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Tiny Tusks Internship and Electronic Application Use Among Breastfeeding Mothers

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498VH

Chair: Dr. Kelly Vowell-Johnson

Internship Reflection

Tiny Tusks Breastfeeding and Infant Support is an organization which provides community-based support for breastfeeding mothers. The internship with Tiny Tusks allowed me to answer multiple questions concerning breastfeeding. For instance, what kind of barriers do women who desire to breastfeed face in a community setting? Through my experience in this internship, I have observed social stigmas and lack of access to private areas to be obstacles to breastfeeding. Public access to private spaces to feed and community education is important to promote breastfeeding in the United States. Many public buildings do not have a designated spot to allow for privacy while breastfeeding, and mothers are confined in an inappropriate space, like a washroom or office. The Fair Labor Standards Act provides protection for breastfeeding mothers in the workplace, however not all companies follow these standards (U.S. Department of Labor, 2018).

Another interest I explored while a Tiny Tusk intern was the criteria for becoming a lactation consultant. There are multiple ways to become certified with specific pathways depending on experience. As a registered nurse the pathway one would take requires 90 hours of lactation specific training within five years prior to taking the certification exam and 1000 hours of clinical experience (Internal Board of Lactation Consultant Examiners, 2021). After that, final certification is gained through the Internal Board of Lactation Consultant Examiners Certification Exam and would require recertification in five years.

While engaged in the social media focus of Tiny Tusk I was able to explore and assist with outreach goals of the organization. Specific data points explored were the kind of information that attracts people, specific platforms suited for distributing different types of information, and the kind of interaction ideal to ensure that our message was being received. I

was mainly focused on our Instagram account, and found that we had a greater engagement of young adults, 17-22 years old. Facebook had less web traffic, but many people who breastfeed utilize the social media platform for information. Posts around lunch or dinner time garnered the most attention, as is when we receive the most engagement with likes and comments. We also had more engagement whenever we posted on Tuesdays-Fridays according to the insights which track account interactions. Pictures that had real-life people and places versus colorful infographics received the most interaction. COVID and breastfeeding facts were best suited in the story archives allowing long-term viewing by the audience.

Future goals for Tiny Tusks could include utilizing the promotional aspect of Instagram and promoting more people to tag the Tiny Tusk account in stories or posts to reach a wider audience. A Twitter account could be launched for brief information bursts and use Instagram for mainly events promotions, such as a future fundraising event.

Future Experiences

I learned much about time management and flexibility, while also gaining insight about working with a team in a professional setting, not just academic. A specific example is the time spent working with other marketing team members concerning what was needed to improve Tiny Tusk's social media presence. Through brainstorming with other interns in the program we were able to identify needs and potential events that could be implemented next semester or next year when we are less restricted. In the future I hope to continue my education past the undergraduate level with the hopes of getting a doctorate. This experience sparked my interest in becoming a lactation expert since breastfeeding is often stigmatized in our society and community support and education is greatly needed.

Coursework and clinicals have both greatly prepared me for my internship. In conjunction with OB and having influential clinical instructors who worked in maternity, I was able to learn from both sources simultaneously. There was quite a bit of overlap, and I would take what I learned in lecture and apply it to my internship and vice versa. For example, we do education for mothers during our hospital rotations. In the NICU, I was fortunate enough to teach a new mother about the benefits of breastfeeding utilizing knowledge that I had acquired during my internship from guest speakers and online modules. The reverse is also true; I took what I learned from therapeutic communication and was able to apply that in my internship when giving information about COVID precautions and social distancing. Also, the process of writing a formal thesis paper is another skill I will need experience with to be successful in graduate school. Both this internship and scientific evidence lecture have prepared me for graduate work.

Importance of this Experience

This experience was important for me and my peers to learn about breastfeeding beyond a textbook. There are many hidden facts and psychosocial implications involved with breastfeeding that should become more common knowledge, such as what are normal changes to a woman's body and breasts during this time and how that can impact her self-esteem. Even more recently, the pandemic has resulted in the need for more information about breastfeeding and COVID-19. The other aspect of my internship revolved around social media and working in a group. I was a member of the marketing team for Tiny Tusks and helped run social media. During this process, I learned about the influence of social media, especially in a time where in-person communication and word of mouth was very limited.

