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The Effect of Education through Cyberspace on Continuation of Breastfeeding in Primiparous Women in Shahroud City in 2018: a Clinical Trial

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Abstract

Background: *Mother milk provides many health benefits to both the mother and baby. The aim of this study was to investigate the effect of education through cyberspace on continued breastfeeding in primiparous women.*

Methods: *This experimental study was performed on 65 primiparous women aged 28-32 weeks who were referred to Shahroud childbirth preparation centers in 2018. There are four centers in Shahroud city which provide "Preparation for childbirth" education for primiparous mothers. We randomly (random numbers methods) selected two centers of the four health centers for the subjects in the experimental group recruitment. For the control group, we selected mothers who gave birth to their child in Bahar hospital and received routine care. Also, after selection of centers, we selected convenience sampling method for recruitment of both experimental and control groups after obtaining the informed consent. The experimental group received a training program based on continuous breastfeeding in 7 sessions, 45-60 minutes. We use a demographic and continuous breastfeeding questionnaire for collecting the variables. The data were analyzed by SPSS21 using independent t-test, paired t-test, and covariance test. Statistical significance level was set at 0.05.*

Results: *The mean and standard deviation of continuation of breastfeeding were 28.72 ± 3.96 before intervention and 31.54 ± 4.5 after intervention in the experimental group and 31.21 ± 3.41 before intervention and 29.43 ± 2.91 after intervention in the control group. Therefore, the duration of continued breastfeeding was longer in the experimental group (Pvalue = 0.02) compared to the control group post intervention.*

Conclusions: *According to the results, education through cyberspace is recommended as an easy, safe, inexpensive and effective intervention for controlling and resolving lactating mothers' problems.*

Keywords: Education, Cyberspace, Pregnant women, Breastfeeding.
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Introduction

Mother's milk is a highly complex biological fluid and appropriate ideal food for neonates. It can provide an optimal nutritional balance for the neonate both qualitatively and quantitatively.[1] Also, breastfeeding promotes the immune system of the baby and protects it against the intensity and frequency of infections. It also leads to receptive system development, social growth, and increased IQ in infants.[2] Prolonging the lactation period increases these benefits while reduced lactation and early discontinuation of exclusive breastfeeding exert some detrimental effects on the health of the baby, mother, and community.[3] According to UNICEF, 1.5 million children die annually due to lack of breastfeeding.[4] Therefore, according to WHO recommendations, breastfeeding should be continued for two or more years. American Academy of Children (American Pediatric Academy) recommends that the neonate should be fed exclusively with mother's milk during the first 6 postnatal months.[5] Despite the emphasis on exclusive breastfeeding in the first 6 months after birth and the universal attempts made to publicize it, this rate is %37 worldwide, %36 in the Eastern Mediterranean region, and %10 in Australia.[6] In recent years, the statistics on exclusive breastfeeding have decreased in Iran such that according to Iranian statistics, the rate of exclusive breastfeeding until 6 years of age was estimated at %44 in 2000 reaching %27 in 2004,[7] again diminishing to %23.1 in 2011. The reduced rate and duration of exclusive breastfeeding that has presently turned to a health problem in developing countries may lead to 2-3 times increase in malnutrition, infection and mortality in neonates.[8] On the other hand, various factors may affect the mother's decision for breastfeeding or its continuation including mother's knowledge of lactation, support systems, mother's economic, social, and cultural status, and healthcare personnel's skills.[9] Furthermore, mothers need to acquire knowledge and correct skills, relaxation and peace, and self-confidence for successful lactation; hence, nutritional education and counseling on breastfeeding will promote lactation and increased breastfeeding.[10] It may be assumed that breastfeeding is a natural process that can be done by any mother without any help or previous preparation. Meanwhile, it should be pointed out that in lower mammals, the timing, duration, and method of breastfeeding are controlled by genetic factors. Yet, in higher mammals such as humans, all these issues require a model and education.[11] Thus, selecting the educational method is an important factor in effective education. The teaching materials for breastfeeding can be readily developed using various teaching methods.[12] Further, the use of educational media plays a significant role in education and establishment of positive beliefs in the community. Additionally, education and distribution of information in the community are among the parameters that encourage the community's positive attitude towards breastfeeding.[13] Given that education in the field of healthcare has changed in recent years, it may be asserted that the teaching approaches and in turn the learning styles have been transformed especially through cyberspace.[14] Consequently, education via cyberspace would be very effective for mothers, addressing a greater audience.[15] Hence, watching a video program on the related topic via cyberspace would form the topic in the addressee's mind with longer durability and could increase the speed of learning.[16] In this way, learning is accomplished more easily and conveniently

