and Prevention. (2020). *How Covid-19 Spreads*. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html>
- Chin, A. W. H., Chu, J. T. S., Perera, M. R. A., Hui, K. P. Y., Yen, H. -L., Chan, M. C. W., Peiris, M., & Poon, L. L. M. (2020). Stability of SARS-CoV-2 in Different Environmental Conditions. *Lancet Microbe*. Adavance online publication. Retrieved from doi:10.1016/S2666-5247(20)30003-3.
- Human Milk Banking Association of North America. (n.d.). *Our Work: Milk Processing and Safety*. Retrieved from <https://www.hmbana.org/our-work/milk-processing-safety.html>.
- Marinelli, K. A., & Lawrence, R. M. (2020). Safe handling of containers of expressed human milk in all settings during the SARS-CoV-2 (COVID-19) pandemic. *Journal of Human Lactation*. [online ahead of print]. doi:10.1177/0890334420919083

Response to Letters to the Editor about the Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic

DOI: 10.1177/0890334420924351

We are writing to clarify and further discuss with more recent data our article “*Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic*” published on-line first April 3, 2020 (Marinelli & Lawrence, 2020). In addition, we have responded to concerns raised in public forums and in the published letters to the editor (Mitchell & Weinstein, 2020; Stellwagen & Chambers, 2020).

We are, and have been for over 25 years, breastfeeding researchers, educators and advocates. We would never intentionally do anything that negatively affects the success of the breastfeeding relationship, as some have suggested. Many unknowns related to the issues raised in our article remain unresolved and much evidence needs to be developed through research. To clarify, we did not suggest, in our previous publication, that contaminated expressed human milk containers are a predominant or even common source of COVID-19 spread. Given the ongoing epidemic, however, we are continuing to recommend the practices previously reported, as one way to ensure an ongoing robust supply of expressed and donor human milk for infants without exposing milk bank, hospital staff or other individuals to a potentially contaminated surface.

We wrote the original article after being approached by neonatal intensive care unit (NICU) staff from across the globe asking us how they should handle containers of expressed milk coming into their units for admitted infants from mothers who were known to be or were possibly SARS-CoV-2 positive or persons under investigation (PUIs). In addition, one non-United States (US) health authority requested guidance on how to advise parents engaged in community milk sharing about how to reduce the risk of external contamination of expressed human milk containers. Despite extensive searching, answers were lacking in the existing and newly published literature and statements from international and national governmental and health authorities. Our discussions with the US

Center for Disease Control and Prevention (CDC) confirmed a lack of recommendations for this specific situation. These concerns were significant for us and warranted a response.

Guidance from the United Kingdom’s Royal College of Obstetricians and Gynaecologists (2020) states that containers of expressed milk should be cleaned without providing directions about how to do this:

COVID-19 positive mothers who are expressing milk must be facilitated to practice excellent hand hygiene, and care must be taken to ensure that bottles containing EBM [expressed breast milk] are not externally contaminated. EBM of COVID-19 suspected or positive mothers should not be stored with EBM from non-infected mothers. Mothers should have a designated breast pump for exclusive use. NNUs [Neonatal Units] should have clear guidelines around handling, storage and use of EBM in these circumstances (p. 23).

The world in which we now live, and work is very different from the one before this global pandemic. That world is the one in which existing policies and protocols were written. This has required all of us to evaluate new and emerging knowledge, and to pose the important but yet unanswered questions. We want to support breastfeeding and the use of expressed human milk during this global pandemic in the best way we know how, including to make sure there are no misunderstandings about what is known and not known.

We recognize that human milk banks worldwide have rigorous, safe handling and processing practices. At this writing, researchers have not suggested that SARS-CoV-2 is present in human milk and we have not been concerned that donor human milk (DHM) is contaminated with virus after pasteurization or during the normal processing of DHM in milk banks. Since our publication went online, there have been 7 new papers published reporting testing of mothers’ milk samples ($N = 14$). To-date all tested samples were negative for COVID-19. We are urging researchers to examine additional milk samples, from a larger sample of mothers that have been collected at different times during the course of mothers’ infections. We all need this type of evidence to make the best decisions possible.

The pasteurization of DHM in milk banks ensures no virus in DHM and its containers. Therefore in our previous paper, we did not address any potential contamination after pasteurization. Also, we are not concerned about the exceedingly low possibility that the expressed unpasteurized mothers’ milk itself might be contaminated with Coronavirus at the time of expression. In the rare event that this occurred, pasteurization of donor human milk would eradicate any live virus. We apologize for

inappropriately attributing the statement “Coronavirus has not been shown, to this point, to be found in human milk, and this virus is destroyed by the holder pasteurization employed in donor milk processing (Human Milk Banking Association of North America, 2020)” (p. 1) to HMBANA.

