Spring 4-24-2023

Instilling Parental Confidence Through Text-linked Educational Modules at 6 and 24 Weeks

Rachel Hage
rachelhage3@gmail.com

Instilling Parental Confidence Through Text-linked Educational Modules at 6 and 24 Weeks

Rachel Colette Hage

University of Connecticut School of Nursing

Ruth Lucas, PhD, RNC, CLS

May 2023

Abstract

Background: Becoming a parent is one of the most demanding and intense social roles individuals can experience in their life (Vance & Brandon, 2017). A lack of maternal confidence and understanding of how to interact with their infant during the first six months of life may adversely affect their lifelong relationship. The early postpartum period is highly suitable for interventions to improve health outcomes among mothers and their infants (Laureij et al., 2021). With internet-based approaches accessible to women of childbearing age, nursing intervention may leverage technology to provide support for unmet postpartum needs. Real-time support may reduce the negative impact on postpartum mood disorders and parenting stress on maternal and infant relationships (ACOG, 2018).

Objective: The purpose of this study was to examine maternal descriptions of text-linked educational modules on infant development and play and their effect on maternal self-efficacy at 6 and 24 weeks.

Method: This study was a mixed-method approach of interviews collected as part of a larger randomized control intervention for mothers to manage their breast and nipple pain during breastfeeding through text messages. Mothers received text-linked educational modules which described their infant's cognitive, social, and emotional development and age-appropriate infant play activities at 4, 8, 12, 16, 20, and 24 weeks. Mothers were asked face-to-face interview questions to evaluate the modules and complete the Karitane Parenting Confidence Scale to measure maternal self-efficacy at 6 and 24 weeks. Boyatzis' thematic analysis guided the analysis and Taguette was used to create a codebook of themes. Descriptive statistics were used for demographic variables. Themes were converted to numerical values for regression analysis.

Results: At 6 and 24 weeks postpartum, maternal report of monthly infant development and play modules were positive. The maternal self-efficacy scores increased slightly between 6 (M=40) and 24 (M=41.9) weeks. One overarching theme of maternal confidence was identified with three supporting subthemes: Parental Reflection, Parental Modeling, and Parental-Infant Interaction. Regression analysis showed a statistically significant relationship between time, parity, and interview responses (p=0.011). The subtheme of Parental-Infant Interaction, controlling for time and parity, was near significant in predicting maternal self-efficacy between 6 weeks and 24 weeks (p=0.051).

Conclusion: Mothers reported that the play modules encouraged maternal-infant interaction and increased their self-efficacy. My study demonstrated that maternal confidence is increased with the knowledge of how to care and interact with their infant during the first six months. Future research is needed with a larger and more diverse population sample to validate my findings. Text-linked support is a powerful platform for accessible maternal intervention that can be implemented across a large population.

Keywords: parental confidence, maternal self-efficacy, text-linked support, educational modules

Problem Statement

The ability for a mother to create a strong maternal-infant relationship is crucial to the development of their infant and also one of the most demanding and intense relationships in their life (Vance & Brandon, 2017). A lack of maternal confidence and understanding of how to interact with their infant during the first six months of life may adversely affect their lifelong relationship. The early postpartum period is highly suitable to improve health outcomes among mothers and their infants (Laureij et al., 2021). Currently, the standard in the United States is for mothers to have one follow-up visit with an obstetrical provider six weeks postpartum, but as many as 40% of mothers miss this crucial preventative health visit (McCarter et al., 2019). With internet-based approaches accessible to women of childbearing age, nursing intervention may leverage technology to provide support for unmet postpartum needs. Real-time support may reduce the negative impact on postpartum mood disorders and parenting stress on maternal and infant relationships (ACOG, 2018). It can be hypothesized that mothers who receive postpartum care and maternal support are more confident to care and interact with their infant, which benefits infant growth and development.

Purpose: The purpose of this study was to examine maternal descriptions of text-linked educational modules on infant development and play and their effect on maternal self-efficacy at 6 and 24 weeks.

Aims

- Examine the relationship between maternal descriptions of text-linked monthly infant development, growth, and play modules on maternal self-efficacy at 6 and 24 weeks.
- Explore which theme related to maternal confidence and maternal self-efficacy is affected by viewing the educational infant modules.

Literature Review

The postpartum period has the potential to be a very stressful experience for mothers (Milani et al., 2017). A secure maternal-infant relationship is essential to an infant's development, however, it is challenging to develop this bond when mothers do not have access to appropriate resources (Gozali et al., 2020). This is an especially prevalent problem for those of lower socioeconomic status (Laureij et al., 2021). An analysis of various methods used to communicate with mothers after the birth of their infant to increase their confidence level was explored. The methods identified were face-to-face home care, pediatrician-led classes, web-based applications, and in-person parenting observations. With the first method, mothers received support after the birth of their infant through home care visits. These face-to-face encounters provide social connection and play an important role in preparing mothers to cope with new situations (Rhodes et al., 2021). During the postpartum period, mothers experience various physical, mental, and emotional changes, which may interfere with their daily routine (Milani et al., 2017). For this reason, regular check-ins with mothers are highly beneficial to ensure adequate knowledge and prevent possible complications. The satisfaction of mothers with emotional and educational postpartum care services received via communication at home is higher compared to those who are not offered these services (Rhodes et al., 2021). Another unique form of in-person support is a pediatrician-led parenting class. The goal of this parenting class is to address medical topics such as safe sleep, feeding, and bathing, as well as developmental topics such as language development, responsive parenting, and soothing an infant (Gozali et al., 2020). Mothers who attend the class showed significantly higher levels of knowledge, as well as significantly higher parenting confidence levels.

