Association between exclusive breastfeeding and common childhood diseases in Bangladesh

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BACKGROUND

- Breastfeeding is a normal feeding method for infants and young children that ensures optimum growth and development.

- Breast-feeding has many benefits for babies, e.g. physical growth, directing to height and weight gain etc.

- Moreover, it also reduce the risk of many illnesses and diseases e.g. ear infections, Respiratory tract infections, Gut infections, Allergic diseases, Diabetes and Childhood leukemia.

- Several national and international organizations (e.g. WHO) indorse exclusive breastfeeding for the first six months

OBJECTIVE

To inspect the association between exclusive breastfeeding and common childhood diseases in Bangladesh. (e.g. diarrhea, blood in stools, fever, cough, breathing problem and problem in chest)

METHODOLOGY (STUDY DESIGN)

- Bangladesh Demographic and Health Survey (BDHS) 2014

- Provides a comprehensive picture of children and women in the seven divisions

- Women were aged between 15-49 years

- There were 632 children of 6 months

- Among them, 55.30% infants are exclusively breastfed

METHODOLOGY (STATISTICAL ANALYSIS)

- We examined a outcome variable (childhood disease) of interest, using

  - Poisson regression (PR),
  - Negative Binomial (NB),
  - Zero-inflated Poisson (ZIP) regression and
  - Zero-inflated Negative Binomial (ZINB) regression analysis.

- Poisson regression is used to model when outcome variables has taken by counts.

- ZIP regression is used to model when outcome variables (count data) that has an excess of zero counts.

METHODOLOGY (STATISTICAL ANALYSIS)

- Count data often display substantial overdispersion with respect to the Poisson models.

- Because of this, NB regression has been used

- On the other hand, count data with excess zero also display substantial overdispersion with respect to the ZIP models

- Because of this, ZINB regression have been used

METHODOLOGY (STATISTICAL ANALYSIS)

- Goodness of fit determining whether regression methods such as PR and logistic regression application are very essential

- In fact that the goodness of statistics were higher than 1, shows that there was an over dispersion in the data set

- In PR analysis, deviance and Chi-square goodness of fit test indicating overdispersion were obtained as 1.85 and 1.83, respectively

- So, we considered all other models and selected a best model based on AIC and BIC.

METHODOLOGY (STATISTICAL ANALYSIS)

- A child is identified as suffering from diseases if their mother reported that the child had diseases in the two weeks prior to the survey.

- For study purpose, firstly, we put 1 if their mother reported that the child had a specific disease, otherwise 0

- Then, we count all diseases for regression analysis

- We estimate crude (unadjusted) risk ratio (CRR) and adjusted risk ratios (ARRs) model for evaluating the association between EBF and childhood disease

- Adjusted model: included all important confounding factors

METHODOLOGY (STATISTICAL ANALYSIS)

- Crude model: Disease (count) ~ EBF

- Adjusted model:

  Disease(count) ~ EBF + Maternal Age + Division + Residence + Education (mothers) + Maternal employment status + Occupation (fathers) + Mass media + BMI (mothers)+ Wealth Index + HH members + C-section + Sex (child) + Place of delivery + Size of child (Birth) + Age (child)
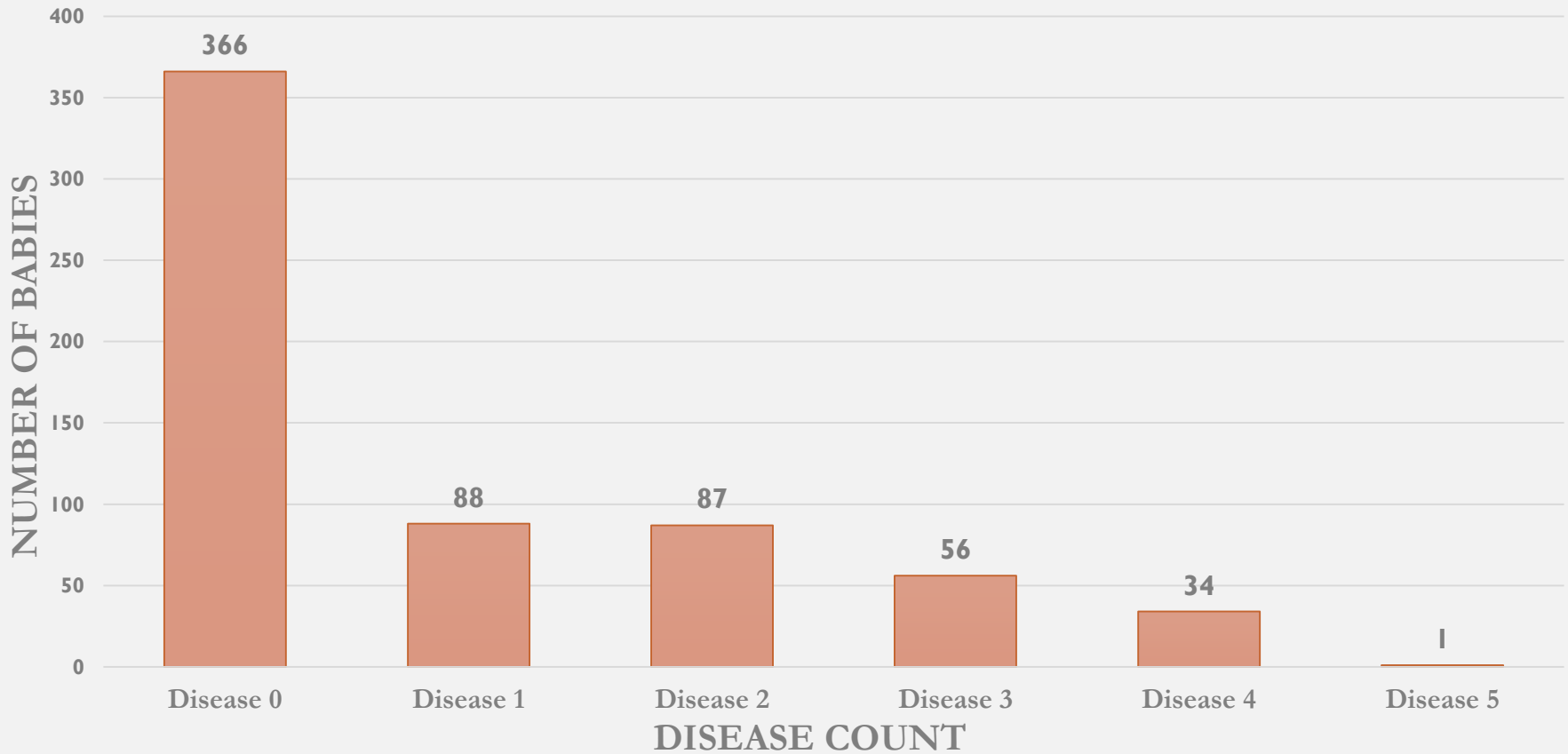
EBF: Exclusive breastfeeding
HH: Household
C-section: caesarean section

