Process evaluation of the development and remote recruitment for Essential Coaching for Every Mother during COVID-19

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Abstract

Background: With the sudden decrease in in-person support and increase in perinatal mental health concerns during the coronavirus pandemic, innovative strategies, such as mHealth, are more important than ever. This study has two objectives: (1) to describe the modification of Essential Coaching for Every Mother during the coronavirus pandemic, and (2) to describe the process evaluation of recruitment and retention of pregnant and postpartum women for a pre-post intervention study.

Methods: For objective 1, modified messages were piloted with mothers and postpartum healthcare providers simultaneously. Semi-structured interviews were conducted with a subset of 10 participants from the original development study. For objective 2, three methods were used for recruitment: social media, posters in hospital, and media outreach. First time mothers were eligible for enrollment antenatally (37+ weeks) and postnatally (<3 weeks). Eligibility screening occurred remotely via text message with participants initiating contact. Data were collected via TextIt and REDCap. Outcomes were days to recruit 75 participants, eligibility vs. ineligibility rates, dropout and exclusion reasons, survey completion rates, perinatal timing of enrollment, and recruitment sources.

Results: For objective 1, three mothers (M age=30.67 years) and seven healthcare providers (M age = 46.0 years) participated in the modification of the messages. Participants felt the messages were appropriate and relevant related to changes in postpartum care during the coronavirus pandemic. Nine messages were modified related to coronavirus and five messages were added to the program. For objective 2, recruitment ran July 15th-September 19th (67 days) with 200 screened and 88 enrolled, 70% antenatally. It took 50 days to enroll 75 participants. Mothers recruited antenatally (n=53) were more likely to receive all intervention message (68% vs. 19%). Mothers recruited postnatally (n=35) missed more messages on average (13.8 vs. 6.4). Participants heard about the study through family/friends (31%), news (20%), Facebook groups (16%), Facebook ads (14%), posters (12%), or other ways (7%).

Conclusion: Antenatal recruitment resulted in participants enrolling earlier and receiving more of the study messages. Word of mouth and media outreach were successful, followed by advertisement on Facebook. Remote recruitment was a feasible way to recruit for Essential Coaching for Every Mother.
1 Introduction

Irrespective of a pandemic, mothers living in Nova Scotia and beyond face gaps in access to information and often struggle to find adequate support during the postpartum period, defined as the first six weeks after birth. These gaps may be magnified during the coronavirus pandemic and may significantly impact the transition for new mothers. Compliance with physical distancing recommendations contribute to mothers isolating at home, being physically isolated from not only health providers, but also from their extended family and support systems. In Nova Scotia, all public health drop-ins were closed indefinitely, there was a reduction in in-person healthcare support, and midwifery-led home births and home visits were temporarily deferred during the coronavirus peak from March to May 2020. This significantly differed from pre-coronavirus procedures, where mothers were recommended to have a postnatal contact shortly after birth by a public health nurse and mothers frequently engaged in visits with family, friends, or new parent groups. Emerging evidence shows that the pandemic has resulted in 37-54% of mothers experiencing perinatal depression and 57-72% experiencing symptoms of perinatal anxiety. With the sudden decrease in in-person support and the increase in perinatal mental health concerns, innovative strategies, such as mHealth, are more important than ever as a means to offer information and support during the postpartum period.

Prior to the coronavirus outbreak, the Essential Coaching for Every Mother program was developed to send daily text messages to mothers during the immediate six-week postpartum period. As a result of changes in care and postpartum recommendations after the coronavirus outbreak, changes were necessary in some of the messages. Additionally, given the requirement of physical distancing and limitations on the number of visitors in hospital, exploration was needed on the ability to recruit remotely rather than the traditional, in-person approach for a planned randomized control trial. Therefore, this study has two aims: (1) to describe the modification of Essential Coaching for Every Mother to be applicable during the coronavirus pandemic, and (2) to describe the process evaluation of remote recruitment of pregnant and postpartum women for the Essential Coaching for Every Mother pre-post intervention study. This study focuses on describing the methodological processes, opportunities, and challenges for recruiting participation of women in a postpartum text message program during pandemic restrictions.

