Facebook recruitment for research of children and parents during the COVID-19 pandemic

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ARTICLE INFO

ABSTRACT

The COVID-19 pandemic has created unique challenges for recruitment of adults and children into clinical research. The sudden onset of stay-at-home orders and social distancing enacted in much of the United States created sudden barriers for researchers to recruit participants in-person. Recognizing the critical need to understand the impact of COVID-19 on children and families in real time, studies required an alternative approach. The present study sought to develop methods and establish the feasibility of utilizing Facebook's targeted advertising to enroll schoolaged children and their parents for a study examining the impact of the COVID-19 pandemic on families.

This study used an 8 week pay-per-click advertisement approach via Facebook for research recruitment. Parents of children age 8 to 17 were invited and asked to include their child. Standardized measures were included for parents and children. Zip code targeting was used to increase diversity in participants.

The ad campaign reached 213,120, yielding 3563 clicks, 684 parent participants, 494 child participants and a 26% conversion rate over eight weeks. The cost-per-click was $0.64, and cost-per-participant was $3.30 and $4.60 for parents and children, respectively.

This nationwide study successfully used social media to recruit a robust nationwide sample of parent-child dyads during the COVID-19 pandemic. Social media recruitment mitigated typical time and engagement barriers for participants while also circumventing social and physical distancing orders due to the pandemic which allowed for real time assessment of the pandemic's effects on families. Future consideration should be given.to social media as a research recruitment methodology.

1. Introduction

While the recruitment of research participants can be difficult in typical circumstances, the COVID-19 pandemic has created unique challenges for the recruitment of adults and children into pediatric nursing research (Padala, Jendro, & Padala, 2020). The sudden onset of stay-at-home orders and social distancing geruenacted in much of the United States of America (USA) created unexpected barriers for researchers to recruit participants and, therefore, understand the psychological outcomes of a modern-day pandemic (Auletta et al., 2020). Recognizing the critical need to understand the impact of COVID-19 in real time, we sought an alternative approach to access parent/child dyads and assess their experiences, particularly school-aged children.

Facebook is now the largest web-based social media platform, with approximately 223 million users in the USA, and 2.6 billion monthly users worldwide (Clement, 2020). Among American adults who use Facebook, the majority, 74%, access the site at least once a day (Gramlich, 2019). Increased Facebook use has led to an increase in paid advertisements, especially for health-related study recruitment (Pechmann, Phillips, Calder, & Prochaska, 2020). Other strategies for mass participant recruitment that utilize traditional marketing strategies of television and print advertisements, letters, and flyers can quickly increase monetary and temporal costs of recruitment while still failing to produce a diverse sample (Whitaker, Stevelink, & Fear, 2017). Advantages of online surveys include rapid data collection, speed of participant engagement, limited resource utilization and snowballing effects

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(Stokes et al. 2019). While limited to those with internet access, recruiting through Facebook may allow for larger samples of vulnerable populations across large geographic areas (Shaver et al., 2019). Furthermore, internet access is expanding across the USA, mitigating the limitations of Facebook recruitment (Cooper, 2020). Previous research has demonstrated that web-based recruitment approaches decrease participant burden and appeal to younger age groups while cutting costs (Akard, Wray, & Gilmer, 2015).

Facebook advertisements have been a time-efficient and cost-effective recruitment method for other populations (Cho et al., 2021; Desroches, 2020; Foster Akard et al., 2016; Reagan et al., 2019). However, research on the feasibility of recruiting children as study participants, via parents on Facebook and other social media platforms, remains limited. Some studies have sought to directly recruit children, without parent participation (Bull, Levine, Schmiege, & Santeli, 2012; Chu & Snider, 2013; Fenner et al., 2012; Jones, Saksvig, Grieser, & Young, 2012; Moreno et al., 2017; Schwinn, Hopkins, Schinke, & Liu, 2017). These studies only involved parents when necessary for consent purposes. In addition, they also included young adults up to age 25 (Bull et al., 2012; Chu & Snider, 2013; Fenner et al., 2012). Schumacher, et al. (2014) did include parents for participation, but only to complete surveys on behalf of children under age 15. Nevertheless, these studies indicate that Facebook is a useful tool in recruiting pediatric participants. Akard et al. (2015) established that Facebook is also effective in recruiting parents for research. Subsequent research illustrated the viability of utilizing Facebook for recruitment of parent-child dyads (Cho et al., 2021; Foster Akard et al., 2016). Although an emerging area, few papers describe the feasibility and how to use social media for recruitment. Therefore, the purpose of this manuscript is to explain the methods and feasibility of Facebook targeted recruitment strategies aimed at enrolling school-aged children and their parents during the COVID-19 pandemic and discuss future implications for nursing.

