Clinical and Experimental Health Sciences

# Effects of Postpartum Web-Based Breastmilk and Breastfeeding Education: A Quasi-Experimental Study

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**Received:** 03.05.2023 **Accepted:** 19.07.2024

**ABSTRACT**

**Objective:** The aim of the study was to examine the effect of web-based breastfeeding education applied to postpartum primiparous women on breastmilk, breastfeeding knowledge and self-efficacy.

**Methods:** This quasi-experimental study was conducted with 73 participants (experimental group=37; control group=36) at the Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital in Istanbul, Türkiye. The study was at postpartum services between June 2018 and October 2019. The participants in the experimental group attended the internet-based breastmilk and breastfeeding education program; where as those in the control group received routine care. Data were collected pre and post training using the demographic information form, Breastmilk and Breastfeeding Knowledge Test and Breastfeeding Self-Efficacy Scale.

**Results:** Our result showed that there was no significant difference found between the experimental and control groups on post-training on Breastmilk and Breastfeeding Knowledge Test ($p>.05$). On the other hand, there was significant difference between the experimental and control groups on post-training on Breastfeeding Self-Efficacy Scale ($p<.05$).

**Conclusion:** The data obtained showed that web-based breastmilk and breastfeeding education increased breastfeeding and breastmilk knowledge in the experimental group, however this increase was not at a level that would make a difference between the groups. But it had a positive effect on breastfeeding self-efficacy. In nursing practices, web-based breastmilk and breastfeeding education can be used to increase breastfeeding self-efficacy in women in the postpartum period.

**Keywords:** Breastfeeding, breast milk, distance education, online learning, postpartum period

## 1. INTRODUCTION

Breastfeeding ensures the mental, physical, psychological and social development of the baby. It protects babies from diseases, it is easily digested and is a reliable food source. In order for babies to get enough breastmilk, women should be supported in breastfeeding (1, 2). According to the results of the Turkey Demographic and Health Survey (TNSA) the rate of breastfeeding after birth, in the first hour is 71.00%, and the exclusive breastfeeding percentage in the first 6 months is 41.00 % (3).

One of the most important steps to take is to encourage mothers to breastfeed and support breastfeeding is to educate women on correct breastfeeding technique, breast care and how to deal with breastfeeding problems, and increase their self-efficacy (2, 4). Breastfeeding self-efficacy is the determination which a woman feels during the breastfeeding process. It has been reported that the breastfeeding duration of mothers who has high breastfeeding self-efficacy is longer than the others (4).

Since 1991, the Promotion of Breast Milk and Baby-Friendly Health Organizations Program has been implemented in Türkiye. Within the scope of the program, mothers are encouraged to breastfeed within the first hour, mothers and babies stay in the same room, health workers are trained about breastfeeding regularly, and training booklets, brochures, etc. are given to mothers in hospitals as education materials (5). In the current literature, it is stated that group



*DOI: 10.33808/clinexphealthsci.1287748*

or individual breastfeeding and breastfeeding trainings in the antenatal or postpartum period are not effective enough in maintaining breastfeeding (6), and that current education technologies (message, teleconference, e-mail, web-based education, etc.) has been reported to increase effective breastfeeding and contribute to the country's economy (7,8).

Developing internet technology has accelerated the access to information. Web-based education method which icludes enriched with videos, animations, spot information and pictures rather than verbal narration is preferred more than traditional education methods, especially by individuals under the age of 30. The rate of women using computers and internet in Türkiye is reported to be 76.30% (9).

Web-based breastfeeding education may be an effective option for nurses (6). Web-based breastfeeding education, which is independent of time and place and based on the individual's learning needs, can enable women to access information independently and quickly in the postpartum period. In studies using web-based education, it was determined that breastfeeding knowledge and attitudes of mothers increased (6).

This can be the first study to examine the effect of web-based breastfeeding education programme in Türkiye. The study was carried out to determine the effect of web-based breastfeeding training applied to postpartum primiparous women on breastfeeding knowledge and self-efficacy.