Another method to reach parents is web-based or mobile phone applications. New parents increasingly use websites and mobile phone apps to obtain information and support (Sawyer et al., 2016), thus nursing interventions that use these platforms are feasible. In fact, over 90% of women of childbearing age have a smartphone (Smith, 2015). Mothers who use web or text-based postpartum support report significantly higher satisfaction scores with no significant changes in postpartum depression or stress (McCarter et al., 2019). More specifically, mothers who receive text-based messages feel comforted and secure with the option to ask for a nurse, even when they choose not to do so. An important factor that needs to be considered with electronic based interventions is the quality and depth of care that can be delivered as compared to face-to-face support. Research suggests that a combination of clinic-based support with an online intervention for new mothers may achieve comparable outcomes to those achieved by home-based support in a less costly manner (Sawyer et al., 2017).

A barrier to text-based interventions is that usage and adherence may be difficult to achieve. In a nine-month nurse-moderated web-based intervention study to support mothers of infants aged zero to six months, several factors were identified that predicted use, adherence, and attrition (Sawyer et al., 2016). After being assisted to log in for the first week postpartum, 50% of mothers logged-in at least once every 30 days. This web-based intervention was comparable to traditional face-to-face new mothers' groups in providing satisfactory postpartum support. As a result, this form of support has the potential to provide real-time pertinent information during the postpartum period.

A challenge to developing maternal confidence is the many transitions in the postpartum period. Low maternal confidence delays transition into the parenting role and limits satisfaction. A mother acquires confidence through a combination of reading their infant's signals,

successfully meeting their infant's needs, and receiving validation from others (JayaSalengia et al., 2019). The postpartum period can be overwhelming and many mothers report a special need for support to cope with their new circumstances (Hoifodt et al., 2020). Due to this increased vulnerability, there is a need to promote positive relationships between mothers and infants by familiarizing mothers to the infant's signals. The Newborn Behavioral Observation (NBO) is a relationship-based tool that offers individualized information to parents about their infant's communication strategies and overall development. The NBO is administered by certified midwives and public health nurses who keep detailed logs of their observations. Based on the observations, caregiving strategies such as handling, sleep protection, comforting, and regulation of social interaction are tailored to the needs of the individual family and discussed. By increasing parental confidence, the intervention may contribute to more sensitive parenting and a positive parent-infant relationship. Although few differences in depressive symptoms and parental stress were reported by the investigators, mothers who received additional parenting strategies learned significantly more by the 8-week postpartum follow-up about their infant's signals in relation to sleep, social interaction, and crying (Hoifodt et al., 2020). As a result, these mothers feel more equipped to read their infant's signals in important everyday situations.

The increased use of digital interventions holds great promise for accessibility in the postpartum period. Although the use of digital interventions has not resulted in a consistent increase in maternal confidence, mothers have reported significantly increased satisfaction levels with their use (McCarter et al., 2019). Digital interventions have implications for combating health disparities and increasing access to healthcare in vulnerable populations (McCarter et al., 2019). There is a crucial need for cost-and time-effective interventions that can be widely implemented to promote parental knowledge and confidence with the goal of fostering healthy

development of both mother and infant (Gozali et al., 2020). Web-based interventions would be an appropriate, less costly alternative for mothers with low socioeconomic status to have healthy developmental outcomes for themselves and their infants (Sawyer et al., 2017). Mothers with low socioeconomic status tend to encounter barriers to health care access and thus underuse healthcare services, have an increased risk of adverse health outcomes, and are generally less empowered (Laureij et al., 2021). Virtually all women of reproductive age in the United States have use of a cell phone, regardless of socioeconomic status, education, race, or residence, and most also have email access (McCarter et al, 2019). Increasing access to postpartum support using digital modalities would facilitate outreach far beyond the usual six-week obstetrical follow-up (McCarter et al, 2019).

Methods

Design: This study was a secondary analysis of a larger randomized control study, **Prom**oting Self-Management of Breast and Nipple **P**ain Using **T**echnology in Breastfeeding Women (PROMPT) (R56NR020041, PI: Lucas). A mixed-methods approach used semi-structured interviews and a parenting confidence survey at 6 and 24 weeks to examine if there were significant differences in mothers' confidence after watching modules on infant development and play. As part of my honors project, I created these infant development modules using information provided by CDC.gov, ZerotoThree.org, and Heidi Murkoff's What to Expect the First Year (3rd ed.) (2014). After approval by Dr. Lucas and the research team, I voiced over the modules using Kaltura Video Platform.