with greater accessibility so that women can access the teaching material any time during the day or night, while travelling, or in the office. They can even do so when they have no time for referring to healthcare providers for education.[17] Considering the role of education in continued breastfeeding, it appears that provision of an educational program for mothers is of utmost significance. Investigations show that the onset of neonatal feeding is triggered by breastfeeding; yet, the continuation of breastfeeding, especially exclusive breastfeeding is somehow overlooked in some cases, an issue that may predispose the neonates to malnutrition, infection and mortality. Thus, this study explored the application of educational interventions based on cyberspace to encourage continued breastfeeding through increasing the mothers' knowledge on exclusive breastfeeding for dealing with their neonate.

Materials and Methods

This experimental classic study was carried out on 70 primiparous women participating in delivery preparation classes in Shahroud, Semnan, Iran in 2018. Using Gpower statistical formula and Kohan paper[3] with an effect size of 0.78, test power of 85%, level of significance of 0.05, the sample size was first measured as 31 persons in each group; also considering dropouts, the researcher determined it as 33 subjects in each group. There are four centers in Shahroud city which provide "Preparation for childbirth" education for primiparous mothers. We randomly (random numbers methods) selected two centers of four health centers for subject recruitment in the experimental group. For the control group, we selected mothers who had their delivery in Bahar hospital and received routine care. Also, after selection of centers, we selected convenience sampling method for recruitment of both experimental and control groups after obtaining the informed consent. Accordingly, 33 members were in the experimental group and 32 in the control group (table 1). The primiparous women meeting all inclusion criteria entered the study after signing informed written consent. The inclusion criteria were: being primiparous, normal neonate (normal weight, full term gestation and lack of any abnormality), no medical contraindication for lactation for both the mother and child, and not participating in any other educational classes similar to the classes in this study. The participants were excluded from the study if they were absent in the educational classes for more than one session. The data were collected by a demographic questionnaire including "age, occupation, parental literacy level, neonatal weight at birth, and neonatal weight at 4 months", and a researcher-made questionnaire with 11 items and a 4-point Likert scale in which each item could obtain 0-3 points for assessing continued breastfeeding. This questionnaire was developed by Parsa et al.[15] Item 1 pertained to feeding method, items 2-10 dealt with unconscious accidental education of breastfeeding during social and familial communication through interpersonal interactions in healthcare centers, and item 11 addressed the frequency of breastfeeding per day. The reliability of this inventory, first developed by Parsa et al., was tested and estimated at Cronbach's $\alpha = 0.78$.

We only blinded the interviewers and, due to the type of study, we could not blind the participants. In the experimental group, 7 educational sessions each lasting 45-60 min were held for primiparous women at 28-32 weeks of gestation in the form of delivery preparation classes (table 1). This educational package included topics such as advantages of breastfeeding, commencing lactation, and education of breast-feeding. The package was provided by Iranian Ministry of Health, Treatment, and Medical Education as pedagogic electronic files. The topics covered in the sessions were as follows: session 1: introduction of members to each other and investigation of their problems, session 2: administering the pretest to the case and control groups, session 3: explaining the advantages of breastfeeding and education of breastfeeding to pregnant women at 28-38 weeks of gestation, session 4: membership of the case group in the virtual groups, session 5: commencing the breastfeeding education via cyberspace groups, session 6: education and answering the questions on breastfeeding through cyberspace group; in case of problems with breastfeeding, the mother was referred to an experienced technician, and session 7: reviewing the previous discussions and providing strategies for follow-up of the taught materials. No sessions were held for the control group. They only received the ordinary instructions in the facility. Both questionnaires were completed again by the participants at the end of the intervention. The researcher was present at the time of completing the questionnaires to resolve any ambiguities in the items. This study was registered with IRCT20181208041889N1 at the Iranian clinical trial site and was approved by the Ethics Committee of Chalus University of Medical Sciences with the IR.IAU.CHALUS.REC.1397.005 identification code. The study samples were explained that they could withdraw from the research at any time. The research units were assured that the information obtained would be confidential. Also, while explaining the goals of the research, informed written consent was taken from the samples for participation in the study and there was a right to withdraw from each stage of the study. All women in the control group were also consulted to restart the exclusive nutrition by the researcher immediately after completing the questionnaire. We only blinded the interviewers while, due to the type of study, we could not blind the participants. Finally, the collected data were analyzed by SPSS21 using descriptive statistics (tabulation of data, mean, and SD (figure 1)) and inferential statistics (paired t-test for before-after comparison of each group, independent t-test for comparing experimental group and control groups. Also, we used analysis of covariance for controlling the effects of covariates in the model. Statistical significance was set at 0.05 and all analyses were performed as two-sided.