*Hypotheses*

$H^1$. After the training, the participants in the experimental group will be higher Breast Milk and Breastfeeding Knowledge Scores and Breastfeeding Self-Efficacy Scores than before the training.

$H^2$. After the training, the Breast Milk and Breastfeeding Knowledge Scores and Breastfeeding Self-Efficacy Scores of the participants in the experimental group will be higher than the control group scores.

## 2. METHODS

### *2.1. Design*

Design of this study was quasi-experimental.

### *2.2. Participants*

The study was conducted with postpartum mother between June 2018 and October 2019 at the Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital in Istanbul, Türkiye.

The inclusion criteria set as: being primipara, over the age of 18, giving birth to a singleton and mature baby, at least primary school graduate, having a smart phone or a computer, having no problems that may cause breastfeeding problems in breast evaluation (crack, redness, drooping), wound, etc.) and not having received breastfeeding education in the antenatal period. 100 mothers who met our criteria were involved in the study.

**Sample Size Calculation**

Sampling was calculated by using the $P^{0.05}$ power analysis program. It was determined that web-based breastfeeding education would create a 30.00 % variation between the knowledge scores of the women in the experimental and control groups, and that at least 31 people should be included in each group in the sample calculation made by accepting the power of the study as 80.00 % and $\alpha$= .05.

In our study, convenience sampling method was used (10). One hundred motheres who met the sampling criterias were divided into two groups. The experimental group had 50 women and the control grup consisted of 50 women. 27 participants (Experimental Group=13; Control Group=14) whose babies were admitted to the intensive care unit, did not enter the training modules and did not fill in the forms withdrew/were excluded from this study. Hence, a total of 73 participants (Experimental Group=37; Control Group=36) completed the study (Figure 1. Research Scheme).

### *2.3. Data Collection and Instruments*

#### *2.3.1. Demographic Information Form (DIF)*

The researchers prepared the DIF based on a review of the literature. The DIF included 12 questions designed to evaluate the participants' (6,11) sociodemographic characteristics (age, educational status, employment status, etc.), birth and infant characteristics (week of birth, birth weight of the baby, how many minutes after birth she started breastfeeding, etc.).

#### *2.3.2. Breastmilk and Breastfeeding Knowledge Test (BBKT)*

There are 10 multiple-choice questions in the Breast Milk and Breastfeeding Knowledge Test, framed by the researchers in line with the current literature (12). The test aims to evaluate the participants' level of knowledge about breast milk and breastfeeding. A minimum of 0 and a maximum of 100 points can be gained from the scale.

After the BBKT was prepared, it was submitted for expert review. When the test's difficulty index (p) was evaluated, it was determined that 5 questions were very easy (50%), 2 questions were very difficult (20%), and 3 questions were acceptable (30%). When the discriminative index was evaluated, 8 items were found to be excellent (80%), 1 item was acceptable (10%), and 1 item was weak (10%). The KR-20 reliability coefficient of the test was calculated to be 0.61, and it was determined that our measurement tool is quite reliable (13).

#### *2.3.3. Breastfeeding Self-Efficacy Scale (BSES)*

It was firstly created by Dennis to determine women's breastfeeding self efficacy (14). It had a total of 33 items. Nonetheless, a 14-item short form version was evolved to be used instead of the 33-item form (14). The Turkish version of the scale were accomplished by Aluş Tokat, Okumuş, and Dennis (15). To each item of the 5-point likert-type scale based on self-report, participants respond as 1= Not at all sure, 2= Not so sure, 3= Sometimes I am sure, 4= I am sure, or 5=Very sure. An increase in the score obtained is interpreted as an increase in breastfeeding self-efficacy. The score of the breastfeeding self-efficacy scale differs from 14 to 70 points. When the participant has between 14 and 32 points, she is advised to have low efficacy; between 33 and 51, moderate; and between 52 and 70, high efficacy. In our study, the Cronbach's Alpha value was found to be 0.86 in our study (15).