Setting: The *PROMPT* study was conducted in two academic hospitals, UConn Health and Hartford Hospital, and Hartford Hospital Women's Ambulatory Health Services. Hartford Hospital and the Women Ambulatory Health Services care for a diverse population which will

benefit this study. Hartford Hospital serves women in the community who self-identify as 63.5% non-Hispanic White, 16% Hispanic, 13.6% Black, 12.8% Asian and 2.4% Other. UConn Health Center, is also a diverse academic hospital who serve women in the community who self-identify as 60% non-Hispanic White, 21% Hispanic, 17% Black, and 2% Other. These clinical sites all have easily accessible locations via public transportation and possess ample parking.

Sample: Participants were recruited using both active and passive methods, along with during prenatal care. Participants were approached during prenatal care and if interested, were provided with a study flyer. Additional passive methods used were UConn Storrs Facebook and Instagram pages. Active methods included inpatient recruitment on the postpartum unit. Several times per week, the research team screened the inpatient census for participants meeting inclusion criteria and exclusion criteria. The research team asked the postpartum staff for permission to approach the potential participants. A research team member approached potential participants and provided a study flyer. The team member returned to answer any questions. A HIPAA consent was also secured privately by a trained research member, prior to the start of initial screening questions via REDCap. After screening, if the participant met the inclusion criteria, the participant was consented.

Inclusion Criteria

- English literate women who are between the ages of 18 to 45 years
- Given birth to a single full term (> 37 weeks gestation) infant within the past 6 months
- Have access to the internet via a smartphone of their own or one provided by the study Unique to the secondary analysis
- Watched the infant development and play modules in REDCap at 4, 8, 12, 16, 20, and 24 weeks.

- Participants who were interviewed at Hartford Hospital

Exclusion Criteria

- Women not meeting the age range
- Those with a history of significant mental health disorder (e.g., major depression, schizophrenia, or bipolar disorder)
- Women who have delivered an infant with medical complications or congenital anomalies

  Unique to the secondary analysis
- Did not watch all of the infant development and play modules
- Participants interviewed at UConn Health

The final sample included 20 participants who watched all of the infant development and play modules at 4, 8, 12, 16, 20, and 24 weeks and completed the 6 and 24 week semi-structured interviews that were recorded.

Instruments: The Karitane Parenting Confidence Scale (Appendix A) is a 15 question Likert scale designed to assist in the support and development of parenting skills for children 0-12 months of age (Črnčec et al., 2008). Karitane Parenting Confidence Scale measures maternal self-efficacy with good test-retest discriminant reliability ($r(26) = .88$, $p < 0.0001$), .81 internal consistency, and sensitivity and positive predictive power are 86% and 88%, respectively (Črnčec et al., 2008).

The semi-structured interview asked questions regarding the efficacy of the PROMPT study and also questions I developed about parenting confidence after watching the infant development and play modules. Semi-structured interviews asked at 6 and 24 weeks regarding the infant development and play modules were as follows:

- What did you like about the infant development modules?
- What did you not like about the infant development modules?
- What was helpful about the infant development modules?
- Which part of the infant development modules was most helpful in understanding your infant?
- What changes have you made because of what you learned in the infant development modules?
- What part of the infant development module did you use in interacting with your baby?
- Physical development, social development, or cognitive development?
- Which part of the infant modules made you confident in interacting with your infant?
- What would you like to see in future modules?

Data Collection: Participants who consented to the study were recruited after delivery of their infant and initiated data collection prior to discharge from the hospital and completed baseline data within the first week at home. Participants as part of the larger study, received educational modules and surveys at weeks 1, 2, 3, 6, 9, 12, 18, and 24. After the first week, phone calls and encrypted text messages, depending on the participant's preference, were made bi-weekly by the research team for encouragement.

In addition to retain interest, participants received educational material regarding infant development and age-appropriate play at 4, 8, 12, 16, 20, and 24 weeks. Each module provides mothers with information about their infant's cognitive, social, and emotional development at each month along with activities they may initiate with their infant. At 6 weeks, maternal self-efficacy was evaluated using the Karitane Parenting Confidence Scale and a semi-structured

interview was conducted. These measures were then reassessed at 24 weeks and compared to the initial findings.

Data Storage, Use, and Security: For the *PROMPT* study, electronic surveys using REDCap v7.4 were used to collect research data responses, including those who watched the infant development and play modules. Prior to discharge postpartum, each participant was requested to demonstrate accessing via text, the REDCap link to view research texts, surveys, and study modules. A research team contacted each participant as needed to ensure access to research material. Texts were secured via an encrypted text (through REDCap with an embedded link from Twilio) or an email if participants preferred. Intervention adherence was assessed routinely utilizing the REDCap feature which records the date, time, length, and number of times the participant accesses surveys and individual modules. The audio files from the participant interviews conducted at 6 and 24 weeks were stored on a UConn OneDrive which required dual authentication. Interviews were transcribed and stored on the OneDrive to be accessed and analyzed by members of the research team.

Data Reliability: Standardized questions were asked and digitally recorded to each participant at the 6 and 24-week interviews. The interviews were conducted in a private setting, the lactation clinic at Hartford Hospital. The raw interviews were uploaded into a UConn OneDrive for later review. The digital files were initially transcribed by artificial intelligence. The transcript was checked and revised by a member of the research team. Dr. Lucas and Helen LaPlant then spot checked the transcriptions.