2. Methods

This study was conducted through Nationwide Children's Hospital and was approved by the Institutional Review Board. A Facebook paid advertising program was used to recruit parents of school-aged children 8 to 17 years of age to complete self-report electronic questionnaires about their social and emotional well-being and quality of life. The advertising campaign (Fig. 1), developed in collaboration with and managed by the hospital marketing department, ran from May 13, 2020 until July 1, 2020. A pay-per-click approach with a maximum $2500 total spending amount was allotted for the campaign. Advertisements asked parents to participate in a survey about the effects of COVID-19 on school-aged children for a chance to win a $100 Amazon gift card. A link to an electronic REDCap survey was included in the ad. Parents clicked on the Facebook approved advertisement, a brief synopsis of the study was provided and then, if still interested, completed a four-item eligibility screening questionnaire. The local IRB determined survey completion was equivalent to implied consent/assent and no formal e-consent was necessary. Eligible parents were then directed to complete the parent report portion of the survey. Children were recruited online via the parent. After parents completed the survey, they were asked to identify the child participant. If more than one eligible child resided in the home, the oldest willing child was asked to participate. Both parents and children completed measures.

2.1.1. Advertising campaign

The Facebook advertisement was designed by the PI and the marketing team experienced in social media recruitment. Together the experienced marketing team and PI chose the image, primary text, headline and call to action. The ad campaign was built and managed by

Fig. 1. Facebook Recruitment Ad.

the hospital's Marketing team, however the Research Team was regularly engaged to determine best targeting strategies, as well as appropriate ad content. The general advertising campaign used in the first 6 weeks targeted parents of children age 8 to 17. Facebook interest terms included; "*parents with preteens*" and "*parents with teens*". The ad was published from the hospital Facebook page. The marketing team conducted weekly review of Facebook analytics. Definitions of terms and measures relevant to Facebook's analytics can be found in Table 1. After one month of recruitment it was noted that the sample was disproportionately white. Therefore, in the last two weeks of the campaign, marketing initiated a targeted zip code campaign in an effort to increase ethnic and income diversity. All continental USA zip codes were sorted from highest to lowest based on percentage of households with black/African American and Hispanic/Latino populations as well as by household income. The targeted campaign used 700 zip codes with

Table 1

Facebook analytics terms and measures.

	Definition
Impressions	The number of times the advertisement appeared in a news feed
Reach	The number of times the advertisement was seen at least once by a user
Click	An interaction with the advertisement
Cost per click	The cost of the ad divided by the number of times the ad was clicked
Conversion rate	The number of people who click on the ad and then become participants (eligibility is not excluded)
Cost per participant	The cost of advertising divided by the eligible recruited participants
Frequency	Average number of times each person saw the ad
Result rate	The number of clicks divided by the number of impressions

ethnic diversity of >65% of the population. Similarly, 400 zip codes used mean household incomes < $25,000. Ethnic diversity and income within zip codes came from the U.S. Census Bureau's publicly available data.

3. Results

3.1. Demographic characteristics

Fig. 2 details eligibility and enrollments. A total of 912 parents completed screening questions. Of those, 842 were eligible, and the majority (82%, $n = 684$) agreed to participate. Table 2 depicts the demographic characteristics of the 684 parent participants, and Table 3 describes the 494 child participants. Most of the parent participants were female (94%, $n = 645$) and White (90%, $n = 624$). While 25% ($n = 167$) of parents were unemployed, almost half of the participants reported an annual income prior to COVID-19 of greater than $100,000. Child participants were equally distributed by sex with a mean age of 12 years old ($SD = 2.7$, range 8–17). The majority (60%, $n = 330$) of participants were geographically located in the Midwest, however, all 50 U.S states were represented within the sample.