#### *2.3.4. Web Based Breastmilk and Breastfeeding Education Program*

The program consisting of three modules was prepared by the researchers by using the current literature (6,12) and two experts were asked for their opinions. Adjustments were made in line with expert recommendations. Then, a pilot study was conducted with five postpartum women and their feedback on the "Web-Based Breastmilk and Breastfeeding Education Program" was received. In line with the feedback, the "Web-Based Breastmilk and Breastfeeding Education Program" was finalized. The final version of the program was integrated into the website www.kadinvehastaliklari.com, prepared by one of the researchers. Participants can enter the program with their own computer, mobile phone, etc. with the user name and password given to them was able to login using devices.

Module 1 (Breastmilk and Breastfeeding); the content of breast milk, the factors that increase and decrease breastmilk, the benefits of breastmilk for the baby, etc. topics are included. The module consists of 27 audio slides and visual materials.

Module 2 (Effective Breastfeeding); it consists of a total of 12 voiced slides and 2 videos showing the correct breastfeeding positions about effective and correct breastfeeding, the frequency and duration of breastfeeding, breastfeeding positions, the mother's nutrition, sleep and rest during breastfeeding, and the situations that the mother should pay attention to before and after breastfeeding.

Module 3 (Breastfeeding and Breast Problems); it consists of 22 audio slides, 1 video and visual material that includes breastfeeding and breast problems encountered during breastfeeding and solution suggestions.

After completing one module, the participant was able to move on to the next module. After the participant completed the training modules, the researchers received a completion e-mail from. Participants could enter the modules as many times as they wanted.

#### *2.3.5. Web Based Breastmilk and Breastfeeding Education Program Brochure*

The brochure included information on how to enter the web-based breastfeeding training program, the content of this program, how the modules progressed, how to watch videos and animations, and basic information about the research process.

*Procedure*

1. Researchers introduced themselves, introduced in the purpose of the study, and invited mothers to participate in this study. Women who agreed to engage in this study signed a consent form.
2. Participants completed the DIF, BBKT and BSES scales.
3. Participants in both the experimental and control groups attended rousetine breastfeeding training by a breastfeeding nurse before discharge.
4. The participants were given a Web-Based Breastmilk and Breastfeeding Education Program Introductory Brochure in the experimental group. If the participant did not enter the program within two days, a reminder was sent by sending an e-mail.
5. After 15 days, the experimental group participants who completed the Web-Based Breastmilk and Breastfeeding Training were sent to the e-mails of the BBKT and BSES transferred to Google Drive and asked to fill in. Simultaneously, the post-test was administered to the participants in the control group.

### *2.4. Data Analysis*

Data was analysed using the IBM SPSS 22 software. Data normality was decided using the Kolmogorov-Smirnov test. Independent groups t-test ve paired sample t-test were used in the analysis of data that conformed to normal distribution. Chi-square test was used for comparison of categorical data. An ANCOVA test was used to determine the differences between the experimental and control group in order to measure the effectiveness of the web-based breastmilk and breastfeeding education program. Statistical significance was accepted as $p < .05$.

### *2.5. Ethical Considerations*

Permission for the trial was gained from the Ethics Committee of Ministry of Health Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital Clinical Research Clinical Research Ethics Committee (23.12.2016 /178). All women enrolled in the study were ask to read and sign the informed consent form. The study was guided by the criteria set by the declaration of Helsinki.

## 3. RESULTS

The mean age of the mothers in this study was 27.80±5.30 (min:19-max:42) years. There were no differences found in mothers' age, employment status, gestational week, mode of delivery, birth weight of the baby and time of first breastfeeding between the groups (p > .05). Only statistically significant difference was found in the educational status of the participants between the two groups (p< .05) (Table 1).

It was found that the post-training BBKT scores of the experimental group participants improved statistically significantly compared to the pre-training scores (pre-training= 51.89±20.39, post-training=61.35±19.74) (p<.05). The pre-training and post-training BBKT scores of the control group were similar (p>.05) (Table 2).