The most significant duties completed during my time were the online modules and participating in social media management. COVID-19 was the most pressing challenge during

this time, preventing all of us from accomplishing a lot of the tasks we normally could through the semester. The only thing I could do in response to this challenge was to be flexible and accept change. The online modules we participated in allowed me to expand my knowledge about breastfeeding and other maternal issues. Hearing from guest speakers with expertise in their fields was enlightening as these women are influential role models in the breastfeeding community. Social media management was both a challenge and beneficial in its own right. As someone with an interest in algorithms and app development, operating social media platforms was intriguing. However, working on the applications and trying to figure out social media etiquette was mentally taxing. There exist aspects such as formatting, aesthetics, the time between posts, what to put on a story, filters, tags, and more features one must take into consideration while running an account. This applies to both business and personal accounts, which have their own protocols since the audience and rationale for posting are different. Posting too often can cause people to become annoyed since it clogs up their feed but posting too little means they will unfollow due to inactivity. Little details like this I found challenging yet extremely enjoyable to learn about.

I found flexibility was my most valued take away. I came in with a specific mindset and objectives that I wanted to reach, with breastfeeding mothers and partaking in an internship of interest. Never did I nor any of my peers anticipate a global pandemic to flip the world on its head as it did. We all had to adjust our expectations, and I had to become more adaptable and loosen up my structured mindset. I was still able to gain the knowledge about breastfeeding I desired, as well as learn what it was like to have an important role in an internship. Hopefully, I can take what I have learned now and be able to pass it onto the next cohort of students who will inherit my position.

Introduction

Breastfeeding rates have increased in the U.S. over the past few years, with 4 out of 5 infants starting to breastfeed. But that number decreases as the infant ages, with only 57.6% breastfeeding at 6 months and 35.9% at 12 months as of 2018 (Center for Disease Control and Prevention, 2020). Healthy People 2020 had the goal of 82% of infants ever breastfeeding, then at 6 months 60.6% breastfeeding, and lastly at 12 months 34.1% of children would still be breastfeeding (U.S. Breastfeeding Committee, 2021). The United States (U.S.) fell short of meeting these standards. Statistically, the U.S. lags behind most of the world and currently stands at having one of the lowest percent of breastfed infants comparatively to other developed countries (United Nations Children's Fund, 2018). Less developed, lower- and middle-income countries constitute the highest rate of breastfeeding rates, hitting percentages of infants ever breastfeed in the eighty and nineties. Afghanistan, Burundi, Cambodia, Costa Rica, Cuba, Ghana, and Liberia are all examples of countries that have higher rates of breastfeeding than the U.S. This is due to government promotion, cost-effectiveness, positive social norms, social support from spouses and family, and other influences (United Nations Children's Fund, 2018). Breastfeeding provides many benefits for both mother and infant, so what methods can be employed to help bring forth improvements in this area for the U.S.

The U.S population today relies on mobile health (mHealth) for information about health promotion and illnesses, with at least 61% of adults having looked for health or medical information on the Internet, and 49% accessing a website to find information about a specific medical problem (Center for Disease Control and Prevention, 2011). With at least 80% of the U.S. population owning smartphones, and the mobile application market being a multi-billion-dollar business, it is not surprising that there are numerous apps revolving around health and

illness (Pew Research Center, 2019). Based on personal experience, mobile phones already allow users to access information concerning their health, with fitness and health apps already preinstalled on every iPhone. There are 318,00 mHealth apps available, with 60% of smartphone users downloading an additional mHealth app other than ones provided for them (Mobius MD, 2019). However, little is known about apps specific to breastfeeding in terms of their effectiveness, retention, opinions of users and so on.

The purpose of this literature review was to synthesize the available statistics concerning application usage and breastfeeding mothers. The objective of this literature review was to determine why apps are utilized, opinions of mothers on these apps, and the benefits and drawbacks of utilizing such technology. The results of this analysis will enhance understanding of the data and clinical implications for nursing.