Data Analysis: Data from the study questionnaires at 6 and 24 weeks were assessed for the effect of the infant development and play modules on maternal self-efficacy and well-being. Guided by Boyatzis' thematic analysis (1998), a close read of the transcripts was performed to

identify consistent ideas that support larger themes. The qualitative analysis program Taguette was used to create a codebook of the themes, their descriptions, and supporting phrases (Rampin & Rampin, 2021). After analyzing the interviews, a thematic diagram (Figure 1) was created. RH met with Dr. Lucas and Helen LaPlant to review the themes and codebook. After reaching consensus, the codebook was sent to another member of the research team, Kristen Delaney who performed her own independent analysis using the codebook, for inter-rater reliability. A meeting was held with RH, KD, Dr. Lucas, and Helen LaPlant, to discuss any interview that fell below the 80% threshold of agreement. Ideas and themes were then shared with Dr. Lucas for agreement among the team. Based on feedback, the themes were revised and analysis proceeded. A second analysis meeting was conducted and all of the 40 interviews met a >80% inter-rater agreement for thematic analysis.

RH identified ten themes. The themes clustered into three Layers. The simplest six themes Validation, Reinforcement of Knowledge, Expansion of Knowledge, Facilitating Cognitive Development, Facilitating Social Development, and Facilitating Physical Development were clustered in the first layer, the Inner Layer. These six themes were merged into three more concise themes, the Middle Layer: Parental Reflection, Parental Modeling, and Parental-Infant Interaction. Finally, all nine themes were merged into Instilling Confidence, the Outer Layer.

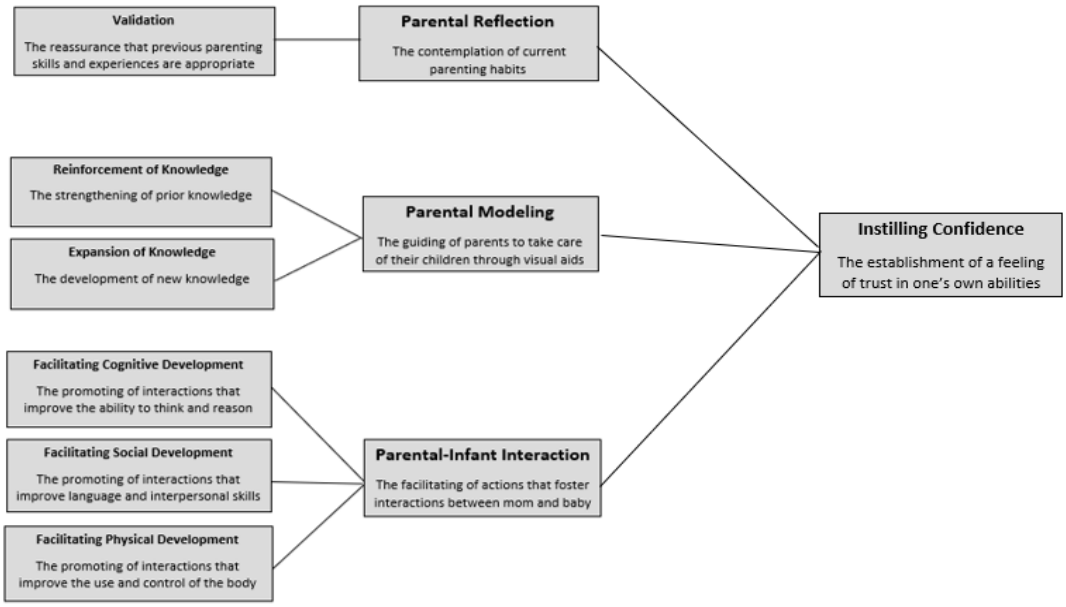
Concurrent with the thematic analysis, the team met with statistician Xiaolin Chang. The team quantified the Middle Layer subthemes, by converting the number of their simpler subthemes into a number. If a participant mentioned a Middle Layer theme, the response was quantified. If the participant did not mention the theme, they were scored as a 0. If they mentioned one or more themes, their scores were 1, 2, or 3.

The Middle Layer included the theme Parental Reflection, which included the Inner Layer theme Validation, and was scored as 0 or 1. The next Middle Layer theme, Parental Modeling included the two Inner Layer themes Reinforcement of Knowledge and Expansion of Knowledge, and scored as a 0, 1, or 2. The last Middle Layer theme, Parental-Infant Interaction included the three Inner Layer themes Facilitating Cognitive Development, Facilitating Social Development, and Facilitating Physical Development and were scored as a 0, 1, 2, or 3. The Outer Layer theme Instilling Confidence was the sum of the Middle Layer Themes and was scored as a 0, 1, or 2.

The higher the total, the greater maternal confidence reported in the interviews. The thematic scores were used to predict parenting scores controlling for time (6 weeks and 24 weeks) and the participant's parenting history. Regression analysis was then performed using IBM SPSS Statistics Version 29.0 (2022) to determine the significance of the results. Descriptive statistics were used for demographic variables.

Figure 1

Thematic Diagram of Parenting Confidence



Note. **Inner Layer:** Validation, Reinforcement of Knowledge, Expansion of Knowledge, Facilitating Cognitive Development, Facilitating Social Development, and Facilitating Physical Development. **Middle Layer**: Parental Reflection, Parental Modeling, and Parental-Infant Interaction. **Outer Layer:** Instilling Confidence.