The pre-training BBKT scores of the control group (62.77±13.22) were statistically higher than the experimental group (51.89 ± 20.39) (p<.05). In order to find the actual conclusion of breastmilk and breastfeeding education on BBKT, the post-training BBKT scores of the experimental and control groups were compared with the ANCOVA test. The independent variable was the study group, and the dependent variable was postpartum 15th day BBKT scores. Participants' scores pre-training of BBKT as covariate. After settling for pre-training scores, there was no significant difference between the two groups on post-training on BBKT (p>.05) (Table 2).

It was found that the post-training BSES scores of the experimental group participants improved statistically significantly compared to the pre – training (pre-training= 52.89±9.72, post-training= 60.58±8.66, respectively, p<.001). Pre-training and post-training BSES scores of the control group were similar (p>.05) (Table 2).

The post-training scores of the two groups were compared with the ANCOVA test. The independent variable was the study group, and the dependent variable was the post-training BSES scores. Mothers' scores pre-training of BSES as covariate. The suitability of the data for analysis was evaluated with the Custom Hypothesis Test. After settling for pre-training scores, there was a difference between the both groups on post-training on BSES (p<.05) (Table 2).

***Table 1.*** *Comparison of demographic, obstetric and breastfeeding characteristics of the participants in the groups*

| | Experimental Group (n=37) | | Control Group (n=36) | | t | p |
|---|---|---|---|---|---|---|
| **Characteristics** | **X ± SD** | | **X ± SD** | | | |
| **Maternal age (year)** | 28.45 ± 6.23 | | 27.16 ± 4.26 | | 1.03 | .30 |
| **Gestational week** | 37.72 ± 2.68 | | 38.33 ± 2.17 | | -1.05 | .29 |
| **Newborn birth weight (gr)** | 2919.18 ± 467.31 | | 3136.11 ± 651.81 | | -1.63 | .10 |
| **First breastfeeding time (min.)** | 240.67 ± 544.87 | | 429.58 ± 1012.20 | | -0.99 | .32 |
| | **n** | **%** | **n** | **%** | **$X^2$** | **p** |
| **Educational Status** | | | | | | |
| • Primary education | 19 | 51.40 | 7 | 19.40 | 8.1 | ***.01*** |
| • High Scool | 9 | 24.30 | 14 | 38.90 | | |
| • University | 9 | 24.30 | 15 | 41.70 | | |
| **Employment status** | | | | | | |
| • Working | 5 | 13.50 | 12 | 33.30 | 4.01 | .056* |
| • Not working | 32 | 86.50 | 24 | 66.70 | | |
| **Mode of delivery** | | | | | | |
| • Cesarean Section (S/C) | 21 | 56.80 | 19 | 52.80 | 0.11 | .73 |
| • Vaginal delivery (VD) | 16 | 43.20 | 17 | 47.20 | | |

*SD. Standard Deviation; Independent groups t-test, Chi-square test, *Fisher Exact Test*

***Table 2****. Comparisons of participants' BBKT and BSES scores*

| | | Pre-training | | Post-training | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Scores** | **Groups** | **X ± SD** | **t ; $p^1$** | **X ± SD** | **t ; $p^2$** | **t ; $p^3$** | **F** | **ηp 2** | **$p^4$** |
| **BBKT Scores** | **Experimental Group (n=37)** | 51.89 ± 20.39 | -2.71; *.009** | 61.35 ± 19.74 | -2.14; .83 | 2.22; *.032** | 0.29 | 0.00 | .86 |
| | **Control Group (n=36)** | 62.77 ± 13.22 | | 62.22 ± 14.56 | | .17 ; .86 | | | |
| **BSES Scores** | **Experimental Group (n=37)** | 52.89 ± 9.72 | -1.35; .17 | 60.58 ± 8.66 | 1.46; .14 | -4.90; *.00** | 5.70 | 0.76 | *.019** |
| | **Control Group (n=36)** | 55.83 ± 8.73 | | 57.66 ± 8.39 | | -1.32; .19 | | | |