Milk expression is a feeding activity. Many international authorities have affirmed that mothers who are COVID-19 infected, suspected of being infected or a person under investigation (PUT) need to practice hand and respiratory hygiene (e.g., hand washing, wearing a mask) before and during feeding to minimize droplet spread to others or onto surfaces (CDC, 2020a; RCOG, 2020; UNICEF, 2020; WHO, 2020a). Common international recommendations also include thoroughly washing and appropriately disinfecting pumps and potentially contaminated surfaces (CDC, 2020a; RCOG, 2020; UNICEF, 2020; WHO, 2020a). If containers of milk themselves are mentioned, instructions for cleaning are not included—leaving many worldwide wondering what to do. These are the questions that came to us.

We determined the need for a simple process to decontaminate the external surfaces of sealed containers holding; 1) human milk (HM) coming into NICUs; 2) DHM coming into donor milk banks and 3) other situations where expressed human milk (EHM) might be exchanged (e.g., informal milk sharing). Our recommendations were based on our expertise and a critical assessment of the available evidence. These recommendations were developed after a careful review of the published recommendations by international authorities (CDC, 2020a; RCOG, 2020; UNICEF, 2020; WHO, 2020a) about breastfeeding, breast pumps or any contaminated surfaces, and current infectious disease, pediatric and public health literature about the COVID-19 virus.

We do not know with certainty the infectious period or peak of viral transmissibility after COVID-19 infection, nor the pattern of viral shedding for symptomatic or asymptomatic COVID-19 infected individuals (Bai et al., 2020; Rothe et al., 2020). COVID-19 screening on admission of all pregnant women ($N=215$) birthing at 2 New York City hospitals was reported by Sutton et al. (2020). Of the 33 women testing positive 29 (87.9%) were asymptomatic. As the authors note, this prevalence may even be underreported because of false negative test results. The peak of the infectious viral shedding appears to occur on or before the onset of symptoms in one study (He et al., 2020). These studies should raise concerns that many among the populations we serve may be shedding virus. We also do not know the relative contribution to transmission by the various modes (i.e., droplet (direct or indirect), airborne, or aerosolized spread; National Research Council, 2020, April 1). These are all essential areas for additional research. However, we do have reliable research about the spread of COVID-19 being predominantly by direct or indirect contact with coronavirus laden respiratory droplets from an infected (symptomatic or asymptomatic) individual, along with the possibility of airborne transmission (van Doremalen et al., 2020; Wei et al.,

2020). Given the continued low level of COVID-19 testing, limited contact tracing and the spread of this virus by asymptomatic individuals, it is extremely difficult, if not impossible to determine, who might be infected and be transmitting virus (including mothers donating their milk).

Accumulating evidence suggests that coronaviruses can survive on inanimate surfaces making transmission by an inanimate object or substance capable of transmitting infectious organisms from one individual to another (i.e., fomites) plausible. Researchers have reported the viral loads of very contaminated surfaces before and after cleaning demonstrating that disinfecting is effective. In Nebraska (US), Santarpia et al. (2020) sampled numerous surfaces and personal items within the rooms of SARS-CoV-2 infected hospitalized patients documenting over 75% positive rate of the personal items tested by a defined polymerase chain reaction (PCR). Coronaviruses have been documented with a viral persistence on inanimate surfaces of different materials for days (Kampf et al., 2020) with documented persistence of SARS-CoV-1 and SARS-CoV-2 on plastic and stainless steel up to 72 hours (van Doremalen et al., 2020). When Ye et al. (2002) tested hospital environmental surfaces ($N = 626$) by reverse transcription polymerase chain reaction (RT-PCR), 13.6% were positive and 13.9% of the hospital objects tested positive (e.g., printers, keyboards, tabletops, doorknobs, telephones and medical equipment). Healthcare professionals' concerns during the pandemic (e.g., the desire to reduce their risk of acquiring the infection, carrying it home to their families and their access to appropriate protection in the workplace) have been well documented (Shanafelt et al., 2020). Although, to date no evidence exists about the transmission of SARS-CoV-2 via human milk storage bags or containers; a tremendous amount of international concern and worry about the possibility of infection of healthcare staff exists (Ye et al., 2002).

Additionally, after the publication of our paper, Chin et al. (2020) demonstrated only a small reduction (0.7 log-unit) in the infectious titer of SARS-CoV-2 maintained at 4°C (39.2°F, just above freezing) for up to 14 days. Testing at 70°C (158°F) incubation temperature the virus inactivation time was 5 minutes. Their testing revealed the virus was more stable on smooth surfaces; free infectious SARS-CoV-2 incubated on the surface of plastic at room temperature (22°C; 71.6°F) demonstrated a biphasic decay with $T_{1/2} = 1.6$ hours and 11.4 hours. Their data are consistent with SARS-CoV-2 having the potential for survival on plastic and other inanimate smooth surfaces in milk banks and NICUs for hours to days and perhaps an even longer survival at temperatures close to freezing.

Chin et al. (2020) tested the viricidal effects of disinfectants on SARS-CoV-2, demonstrating no infectious virus after contact with bleach for 5 minutes at working concentrations of 0.107% (~1200 ppm) and 0.053% (~600 ppm). Kampf et al. (2020) listed a range of reduced viral

infectivity for different human and veterinary coronavirus strains, over a range of bleach concentrations and times (0.4–0.6 log₁₀ reduction in 1 minute exposure, at a concentration of 0.6% (~600 ppm) and >3.0 log₁₀ reduction in 1 minute of exposure to a 0.5% concentration (~6000 ppm) or a concentration 0.1% (~1200 ppm). In our paper we reprinted some of the limited available data about the persistence of the COVID-19 virus on various surfaces and the efficacy of disinfection with bleach (NaOC) for the reader's easy reference.