Methods

Study Design

A systematic review of research was conducted on the correlation between breastfeeding and app usage. This review was guided by the PRISMA guidelines and consists of articles collected from CINAHL.

Information Sources

The database CINAHL was used with the assistance of a research librarian. CINAHL subject headings were used in an electronic search of the database.

Search Strategy

Search terms used that were relevant to the research question were “breastfeeding or breast-feeding or infant feeding” and “apps or mobile device applications or mobile apps.”

Search limiters include human subjects, English language, and a timeframe from 2015-2021.

Inclusion/Exclusion Criteria

Abstracts were reviewed to identify relevancy of articles found. Articles were excluded if they were not based in the U.S., did not include application usage, did not have women as a demographic surveyed, or did not include breastfeeding.

Search Results

After searching the CINAHL database, the initial search yielded 44 articles. One article was removed as it was a CEU and not a scholarly article. Titles and abstracts reviews were conducted on the remaining 43 articles, and 22 were removed leaving 21 for a full text review. Finally, 9 articles were excluded for not meeting the inclusion criteria, resulting in 12 full-text articles for review. The study selection process of included studies is presented in Figure 1.

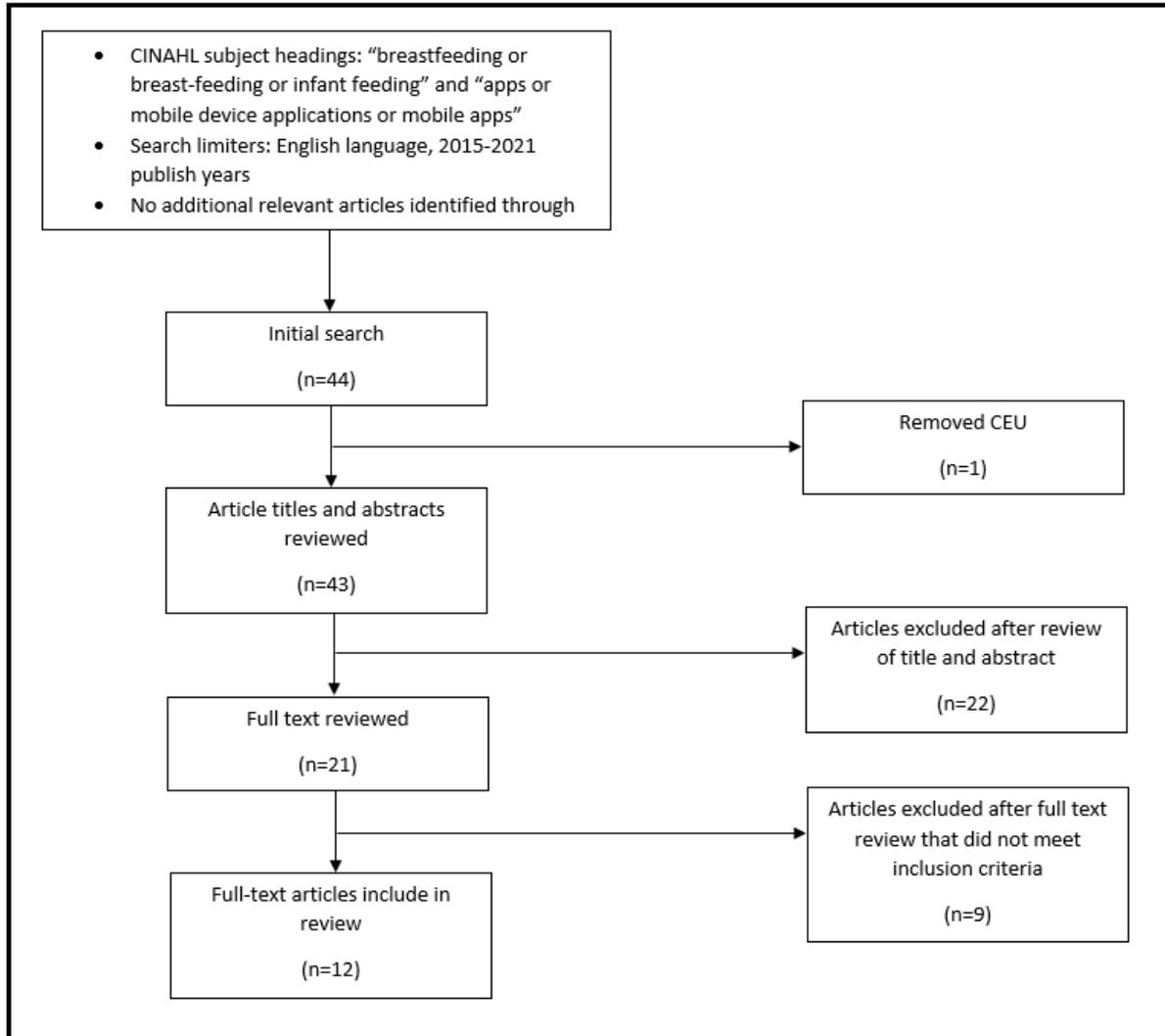


Figure 1. Selection process of included studies.

Results

Why turn to breastfeeding apps?

In a survey done with 146 postpartum women who intended to breastfeed, reasons for why they utilized technology in the breastfeeding process was because it was familiar, not costly, and convenient (Demirci et al., 2016). Most research indicates pregnant women turn to the Internet for information since they are dissatisfied with health-care professionals (Lagan,

Sinclair, & Kernohan, 2010). Information could be easily accessed and fit into their daily routine than the time it would take to get opinions from health-care professionals or lactation consultants (Demirci et al., 2016). The validity of the information they can find online is checked by the mothers themselves. Breastfeeding mothers who preferred apps over other means of technology (such as email or internet) claimed they liked the consolidation of information in one place, and the personalization that is based on the inputted data (Demirci et al., 2016). The most commonly self-identified breastfeeding needs were guidance for breastfeeding changes and cheerleading support or advice in times of difficulty, with 37 and 36 women feeling this way respectively (Demirci et al., 2016). Sufficient social support can come from spouses, friends, or social media platforms.