*BBKT. Breastmilk and Breastfeeding Knowledge Test; BSES. Breastfeeding Self Efficacy Scale*

*p1 = Comparison of pre-training scores between groups (Independent sample t test)*

*p2 = Comparison of post-training scores between groups (Independent sample t test)*

*p3 = Comparison of pre-training and post-training scores within the group (Paired sample t test)*

*p4 = ANCOVA*

**p< .05*

The participant rate with high BSES score in both experimental and control groups were similar (Experimental group n=26, 70.30%; Control group n=27, 75.00 %). After the training, while the participant rate with high BSES scores increased in the experimental group (n=32, 86.60%), only one participant in the control group had an increase in the BSES score (n=28, %77.80) (Table 3).

***Table 3.*** *Distribution of BSES scores of participants in groups*

| | Pre-training | | Post-training | |
|---|---|---|---|---|
| | n | % | n | % |
| **Experimental Group** | | | | |
| • Low BSES (14-32) | 1 | 2.70 | - | - |
| • Modarate BSES (33-51) | 10 | 27.00 | 5 | 13.50 |
| • High BSES (52-70) | 26 | 70.30 | 32 | 86.60 |
| **Total** | **37** | **100.00** | **37** | **100.00** |
| **Control Group** | | | | |
| • Low BSES (14-32) | 1 | 2.80 | 1 | 2.80 |
| • Modarate BSES (33-51) | 8 | 22.20 | 7 | 19.40 |
| • High BSES (52-70) | 27 | 75.00 | 28 | 77.80 |
| **Total** | **36** | **100.00** | **36** | **100.00** |

*BSES. Breastfeeding Self Efficacy Scale*

## 4. DISCUSSION

This may be the first study in Türkiye to evaluate the effect of web-based breastmilk and breastfeeding training applied to postpartum primiparous women on breastfeeding knowledge and self-efficacy based on the current literature. Findings from the study revealed that web-based breastmilk and breastfeeding education increased breastfeeding self-efficacy, but had no effect on BBKT scores. Our findings are important in terms of demonstrating that web-based breastmilk and breastfeeding training can be a new approach that can be used by healthcare professionals to increase breastfeeding self-efficacy.

The homogeneity of the groups was evaluated considering that web-based breastmilk and breastfeeding education might be affected by variables such as maternal age, educational status, employment status, week of birth, mode of delivery, birth weight of the baby and time of first breastfeeding (16). It was determined that the other characteristics of the participants in the groups were similar except for the education level, and other studies in the literature were similar to our findings (11,17,18).

The education level of the women in the experimental group was found to be lower than that of the control group. It may be a result of the women in the experimental group showing more interest in web-based breastfeeding education in order to obtain information. Because as the education level of women increases, it becomes easier for them to access information by using different sources. Our finding may be important in showing that web-based breastmilk and breastfeeding education can be an important option for women with low education levels.

There are several studies reveal that the two weeks following the birth is an important period for breastfeeding. Women suffer from lack of milk, swelling of breasts, babies crying, baby refusal to drink milk, fatigue, insufficient support, etc. which may cause stoping breastfeeding (19). Breastfeeding education increases mothers' knowledge, attitudes and self-efficacy, increasing both the percentages of initiation of breastfeeding and the duration of breastfeeding (16,20-22). Studies that used breastfeeding education, short motivational interview, and short-term training methods have also shown that the level of breastfeeding knowledge increases (6). Internet-based educations are one of the effective ways to deliver a good intervention.

In our study, it was determined that the post-training BBKT scores and BSES scores of the participants in the experimental group of web-based breastfeeding education increased statistically significantly compared to the pre-training, confirming our H1 hypothesis. When the effect of web-based breastfeeding training on BBKT was tested with ANOVA, which is one of the advanced analysis methods; no statistically significant difference found between the post-training BBKT scores of the experimental and control groups and our H2 hypothesis was not accepted.