Results

The present study began on 70 first-delivery mothers. From among the 70 mothers who were initially enrolled, 2 mothers of the experimental group (leaving the group) and 3 mothers of the control group (changing the phone number) withdraw the study. Finally, the data of 65 mothers (33 in the experimental and 32 in the control group) were analyzed. In the statistical analysis, the two groups did not show any significant difference in maternal age, husbands' age, mothers' occupation, husband's job and education. However, the level of education of mothers' husbands in the two groups showed a significant difference (Pvalue = 0.049). Also, there was no significant difference in the weight of children in the two groups before the intervention (Pvalue = 0.2); however, after the intervention, the weight of children at 4 months showed a significant difference between the two groups (Pvalue = 0.01) (table 2).

Table 1. Educational session's process

Educational steps	Educational objectives	Duration of education
Step 1	Introduction of members to each other and their problems (trainer, participants, program framework (case group).	45-60 min
Step 2	Setting program goals, obtaining informed written consent, and administering the pretest to the case and control groups.	45-60 min
Step 3	Explaining the advantages of breast-feeding and education of feeding to pregnant women at 28-38 weeks of gestation (case group).	45-60 min
Step 4	Membership in the virtual group (case group).	45-60 min
Step 5	Commencing of breast-feeding feeding education via cyberspace groups: sending pedagogic files by the Ministry of Health, animations on breast-feeding lasting less than 10 min including method of milk saving, advantages of breast-feeding, etc., a 3-5-min animation per week submitted to the study units, phone question-and-answer sessions to respond to mothers' problems in breast-feeding and referral to an experienced technician (case group).	45-60 min
Step 6	In this study, there is no need for mothers' attendance after delivery for education. Mothers' questions on breast-feeding are answered by the cyberspace group and if necessary, they are referred to a technician with 25 years of experience who is employed at Breast-feeding Clinic of the city for presenting in person.	45-60 min
Step 7	Reviewing the previous discussions and providing strategies for the follow-up of the taught materials, encouraging mothers for correct decision-making, verbal and non-verbal encouragement of mothers and administration of the post-test (case and control groups).	45-60 min