What kind of support would breastfeeding apps provide?

Social support is one of the most common needs for breastfeeding mothers (Demirci et al., 2016). Those who cannot get it from providers, spouses, families or friends may turn to mHealth to fill that void. Breastfeeding apps that are available on the market are all pro-breastfeeding, and a majority provide information during the postpartum period (Schindler-Ruwisch et al., 2018). Informational support was the only support 66% of the apps had, but the apps can also include instrumental, emotional or appraisal support (Schindler-Ruwisch et al., 2018). Women may benefit the most from engaging in emotional or appraisal support, since information alone may not be enough to change or maintain breastfeeding behavior (Schindler-Ruwisch et al., 2018).

How effective are breastfeeding apps?

An ecological momentary assessment was conducted on a breastfeeding app called Baby Connect that mothers used through eight weeks postpartum (Demirci & Bogen, 2017). Follow-up

calls were made at two and eight weeks to see how the mothers were feeding and their general mood. The mothers were able to send texts freely voicing their opinions on the app as they used it. The majority of first-time mothers who entered data on the app, 34 of the 41 participants, stated they enjoyed tracking their breastfeeding progress (Demirci & Bogen, 2017). In particular, they liked that other tools were included, such as diapers, sleeping monitoring, and milestone progress. This app could also be shared with other caregivers, such as a partner, so they could log and monitor information about the infant together. Complaints about app usage revolved around logging the daily information, which felt time-consuming, anxiety-provoking, difficult to remember, or was only done for the research (Demirci & Bogen, 2017). These issues involve problems with the personal preference of the mother rather than issues with the app design itself. For personal use, if the mother feels she does not want to chart progress for the day, then she is under no obligation to do so.

