

The Effect of Mobile Instant Messaging versus Face-to-Face Counseling on the Primiparous Mothers' Breastfeeding Self-efficacy: A Pilot Randomized Controlled Trial

Manoosh Mehrabi

Shiraz University of Medical Sciences <https://orcid.org/0000-0002-2024-9415>

Shoale Zarei

Shiraz University of Medical Sciences

Leila Bazrafkan

Shiraz University of Medical Sciences

Ali Reza Safarpour (✉ safarpourar@gmail.com)

<https://orcid.org/0000-0002-9880-0043>

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Abstract

Background Increasing breastfeeding rates around the world is one of the most important goals of the World Health Organization. Self-efficacy is a modifying and predictive factor for initiation and continuation of breastfeeding. This study was conducted to investigate the impact of mobile-based education and regular delivery of designed messages on breastfeeding self-efficacy in primiparous mothers.

Methods This study was a double blind pilot randomized controlled trial, in which a hundred and twenty primiparous breastfeeding mothers were randomly allocated into two groups using permuted block randomization. The standard method counseling arm received routine counseling interventions and the intervention arm received a mobile instant messaging program in addition to the usual counseling. The main objective of this study was to compare self-efficacy in face-to-face counseling group and mobile instant messaging group. Self-efficacy levels were compared in the two groups before and after the study procedures.

Results In this study, 60 mothers were studied in each group, and then the collected data were analyzed. The mean post-test scores in the intervention group (60.40 ± 4.92) and the control group (50.10 ± 7.60) were compared in the main analysis. The results indicated a statistically significant difference ($p < 0.001$). Given the amount of effect size ($d = 0.99$; 95% CI=1.19-2.02) it appears that there is a high level correlation between the applied intervention and level of self-efficacy among the study participants, especially those with higher levels of education. Secondary findings of the study involved evaluating the effects of education, occupation, family income, lactation duration and spouse support for breastfeeding self-efficacy. Except for the maternal education level, which had a significant relationship with the level of breastfeeding self-efficacy ($p = 0.02$), the other factors did not show any correlation with self-efficacy in breastfeeding.

Conclusion The pilot study provided valuable information for feasibility assessment of randomized controlled trials in future studies with larger sample sizes and more participant diversity.

Background

Breastfeeding is a vital activity with numerous benefits for mothers and newborns (1). These benefits include providing rich nutrition for infants' physical and mental growth, and reducing respiratory and infectious diseases and mortality, especially in the first few months of their lives (2).

Unfortunately, in spite of advice from the World Health Organization and UNICEF, many mothers around the world feed their infants with synthetic milk, because they often think that they cannot produce sufficient milk or because they do not have sufficient knowledge of its benefits (3).

In Iran, the rate of breastfeeding is moderately acceptable (53.13% in 2010, compared with 13.3% in the United States in 2010(4)), but is still far from the rate recommended by WHO (5).

Successful breastfeeding is affected by many factors such as age, level of education, family income, prenatal education, first feeding time, mother's experience and most importantly, breastfeeding self-efficacy (6).

Among these factors, self-efficacy is a modifying and predictive factor in terms of breastfeeding continuation (7).

Breastfeeding self-efficacy has been defined as a mother's confidence in her ability to breastfeed her infant. Studies show that low levels of self-efficacy have the greatest impact in early breastfeeding, and interventions to increase mother's self-confidence and self-efficacy have a positive effect on breastfeeding continuation(8).

Breastfeeding self-efficacy is influenced by four sources of information: past experiences, observations of other breastfeeding mothers, verbal encouragement and physical reactions (9). This suggests that the role of healthcare workers can be crucial in supporting primiparous mothers who have no prior breastfeeding experience (10). Recent research shows that mobile-based tutorials that include regular text and voice messaging in addition to standard methods of education have had a positive

impact on mothers' knowledge (11,12). Also there are studies that illustrate the effects of different educational methods on mothers' self-efficacy (7,13–16). However, to the author's knowledge, no study has so far been conducted on the effects of mobile messaging or mobile based education on mothers' breastfeeding self-efficacy. The purpose of this study was to investigate the impact of routine mobile-based health education and regular delivery of designed messages on breastfeeding self-efficacy in primiparous mothers referred to health centers in Shiraz, Iran.

Methods

Design:

The present study is a randomized double blind controlled trial. which adheres to CONSORT guidelines and include a completed CONSORT checklist as an additional file. A two-group pre- and post-test design was used to investigate the effect of mobile messaging on breastfeeding self-efficacy in primiparous mothers referred to health centers in Shiraz, Iran. The study was conducted from March 2018 to March 2019.