3.2. Facebook analytics

On average, 26% of individuals that clicked on the ad completed eligibility screening. Those that did not meet study criteria included; non-English speaking ($n = 2$), child age ($n = 62$), home schooled ($n = 5$). The overall campaign had a total of 213,120 impressions and received a total of 3563 advertisement clicks in an 8-week period with an average cost per click of $0.64. The general marketing campaign received 2348 clicks in 6 weeks. Examples of Facebook analytics by age group are included in Figs. 3 and 4. The figures illustrate the number of clicks over
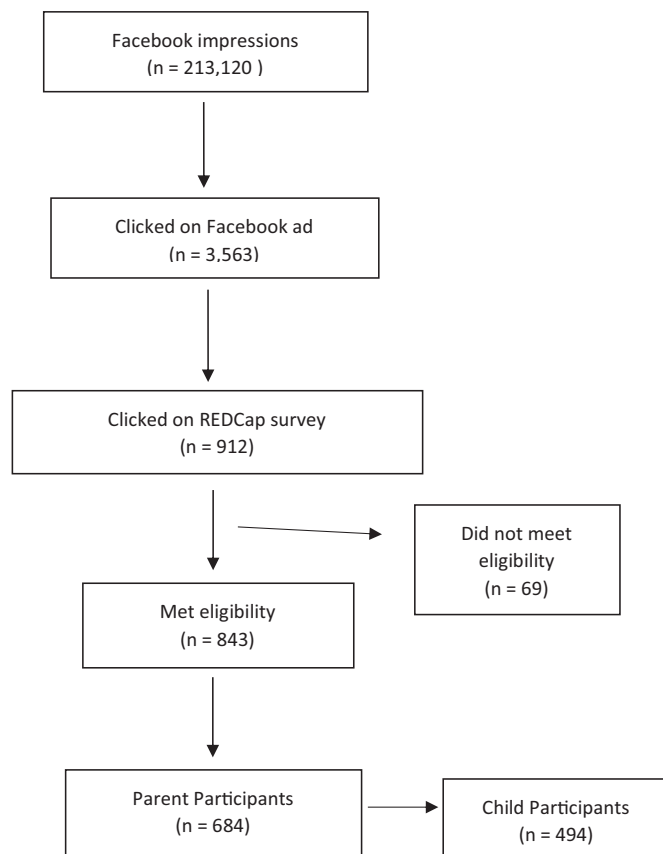

Fig. 2. Prisma diagram of Facebook enrollments.

Table 2
Parent demographic characteristics (N = 684).

	N	Valid %
Sex		
Male	39	5.7
Female	645	94.3
Race		
American Indian/Native American	6	0.9
Asian	18	2.6
Black/African American	28	4.1
Native Hawaiian/Pacific Islander	5	0.7
White	624	90.6
Other	19	2.8
Ethnicity		
Hispanic or Latino	40	5.9
Not Hispanic	639	94.1
Region		
Northeast	58	10.4
South	95	17.0
Midwest	330	58.9
West	67	12.0
Puerto Rico	8	1.4
Outside the USA	2	0.4
Marital status		
Single	46	6.7
Married	583	85.1
Divorced	33	4.8
Separated	4	0.6
Widowed	3	0.4
Living with someone	16	2.3
Education level		
Less than high-school or GED	83	12.1
High-school or GED	57	8.3
Some college	107	15.6
Bachelor's degree	138	20.2
Graduate degree	299	43.7
Current employment status		
Working full-time (>30 h/wk)	404	59.2
Working part-time (<30 h/wk)	112	16.4
Unemployed	167	24.5
Annual income prior to COVID-19		
Under - $25,000	42	6.2
$25,001 - $50,000	85	12.5
$50,001 - $75,000	91	13.4
$75,001 - $100,000	131	19.3
$100,001 - $150,000	192	28.2
$150,001 – more	132	19.4
Other	7	1.0

Table 3
Child demographic characteristics ($N = 494$).