2 Methods

2.1 Objective 1: Modification

Essential Coaching for Every Mother is a six-week postpartum text message program that was previously developing in consultation with postpartum mothers and healthcare providers with the goal of improving women’s psychosocial outcomes. Details of the original development has been previously published. With the outbreak of COVID-19 in early 2020 and the readiness of the Essential Coaching for Every Mother program to fill the sudden gap in postpartum support, a decision was made to modify the program to be offered immediately. Given that Essential Coaching for Every Mother was developed prior to the coronavirus outbreak but not previously implemented, some modifications were necessary of existing messages and for the inclusion of coronavirus related content. To ensure that the revised content of Essential Coaching for Every Mother was appropriate and acceptable, the modified messages were piloted with mothers and postpartum healthcare providers simultaneously. Messages were updated using the Government
of Canada and World Health Organization guidelines around mother-infant care and coronavirus\textsuperscript{12,13} and followed the Government of Nova Scotia public health guidelines during the coronavirus pandemic.\textsuperscript{14}

In the original Essential Coaching for Every Mother program, 53 messages were designed to be sent twice daily in the first two weeks, once a day for the following four weeks. In the modification, 10 existing messages were modified and 4 new messages were created. Of these, nine were significant enough to be piloted. Messages that were not piloted were due to simple modifications that did not warrant feedback (e.g., message was changed from ‘visit/go’ to ‘call’).

2.1.1 Study population

The study population were mothers and postpartum healthcare providers who care for the women and newborns during the postpartum period. Participants in the original development\textsuperscript{11} were contacted as an update on the original research project and were asked to respond if they are interested in participating in this sub-study based on their prior knowledge of the program. The original study had 10 mothers and 18 healthcare providers enrolled, thus the targeted sample was for 10 participants (approximately a third of the original sample).

2.1.2 Procedures

Upon recruitment and prior to starting the interview, oral consent was obtained on the study purpose and for recording the interview. All interviews were conducted virtually, and the audio was recorded. Participants were shown the revised messages through screen sharing using video conference software by the first author who conducted all the interviews. The interviews were semi-structured, with the following questions starting the conversation for each category: How do you feel about these text messages to be sent to new moms during the first six-weeks? Was anything unclear or is there a different way you would say this? Each interview took approximately 20 minutes and occurred in the first week of June 2020. Ethics approval was obtained by the IWK Health Centre (#1024247).

2.1.3 Analysis

Interviews were transcribed verbatim to facilitate analysis. The first author completed manual analysis to make any further modifications to the messages based on the feedback obtained.

2.2 Objective 2: Recruitment Evaluation

The second objective of this study is to describe the process evaluation of remote recruitment of pregnant and postpartum women for the Essential Coaching for Every Mother pre-post intervention study. Specifically, the following outcomes were of interest: (1) number of days required to recruit at least 75 participants; (2) eligibility vs. ineligibility rates and reasons; (3) dropout, exclusion and baseline survey completion rates; (4) enrollment rates based on antenatal or postnatal recruitment; and (5) recruitment sources.

2.2.1 Study Population & Sample Size

Between 2017 and 2019 at the IWK Health Centre, 4,055 primiparous women gave birth, representing 45\% of all mothers who delivered at this hospital;\textsuperscript{15} this is about 169 primiparous births per month. Targeting recruitment over three months, a potential population of
approximately 500 mothers would be available. To determine feasibility of recruitment, the goal was to recruit at least 15% of this sample (n=75) within three months.

To participate, women must (1) have given birth to their first baby at the IWK Health Centre and live in Nova Scotia; (2) have access to a mobile phone with SMS capabilities; (3) be over 18 years of age; and (4) speak and read English. Only first-time mothers were included to minimize confounding factors such as prior knowledge and previous interactions with public health. Women were eligible to enrol antenatally if they were at least 37 weeks pregnant and had not yet given birth. The antenatal time limitation was set to ensure participants would deliver within the three-month recruitment period. Women were eligible to enrol postnatally up to 21 days following the birth of their child. The postpartum limit was set to ensure there was a least a three-week gap between baseline and 6-week follow-up surveys and to ensure participants received enough of the message to provide evaluative feedback.