Sample size and Randomization:

Based on the sample size calculation formula for comparing two means ($\alpha = 0.05$ and $\beta = 0.2$), 64 participants were estimated to be in each groups. The study began with 163 lactating mothers with single healthy infants. Eventually 43 participants were excluded, leaving a final sample size of 120 participants. As illustrated in Fig. 1 (CONSORT Flow diagram), the mothers were allocated to control ($n = 60$) and intervention ($n = 60$) groups using permuted block randomization (block size = 4).

Evaluation of self efficacy (Primary outcome):

The intervention arm received a mobile designed instant messaging program in addition to regular counseling. The program included answers to frequently asked questions, proper breastfeeding principles, words of encouragement for breastfeeding mothers, and regular phone calls to the mothers to monitor their performance, which continued up to the second week after delivery. Mothers in the intervention group received messages in text, audio, visual or audio-visual formats. The standard method conseling arm control group received routine interventions, namely face-to-face counseling at health centers, which included two pre-natal and post-natal training sessions.

Secondary outcomes

This part of the study involved an evaluation of the relation between self-efficacy and other possible related factors such as education, occupation, family income, lactation duration and spouse support for breastfeeding in the intervention group.

Eligibility criteria:

Participants included all single fetus mothers aged 18–45 years with no history of breastfeeding at 35–40 weeks of gestation (ninth month). They were all literate, familiar with smartphones and not participating in other similar studies.

Data Collection and Questionnaire:

The study data were collected using a questionnaire on demographic characteristics (age, educational level, occupation, family income, lactation duration and spouse support for breastfeeding), and Denise Short Form Breastfeeding Self-efficacy Questionnaire BSES-SF. The Short Form Breastfeeding self-efficacy scale consists of 14 questions measured on a 5-point Likert scale (answer 1; Not at all Confident and answer 5; Always Confident). Content validity of the BSES was based on the literature, interviews with breastfeeding mothers, and expert opinions. Cronbach's alpha coefficient for the scale was 0.96 with 73% of all corrected item-total correlations ranging between 0.30 and 0.70 (9).

Statistical analysis:

The minimum and maximum scores on BSES-SF questionnaire are 14 and 70, respectively, and the scores above 50 reflect the likelihood of breastfeeding. Data were analyzed using SPSS (version 21) for Windows. After determining the normal

distribution in both groups, mean comparison test (t-test) was performed in two independent groups, and effect size was estimated. To compare self-efficacy scores and possible related factors in the intervention group, Kruskal-Wallis test was used. A p-value of less than 0.05 was designated as statistically significant.

Results

Attrition and completion

All participants completed the study questionnaires, and comparing their numbers during the study revealed that they remained in their groups until the end of the study.

The mean age of the mothers in the intervention group was 27.37 (\pm 2.54) years and in the control group it was 28.93 (\pm 2.36) years. Other baseline characteristics of the intervention and control groups are revealed in Table 1.

Table 1
Baseline characteristics of study participants

Variables	Control group	Intervention group
Age, (Mean and SD)	28.93(2.36)	27.37(2.54)
Education, (Frequency, %)		
Elementary	10 (16.7%)	6 (10.6%)
High school	25 (41.6%)	21 (36.8%)
University degree	25 (41.7%)	30 (52.6%)
Occupation (Frequency, %)		
Housewife	52 (86.7%)	49 (81.7%)
Employee	7 (13.3%)	9 (15%)
Others	0	2 (3.4%)
Family Income (Frequency, %)		
Low	14 (24.1%)	15 (25.9%)
Intermediate	43 (74.1%)	43 (74.1%)
High	1 (1.7%)	0
Lactation Duration (Frequency, %)		
< 6 month	1 (1.7%)	2 (3.3%)
6–12 month	4 (6.7%)	4 (6.7%)
> 12 month	38 (63.3%)	39 (65%)
forgotten	17 (38.3%)	15 (25%)
Spouse support for breastfeeding (Frequency, %)		
Very high	31 (51.7%)	33 (59.9%)
High	27 (45%)	22 (37.9%)
Intermediate	2 (3.3%)	3 (5.2%)
Low	0	0

Evaluation of primary outcome

Comparing the mean scores of mothers in the control and intervention groups did not indicate a significant difference in the pre-test scores ($p = 0.37$). But comparing the mean of post-test scores in the intervention group (60.40 ± 4.92) and the control group (50.10 ± 7.60) showed a statistical significant difference ($p < 0.001$) (Table 2).