Before recommending the somewhat higher concentration of bleach and exposure for a shorter relative time, we considered several variables and referred to official resources at the CDC and US Food and Drug Administration (FDA) (CDC, 2018; US FDA, 2017). One concern raised about our paper in public forums was the issue of the human milk containers being a food contact surface; therefore, subject to regulations for these. Various food preparation and packaging resources refer to a bleach concentration of 200 parts per million (ppm) as the highest concentration which should come in contact with a food-contact surface, which some in the milk banking community have extrapolated to mean the external surfaces of milk containers. The FDA states in the *Food code, 2017* that:

Food-contact surface means: (1) a surface of equipment or a utensil with which food normally comes in contact; or (2) a surface of equipment or a utensil from which food may drain, drip, or splash: (a) into a food, or (b) onto a surface normally in contact with food (p. 38).

The outside of a sealed plastic container, in particular human milk storage bags or bottles, is not intended to come in contact with the actual food (human milk). Sanitizing the outside of HM sealed containers that come into milk banks does not fit the FDA's definition of food contact surface.

The concentration of bleach (sodium hypochlorite; NaOC), temperature and humidity of exposure, duration of exposure, and pH of the solution can all influence the sanitizing effect (inactivation of virus) of a solution. The CDC's (2018) guidance about "How to Clean, Sanitize, and Store Infant Feeding Items" (written prior to the pandemic) provides recommendations for cleaning empty bottles, nipples, rings and caps. They stated that if boiling, steaming or use of a dishwasher is not available, sterilization can be accomplished by using a bleach solution of 2 teaspoons of unscented bleach per gallon (16 cups) of water to soak the items for at least 2 minutes. They also reported that "*Any remaining bleach will break down quickly as it dries and will not hurt your baby*" (CDC, 2018, For Extra Protection, Sanitize section). *Therefore, no bleach remains on disinfected containers beyond the time it takes for evaporation to occur, allaying concerns about the safety of using bleach.* More recently, The CDC (2020b, cleaning non-porous surfaces) has recommended a

bleach solution of 5 tablespoons (1/3rd cup) bleach per gallon of water or 4 teaspoons bleach per quart of water for cleaning non-porous surfaces during the pandemic. The 1-minute step we recommended, allows time for viricidal effect and the step for drying for subsequent breakdown of the bleach on the external surface of the container. We recommended this as a one-time step in handling the human milk containers, not to be repeated.

Our recommendation of the use of a higher concentration of bleach for a shorter time period is a simpler step and is consistent with modifying variables for disinfection (Kampf et al., 2020; WHO, 2020a, WHO, 2020b). Although we made every attempt to relay the best available evidence at the time, we thought that we had made it clear that further research was needed. Our recommendations were aimed at meeting the immediate global crisis and the needs expressed by the international groups of healthcare workers seeking our best professional advice — before additional research could be conducted. Our approach, as physicians was '*first do no harm*', which we interpreted as protecting milk banking and NICU staff from becoming contaminated from possibly infected mothers.

With the current lack of essential information about the infectious dose, the period of transmissibility, viral shedding by asymptomatic or symptomatic individuals, and the severe current limitations in being able to identify infected individuals, we continue to recommend this simple disinfecting step applied to the sealed external surface of intact milk containers received from donor mothers (prior to any additional processing of the milk or storage in freezers or refrigerators with other containers of milk within hospital milk storage facilities, milk banks and at home prior to use for informal milk sharing). This would protect staff and others who came in contact with these containers and eliminate the risk of contaminating surfaces in these locations or other containers of milk with infectious particles.

As always, we strongly support breastfeeding first, and then use of human donor milk for infants. We hope that our recommendations can be used in appropriate situations to support the continued collection and use of donor human milk or that hospitals already have policies in place to address the disinfecting of the outside of containers mothers bring in from home or express in the hospital. As more data-based evidence becomes available, many existing recommendations about SARS-CoV-2 most likely will change.

Kathleen Ann Marinelli, MD, IBCLC, FABM
Pediatrics, University of Connecticut School of Medicine,
Farmington, CT, USA
kathleen.marinelli@cox.net

Robert Michael Lawrence, MD
Pediatric Infectious Disease, University of Florida,
Gainesville, FL, USA
lawrerm@peds.ufl.edu

Declaration of Conflicting Interests

Dr. Marinelli is a Clinical Professor of Pediatrics at the University of Connecticut School of Medicine. She also belongs to the *European Milk Banking Association*. She is an Associate Editor for the *Journal of Human Lactation* and as an author did not have any role in the acceptance of this manuscript for publication.