Results

The characteristics of mothers who watched the educational modules in full and completed both the 6 week and 24-week interviews are presented in Table 1. The average age of the participants was 30.4 years old. Mothers self- reported ethnicity as Hispanic (*n*= 5, 25%) and Not Hispanic (*n* = 15, 75%). Mothers self-reported race as White (*n* = 16, 80%), Black or African American (*n* = 3, 15%), Asian (*n* = 1, 5%). One mother self-reported as Mixed (White and Black or African American). One mother did not report race (*n* = 1, 5%). In terms of completed education, mothers reported high school (*n* = 2, 10%), vocational school (*n* = 1, 5%),

some college (*n* = 1, 5%), Bachelor's degree (*n* = 5, 25%), Master's degree (*n* = 8, 40%), Doctoral degree (*n* = 2, 10%), and professional school (n= 1, 5%). Family income was reported as less than $25,000 (*n* = 1, 5%), between $26,000 and $50,000 (*n* = 2, 10%), between $51,000 and $75,000 (*n* = 2, 10%), between $76,000 and $100,000 (*n* = 2, 10%), and greater than $100,000 (*n* = 13, 65%). Mothers reported being primiparas (*n* = 7, 35%) and multiparas (*n* = 13, 65%).

Table 1

Demographics

Variable	Frequency (%)
Age (mean)	30.4
Ethnicity	
Hispanic	5 (25)
Not Hispanic	15 (75)
Not reported	0 (0)
Race	
White	16 (80)
Black or African American	3 (15)
Asian	1 (5)
Not reported	1 (5)
Education	
9th grade	0 (0)
High school graduate	2 (10)
Associate's degree: occupational/technical/vocational	1 (5)
Associate's degree: academic program	0 (0)
Some college, no degree	1 (5)
Bachelor's degree	5 (25)
Master's degree	8 (40)
Doctoral degree	2 (10)
Professional school degree	1 (5)
Family income	
Less than $25,000	1 (5)
$26,000 - $50,000	2 (10)
$51,000 - $75,000	2 (10)
$76,000 - $100,000	2 (10)
Greater than $100,000	13 (65)
Parenting history	
First child	7 (35)
Second child	9 (45)
Third child	3 (15)
Fourth child	1 (5)

Note. $n = 20$

General Response to Infant Modules

During the 6 and 24 weeks interviews, mothers spoke positively about the monthly infant development and play modules. At 6 weeks, many mothers expressed the 4-week module felt like common sense. At 24 weeks, mothers thought the modules were helpful. There was no evidence that one domain, physical, cognitive, or social affected maternal self-efficacy more than another. Overall, postpartum mothers reported that all three domains of development, social, cognitive, and physical, were utilized when interacting with their infants.

The Karitane Parenting Confidence Scale

The Karitane Parenting Confidence scale scores demonstrated an overall slight increase from the 6-week time point to the 24 week time point. The average scores were 40 and 41.9, respectively. The scores reflect that mothers felt subjectively more confident in their parenting abilities over time.

Maternal Evaluation of the Infant Modules – Middle Layer Themes

Three major themes were identified in the Middle Layer from the semi-structured interviews. The three themes were Parental Reflection, Parental Modeling, and Parental-Infant Interaction. The three themes had supporting subthemes depicted in Figure 1. Each of these supporting themes, Validation, Reinforcement of Knowledge, Expansion of Knowledge, Facilitating Cognitive Development, Facilitating Social Development, and Facilitating Physical Development, build on each other. Collectively, these ideas were brought together to an overarching theme of Instilling Confidence as a parent.

Parental Reflection

The theme Parental Reflection is defined as the contemplation of current parenting habits. Throughout the interviews, mothers felt a sense of reassurance or validation that their previous

parenting skills and experiences were appropriate. Many participants found comfort in matching up what they were looking at in the infant development and play modules with what they were doing with their infant. Many expressed that they would continue to do those things, especially now that they are sure of their actions. After reflecting on their parenting behavior in the interviews, mothers felt confident that they were where they should be as a mother. One participant noted "whenever there were milestones…knowing that my baby had met those milestones made me feel more confident and then…sometimes the recommendations…we were already doing, so that just made us feel more confident about what we were doing." Receiving the educational modules validated what mothers thought to be true and right for their infant and recognized their knowledge and capability to succeed in their parenting roles.

Parental Modeling

The theme Parental Modeling is defined as the module information guiding parents to take care of their infant. The supporting themes tagged in the interviews were Reinforcement of Knowledge and Expansion of Knowledge. For parents who had children prior to this pregnancy, the educational modules were often described as nice reminders or refreshers. The information presented often brushed up on a lot of the things they may have put down for a while. For example, one mother said how:

> "it just kind of was a good…review… 'cause even though I had my first son just about three years ago, it still was good to like review all of that stuff and have it fresh in my mind and kind of um every baby is different so…just giving the information was…nice to hear and reinforce like what I already thought I knew."