### 2.2.2 Recruitment Procedures

Three primary methods of recruitment were used: social media, posters in the hospital, and media outreach. First, social media advertisements were used to recruit mothers via Facebook and Instagram advertisements and tweets on Twitter. Social media outreach and paid advertisements started on July 15th, 2020 and ran until August 16th, 2020. Second, postpartum mothers were targeted for recruitment via posters at the IWK Perinatal Clinic at IWK Health and in each room on the Family Newborn Unit. Posters were placed on August 5th, 2020 and taken down on September 15th. Finally, media interviews also occurred with the first author, with one televised news interview, two radio interviews, and several written media pieces occurring after a media release was published by IWK Health on August 5th, 2020. This targeted both prenatal and postpartum women.

All eligibility screening occurred remotely via text message through the TextIt platform with interested participants initiating contact. Pregnant women started the recruitment process by texting ‘pregnant’ to the study number and proceeded through the antenatal eligibility screening process. Eligible mothers were instructed to text ‘delivered’ within 48 hours of giving birth to be enrolled in the study. During the antenatal screening process, participants were not truly enrolled in the study but were monitored for enrollment post-birth. During the antenatal recruitment flow, only the mother’s phone number and due date was collected via TextIt once she was deemed eligible. Women received reminder messages to text ‘delivered’ at 39 weeks, 40 weeks, 41 weeks and 42 weeks if they had not yet enrolled or withdrawn. Mothers who were deemed ineligible as part of the antenatal screening due to being less than 37 weeks were sent a message to remind them to text ‘pregnant’ if they were still interested. This occurred until August 27th when the number of interest and enrolled participants was beyond the desired 75 participants.

Postpartum women who initiated contact using ‘birth’ proceeded through the postpartum eligibility flow. Once deemed eligible, postpartum participants and antenatal women who texted ‘delivered’ completed the same flow to be enrolled in the study and start receiving messages based on their delivery date. During this phase, additional details about newborn’s name, preferred gender pronoun, date of birth, mother’s name, and preference for breastfeeding or formula messages were collected through TextIt. This was used to personalize the messages with names and ensure messages were sent based on child’s age and preference for breastfeeding or formula messages.

Participants were asked to complete a consent form and survey at baseline (survey #1) and once the messages ended at 6-weeks (survey #2). Participants were reminded about the
surveys via text message six times (every 2 days) at each timepoint or until they completed the
full survey. On day 14 post-enrollment and/or program completion, participants who had yet to
complete the full survey were sent an email or text as a final reminder and it was assumed to be
incomplete if a participant did not complete after this point. All participants who completed the
full survey received a $20 electronic gift card at each survey timepoint. Figure 1 outlines of
study enrollment and participation flow diagram.

While messages were only one-way, if a mother responded with a question of
clarification during recruitment or related to the survey, the first author responded to provide
clarification only. For example, if a mother asked if they would receive reminder messages, a
brief message that reminder messages will be sent was provided as a response. No responses to
the Essential Coaching for Every Mother messages occurred.

Figure 1. Study enrollment and participation flow diagram

2.2.3 Intervention Procedures

TextIt\textsuperscript{16} was used as the platform to develop the message flows and capture participant
contact information. It was used in conjunction with Twilio\textsuperscript{17} the server that sent and received
the messages. Survey data were collected via REDCap.\textsuperscript{18} Contact information was collected via
TextIt which was kept separate from survey data collected via REDCap. Survey data included
questionnaires about psychosocial outcomes and evaluated the impact of the program. This data
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will be reported elsewhere and is not the focus of this manuscript. Ethics approval was obtained by the IWK Health Centre (#1024984).

The first message of Essential Coaching for Every Mother is designed to start the evening of the second day after giving birth. This could be as early as 17 hours after birth (if a mom delivered at 11:59 the night before) or as late as 41 hours (if a mom delivered at midnight). If a participant signed up beyond this time frame, they started the messages based on when they delivered.