Table 2

Comparison of the mean self-efficacy scores in control and intervention groups before and after the intervention

Study groups	Self-efficacy, before intervention score Mean(SD)	Number	Standard Error of Mean	P-value	Self-efficacy after intervention score Mean(SD)	Number	Standard Error of Mean	P-value	Effect size(d_{ppc2} sensu) and 95%CI
Control group	52.72(8.55)	60	1.19	0.37	50.10(7.60)	60	0.99	< 0.001	0.99* (1.19–2.02)
Intervention group	54.23(8.96)	60	1.15		60.40(4.92)	60	0.63		

*Effect size was calculated according to Morris 2008 (17), (d = 0.2 be considered a 'small' effect size, 0.5 represents a 'medium' effect size and 0.8 a 'large' effect size)

Given the amount of effect size ($d = 0.99$; 95% CI = 1.19–2.02) it appears that there is a high-level relationship between the applied intervention and the level of self-efficacy among study participants.

Secondary outcomes

Kruskal-Wallis test was used to compare self-efficacy scores and other possible related factors such as education, occupation, family income, lactation duration and spouse support for breastfeeding in the intervention group (Table 3). The results demonstrate that the level of maternal education has a significant relationship with the level of breastfeeding self-efficacy ($p = 0.02$). The other factors did not show any noticeable correlation with breastfeeding self-efficacy.

Table 3
Comparison of self-efficacy scores of the intervention group in view of possible related factors

Factors	Intervention group	p- value*
Education, (Frequency, %) Elementary High school University degree	6 (10.6%) 21 (36.8%) 30 (52.6%)	0.02
Occupation (Frequency, %) Housewife Employee Others	49 (81.7%) 9 (15%) 2 (3.4%)	0.42
Family Income (Frequency, %) Low Intermediate High	15 (25.9%) 43 (74.1%) 0	0.71
Lactation Duration (Frequency, %) < 6 month 6–12 month > 12 month forgotten	2 (3.3%) 4 (6.7%) 39 (65%) 15 (25%)	0.71
Spouse support for breastfeeding (Frequency, %) Very high High Intermediate Low	33 (59.9%) 22 (37.9%) 3 (5.2%) 0	0.65
*P-value was calculated by Kruskal-Wallis test		

Discussion

The aim of this study was to investigate the effect of educational mobile messaging in combination with face-to-face counseling on primiparous mothers' breastfeeding self-efficacy.

The results showed that the designed instant messaging program yielded higher self-efficacy scores among the primiparous mothers who received this intervention as compared to the ones who had solely received standard breastfeeding training.

The results also revealed that there was a significant difference between the mean self-efficacy scores of the two groups under study.

The results of this randomized controlled trial are in line with the results of the other studies dealing with the effect of educational interventions on self-efficacy (15,18–20). It demonstrates the effectiveness of self-efficacy training in encouraging mothers to breastfeed, which can improve the duration and quality of breastfeeding.

These training programs can be delivered in a variety of ways, ranging from face-to-face counseling to new teaching methods such as technology-based training programs, including mobile text messaging in this study. This intervention is almost cost-free and can easily be incorporated into routine training programs.

We also found that the applied intervention significantly increased self-efficacy levels in mothers with higher levels of education than those with lower levels.

Educational level can directly improve mothers' breastfeeding experiences by influencing their lifestyle and enhancing their quality of life. This result is consistent with the study by Ansari, et al., which reported a significant relationship between breastfeeding self-efficacy and the level of education in breastfeeding mothers (21).

We also examined other factors that could potentially affect the results of the study, including career status, income level, duration of breastfeeding, and spouse support for breastfeeding. The results showed that these variables had no significant effect on maternal self-efficacy. Some studies have examined the influence of some of these variables including family, job, and spouse support, as the predictors of breastfeeding (22–24).

For future research, the authors recommend using larger sample sizes, sampling from more diverse health centers, and analyzing the influential factors over a longer period of time.

Conclusions

The results of the present study revealed that breastfeeding counseling by text, audio and video messages may increase maternal self-efficacy and breastfeeding duration especially among mothers with higher levels of education. The pilot study provided valuable information for testing the feasibility of randomized controlled trials in future studies with larger sample sizes and more participant diversity.

Declarations

Ethics approval and consent to participate

The design of the study was approved by the Ethics Committee of Shiraz University of Medical Sciences. (Code of Ethics Committee: IR.SUMS.REC.1395.201) All study participants were fully informed about the nature of the study. They signed the informed consent form after receiving a thorough explanation about the study and ensuring that they understood the objectives.

Consent for publication

Not Applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interest

The authors declare that they have no competing interests.