As for first-time mothers, the modules provided new knowledge on what is normal at each period of time. One mother in particular expressed how she found the videos to be a "nice outline" that she could follow since she did not know much of where the infant is supposed to be. In both scenarios, mothers were guided in the right direction of how to best support their new infant.

Parental-Infant Interaction

The theme Parental-Infant Interaction is defined as the facilitating of actions that foster interactions between mother and infant. The subthemes included in this theme are the three domains of development: cognitive, social, and physical. Although there was no clear domain influenced the most by the educational modules, many mothers reported high satisfaction with the recommendations. Mothers felt that the modules had good insight into what their infant was thinking at each stage of development and what kinds of activities they should be engaging in. Many recalled how the modules prompted them to interact with their infant in ways such as using mirrors and contrast books, supervising tummy time, singing, practicing simple commands, playing peek-a-boo, and giving their infant age-appropriate toys. One participant felt that the modules about play were the most helpful in this study because "when they're really little [she] never knows how to…interact with them when they don't really know how to play." This was the only theme that had a noticeable difference in maternal descriptions at the 6-week and 24-week time points. At 6 weeks most of the reports felt that the information was basic as it was more so related to sleeping habits, but at 24 weeks mothers reported positively of the recommendations.

Outer Layer Predictive of Karitane Parenting Confidence Scale Score

Three different regression analyses were run to evaluate the relationship between watching the infant modules and affected parenting confidence. Parenting confidence was measured by the Karitane Parenting Confidence Scale scores. The first analysis examined Instilling Confidence as an overarching theme was significant to parenting confidence. The overall best model was significant with a *p*-value of 0.011 (Table 2). The theme Instilling Confidence (p=0.042) and prior parenting (p=0.034) were significant predictors of parenting scores (Table 3). Time was a marginally significant co-variant (p=0.069) (Table 3).

Table 2

Outer Layer ANOVA Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	82.039	3	27.346	4.246	0.011
Residual	231.861	36	6.441		
Total	313.900	39			

Note. Dependent Variable: Karitane Parenting Confidence Scale. Predictors: (Constant) Instilling Confidence, Time, Parity.

Table 3

Outer Layer Coefficients

Model	Unstandardized B	Coefficients Std. Error	Standardized B	t	Sig.	95.0% Confidence Interval for B	
						Lower Bound	Upper Bound
(Constant)	34.162	1.945		17.561	< 0.001	30.217	38.108
Time	1.537	0.821	0.274	1.873	0.069	-0.127	3.202
Parity	1.117	0.507	0.331	2.202	*0.034	0.088	2.146
Instilling Confidence	0.660	0.313	0.324	2.112	*0.042	0.026	1.294

Note. Dependent Variable: Karitane Parenting Confidence Scale. *p < 0.05.

Middle Layer Predictive of Karitane Parenting Confidence Scale Score

A second analysis was run to determine which subtheme had predicted parenting scores. The total scores for Parental Reflection, Parental Modeling, and Parental-Infant Interaction were compared to the parenting confidence scores controlling for time and parity. Overall, the analysis was significant, however, only parity was significant, 0.037, meaning first time parents had lower scores than more experienced parents (Table 5). Time (p=0.065) and the Parental-Infant Interaction theme (p=0.084) did not reach significance (Table 5).

Table 4

Middle Layer ANOVA Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	84.947	5	16.989	2.523	0.048
Residual	228.953	34	6.734		
Total	313.900	39			

Note. Dependent Variable: Karitane Parenting Confidence Scale. Predictors: (Constant) Parental-Infant Interaction, Parental Reflection, Parental Modeling, Time, Parity.

Table 5

Middle Layer Coefficients

Model	Unstandardized B	Coefficients Std. Error	Standardized B	t	Sig.	95.0% Confidence Interval for B	
						Lower Bound	Upper Bound
(Constant)	34.300	2.083		16.463	< 0.001	30.066	38.534
Time	1.626	0.854	0.290	1.904	0.065	-0.109	3.361
Parity	1.130	0.519	0.335	2.176	*0.037	0.075	2.185
Parental-Infant Interaction	0.757	0.425	0.282	1.782	0.084	-0.107	1.621
Parental Reflection	0.045	0.988	0.007	0.046	0.964	-1.963	2.054
Parental Modeling	0.667	0.768	0.133	0.869	0.391	-0.893	2.228

Note. Dependent Variable: Karitane Parenting Confidence Scale. *p < 0.05.

To validate the effect of Parental-Infant Interaction had on Instilling Confidence, a third analysis was conducted. The model included time, parity, and Parental-Infant Interaction. The overall model had a *p*-value of 0.013 (Table 6). Parental-Infant Interaction (p=0.051) and time (p=0.057) approached significance (Table 7). Prior parenting had a significant effect on parenting scores (p=0.040) (Table 7).

Table 6

Parental-Infant Interaction ANOVA Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	79.827	3	26.609	4.092	0.013
Residual	234.073	36	6.502		
Total	313.900	39			

Note. Dependent Variable: Karitane Parenting Confidence Scale. Predictors: (Constant) Parental-Infant Interaction, Time, Parity.