To determine feasibility, data on implementation extent was collected via output data available through the TextIt platform as well as REDCap. For the outcomes identified above, the following information was used:

- Days required to recruit participants = number of days from start of study to enrollment of 75 participants, total number of participants enrolled, and time required for recruitment
- Eligibility vs. ineligibility rates = number of individuals who were eligible and enrolled in the study vs. the number of individuals who contacted but were not eligible (comparing both antenatal and postpartum ineligibility and reasons)
- Dropout & survey completion rates = the number of participants who withdrew or were excluded from the study and when (% completion, timing of withdraw), number of surveys completed, partially and in full at baseline, time between initial survey request sent and completed
- Enrollment based on antenatal vs. postnatal recruitment = comparing number of antenatal vs. postpartum recruitment and timing of enrollment (number of messages received, infants age at enrollment, time of day of initial contact)
- Recruitment sources = enrolled participant’s self-reported source of where they heard about the study

2.2.4 Analysis

Descriptive analysis of TextIt and REDCap event data was used to examine the frequency and proportion of outcomes above. All descriptive analyses were completed in Excel.

3 Results

3.1 Objective 1 – Modification

3.1.1 Participants

Three mothers and seven healthcare providers participated in the modification of the messages. The mothers were a mean age of 30.67 years (Standard Deviation [SD] =1.53 years) and their infants were a mean age of 1 year, 17.71 weeks (SD = 2.42 weeks). All mothers were white and married.

The healthcare providers ranged in type of postpartum healthcare provider role, with one each of: postpartum unit registered nurse, public health nurse, family doctor, reproductive care program representative, midwife, family practice nurse, and a physiotherapist. Health care providers mean age was 46.0 years old (SD =9.87) and had a mean of 17.71 years (SD = 11.37) working with mothers. All postpartum healthcare providers were white women.
### 3.1.2 Outcomes

Overall, the mothers and healthcare providers felt the messages were appropriate and relevant related to changes in postpartum care during the coronavirus pandemic. General feedback was related to ensuring that the messages shared information about what mothers could do (e.g., go for walks when safely physically distancing, going to their family doctors for vaccinations and follow-ups) and who to contact if they had questions (i.e., call 811 if you show COVID-19 symptoms). There were also recommendations to provide links to current guidelines in case recommendations changed, which happened as Nova Scotia shifted from household isolation, to family bubbles, to the Atlantic province bubble.

Nine messages were modified from the original program to include information related to the coronavirus, of which four messages were collapsed into two, and five messages were added to the program. Three of the five messages were provided during the first two weeks of the program in which participants received on three days an additional message (three messages total per day) versus the usual two messages. The other two messages were sent in place of one of the previously collapsed message. In weeks three through six, usual messaging was reduced to one message a day. Figure 2 provides an example of two messages included – the first is a message that was revised to reflect the current standard of care in postnatal follow-up by a public health nurse which increased from within 48 hours to 3-5 days and may occur over the phone or online rather than in person. The second message is an example of a message that was added specifically to postnatal care during COVID-19.

![Example Messages](Figure 2. Examples of Essential Coaching for Every Mother messages relevant to COVID-19)

### 3.2 Objective 2 - Recruitment & Completion

#### Timing required to recruit participants

The study started recruitment on July 15, 2020 and stopped all enrollment on September 19, 2020. This is a period of 67 days during which, 96 participants were enrolled in the program and were assigned a study identification number. Timing to enroll 75 participants (our initial target) took 50 days (July 15, 2020 to September 2, 2020).
Eligibility vs. eligibility

A total of 200 initial contact messages were sent to the study contact number by potential participants during the recruitment period. Figure 3 outlines the perinatal timing and reasons for ineligibility. A total of 140 participants initiated contact antenatally and 60 participants had initiated contact in the postpartum period. For the antenatal participants, 30 were not eligible, seven were not interested, and 45 were excluded not being based in Nova Scotia. For the postpartum period, 20 were not eligible and two were not interested.

We had to exclude 45 participants who were not based in Nova Scotia and were using a United States (US) number. We initially thought this could be individuals who are temporarily residing in Canada since they provided valid Nova Scotia postal codes in the demographic questionnaire. However, upon further analysis, we believe these were not actual mothers from the US wanting to participate due to a discrepancy in the standardized questionnaire responses with extremely high scores on these measures (well beyond the standard mean) and quick completion time of their REDCap surveys (immediately after they enrolled and on their delivery date), suggesting these were not actual participants. When analyzing location through Twilio, the US had a predominant send/receive rate, providing further evidence that these respondents were not in Canada. Therefore, with the triangulation of these findings, it was deemed that these responses are not actual potential participants and if they were, they were not residing in Nova Scotia as required by the study protocol.