Dr. Lawrence is an Adjunct Clinical Professor of Pediatric Infectious Disease at the University of Florida. He is co-editor of a book on breastfeeding; *Breastfeeding: A Guide for the Medical Profession*. Lawrence RA, & Lawrence RM. Elsevier Publishing Philadelphia PA, 2016.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Kathleen Ann Marinelli, MD, IBCLC, FABM  <https://orcid.org/0000-0001-9342-6833>

References

- Bai, Y., Yao, L., Wei, T., Tian, F., Jin, D. -Y., Chen, L., & Wang, M. (2020). Presumed asymptomatic carrier transmission of COVID-19. *Journal of the American Medical Association*. doi:10.1001/jama.2020.2565
- Center for Disease Control and Prevention. (2018). Water, sanitation & environmentally – related hygiene. How to clean, sanitize, and store infant feeding items. <https://cdc.gov/healthywater/hygiene/healthychildcare/infantfeeding/cleansanitize.html>
- Centers for Disease Control and Prevention. (2020a). Coronavirus Disease 2019 (COVID 19). Pregnancy & Breastfeeding. Information about Coronavirus Disease 2019. <https://www.cdc.gov/coronavirus/2019-ncov/prepare/pregnancy-breastfeeding.html>
- Centers for Disease Control and Prevention. (2020b). Interim Recommendations for U.S. Households with Suspected or Confirmed Coronavirus disease 2019 (COVID-19): Cleaning and disinfection for Households. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprepare%2Fcleaning-disinfection.html
- Chin, A. W. H., Chu, J. T. S., Perera, M. R. A., Hui, K. P. Y., Yen, H. -L., Chan, M. C. W., Peiris, M., & Poon, L. L. M. (2020). Stability of SARS-CoV-2 in different environmental conditions. *The Lancet Microbe*, published online April 2. doi: 10.1016/S2666-5247(20)30003-3
- He, X., Lau, E. H. Y., Wu, P., Deng, X., Wang, J., Hao, X., Lau, Y. C., Wong, J. Y., Guan, Y., Tan, X., Mo, X., Chen, Y., Liao, B., Chen, W., Hu, F., Zhang, Q., Zhong, M., Wu, Y., Zhao, L., . . . Leung, G. M. (2020). Temporal dynamics in viral shedding and transmissibility of COVID-19. *Nature Medicine*. Advance online publication. doi:10.1038/s41591-020-0869-5
- Human Milk Banking Association of North America. (2020). Milk banking and COVID-19. (March 6, 2020). https://www.hmbana.org/file_download/inline/a04ca2a1-b32a-4c2e-9375-44b37270cfbd
- Kampf, G., Todt, D., Pfaender, S., & Steinmann, E. (2020). Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*, 104(3), 246–251. doi:10.1016/j.jhin.2020.01.022
- Marinelli, K. A., & Lawrence, R. M. (2020). Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic. *Journal of Human Lactation*, 36(3), 089033442091908. doi:10.1177/0890334420919083
- Mitchell, K. B., & Weinstein, S. R. (2020). Concerns Regarding the Article Entitled Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19). *Journal of Human Lactation*, 36(3), XX.
- National Research Council. (2020, April 1). *Rapid expert consultation on the possibility of bioaerosol spread of SARS-CoV-2 for the COVID-19 pandemic*. The National Academies Press.
- Rothe, C., Schunk, M., Sothmann, P., Bretzel, G., Froeschl, G., Wallrauch, C., Zimmer, T., Thiel, V., Janke, C., Guggemos, W., Seilmaier, M., Drosten, C., Vollmar, P., Zwirglmaier, K., Zange, S., Wölfel, R., & Hoelscher, M. (2020). Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *New England Journal of Medicine*, 382(10), 970–971. doi:10.1056/NEJMc2001468
- Royal College of Obstetricians and Gynaecologists (RCOG). (2020, April 9). *Coronavirus (COVID-19) Infection in Pregnancy. Information for healthcare professionals Version 7*. <https://www.rcog.org.uk/globalassets/documents/guidelines/2020-04-09-coronavirus-covid-19-infection-in-pregnancy.pdf>
- Santarpia, J. L., Rivera, D. N., Herrera, V., Morwitzer, M. J., Creager, H., Santarpia, G. W., Crown, K. K., Brett-Major, D. M., Schnaubelt, E., Broadhurst, M. J., Lawler, J. V., Reid, S. P., & Lowe, J. J. (2020). *Transmission potential of SARS-CoV-2 in viral shedding observed at the University of Nebraska Medical Center*.
- Shanafelt, T., Ripp, J., & Trockel, M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *Journal of the American Medical Association*. April 7. [Epub ahead of print]. doi:10.1001/jama.2020.5893
- Stellwagen, L., & Chambers, C. (2020). Response to: Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS-CoV-2 (COVID-19) Pandemic. *Journal of Human Lactation*, 36(3), XX.
- Sutton, D., Fuchs, K., D'Alton, M., & Goffman, D. (2020). Universal screening for SARS-CoV-2 in women admitted for delivery. *New England Journal of Medicine*. April 13. [Epub ahead of print].