RESULT

The AIC BIC model selection criteria for the models PR, NB, ZIP and ZINB are given in the table below

Model	Log-likelihood	AIC	BIC
PR	-632.55	1906.13	1915.03
NB	-558.74	1670.46	1683.80
ZIP	-531.01	1705.04	1718.39
ZINB	**-797.34**	**1602.67**	**1620.47**

In the selection of appropriate regression model, ZINB regression was choosen as the best model

RESULT

ZINB regression **analysis between disease (count) and Exclusive breastfeeding**

Crude Model (only EBF variable in the model)

	Risk Ratio	95% CI	P-value
EBF (Yes vs No)	1.23	0.98 – 1.53	0.072

Adjusted Model (C-section & other covariates in the model)

	Risk Ratio	95% CI	P-value
EBF (Yes Vs No)	1.21	0.97 – 1.52	0.099

The ZINB regression analysis showed that the relative risk for the EBF was 1.23 (Crude) & 1.21 (Adjusted), indicates that children who exclusively breastfed compare to the non-exclusively breastfed are at increased risk for developing childhood disease; though the association was not statistically significant in both model at 5% level.

CI: Confidence Interval

ADJUSTED LR STATISTICS FOR TYPE 3 ANALYSIS FOR ZINB REGRESSION

Source	Chi-Square	Pr > ChiSq
EBF	2.76	0.097
Division	7.79	0.254
Residence	0.18	0.674
Education (mothers)	5.26	0.154
Employment Status (mothers)	0.01	0.908
Occupation (fathers)	3.52	0.318
Mass media	2.27	0.132
Age (mothers)	2.07	0.355
BMI (mothers)	6.14	0.047
HH members	0.12	0.724
C-section	0.06	0.800
Sex (childs)	0.25	0.616
Size (childs)	1.31	0.860
Age (childs)	18.82	<0.001
Wealth status	4.25	0.373
Religion	1.14	0.286

KEY FINDINGS

Although the association between exclusive breastfeeding and childhood diseases was not significant there is still an increased risk for those children who was not exclusively breastfed

LIMITATION OF OUR DATA

- As the information was derived from a cross-sectional data, longitudinal study is necessary for assess such association.

- The sample size was not much big

- Information about child disease like Asthma, type 1 diabetes, Crohn's disease, allergic diseases, immune deficiencies leukemia, were not available

- The definition of EBF used in BDHS according to 24 h-recall period is subject to bias and misreporting (NIPORT/Bangladesh, Associates, & International, 2016)

- Insufficient information was available about mothers health

CONCLUSION

- This study reveals that there is an association between EBF and children health development. Common childhood infectious diseases can do rare harm in infants' body because of EBF other than infants who are non-EBF.

- Although exclusive breastfeeding status in Bangladesh is good, still monitoring is necessary.

- Proper awareness and training program for mothers during antenatal and postnatal visits are highly recommended.

CONCLUSION

The connection between breastfeeding and SDG 3 (ensure healthy lives and promote well-being for all at all ages) is obvious; but breastfeeding can also help us to achieve the other SDGs.

REFERENCE

NIPORT/Bangladesh, N. I. of P. R. and T.-, Associates, M. and, & International, I. (2016, March 1). *Bangladesh Demographic and Health Survey 2014*.

Retrieved from https://dhsprogram.com/publications/publication-fr311-dhs-final-reports.cfm

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