A similar study was done by Patchen et al. (2020) for a prototype app that was called the KULEA-NET. A mixed-method study was conducted to determine the user's preferences while exploring the prototype. Participants identified content that the app should address; low self-efficacy, parent-child attachment beliefs, social support, public breastfeeding, and returning to work (Patchen et al., 2020). Information that could be given through the app was a topic of concern. The mothers wanted information to be from a variety of sources, factual, and free of judgement (Patchen et al., 2020). Post-prototype reception was positive towards the designs and features of the app. Participants also found that features other than feeding were beneficial, such as the feature to find public places to breastfeed and diaper tracking (Patchen et al., 2020). This app also found positive reception to the inclusion of a support person in utilizing the app. Informational support was also given in the prototype via a text notification, and participants

could readily access more information within the app if they so desired. Most times they would read the informational support further for topics they felt they did not understand (Patchen et al., 2020).

Table 1 provides the extended review of all literature results. The eight studies that were not included the in-depth discussion were explained below. The table highlights the year of study, countries of research, sample size, content, and significant findings of each journal.

Results

| Authors | Year | Country where research conducted | Sample (N =) Method | Content of Journal | Significant Findings |
|---|------|----------------------------------|----------------------|--|---|
| Lesi Biediger-Friedman, PhD, MPH, RD, Sylvia H. Crixell, PhD, RD, Monica Silva, MS, Brittany R. Markides, MS, RD, Kenneth S. Smith, PhD, LCSW | 2016 | United States (U.S.) | 61 participants | Semi-structured focus group discussions centered around WIC topics. User-led idea generator that will be used to create a prototype app. | Focus group revealed facilitators to increase breastfeeding duration was knowledge of benefits, knowing how to manage the process of breastfeeding, and having support from friends and family. The desire for additional support from online was also prominent. The mothers preferred |

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| | | | | | features of apps they currently use to be in this app, like connecting to social media to share information. |
| Lesli Biediger-Friendman, PhD, MPH, RD, Monica Silva, MS, RD, Kenneth Smith PhD, MSW | 2018 | U.S. | 48 participants | Prototype app developed for both English and Spanish speakers. Features included growth chart, breastfeeding timer, physical activity tracker, meal planning/recipe database and shopping list builder. Both Spanish and English-speaking users had input for the development of the application. | A WIC educational app prototype favorable user intention. Desirable modifications to the app included easy access to nutrition information, motivational pings, behavior tracking features, and links to social media. Users desired trustworthy information for accuracy. |
| Cassey Dauphin, BA, Nikia Clark, BS, Renee Cadzow, PhD, Frances Saad-Harfouche, | 2020 | U.S. | 288 enrolled in presurvey, 22 participants in postnatal surveys. | Private Facebook platform, and participants divided up into the control group, breastfeeding-only messages, or intervention | Text messaging platforms, like Telerivet, and survey collection software is an effective tool for recruitment electronically. |

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| <p>MSW, Elisa Rodriguez, PhD, Kathryn Glaser, PhD, Marc Kiviniemi, PhD, Maria Keller, MS, Deborah Erwin PhD</p> | | | | <p>group that received both breastfeeding and breast cancer risk reduction messages.</p> | <p>Experienced breastfeeding mothers were positive about social media messages and any efforts to increase breastfeeding. Less experienced participants expressed learning from the Facebook interventions.</p> |
| <p>Jill R. Demirci, Debra L. Bogen</p> | <p>2017</p> | <p>U.S.</p> | <p>61 participants 23 sent complete data for 8 weeks, 15 sent some data, 23 sent nothing</p> | <p>Primiparous women during postpartum birth used a mobile phone app to track breastfeeding through eight weeks postpartum. It was well received, and utilized other app features like milestones, moods, and activities. Drawbacks were anxiety inducing and technical issues.</p> | <p>Of 41 participants who completed end-of-study interviews, 34 gave positive reviews of the app. The majority of first-time mothers enjoyed tracking their breastfeeding progress.</p> |