- UNICEF. (2020). Coronavirus disease (COVID-19): What parents should know. *How to protect yourself and your children.* <https://www.unicef.org/stories/novel-coronavirus-outbreak-what-parents-should-know>
- U.S. Food & Drug Administration, U.S. Public Health Service. *Food Code 2017*, publication number IFS17. <https://www.fda.gov/media/110822/download>
- van Doremalen, N., Bushmaker, T., Morris, D. H., Holbrook, M. G., Gamble, A., Williamson, B. N., Tamin, A., Harcourt, J. L., Thornburg, N. J., Gerber, S. I., Lloyd-Smith, J. O., de Wit, E., & Munster, V. J. (2020). Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *New England Journal of Medicine*, 382(16), 1564–1567. doi:10.1056/NEJMCo2004973
- Wei, W. E., Li, Z., Chiew, C. J., Yong, S. E., Toh, M. P., & Lee, V. J. (2020). Presymptomatic transmission pf SARS-CoV-2—Singapore, January 23–March 16, 2020. *Morbidity and Mortality Weekly Report*, 69(14), 411–415. doi:10.15585/mmwr.mm6914e1
- World Health Organization. (2020a, March 13). *Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected*. Interim guidance V 1.2. [www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected).
- World Health Organization. (2020b, March 19). *Infection prevention and control during health care when COVID-19 is suspected: Interim guidance*.
- Ye, G., Lin, H., Chen, L., Wang, S., Zeng, Z., Wang, W., Zhang, S., Rebmann, T., Li, Y., Pan, Z., Yang, Z., Wang, Y., Wang, F., Qian, Z., & Wang, X. (2002). Environmental contamination of the SARS-CoV-2 in healthcare premises: An urgent call for protection for healthcare workers. *medRxiv*.

Use of Disinfectant Wipes to Sanitize Milk's Containers of Human Milk Bank During COVID-19 Pandemic

DOI: 10.1177/0890334420924639

In reply to Marinelli KA and Lawrence RM: “Safe Handling of Containers of Expressed Human Milk in all Settings During the SARS- CoV-2 (COVID-19) Pandemic”, Journal of Human Lactation, April 2020.

We comment this paper reporting our experience in Italy during current COVID-19 pandemic. Although there is no current evidence of SARS-CoV-2 vertical transmission and viral passage in human milk (De Rose et al., 2020; Salvatori et al., 2020), the knowledge about COVID-19 is changing rapidly, while health benefits of breastfeeding remain unquestionable. Herein we describe our experience at the Human Milk Bank (HMB) of a children’s hospital in Rome (Italy). There are 39 HMBs in Italy, but ours is the sole bank in Rome and in the whole area of Lazio, inhabited by 6 million citizens: it offers donor human milk (DHM) not only to our critically ill infants, but also to infants of other Neonatal Intensive Care Units. Several studies have documented that the use of DHM is cost-effective (Haiden and Ziegler 2016). Donors for our HMB come from mothers whose babies are sick in our hospital (18%) and volunteering at home nursing mothers (82%) they are carefully selected and then tested for several infectious diseases, as suggested (Haiden and Ziegler 2016). Donors express milk by mechanical pumping, and store it in the freezer compartment of

their home refrigerator before delivery to the HMB, always using sterile single-use plastic containers previously supplied by our bank. This is done according to current recommendations from the Center for Disease Control and Prevention during this pandemic for proper pump cleaning after each use (Centers for Disease Control and Prevention 2020). Donors are forced to remain in their residence according Italian Government mandate during the pandemic. While milk donation was practically suspended in other Italian cities (Marinelli 2020), our drivers still collect once a week the expressed human milk (EHM) directly from the donors (while we usually collect EHM 15 times/month), but without entering into the donors’ residence and wearing protective equipment. In this way, without suspending HMB’s activities, we collected 270 containers (49 liters) during the last 30 days. Milk was frozen and then defrosted and pasteurized before use, with pasteurization process at 62.5°C for 30 minutes (Holder pasteurization) as recommended in all international HMBs guidelines (Moro et al. 2019).

Breastfeeding information is provided to the mothers via telephone consultation available 8 hours a day. Although we recommended that donor mothers suspend donation and be promptly tested if any SARS-CoV-2 symptoms occur (and mothers agreed to avoid any contact with suspected cases), SARS-CoV-2 could contaminate the outside of the container, considering that this virus can be detected for up to 72 hours on plastic and various surfaces (van Doremalen et al. 2020). Therefore, as recently suggested in *JHL* (Marinelli and Lawrence 2020), we started to sanitize EHM containers using disinfectant wipes and gloved hands, in order to guarantee safety of our children and our workers.

Before storing containers in our HMB’s freezers, we employ a ready-to-use disinfectant wipes containing 20 ml of 0.105%

sodium hypochlorite (distributed by Lombarda H, Italy). We estimate that with a single wet wipe it is possible to disinfect the outside surface of 55 containers (each one with 200 ml EHM, for a total of about 11 liters) in about 15 minutes. The cost of a single wet wipe is 0.58 euros. Therefore, considering use of a single wet wipe each time we collect EHM (15 times/month before pandemic with an average of 50 collected containers/time), we calculate an additional charge of about 104.4 €/year. While the use of a diluted bleach (0.5% sodium hypochlorite, with a dilution of 1:10) is the least expensive method (Marinelli and Lawrence 2020), it is necessary to carry out the appropriate dilutions, and this could be not as easy and fast.