	Mean (SD)	
Age	11.9 (2.7)	
	N	Valid %
Sex		
Male	251	51.0
Female	241	49.0
Race		
White	447	90.5
Black/African American	25	5.1
Asian	21	4.3
American Indian/Native American	4	0.8
Native Hawaiian/Pacific Islander	3	0.6
Other	16	3.2
Ethnicity		
Hispanic or Latino	39	7.9
Not Hispanic	452	92.1

time, with the number of clicks plotted on the y-axis. Total clicks, reach, and cost as well as the mean number of times each unique individual saw the advertisement is included on the left of these figures. The ethnic targeted campaign and income targeted campaign received 435 and 780 clicks in two weeks respectively. Differences in clicks and cost per target
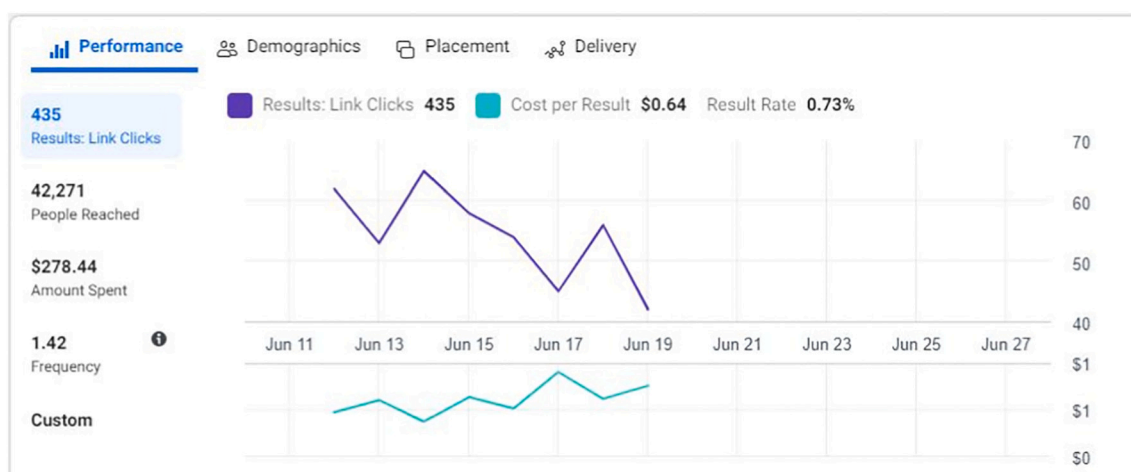
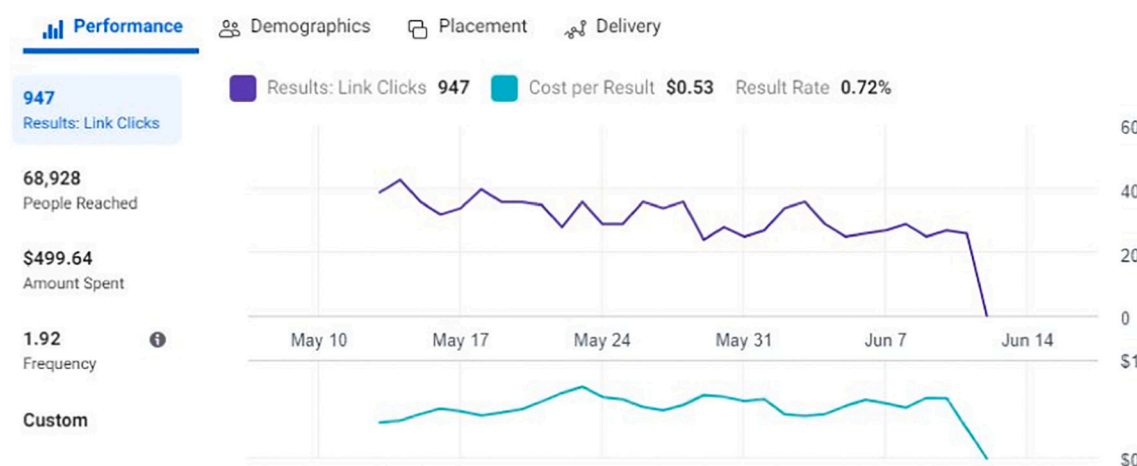**Fig. 3.** Example of Facebook analytics ad set ages 8–12 years of age.

Fig. 4. Example of Facebook analytics ad set ages 13–17 years of age.

group are depicted in Fig. 5. The two zip code targeted groups cost more per click ($1.28 and $0.64) than the general campaigns ($0.36, $0.53).