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| <p>Jill R. Demirci, PhD, RN, IBCLC, Debra L. Bogen, MD, FAAP, FABM</p> | <p>2016</p> | <p>U.S.</p> | <p>61 first-time mothers intending to exclusively breastfeed, 41 completed study</p> | <p>An observational study tracking breastfeeding behaviors and thoughts until eight weeks postpartum via an app.</p> | <p>Latch problems, pain, insufficient milk are the most common breastfeeding problems within the first few weeks. Consistent schedule, device problems, infant GI issues among other barriers. Women likely replace at-breast feeds with expressed milk around two weeks postpartum.</p> |
| <p>Jill Demirci PhD, RN, IBCLC, Erin Caplan BA, Nora Murray, Susan Cohen PhD, APRN</p> | <p>2017</p> | <p>U.S.</p> | <p>61 enrolled women, 35 who used app and logged diary entry</p> | <p>Mothers logged for eight weeks in the diaries about their emotions during the breast-feeding period. It highlights the positive and negative aspects of breastfeeding for women, and what caused them to</p> | <p>Want normalcy and routine, lack of sleep and self-care breaking point for breastfeeding. Sharing the burden with a partner takes pressure off. Talking to pediatricians feels too medical, lactation experts preferred. Setbacks can</p> |

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| | | | | stop or carry on. | cause plummeting self-esteem External validation rewarding, since it is others noting their baby's progress. |
| Jill Radtke Demirci, PhD, RN, IBCLC, Susan M. Cohen, PhD, APRN, FAAN, Maris Parker, MSW, Ashleigh Holmes, Debra L. Bogen, MD, FAAP, FABM | 2016 | U.S. | 146 postpartum women | Postpartum women surveyed to assess their use and preferences regarding technology about breastfeeding support. Pregnant women turn to the internet for information because they are dissatisfied with the time allotted and extent of information from their health care providers. | The most preferred technology medium to receive information was e-mail, followed by Internet links. Perinatally, women desire support emotionally, informationally, technology and consultative use. The most common breastfeeding needs were advice for coping with difficulties. |
| Rebecca S. Farr, Rarah Rahman, Mary Ann O'Riordan, | 2019 | U.S. | 243 consenting participants | Women were given champion and positive messaging interventions prenatally to | Most women who already intended to exclusively breastfeed intended to after |

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| <p>Lydia Furman</p> | | | | <p>see how that would impact exclusive breastfeeding intentions postpartum.</p> | <p>interventions as well. There was a statistically significant difference in the proportion of mothers who originally did not want to breastfeed, but then chose to exclusively breastfeed during the postpartum period after interventions.</p> |
| <p>Adam K. Lewkowitz, Julia D. López, Erika F. Werner, Megan L. Ranney, George A. Macones, Dwight J. Rouse, David A. Savitz, Alison G. Cahill</p> | <p>2021</p> | <p>U.S.</p> | <p>253 women eligible, 170 women used. 41 women from BreastFeeding Friend app (BFF) and 46 from control app groups included in analysis.</p> | <p>Double blind randomized controlled trial to test BFF app. There was no difference in breastfeeding rates among mothers intending to exclusively breastfeed who had control app versus BFF app. Various statistical differences were recorded between the two apps in regards to information and</p> | <p>In hospitals, women were likely to select a health care professional when asked about the best breastfeeding resource. At six weeks postpartum, two-thirds of BFF users said the app was the best breastfeeding resource, and 6 months postpartum half the women using BFF said the same. A higher proportion of women</p> |

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| | | | | breastfeeding challenges. | randomized to BFF app reported it provided best pumping support. Those who used BFF were 2.5 times more likely to report they did not have breastfeeding challenges. |
| Nancy Mohrbacher, IBCLC FILCA | 2015 | U.S | N = not given | Retrospective analysis about multiple forms of breastfeeding technologies available on the market. | Parents in the modern world want information that comes from a reliable source and easy to assess. Tracking apps, although useful, can overwhelm and take time away from baby towards data entry. Breastfeeding babies on cue is something that cannot be measured and expecting newborns to follow a schedule may produce unneeded anxiety when they aren't on track. |