Struggle against this insidious virus, that changed the way we live and think, requires continuous efforts (De Rose et al. (2020); Salvatori et al., 2020). On the other hand, trying to restart our activities and ensure human milk to those who need it could help us to not change the quality of our assistance of these fragile infants.

Using wet wipes is a sustainable expense, and the extra-time used to disinfect containers is feasible, easy, and advisable.

Domenico Umberto De Rose, MD
Neonatal Intensive Care Unit and Human Milk Bank
- Department of Medical and Surgical Neonatology,
"Bambino Gesù" Children's Hospital IRCCS, Rome, Italy
derosedomenicoumberto@gmail.com

Maria Paola Reposi
Neonatal Intensive Care Unit and Human Milk Bank
- Department of Medical and Surgical Neonatology,
"Bambino Gesù" Children's Hospital IRCCS, Rome, Italy

Patrizia Amadio
Neonatal Intensive Care Unit and Human Milk Bank
- Department of Medical and Surgical Neonatology,
"Bambino Gesù" Children's Hospital IRCCS, Rome, Italy

Cinzia Auriti
Neonatal Intensive Care Unit and Human Milk Bank
- Department of Medical and Surgical Neonatology,
"Bambino Gesù" Children's Hospital IRCCS, Rome, Italy

Immacolata Dall'Oglio
Health Professions Development - Continuing Education
and Research Service, "Bambino Gesù" Children's Hospital
IRCCS, Rome, Italy

Tiziana Corsetti
Hospital Pharmacy, "Bambino Gesù" Children's Hospital
IRCCS, Rome, Italy

Andrea Dotta
Neonatal Intensive Care Unit and Human Milk Bank
- Department of Medical and Surgical Neonatology,
"Bambino Gesù" Children's Hospital IRCCS, Rome, Italy

Guglielmo Salvatori
Neonatal Intensive Care Unit and Human Milk Bank
- Department of Medical and Surgical Neonatology,
"Bambino Gesù" Children's Hospital IRCCS, Rome, Italy

Ethical Disclosures

The authors declare that they have followed the protocols of their work center on the publication of patients' data and Helsinki Declaration.

Acknowledgments

The authors thank the donor mothers, who continued to donate their milk to most fragile infants even during COVID-19 pandemic. We thank also Roberto Salvatori, full professor at Johns Hopkins University (Baltimore, US), for English revision.

Author' Contributions

All authors participated to the conception and design of the study, acquisition and interpretation of data and drafting the article. All authors read and approved the final version.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Domenico Umberto De Rose, MD  <https://orcid.org/0000-0002-9076-9838>

References

- Centers for Disease Control and Prevention. (2020). Coronavirus Disease 2019 (COVID-19) Recommendations: Pregnancy and Breastfeeding. Accessed on April 13th, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/prepare/pregnancy-breastfeeding.html>
- De Rose, D. U., Piersigilli, F., Ronchetti, M. P., Santisi, A., Bersani, I., Dotta, A., Danhaive, O., & Auriti, C. (2020). Novel Coronavirus Disease (COVID-19) in Newborns and Infants: What We Know so Far. *Italian Journal of Pediatrics* April (in press).

- Haiden, N., & Ziegler, E. E. (2016). Human Milk Banking. *Ann Nutr Metab*, 69(suppl 2), 8–15. doi:10.1159/000452821
- Marinelli, K. A. (2020). International Perspectives Concerning Donor Milk Banking During the SARS-CoV-2 (COVID-19) Pandemic. *Journal of Human Lactation*, 16(April), 1–6. doi:10.1177/0890334420917661
- Marinelli, K. A., & Lawrence, R. M. (2020). Safe Handling of Containers of Expressed Human Milk in All Settings During the CoV-2 (COVID-19) Pandemic. *Journal of Human Lactation*, (April) 1–4. doi:10.1177/0890334420919083
- Moro, G. E., Billeaud, C., Rachel, B., Calvo, J., Cavallarin, L., Christen, L., Escuder-Vieco, D., & Lembo, D. (2019). Processing of Donor Human Milk: Update and Recommendations From the European Milk Bank Association (EMBA). *Frontiers in Pediatrics*, 7(February), 1–10. doi:10.3389/fped.2019.00049
- Salvatori, G., De Rose, D. U., Concato, C., Alario, D., Olivini, N., Dotta, A., & Campana, A. (2020). Managing COVID-19 positive maternal-infant dyads: An Italian experience. *Breastfeeding Medicine*, April in press.
- van Doremalen, N., Bushmaker, T., Morris, D. H., Holbrook, M. G., Gamble, A., Williamson, B. N., Tamin, A., Harcourt, J. L., Thornburg, N. J., Gerber, S. I., Lloyd-Smith, J. O., de Wit, E., & Munster, V. J. (2020). Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *New England Journal of Medicine*, 382(16), 1564–1567. doi:10.1056/NEJMc2004973