4. Discussion

This study reports on methods and feasibility of Facebook targeted recruitment to enroll a national sample of school-aged children and their

Fig. 5. Facebook analytics per group.

parents during the COVID-19 pandemic. The findings demonstrate Facebook to a feasible, efficient recruitment method. We enrolled a total of 1178 participants, almost 500 of which were children. The recruitment rate for enrollment was also rapid, 85.5 adults per week and 61.75 children per week. This is a considerable increase over traditional methods. In addition to rapid, robust recruitment rates, this approach was also cost effective. The total cost of the study was $2280, and approximately $0.64 per participant.

As a relatively new communication medium, many researchers are skeptical of the utility of social media for participant recruitment in health care research (Shere, Zhao, & Koren, 2014). Concerns include the assumption that samples recruited online, and particularly through social media, may result in selection bias and an unrepresentative sample, attributable to the exclusion of individuals that are not using the Internet or social media (Khatri et al., 2015; VanGeest & Johnson, 2011). While we initially shared these concerns, given the benefits of rapid recruitment (Godino, Turchetti, & Skirton, 2013), snowballing effects (Child, Mentes, Pavlish, & Phillips, 2014), and minimal required resources (Mannix, Wilkes, & Daly, 2014), this method demonstrated efficiency and effectiveness.

Recruiting research participants can be an extremely costly aspect of the research process (Carlini, Safioti, Rue, & Miles, 2015). As new media for advertisement arise, they may provide new avenues and potentially more effective methods for researchers to reach participants. Additionally, assessing the impact of the COVID-19 pandemic required an
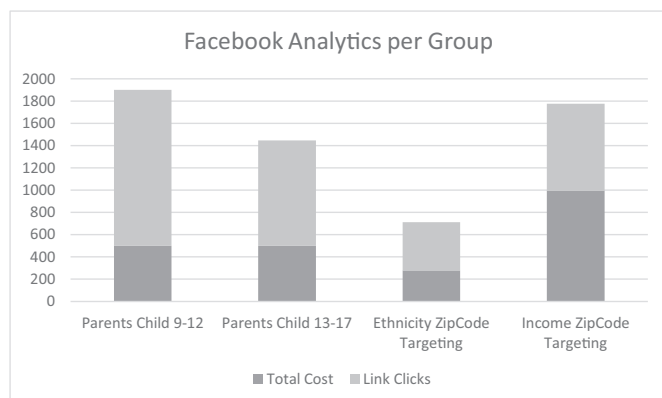
effective way to access individuals' experiences in real time that would not be hindered by public health guidelines. With close to two thirds of the USA population now using Facebook, the platform holds promise in recruiting large, diverse samples for research at minimal cost to the researcher and participants (Clement, 2020; Shaver et al., 2019).

This novel study successfully used a social media recruitment methodology to enroll parent-child dyads in research during the COVID-19 pandemic. Recruitment over eight weeks, with a small budget, resulted in a robust sample of over one thousand participants from 684 families. Social media recruitment mitigated typical time and engagement barriers for participants while also circumventing social and physical distancing orders due to the pandemic which allowed for real time assessment of the pandemic's effects on families over a short period of a few weeks. In fact, Facebook has been used to recruit samples close to 100 in as little as three days (Child et al., 2014). Facebook advertising methodology resulted in rapid recruitment of a large, geographically diverse sample, which would otherwise be difficult to access at low cost when compared to traditional recruitment strategies (Whitaker et al., 2017). The use of Facebook recruitment expedited remote recruitment during the pandemic.

Most participants were non-Hispanic white females, similar to other studies utilizing Facebook recruitment (Akard et al., 2015; Chu & Snider, 2013). Females represented the majority of the parental sample in this study. This is consistent with Facebook user data indicating 77% of women in the U.S use Facebook, compared with 61% of men (Gramlich, 2019). In our study, 80% of users were college educated. Facebook demographic data indicates that three-quarters (73%) of adults with at least a college degree are users, compared with 64% of those who have a high school diploma or less (Statista, 2021). It is unclear exactly why college graduates are so overrepresented in this sample. A degree of ascertainment bias may have influenced the recruitment, as college graduates are more likely to be Facebook users, however it could not explain this effect entirely.