Table 7

Parental-Infant Interaction Coefficients

Model	Unstandardized B	Coefficients Std. Error	Standardized B	t	Sig.	95.0% Confidence Interval for B	
						Lower Bound	Upper Bound
(Constant)	35.151	1.729		20.327	< 0.001	31.644	38.658
Time	1.611	0.819	0.288	1.967	0.057	-0.050	3.272
Parity	1.074	0.505	0.318	2.125	*0.040	0.049	2.099
Parental-Infant Interaction	0.826	0.409	0.307	2.019	0.051	-0.004	1.655

Note. Dependent Variable: Karitane Parenting Confidence Scale. *p < 0.05.

Discussion

Mothers valued watching the infant development and play modules. The results demonstrate a relationship between the mothers watching the infant development and play modules and their parenting confidence scores. The driving factor of significance was parity. However, the theme Parental-Infant Interaction showed a strong trend. A larger sample size may see more significance in explaining parenting confidence scores. Similar to the previous literature, high levels of satisfaction were reported at 6 and 24 weeks after receiving web-based support (McCarter et al., 2019). Mothers in our study value learning how to play and interact with infants in the first six months of life and affect their parenting confidence. Successful parenting requires both knowledge of behaviors and the belief in their capacity that is not overpowered by self-doubt (Vance & Brandon, 2017). In a randomized controlled trial assessing technology-assisted postpartum support, mothers were positive about their experience of receiving messages (McCarter et al., 2019). These feelings towards such a modality of support are confirmed by this study.

My study further evaluated the effectiveness of this type of postpartum support by assessing Karitane Parenting Confidence scores. Mothers who watched the infant modules felt secure in their ability to engage with their infant. The ability to facilitate their infant's development led to greater self-reported confidence scores. The more mothers watched the videos the higher their parenting scores were.

This text-linked intervention can easily replace face-to-face postpartum support. Maternal and infant outcomes from a clinic-based postnatal health check plus nurse-moderated Internet-based support are not inferior to those achieved by a universal home-based support program (Sawyer et al., 2017). Cost-effective interventions with wide population reach are necessary to improve maternal confidence during the postpartum period.

Limitations

This study has potential limitations. Participants had only the 4 weeks module on infant development and play at the 6-week interview. Mothers may have had too little to say about the module's influence on their behaviors and parenting confidence due to the lack of information presented at this time point. At 24 weeks, viewing six modules may have led to mothers' incorrect recall of which modules they were being asked to report on. Another limitation of this study is that there was not enough specificity in the interview questions to delineate between Reassurance and Confirmation as a subtheme of Parental Reflection. Although originally two separate categories, they were ultimately combined into one subtheme. Despite evidence of the two being present, there was only enough data to tag the subtheme of Validation. This would have impacted the coding of the statistical analysis and potentially affected the Instilling Confidence totals.

Conclusion

Overall, mothers reported that the infant development and play modules encouraged maternal-infant interaction and increased their self-efficacy. My study demonstrated that maternal confidence is increased with the knowledge of how to care and interact with their infant during the first six months. Developing a strong maternal-infant relationship is essential to successfully transitioning into the parental role and promoting future infant development.

The outcome of the study data has significant implications for clinical practice among populations with limited access to care. Text-linked educational modules that are short and concise offer an easy way to provide reassurance to postpartum mothers and increase their confidence during their transition into parenting. The benefits of this study directly align with the values and devotion to positive patient outcomes by enhancing access to services and better responding to the needs of a diverse population. Overall, if mothers who participate in the study that watched all of the infant development and play modules have higher Karitane Parenting Confidence scores and positive feedback, new doors to postpartum education will open. The text-linked model is a widely accessible intervention that can be implemented across a large population. Providing text-based support will facilitate a cost-effective means to ensuring mothers have the information they need to feel successful in their new role as a parent. This will ultimately assist in providing the best quality care possible to the community.

Future research with additional participants would be needed to yield more specific results. A more diverse population is also needed for improved generalizability of themes and to assess the effect of the infant development and play modules on paternal self-efficacy.

References

Crncec, R., Barnett, B., & Matthey, S. (2008). Development of an instrument to assess perceived self-efficacy in the parents of infants. *Research in Nursing & Health*. Retrieved from https://doi.org/10.1002/nur.20271.

Gozali, A., Gibson, S., Lipton, L. R., Pressman, A. W., Hammond, B. S., & Dumitriu, D. (2020). Assessing the effectiveness of a pediatrician-led newborn parenting class on maternal newborn-care knowledge, confidence and anxiety: A quasi-randomized controlled trial. *Early Human Development*. Retrieved from https://doi.org/10.1016/j.earlhumdev.2020.105082.

Hoifodt, R. S., Nordahl, D., Landsem, I. P., Csifcsak, G., Bohne, A., Pfuhl, G., Rognmo, K., Braarud, H. C., Goksoyr, A., Moe, V., Slinning, K., & Wang, C. E. A. (2020). Newborn behavioral observation, maternal stress, depressive symptoms and the mother-infant relationship: Results from the Northern Babies Longitudinal Study (norbaby) - BMC psychiatry. *BioMed Central*. Retrieved from https://doi.org/10.1186/s12888-020-02669-y.

JayaSalengia, B. H., Rajeswari, S., & Nalini, S. J. (2019). The relationship between maternal confidence, infant temperament, and postpartum depression. *Iranian Journal of Nursing and Midwifery Research*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6875894/.