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Authors' contributions

1. Study concept and design: M.M, SH.Z, L.B, AR.S
2. Acquisition of data: M.M, SH.Z
3. Analysis and interpretation of data: SH.Z, AR.S, M.M
4. Drafting of the manuscript: M.M, AR.S, L.B, SH.Z
5. Critical revision of the manuscript for important intellectual content: M.M, AR.S, L.B
6. Statistical analysis: AR.S, M.M
7. Administrative, technical, and material support: L.B, M.M, AR.S
8. Study supervision: M.M

All authors have read and approved the manuscript.

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Figures

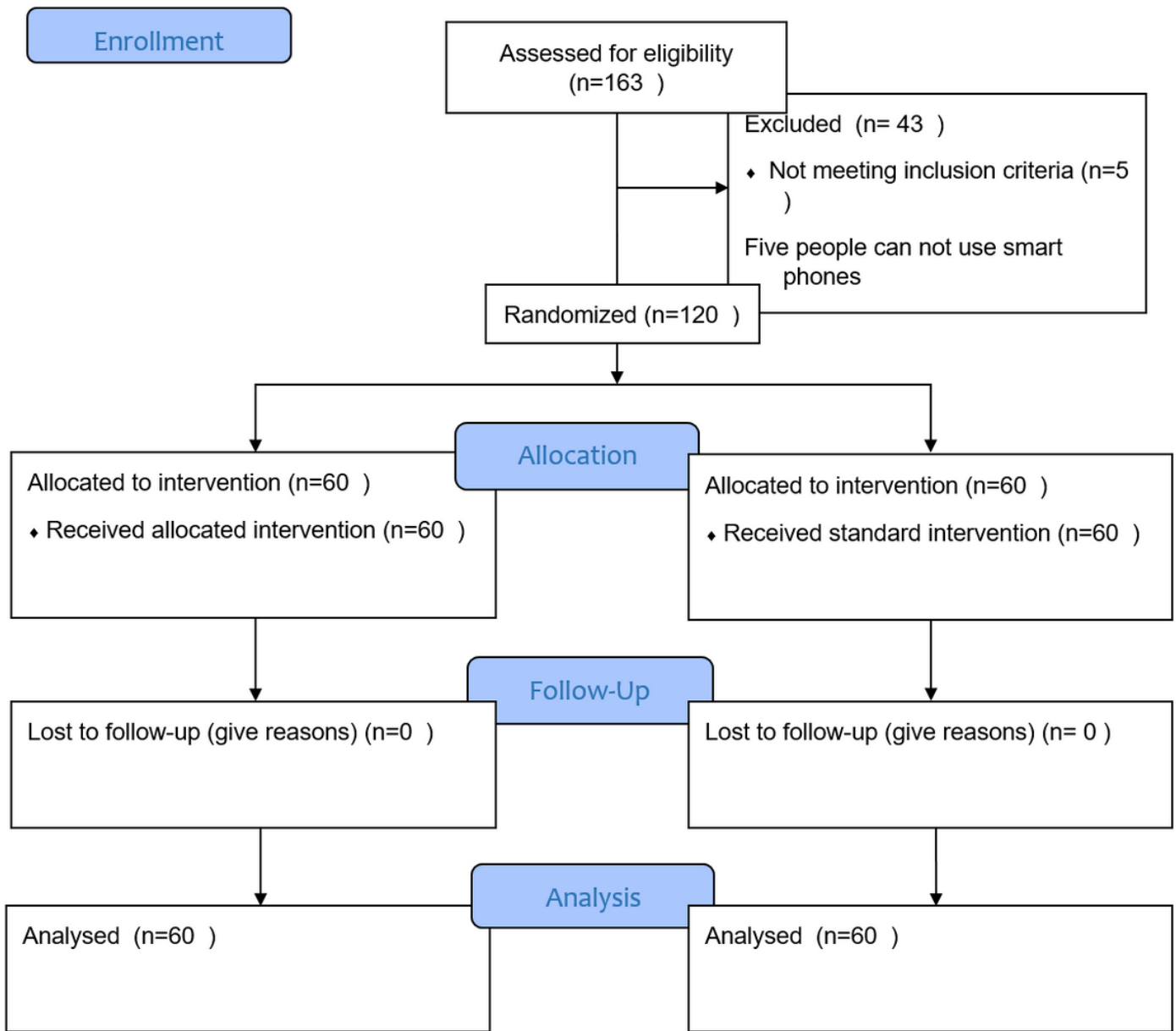


Figure 1

CONSORT 2010 Flow Diagram

Supplementary Files

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- [CONSORT2010Checklist.doc](#)