Web-based breastfeeding training provides an environment that women can learn by taking responsibility regardless of time and place during education. The videos, pictures, animations, and written information it contains have shown in many studies to increase women's knowledge of breastfeeding (6, 23, 24). Unlike other's study, in our study, it was determined that web-based breastmilk and breastfeeding education increased the breastfeeding knowledge level of the experimental group compared to the pre-training, but there was no significant difference between the groups. In support of our study finding, it was reported in Abuibdihal's (2021) study that web-based breastfeeding education was not effective at the desired level in increasing the level of knowledge (11). The difference between the studies may be caused by many factors such as the content difference of the web-based breastfeeding education programs used, and the duration of the trainings.

In fact, with web-based training, women can learn breastfeeding knowledge by working on their own. They can arrange the learning program themselves, as there are no time and place restrictions. The self-learning process can positively affect self-efficacy and this can encourage breastfeeding practice. It has been reported that the breastfeeding duration of mothers with high breastfeeding self-efficacy is longer than others (4).

When the effect of web-based breastmilk and breastfeeding education on BSES was tested with ANCOVA; there was a statistically significant difference found between the post-training BSES scores of the two groups so our H2 hypothesis was accepted. Similar to our findings, it was found that breastfeeding education increased BSES in studies where different education methods were applied (24-26). Different from Abuibdihal's study, the significant increase in BSES in

our study can be explained by the fact that the studies were conducted with different cultures (11).

### Limitations

Our study was conducted in one hospital. The findings cannot be generalized to all women. The study was planned as randomized. However, randomization could not be achieved due to case losses. The high number of case losses is unfortunately a general problem of research conducted in our country. Another limitation of the study is that the education levels of the participants in the experimental and control groups were not similar. One of the limitation of the study is that we do not have information about how many times participants entered the web-based breast milk and breastfeeding training, how long they took to complete and how many times they repeated the modules. It is recommended that future researchers add software to their websites that will allow them to evaluate them.

## 5. CONCLUSION

The data we obtained showed that web-based breastmilk and breastfeeding education increased breastfeeding and breastmilk knowledge in the experimental group, however this increase was not at a level that would make a difference between the groups. But it had a positive effect on breastfeeding self-efficacy. With the rapid increase in the use of technology, nurses have to adapt to new teaching methods and use them in nursing care. In nursing practices, web-based breastmilk and breastfeeding education can be used to increase breastfeeding self-efficacy in women in the postpartum period. It is recommended that future researchers conduct randomized controlled, multicenter studies with more participants on the subject.

***Acknowledgements:*** *The authors would like to thank the pregnant women who were willing to participate in the study.*
***Funding:*** *The authors declared that this study has received no financial support.*
***Conflicts of interest:*** *The authors declare that there are no conflicts of interest.*
***Ethics Committee Approval:*** *This study was approved by Ethics Committee of Ministry of Health Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital Clinical Research Clinical Research Ethics Committee (Approval date: 23.12.2016; Number:178)*
***Peer-review:*** *Externally peer-reviewed.*
***Author Contributions:***
*Research idea: ÖCG*
*Design of the study: ÖCG, BY, FEY, ATB, BYD*
*Acquisition of data for the study: BY, FEY, ATB, BYD*
*Analysis of data for the study: ÖCG*
*Interpretation of data for the study: ÖCG, EK*
*Drafting the manuscript: ÖCG, EK*
*Revising it critically for important intellectual content: ÖCG, EK*
*Final approval of the version to be published: ÖCG, EK*

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**How to cite this article:** Can Gürkan Ö, Karali E, Yağci B, Emanet Yayla FN, Tamtaş Bayin A, Yilmaz Dada B. Effects of Postpartum Web-Based Breastmilk and Breastfeeding Education: A Quasi-Experimental Study. Clin Exp Health Sci 2024; 14: 676-682. DOI: 10.33808/clinexphealthsci.1287748