Dropout & survey completion rates

Of the 96 enrolled participants, four withdrew from the program after receiving 0, 5, 6 and 9 messages respectively (Mean [M] = 4, Standard Deviation [SD] = 3.7). Three of the participants who withdrew enrolled in the postpartum period and one enrolled antenatally. As none of the participants who withdrew completed the baseline survey, we were unable to determine if these participants were different from those who completed the program. Four participants did not complete any aspect of the baseline survey, thus were excluded from the analysis.

Therefore, the study had a total of 88 participants who did not opt out and who completed at least some of the baseline survey. All participants received a reminder text messages to complete the survey every other day from enrollment until two weeks postpartum or survey completion, whichever came first, as well as a final email or text reminder to complete the survey. Ninety percent (90.1%) of participants completed the full survey, taking on average 5.0 days to complete the baseline survey from enrollment (Median = 3 days, SD= 5.3 days, range 0-19 days). Nine percent (n=8) did not complete baseline survey in full – on average, participants completed 56.25% of the survey (range: 25%-75%).

Timing of recruitment

Of the 88 participants who were enrolled, 42 (47.7%) received full messages. Of these 42, 36 were antenatally recruited and six were recruited postnatally. There were differences in the number of messages missed if participants were recruited antenatally or postnatally. Late enrollment during the antenatal period resulted in missing on average 6.4 messages (SD=6.2) whereas late enrollment during the postpartum period resulted in missing on average 13.8 messages (SD=10.6). Similarly, when women enrolled antenatally, their infants were a mean of
1.4 days old (SD=2.0) whereas when they enrolled postnatally, their infants were a mean of 6.0 days old (SD=5.3). Most (40.4%) enrollment messages (text of ‘birth’ or ‘delivery’) were received in the morning hours (between 0600-1200), followed by 24.7% in the afternoon (1200-1800), 20.7% in the evening (1800-2400) and 14.6% overnight (0000-0600).

Recruitment sources

Among the 80 participants who completed the full survey, 30.5% (n=25) heard about the study through friends or family and 18.3% (n=15) heard about it on the news. Recruitment via Facebook was also successful, with a quarter of participants reached through the social media platform – 14.6% via Facebook groups, 13.4% via Facebook advertisements, and 1.2% via Facebook Marketplace. No participant reported hearing about it through Instagram or Twitter. Posters in the hospital was the source of recruitment for 14.6% of participants, with 7.6% saying other (including doula, social media broadly, hospital website, and no response).

For paid Facebook advertisements, a total of $215.77 Canadian was spent, which equals a cost of $19.62 per enrolled participants who indicated this a primary recruitment method. However, this may not be accurate as this does not consider whether any friends or family heard about the study through paid advertisements.

Figure 3. Enrollment flow

Discussion

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This study describes the modification of *Essential Coaching for Every Mother* to be applicable during the coronavirus pandemic as well as the process evaluation of remote recruitment for a pre-post intervention study. Overall, the modification of *Essential Coaching for Every Mother* to be applicable during the coronavirus pandemic was achieved relatively efficiently, with only nine messages modified out of the 53 originally developed with five messages added. We were able to maintain approximately twice a day messages for the first two weeks, followed by once a day for the following four weeks. Only three new messages were added to the program that did not fit into the original schedule and were sent in the first two weeks, resulting in participants receiving three messages per day for those days. In total, participants would receive up to 56 messages if they enrolled prior to 5pm on the second day of their infant’s life.

In the modification feedback, participants encouraged the inclusion of links to current guidelines in case recommendations changed, which happened as Nova Scotia shifted from household isolation, to family bubbles, to the Atlantic province bubble. Given the rapidly changing nature of collective understanding of COVID-19 as well as the ebbs and flows of outbreaks, public health recommendations are constantly changing. One of the benefits of using mHealth is the ability to change and update content as needed. *Essential Coaching for Every Mother* is not a static intervention, such as print media, which is harder to update and ensure everyone has the updated version, suggesting that mHealth could be a viable option to keep content up to date, especially during emerging health concerns.