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| | | | | | Breastfeeding apps that inform offers clarification on topics. |
| Loral Patchen, CNM, PhD, IBCLC, Lindsey Ellis, NP, MPH, IBCLC, Cherise B. Harrington, PhD, MPH, Tony Ma, MS, Rohini Mohanraj, MHA, Virginia Andrews, MPH, William Douglas Evans, PhD | 2020 | U.S. | 17 participants, 14 completed usability testing, 3 lost to follow-up. | Mixed-method study broken up into two phases. Phase 1 to identify ideal components of mobile health interventions, Phase 2 to determine usability of KULEA-NET application. | Positive reception to this app. Found that tips, like returning to work, were useful. Any information they did not understand prompted them to read more about it on the app. GPS map identifying public places to breastfeed and feeding/diaper changing logs useful. |
| Jennifer M. Schindler-Ruwisch, MPH, DrPH, Amira Roess, PhD, Rebecca C. Robert, PhD, Melissa A. Napolitano, | 2018 | U.S. | 65 total programs looked at: 12 text messaging, 53 mobile applications | Content analysis of mHealth programs. Most of them hold potentials for a wide reach and easy accessibility but are limited to only providing | Most apps and programs providing breastfeeding assistance acknowledge difficulties, highlighted troubleshooting tips, and included initiation and duration |

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| <p>PhD, Shawn Chiang, MPH</p> | | | | <p>informational support.</p> | <p>information for the pregnancy and postpartum periods. Interactivity and personalization features are largely limited across app and programs. Most women would benefit from emotional or appraisal support, which is not readily available online.</p> |
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Discussion

mHealth is a growing industry that many mothers can take advantage of while breastfeeding. Most mothers feel the convenience of mHealth is the most appealing if they are experiencing difficulties breastfeeding (Demirci et al., 2016). Healthcare providers are trusted; however, they are not always readily available for consultation in times of struggle (Patchen et al., 2020). Therefore, most mothers turn to the internet for quick advice and interventions to implement immediately. In terms of apps specific to breastfeeding, a general pattern arises in terms of features that are favorable and least beneficial. The consolidation of information in one space is appealing, but mothers want to make sure the information they are receiving is coming from a trustworthy source (Demirci et al., 2016; Patchen et al., 2020). Apps that provided features other than just breastfeeding monitoring were heavily preferred. (Demirci & Bogen, 2017; Patchen et al., 2020). The ability to have others involved in utilization of the app was also

a desirable feature. When partners or other family members share in the “work” of breastfeeding, it can lead to better outcomes since the mothers are more optimistic (Demirci et al., 2017).

Support through times of difficulty and praise in times of triumph is a common need for breastfeeding mothers. The breastfeeding apps that are on the market provide breastfeeding information that can be utilized for questions and research (Schindler-Ruwisch et al., 2018). The emotional support that is needed is not prevalent in these apps. Emotional and appraisal support often comes from person-to-person interactions, so mHealth resources with these qualities are preferred, they are just not on the market (Schindler-Ruwisch et al., 2018). In most cases, mothers who rely heavily on the internet for support will utilize apps for their information and go to online groups for that emotional and appraisal support (Mohrbacher, 2015). Drawbacks of the breastfeeding apps available were the anxiety they produced. Setbacks were seen as more devastating and some mothers felt documenting information took time away from the infant (Demirci & Bogen, 2017). Breastfeeding apps that are heavy on tracking features need to explain the significance of the values that are being recorded, or else parents will get confused or simply do not understand what the numbers mean. These applications also need to provide guides on what to do if the values are outside of the desired range (Mohrbacher, 2015). Further research is needed to determine if there is a correlation between app usage and duration breastfeeding.

Conclusion

The Tiny Tusks internship has helped me to understand that supporting women to exclusively breastfeed has many layers and components. Although every mother is different, I believe that the best way to help all of them is through understanding and support. As social media ambassador for Tiny Tusk, the majority of Tiny Tusks education materials is information about breastfeeding and infant safety. Although useful, providing emotional support is also a key

factor to supporting breastfeeding with a community focus. Multiple sources in my research demonstrate that emotional support is beneficial for both mother and baby (Demirci et al., 2016; Schindler-Ruwisch et al., 2018). Tiny Tusks provides both in person and online support for breastfeeding women. Living in a digital world I believe it is advantageous for everyone to adapt in order to best serve breastfeeding women.

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