YOU belong at ILCA

Connect with the **TOOLS** and **COMMUNITY** you need to support families

GET THE TOOLS

to feel confident in your clinical skills and support strategies

HAVE YOUR VOICE HEARD

at the table where global decisions are made

CONNECT TO THE WORLDWIDE COMMUNITY

of lactation supporters

Benefits include:

- A minimum of **18 FREE** continuing education units each year plus resources on the topics you need most
- Access to the **Journal of Human Lactation**
- Access to a full library of **educational offerings**
- Get listed on our **Lactation Consultant directory**, the only international Lactation Consultant directory* (IBCLC members only)
- **Resources and handouts for your clients** like *Inside Track*
- **Savings** on our annual conference
- and **More!**

The International Lactation Consultant Association® (ILCA®) is the member association for International Board Certified Lactation Consultants® (IBCLC®) and other healthcare professionals who care for breastfeeding families. IBCLCs, students, retired members, clinical professionals, and all supporters are welcomed members of our community.

Join now at joinilca.org/belong20 or email info@ilca.org

*Standard membership only. See www.ilca.org for details on all membership categories and benefits.



YOU are welcome at **ILCA**

YOU belong at ILCA

Membership Application

Fax: 1.919.459.2075 • Email: info@ilca.org

First Name _____ Last Name _____

Company _____ Institution/Course Provider (if student) _____

Mailing Address _____

City _____ State/Province/Territory _____ Postal/Zip Code _____ Country _____

Phone _____ Email _____

Credentials _____ IBCLC? Yes No IBCLC# _____ Recertification Year _____

Would you like to be included on ILCA's Find a Lactation Consultant Directory (IBCLC members only)? Yes No

■ PLUS, I want to be an ILCA Benefactor! You'll have the opportunity to support scholarships for those who are currently unable to access ILCA membership or conferences, which will increase knowledge for IBCLCs all over the world. All benefactors will receive recognition in the Journal of Human Lactation, the ILCA website, and on a ribbon at the ILCA conference.

Personal Demographics

Information provided below will be used only by ILCA to better understand the members it serves.

Profession/Credentials (select all that apply)

- | | | |
|--|---|--|
| <input type="checkbox"/> IBCLC | <input type="checkbox"/> Student | <input type="checkbox"/> Midwife |
| <input type="checkbox"/> Educator/Researcher | <input type="checkbox"/> Dietitian/Nutritionist | <input type="checkbox"/> Retired |
| <input type="checkbox"/> Nurse | <input type="checkbox"/> Physician | <input type="checkbox"/> Volunteer |
| <input type="checkbox"/> Other Lactation Cred./Cert. | <input type="checkbox"/> Therapist | <input type="checkbox"/> Other (specify) _____ |

Areas of Practice (select all that apply)

- | | | |
|---|--|--|
| <input type="checkbox"/> Clinic/Birthing Center/Wards | <input type="checkbox"/> Student | <input type="checkbox"/> Retail Sales |
| <input type="checkbox"/> Hospital | <input type="checkbox"/> Corporate Lactation Program | <input type="checkbox"/> Volunteer Support |
| <input type="checkbox"/> Retired | <input type="checkbox"/> Private Practice | <input type="checkbox"/> Government/Military |
| <input type="checkbox"/> Community/Public Health/WIC | <input type="checkbox"/> Milk Banking | <input type="checkbox"/> Research |
| <input type="checkbox"/> Physician's Office | <input type="checkbox"/> Educator/Course Provider | <input type="checkbox"/> Other (specify) _____ |

Communications Preferences

Please indicate the communications you would like to receive from ILCA:

- | | | |
|--|--|---|
| <input type="checkbox"/> ILCA member news and membership updates | <input type="checkbox"/> <i>Journal of Human Lactation</i> and SAGE Publication news and updates | <input type="checkbox"/> Third party emails and mailings approved by ILCA |
|--|--|---|

Membership Fees and Payment

Please refer to the table provided below to determine your membership category. All rates are in US currency.

MEMBER TYPE	INDIVIDUAL DUES	ILCA BENEFACTOR RATES (OPTIONAL)			TOTAL DUES \$USD
		BRONZE	SILVER	GOLD	
Category A Countries					
Standard (IBCLCs)	\$132	\$25	\$50	\$100	\$_____
Clinical Care Professionals (non-IBCLCs)	\$124	\$25	\$50	\$100	\$_____
Supporters (non-IBCLCs)	\$85	\$25	\$50	\$100	\$_____
Students	\$85	\$25	\$50	\$100	\$_____
Retired	\$58	\$25	\$50	\$100	\$_____
Category B Countries					
Standard (IBCLCs)	\$27	\$5	\$10	\$21	\$_____
Clinical Care Professionals (non-IBCLCs)	\$25	\$5	\$10	\$21	\$_____
Supporters (non-IBCLCs)	\$17	\$5	\$10	\$21	\$_____
Students	\$17	\$5	\$10	\$21	\$_____
Retired	\$11	\$5	\$10	\$21	\$_____
Category C Countries					
Standard (IBCLCs)	\$7	\$1	\$3	\$5	\$_____
Clinical Care Professionals (non-IBCLCs)	\$6	\$1	\$3	\$5	\$_____
Supporters (non-IBCLCs)	\$4	\$1	\$3	\$5	\$_____
Students	\$4	\$1	\$3	\$5	\$_____
Retired	\$3	\$1	\$3	\$5	\$_____
Category D Countries					
Standard (IBCLCs)	\$3	\$1	\$1	\$2	\$_____
Clinical Care Professionals (non-IBCLCs)	\$3	\$1	\$1	\$2	\$_____
Supporters (non-IBCLCs)	\$2	\$1	\$1	\$2	\$_____
Students	\$2	\$1	\$1	\$2	\$_____
Retired	\$1	\$1	\$1	\$2	\$_____
TOTAL \$_____					