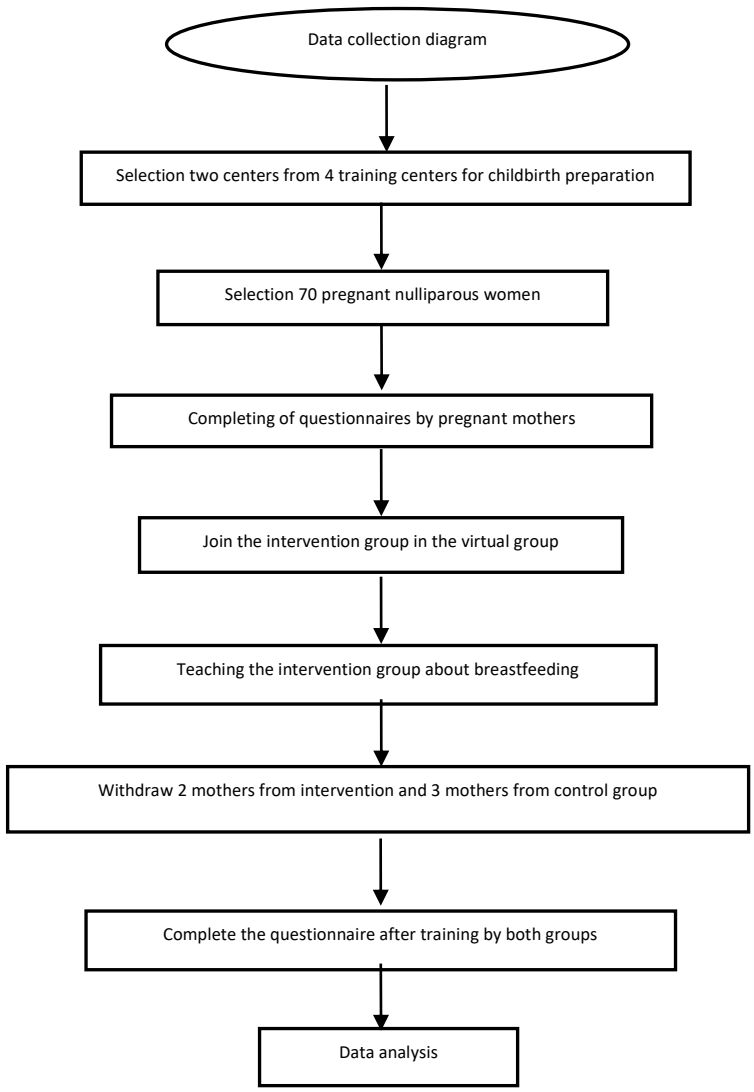

Figure 1. Data collection diagram

Table 2. Comparison of demographics of the study units in both experimental and control groups

Demographics	Groups	Experimental	Control	Pvalue
Mother's age	19-37 years	27.96 ± 4.19	28.68 ± 4.96	P = 0.50*
Husband's age	25-37 years	31.66 ± 3.34	32.4 ± 4.11	P = 0.42*
Mother's occupation	Employed	10	26	P = 0.24**
	House keeper	23	6	
Husband's occupation	Employed	10	6	P = 0.19***
	Day worker	3	0	
	Unemployed	20	26	
Mother's literacy level	Primary school	0	2	P = 0.06***
	High school	7	13	
	Academic degree	26	17	
Husband's literacy level	Primary school	0	1	P = 0.049***
	High school	10	18	
	Academic degree	23	13	
Infant's weight	At time of birth	3.11 ± 0.40	2.94 ± 0.64	P = 0.20*
	At 4 months of age	7.07 ± 0.38	6.29 ± 0.67	P < 0.01*

* T Student test
** K Square
*** Fisher exact test

The results of the study showed that the extent of breastfeeding continuation before the study in the experimental group was 28.72 ± 3.96 and 31.54 + 4.5 after the intervention, with the t-test being significant before and after the intervention (Pvalue = 0.02, t = -2.31). In the control group, the amount of breastfeeding continuation before and after the intervention was 31.21 + 3.45 and after the intervention 29.43 ± 2.81, where paired-sample T-test showed a significant difference between pre- and post-intervention (t = 2.87, Pvalue = 0.007). In the control group, we observed a decrease in lactation continuation. Independent-sample T-test indicated that there was a significant difference between the two groups before and after the intervention (Pvalue < 0.009). After the intervention, there was a significant difference between the two groups (Pvalue = 0.03) (table 3).

Table 3. Comparison of mothers' continued breast-feeding before and after intervention

Group	Experimental	Control	Pvalue
Time			
Before	28.72 ± 3.96	31.21 ± 3.41	0.009
After	31.54 ± 4.5	29.43 ± 2.81	0.003
Change (after-before)	2.81 ± 6.94	-1.78 ± 3.50	0.001

Analysis of covariance was performed to adjust the covariates that were not the same in the two groups. After running several models, the best model has been presented in table 4. The final result indicated that the variables of husband's education level and Infant's weight are not significant as an effect modifier or confounder (table 4).

Table 4. Regression analysis adjusting for significant covariates in bassline

Source	Type III sum of squares	df	Mean square	F	Pvalue
Corrected model	132.31[a]	5	26.47	1.78	.130
Intercept	4027.08	1	4027.08	271.26	.000
Self-efficacy score before intervention	58.98	1	58.98	3.97	.051
Husband's education	.95	2	.47	.03	.969
Group	83.44	1	83.44	5.62	.021
Husband's education * group	1.46	1	1.46	.10	.755