Laureij, L. T., van der Hulst, M., Lagendijk, J., Been, J. V., Ernst-Smelt, H. E., Franx, A., & Lugtenberg, M. (2021). Insight into the process of postpartum care utilisation and in-home support among vulnerable women in the Netherlands: An in-depth qualitative exploration. *BMJ open*. Retrieved from https://doi.org/10.1136/bmjopen-2020-046696.

McCarter, D. E., Demidenko, E., Sisco, T. S., & Hegel, M. T. (2019). Technology-assisted nursing for postpartum support: A randomized controlled trial. *Journal of Advanced Nursing*. Retrieved from https://doi.org/10.1111/jan.14114.

Milani, H. S., Amiri, P., Mohseny, M., Abadi, A., Vaziri, S. M., & Vejdani, M. (2017). Postpartum home care and its effects on mothers' health: A clinical trial. *Journal of Research in Medical Sciences: The Official Journal of Isfahan University of Medical Sciences*. Retrieved from https://doi.org/10.4103/jrms.JRMS_319_17.

Rampin, R., & Rampin, V. (2021). Taguette: Open-source qualitative data analysis. *Journal of Open Source Software*. Retrieved from https://doi.org/10.21105/joss.03522.

Rhodes, E. C., Damio, G., LaPlant, H. W., Trymbulak, W., Crummett, C., Surprenant, R., & Perez-Escamilla, R. (2021). Promoting equity in breastfeeding through peer counseling: The US Breastfeeding Heritage and Pride program. *International Journal for Equity in Health*. BioMed Central. Retrieved from https://doi.org/10.1186/s12939-021-01408-3.

Sawyer, M. G., Reece, C. E., Bowering, K., Jeffs, D., Sawyer, A. C. P., Mittinty, M., & Lynch, J. W. (2017). Nurse-moderated internet-based support for new mothers: Non-Inferiority, randomized controlled trial. *Journal of Medical Internet Research*. Retrieved from https://doi.org/10.2196/jmir.6839.

Sawyer, M. G., Reece, C. E., Bowering, K., Jeffs, D., Sawyer, A. C. P., Peters, J. D., Mpundu-Kaambwa, C., Clark, J. J., McDonald, D., Mittinty, M. N., & Lynch, J. W. (2016). Usage, adherence and attrition: How new mothers engage with a nurse-moderated web-based intervention to support maternal and infant health. A 9-month observational study. *BMJ Open*. Retrieved from https://doi.org/10.1136/bmjopen-2015-009967.

Smith, A. (2015). U.S. Smartphone Use in 2015. *Pew Research Center: Internet, Science & Tech*. Retrieved from https://www.pewresearch.org/internet/2015/04/01/us-smartphone-use-in-2015/.

The American College of Obstetrics and Gynecology. (2018). Optimizing postpartum care. *ACOG*. Retrieved from https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2018/05/optimizing-postpartum-care.

Vance, A. J., & Brandon, D. H. (2017). Delineating among parenting confidence, parenting self-efficacy, and competence. ANS. *Advances in Nursing Science*. Retrieved from https://doi.org/10.1097/ANS.0000000000000179.

Appendix A

Karitane Parenting Confidence Scale (KPCS)

Karitane
leaders in parenting services since 1923

KARITANE PARENTING CONFIDENCE SCALE
FOR PARENTS OF INFANTS

Reference as: Črnčec, R., Barnett, B., & Matthey, S. (in press: 2008). Development of an instrument to assess perceived self-efficacy in the parents of infant. *Research in Nursing and Health.*

Your name: _____ Baby's name: _____

Your age: _____ Baby's age (months): _____

You are baby's (circle): mother / father Number of children including baby: _____

Cultural background:_____ Today's date: _____

This scale has 15 items. Please underline the answer that comes closest to how you generally feel.

Here is an example already completed:

eg. I am confident about holding my baby

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

This would mean "*I feel confident about holding my baby some of the time*".

Please complete the other questions in the same way.

Office use only.
Page 1 ____
Page 2 ____+
Total ____

1. I am confident about feeding my baby

Not applicable (my partner feeds the baby)
No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

2. I can settle my baby

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

3. I am confident about helping my baby to establish a good sleep routine

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

4. I know what to do when my baby cries

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

Continued over the page ⟹

5. I understand what my baby is trying to tell me

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

6. I can soothe my baby when he / she is distressed

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

7. I am confident about playing with my baby

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

8. If my baby has a common cold or slight fever, I am confident about handling this

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

9. I feel sure that my partner will be there for me when I need support

Not applicable (I don't have a partner)
No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

Office use only:
All items scored 0,1,2,3. N/A=2.

10. I am confident that my baby is doing well

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

11. I can make decisions about the care of my baby

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

12. Being a mother / father is very stressful for me

Yes, most of the time
Yes, some of the time
No, not very often
No, hardly ever

13. I feel I am doing a good job as mother / father

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

14. Other people think I am doing a good job as a mother / father

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

15. I feel sure that people will be there for me when I need support

No, hardly ever
No, not very often
Yes, some of the time
Yes, most of the time

Thank you for completing this questionnaire