Payment Information

Check (payable to ILCA) Credit Card: Discover MasterCard VISA

Credit Card Number _____ Security Code _____

Signature _____ Exp. Date _____

If you are from a category A country, you have the option of receiving the JHL in print and online OR online only. Please choose:
 Print and Online JHL Online only JHL

Category and Criteria for Eligibility

Countries are categorized by the World Bank Income Indicators. For more information about membership benefits for each category and criteria, please visit www.ilca.org.

Category A: Andorra, Antigua and Barbuda, Aruba, Australia, Austria, The Bahamas, Bahrain, Barbados, Belgium, Bermuda, British Virgin Islands, Brunei Darussalam, Canada, Cayman Islands, Channel Islands, Chile, Croatia, Curaçao, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, French Polynesia, Germany, Gibraltar, Greece, Greenland, Guam, Hong Kong SAR, Hungary, Iceland, Ireland, Isle of Man, Israel, Italy, Japan, Korea (Rep.), Kuwait, Latvia, Liechten-stein, Lithuania, Luxembourg, Macao SAR, Malta, Monaco, Netherlands, New Caledonia, New Zealand, Northern Mariana Islands, Norway, Oman, Palau, Panama, Poland, Portugal, Qatar, San Marino, Saudi Arabia, Seychelles, Singapore, Sint Maarten (Dutch part), Slovak Republic, Slovenia, Spain, St. Kitts and Nevis, St. Martin (French part), Sweden, Switzerland, Trinidad and Tobago, Turks and Caicos Islands, United Arab Emirates, United Kingdom, United States, Uruguay, Virgin Islands (U.S.)

Category B: Albania, Algeria, American Samoa, Argentina, Armenia, Azerbaijan, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, China, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, Equatorial Guinea, Fiji, Gabon, Georgia, Grenada, Guatemala, Guyana, Iran (Islamic Rep.), Iraq, Jamaica, Jordan, Kazakhstan, Kosovo, Lebanon,

Libya, Macedonia, FYR, Malaysia, Maldives, Marshall Islands, Mauritius, Mexico, Montenegro, Namibia, Nauru, Paraguay, Peru, Romania, Russian Federation, Samoa, Serbia, South Africa, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Suriname, Thailand, Tonga, Turkey, Turkmenistan, Tuvalu, Venezuela RB

Category C: Angola, Bangladesh, Bhutan, Bolivia, Cabo Verde, Cambodia, Cameroon, Comoros, Congo, Rep., Côte d'Ivoire, Djibouti, Egypt (Arab Rep.), El Salvador, Ghana, Honduras, India, Indonesia, Kenya, Kiribati, Kyrgyz Republic, Lao PDR, Lesotho, Mauritania, Micronesia (Fed. Sts.), Moldova, Mongolia, Morocco, Myanmar, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Philippines, São Tomé and Príncipe, Senegal, Solomon Islands, Sudan, Swaziland, Timor-Leste, Tunisia, Ukraine, Uzbekistan, Vanuatu, Vietnam, West Bank and Gaza, Zambia, Zimbabwe

Category D: Afghanistan, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Congo (Dem. Rep.), Eritrea, Ethiopia, The Gambia, Guinea, Guinea-Bissau, Haiti, Korea, Dem. People's Rep., Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, Puerto Rico, Rwanda, Sierra Leone, Somalia, South Sudan, Syrian Arab Republic, Tajikistan, Tanzania, Togo, Uganda, Yemen (Rep.)

Student: To qualify as a student member, an individual must list the educational institution being attended along with the course provider's name. Individuals may only be student members for a total of two (2) years.

Retired: To qualify as a retired member, an individual must be at least 62 years of age and have been a member of ILCA for a minimum of five (5) non-contiguous years. By applying as a retired member, an individual is confirming their status of eligibility.

Clinical Care Profession: To qualify as a Clinical Care Professional member, one must be non-IBCLC practitioner whose scope of practice includes the clinical care of breastfeeding families. Examples include physicians, midwives, nurses, etc.

Supporter: To qualify as a supporter member, one must be a non-IBCLC whose scope of practice or role in the community is the support of the normal course of breastfeeding. Examples include volunteers with new family support groups, peer counselors, and lactation counselors.