With zip code specific targeting over a 2-week period, the diverse population in our study increased to 26% and 11% respectively during those weeks, as compared to less than 5% in previous weeks. While zip code targeted ads have previously been successful in improving diversity (Pechmann et al., 2020), the majority of our participants were still White (90.6%). However, our increased diversity suggest that zip code targeting can effectively increase diversity and inclusion of underrepresented populations. Alternative methods to increase representation include health system recruitment and referral recruitment (UyBico, Pavel, & Gross, 2007). Community involvement and improved communications have also been shown to lead to increased participation by minoritized populations (Kraft & Doerr, 2018; Vuong et al., 2020). The authors attempted to work with a hospital based inner city organization to increase enrollment via a newsletter, however metrics related to this approach could not be captured. National community organizations with diverse populations or target of populations of interest could also be a way to reach a more diverse sample. Sharing ads and information related to the study via those mechanisms have the potential to increase recruitment. Alternatively, partnering with a church the target population attends or creating a community advisory board of local leaders may be effective strategies to increase recruitment. To ensure full representation, future studies should consider combining a Facebook based approach with alternative methods of recruitment that have been effective in increasing research participation from diverse groups.

Over 491,833 impressions occurred for this campaign. *Impressions* are views and considered the number of times an ad appears on the screen. The number of times the ad was seen at least once by a user or *reach* was 213,120 (Carter-Harris, 2016). Facebook *reach* varies based on budget, target audience, and bids. The cost per click for the overall study was $0.64. This is similar to cumulative means ranging from $0.54 to $0.71 reported in recent systematic reviews of Facebook recruitment research (Reagan et al., 2019; Whitaker et al., 2017). *Cost per click* is defined as the amount the advertiser pays for each click on the ad.

Typically advertisers set a maximum cost-per-click bid that they are willing to pay (Ads, 2021b). *Conversion rate* is the percentage of people who click on the ad and then become participants (eligibility is not excluded) (Ads, 2021a). Conversion rates in other studies have been reported as high as 48%, but the mean conversion rate is closer to 4% (Whitaker et al., 2017). The conversion rate in our study is unusually high at 26% for parents. While this may be due to the salience of the topic during a national pandemic, the increase in conversion needs to be replicated or examined in future Facebook recruitment studies. Additionally, the *cost per participant* (CPP) of our study was considerably low. The cost to recruit each parent was $3.30 and $4.60 for children. Reviews of studies utilizing Facebook recruitment have reported a median cost per participant between $6.18 and $14.40 (Thornton et al., 2016; Whitaker et al., 2017). Regardless, rates in these studies are considerably lower than traditional recruitment methods that range from $13.12 to $250.00 (Carlini et al., 2015). Low costs in our study could have been due in part to the broad inclusion criteria targeting a healthy child-parent population, as opposed to vulnerable hard to reach populations that typically have higher costs (Cho et al., 2021). Thus, target population is an important consideration to determine if Facebook recruitment is a cost-effective recruitment strategy.

4.1. Limitations

While a potentially effective recruitment method for pediatric nursing research, limitations exist. Accuracy of the data could be questioned and is frequently considered a limitation in anonymous online research. This can occur if someone entered data on behalf of the child, someone repeatedly completed the survey, or even created a computer program to repeatedly complete the survey in an attempt to increase the chance of receiving compensation from the study. Some methods to prevent these issues are to block individuals from filling out the survey multiple times from the same IP address, use spam prevention software (e.g. reCAPTCHA), and monitoring survey participants for abnormal responses (Bybee et al., 2021). Even using these strategies, researchers should still be wary of potentially inaccurate data. An additional limitation is the constrained time of recruitment. However, due to the sensitive and rapidly changing nature of the pandemic, the shorter time frame was necessary to evaluate the early impact of COVID-19 on school-aged children. This sample presented an overrepresentation of participants from the Midwest. This outcome is likely because Facebook advertisements were posted by a children's hospital located in the Midwest. As forementioned, there was also an underrepresentation of diverse participants, which is similar to several studies using Facebook recruitment (Akard et al., 2015; Bauermeister et al., 2012; Ramo & Prochaska, 2012; Ramo, Rodriguez, Chavez, Sommer, & Prochaska, 2014). The authors attempted to increase diversity by using zip code targeting but this approach is not without limitations. The use of zip codes to specifically target advertisements to diverse racial and lower income groups is limited by the data available via the U.S. Census Bureau. This data may not be fully representative of the population within a given zip code as data may be out of date or otherwise uncharacteristic of the true population within a zip code. Thus, careful consideration is warranted when using zip code advertisement targeting. However, this issue presents through other recruitment methods as well. Similarly, father participants were significantly outnumbered by mother participants. Reasons for this may be two-fold. First, women are more likely to be users on Facebook (Gramlich, 2019). Second, mothers are often the primary caregivers for their children (Livingston & Parker, 2019). There is also some evidence to suggest that females may be more likely to respond to a survey than males (Smith, 2008). Thus, a mother might be more likely to respond to a survey ad. Underrepresentation of some participants may demonstrate a volunteer bias with non-Hispanic white women being the most likely to volunteer for this study. Finally, participants were limited to those with internet access and Facebook accounts. Despite limitations, this study still successfully recruited a robust