Additionally, the online and remote recruitment of pregnant and postpartum women for a pre-post intervention study for *Essential Coaching for Every Mother* was a success as we were able to recruit over our target of 75 participants within 50 days, with recruitment suspended within 67 days due to significant interest. This suggests that mothers were interested in receiving information during the postpartum period, which may have been enhanced due to the pandemic. Emerging evidence shows that the pandemic has resulted in 37-54% of mothers experiencing perinatal depression and 57-72% experiencing symptoms of perinatal anxiety, suggesting that a preventative mHealth program for mothers could have a positive effect on mothers postpartum adjustment and experience. Given the growing evidence of the mental health consequences of physical distancing recommendations, particularly during an intensely vulnerable period as is the postpartum period, having evidence-based information provided via text message may help cover this gap. Digital health during COVID-19 has the potential to bridge the healthcare service gap while maintaining physical distancing recommendations.

We found that mothers who were recruited antenatally received more of the study messages than participants who were recruited postnatally, with the latter missing on average 7.4 reminder messages starting at 39 weeks, they were more likely to enroll earlier than mothers who had already delivered. No mother who expressed interest during the antenatal period and was deemed eligible failed to enroll. Thus, antenatal recruitment may be a more efficient way to target recruitment for the larger clinical trial to ensure mothers receive as much of the program as possible. Additionally, given the delay in baseline survey completion after delivery, shifting to have participants complete the baseline survey upon enrollment and prior to delivery may result in more timely completion than during the postpartum period.

Looking at the direct recruitment methods, the most successful approach was promotion through Facebook. Both advertisement through mother-focused Facebook groups and paid advertisements were similarly effective. This finding is supported by previous systematic
reviews which found that Facebook recruitment was an effective way to reach participants for health research.\textsuperscript{23,24} Within our study, we also found that sharing the study in the media and news reached 17\% of participants and posters in the hospital reached 13.6\% of participants, which suggests that using a multi-pronged approach to recruitment is more efficient than solely using social media.

### 4.1 Limitations

Despite the successes, there were some challenges in recruitment. First, most participants heard about the study through family and friends, but it is unclear how these family and friends heard about it. Additionally, we were unable to gather how mothers who contacted us but did not enroll in the study heard about it. Both of these factors limit the interpretation of recruitment source analysis. A second challenge was the high potential for people to misuse the self-identification of eligibility screening which occurred exclusively via text message. This occurred in relation to the large number of non-Nova Scotia based on phones. We hypothesize that someone(s) had been completing the eligibility screening and baseline questionnaire to gain access to the honorarium. While TextIt cannot limit to provincial locations, we continued to monitor recruitment closely to ensure we identified any issues related to this through regularly monitoring of area codes. This may have potentially excluded individuals who were residing in Nova Scotia but had US numbers, this was required to ensure safety and adherence to study protocol inclusion criteria.

Another limitation was that limited sample size and diversity representation in the modification testing of\textit{Essential Coaching for Every Mother}. However, as participants were recruited from the original development to ensure they were familiar with the program, having 10 participants represents over a third of the original sample (10/28 = 35.7\%). In terms of the sample being primarily white and women, this was recognized as a limitation of the original development and thus was not able to be controlled for this purpose. Further work should have a more direct focus on collecting a diverse sample.

### 4.2 Conclusion

Despite these challenges, this study found that\textit{Essential Coaching for Every Mother} was able to be successfully modified for implementation during the COVID-19 pandemic and remote recruitment of pregnant and postpartum women for a pre-post intervention study was possible using a variety of recruitment sources. Findings from this study will be applied in the development of a clinical trial to determine effectiveness in a real-world setting.
5 Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

6 Author Contributions

Author JD conceptualized the manuscript, conducted the data collection, wrote the manuscript, and edited all revisions. Authors MCY, GTM, MA and DM intellectually contributed to the development and writing of the manuscript, added text, and edited all revisions.

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