Discussion

Given the importance of lactation, especially in primiparous women, this study investigated the effect of education through cyberspace on continued breastfeeding in Iranian primiparous women. The results revealed a significant increase in the rate of continued breastfeeding in the case group and a significant decrease in this variable in the control group suggesting the positive effect of education through cyberspace on increasing primiparous women's awareness of and attitudes towards the benefits of breastfeeding. In line with our study, Sakkaki and Kheirkhah (2012) showed that the rate of exclusive breastfeeding was significantly greater in neonates of mothers who were supported by their husband, mother, or mother-in-law.[16] Further, the findings by Arshad et al. (2017) suggested that educational programs, social support, and the presence of appropriate conditions of community for breastfeeding influence neonatal feeding during the first postnatal trimester.[17] Additionally, Su et al. (2007) found that education provided before delivery during pregnancy (through video packages, pamphlets and consultation) and relatives' support after delivery both significantly increased the rate of exclusive breastfeeding until 6 months after labor compared to routine care.[1] In this regard, Shahbazi Sighaldeh et al. (2015) stated that holding collective classes reduces the quality of education; yet, individualized education at mothers' bedside can be the most suitable method of breastfeeding education after delivery.[18] In the study by Sharifirad (2014), the lactating mothers' performance score was significantly greater after education compared to before education.[19] The findings by Akaberian (2015) indicated no significant difference between the two groups regarding the duration of exclusive breastfeeding in the follow-up visits. Nonetheless, breastfeeding problems such as insufficient mother's milk, inappropriate baby feeding positions, and breast problems like pain and mastitis decreased significantly compared to controls.[20] The results of the study by Gholamitabar et al. (2019) suggested that education during gestation, supportive systems, as well as pre- and postnatal consultation for greater breastfeeding affect breastfeeding such that the neonates in the case group enjoyed breastfeeding more frequently. The study also indicated that the education improved the constructs leading to improved performance of mothers in the case group compared to controls.[21] In this regard, the results of the study by Froehlich et al. (2013) demonstrated that education leads to increased and improved performance. Further, increasing the information and knowledge of participants in educational courses along with promoting mothers' motivation for

continuing breastfeeding despite the problems are influential.[22] Additionally, the results the study by Nilsson et al. (2017) carried out in 9 hospitals in Denmark suggested that educating mothers before discharge from hospital was associated with greater continuation of breast-feeding in the case group.[23] Bich et al. (2014) dealt with educating the couples in routine visits after delivery in healthcare facilities and found that mothers in the case group had a better performance in breastfeeding of neonates aged 4-6 months compared to controls.[24] Amini et al. (2016) reported that education based on health beliefs model improves breastfeeding performance in primigravida women.[4] Also, the studies by Parsa et al. (2016) indicated that breastfeeding consultation affects self-efficacy and continuation of breastfeeding. Hence, breastfeeding may be continued via increasing mothers' feeling of self-efficacy.[15] Mohammadi Zeidi et al. (2014) also suggested that educational intervention leads to increased number of primiparous mothers that breast-fed their neonates until 4 months after delivery (Pvalue < 0.05).[25] In addition, the results by Masoumi et al. (2015) indicated that teaching breastfeeding to mothers and providing them with consultation would encourage continued breastfeeding and improve their lactation performance.[26] In the study by Abdeyazdan et al. (2015), the mean exclusive breastfeeding was significantly greater in women who received an educational program before delivery compared to those who used it after labor.[11] Further, in the study by Liu et al. (2017), education and consultation in breastfeeding increased the self-efficacy of mother and enhanced exclusive breastfeeding at 4-8 weeks post-delivery.[27] Contrary to our results, the findings by Dehkordi et al. (2012) suggested that exclusive continued breastfeeding was not significantly different between the case and control groups at the end of the first month (Pvalue = 0.7).[28] Ultimately, Pisake Lumbiganon et al. observed that education had no effect on improving women's breastfeeding.[29] This is not consistent with our findings.

One limitation of the present study was the small sample size and reluctance of some mothers for participation. Since these variables may affect the results negatively limiting their applicability and generalizability, it is recommended that future studies use greater sample size along with other supportive measures to explore the effect of education on continuation of breastfeeding. Finally, educational interventions may be considered seriously for less experienced primiparous mothers in healthcare policy-makings.

Considering the results of this study and the effects of education through cyberspace on continued breastfeeding, it may be postulated that implementation of educational programs via cyberspace to improve breastfeeding after delivery is not effective since mothers in most hospitals undergo much suffering due to difficult labor and inappropriate hospital conditions and also due to labor fatigue. All these lead to incorrect and insufficient learning of breastfeeding and lack of strong belief in continuing the breastfeeding. Consequently, it is mandatory to hold face-to-face consultation sessions and phone follow-ups until 4-6 months' post labor and encourage mothers to breast-feed their neonate. On the other hand, since this demands the presence of skilled personnel, time, and costs, the program should be implemented by hospitals affiliated to the healthcare system. Thus, it is recommended that support groups be formed and inexperienced young primiparous mothers be introduced to these groups during the gestational period or at the time of discharge from hospital. It is also advisable to conduct future studies with longer follow-ups. Prolonged intense follow-up can aid mothers in perceiving the long-term effects of this method. Ultimately, our findings indicated that education through cyberspace to motivate continued breastfeeding in primiparous women has been effective after intervention. Hence, the use of education is an effective intervention for primiparous women.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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