geographically diverse sample early in the pandemic.

4.2. Nursing implications

Pediatric nurses are in ideal roles to consider innovative strategies to advance nursing science and ultimately improve care for children and their families. Social media is changing the paradigm for future nursing communication, practice, education and research to a model that encompasses a variety of Web-based social media applications (Peck, 2014). The benefits of technology are well-known and provide nursing the opportunity to provide a real-time exchange of health information, attaining timely information, the potential of maintaining contact with patients and their families, extending the reach for education and services as well as dissemination of knowledge and findings. More globally, the societal change in digital use also requires nursing to acquire effective digital literacy skills (Ross & Cross, 2019). From a practice standpoint, and more broadly, these skills will create a networked nursing workforce that can influence and create collaborative communities to develop and shape healthcare from a clinical and nursing education perspective. Social media use in some chronic illness has improved communication and support for patients and caregivers. Nurses can carefully and ethically use social media to enhance the patient experience and improve outcomes. Nurse researchers should consider Facebook and other social media as a potential tool in the research toolbox to not only recruit, but also effectively deliver interventions. It is necessary to identify best practices and learn how to use these tools so that they can take full advantage of these new communication platforms (Miller, 2013). Despite the positive aspects, pediatric nurses and beyond should give careful ethical considerations to the use of social media in practice, education and research.

5. Conclusion

An emerging body of evidence suggests Facebook is a valuable recruitment tool (Foster Akard et al., 2016; Pechmann et al., 2020; Shaver et al., 2019) for pediatric nursing research. Social media recruitment can be cost effective and provide rapid access to large, sometimes difficult to reach samples. Facebook provided specific benefits over other social media platforms because of use by parents with children in our target population. Active users on other platforms, such as Instagram, tended to be younger and, thus, have younger children that did not qualify for the study. Furthermore, Twitter has also been used for recruitment, but Facebook has shown to be a more effective recruitment tool (Whitaker et al., 2017). With this in mind, it would be useful for future researchers to consider the characteristics of typical active users on a given platform to best utilize advertising funds. The underrepresentation of marginalized groups in this and other studies does suggest that Facebook has some limitation in recruiting diverse samples. Future research in other methodologies to ensure diversity within the sample would benefit understanding of Facebook and social media as a recruitment tool. Moreover, there are other recruitment strategies that have proven to be effective in recruiting ethnically diverse populations, despite a higher cost per participant to recruit. It may be the case that Facebook is best used in conjunction with other strategies to optimize sample diversity. Although not appropriate in all settings, Facebook and social media should be considered as an acceptable recruitment method for parents and healthy school-aged children in future pediatric nursing research.

CRediT authorship contribution statement

Dr. Micah Skeens conceptualized and designed the study, designed the data collection instruments, procured funding, collected data, drafted the initial manuscript, and reviewed and revised the manuscript.

Malcolm Sutherland-Foggio assisted with writing of original draft, data visualization, and review.

Dr. Cynthia Gerhardt assisted with design of the study and data collection instruments, drafted initial manuscript and reviewed and revised the manuscript.

Dr. Terrah Akard assisted with methodology, reviewed and revised the manuscript and critically reviewed the manuscript for important intellectual content.

All authors approved the final manuscript as submitted and agree to be accountable for all.

aspects of the work.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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