ORIGINAL RESEARCH ARTICLE

The effect of web-based breastfeeding education given to primiparous pregnant women: a randomised controlled study

Elif Velioğlu[1] and Nurdan Demirci[2]

Marmara University, Institute of HealthSciences, Istanbul-Turkey[1]; Department of Nursing Obstetrics and Gynaecology Nursing Department, Istanbul-Turkey[2]

For Correspondence: Email: *elifff.ilgun@hotmail.com*

Abstract

This was a randomised controlled study to investigate the effect of web-based breastfeeding education given to primiparous pregnant women on postpartum breastfeeding. The study included a total of 120 primiparous pregnant women, including control group (n:60) and experimental group (n:60). The study was conducted in a district in northern Turkey. Only the pregnant women in the experimental group received web-based breastfeeding education. Descriptive statistics and independent two-sample t-test analysis were used to analyse the data and to compare the demographic characteristics and scale scores according to the groups. 'IOWA Infant Feeding Scale', "Edinburgh Depression Scale", "IMDAT", "Breastfeeding Self-Efficacy Scale", "Perception of Insufficient Milk Scale" and "Breastfeeding Motivation Scale" were administered to the experimental and control groups on the 7th day, 3rd month and 6th month after birth. Several factors, including breastfeeding motivation, breastfeeding self-efficacy, and the perception of milk sufficiency for the baby, were significantly different between the groups (p<0.001). A significant difference was found between the two groups in terms of mothers breastfeeding their babies within the first half hour after birth. All of the mothers in the experimental group breastfed their babies within the first half hour. Breastfeeding self-efficacy and motivation levels in the experimental group showed a statistically significant increase when compared to both pre-training levels and the control group. (Clinical Trials Number: NCT06443801). *(Afr J Reprod Health 2024; 28 [12]: 61-72).*

Keywords: breastfeeding; nursing; web-based education; pregnancy; breastfeeding success

Résumé

Il s'agit d'une étude randomisée et contrôlée visant à étudier l'effet d'une formation à l'allaitement en ligne dispensée à des femmes enceintes primipares sur l'allaitement post-partum. Un total de 120 femmes enceintes primipares, comprenant un groupe de contrôle (n:60) et un groupe expérimental (n:60), ont été incluses dans l'étude. L'étude a été menée dans un district du nord de la Turquie. Seules les femmes enceintes du groupe expérimental ont reçu une éducation à l'allaitement en ligne. Des statistiques descriptives et un test t indépendant à deux échantillons ont été utilisés pour analyser les données et comparer les caractéristiques démographiques et les résultats de l'échelle en fonction des groupes. L'échelle d'alimentation infantile IOWA, l'échelle de dépression d'Édimbourg, l'échelle IMDAT, l'échelle d'auto-efficacité de l'allaitement, l'échelle de perception d'insuffisance de lait et l'échelle de motivation de l'allaitement ont été administrées aux groupes expérimental et témoin le 7e jour, le 3e mois et le 6e mois après l'accouchement. De nombreuses conditions telles que la motivation à l'allaitement, l'auto-efficacité en matière d'allaitement et l'idée que le lait est suffisant pour le bébé ont montré une différence significative entre les groupes (p<0,001). Une différence significative a été constatée entre les deux groupes en ce qui concerne l'allaitement par les mères de leur bébé dans la première demi-heure suivant la naissance. Toutes les mères du groupe expérimental ont allaité leur enfant dans la première demi-heure. Les niveaux d'auto-efficacité en matière d'allaitement et de motivation pour l'allaitement dans le groupe de formation ont montré une augmentation statistiquement significative par rapport au groupe de préformation et au groupe de contrôle. (Numéro d'essai clinique : NCT06443801). *(Afr J Reprod Health 2024; 28 [12]: 61-72).*

Mots-clés: allaitement; soins infirmiers; formation en ligne; grossesse; réussite de l'allaitement

Introduction

It is vitally important that breastfeeding occur for the health of the infant, the mother, the family and for society in general[1].

According to both the United Nations Children's Fund (UNICEF) and the World Health Organisation (WHO) infants should solely be breastfed until they are six months old, starting within one hour of birth, and breastfed from the

sixth month onwards and until they are at least two years of age and beyond, provided that additional nutrients are included[2,3].

The report prepared under the Global Breastfeeding Collective by WHO and UNICEF states that, only about 44% of infants aged between 0 and 6 months were breastfed exclusively between 2015 and 2020 worldwide. WHO aims to increase these rates to 50% by 2025 and 70% by 2030[4,5].

According to a report prepared under the Global Breastfeeding Partnership, which is an initiative by UNICEF and WHO to increase breastfeeding rates globally, no country fully meets breastfeeding standards. The situation is similar in Turkey as well. National data for Turkey in 2018 show that 41% of children who were under six-months were breastfed exclusively and that 71% were introduced to breastfeeding in the first postnatal hour[6,7].

Pregnancy provides an ideal time to prepare women for breastfeeding. Women should receive breastfeeding education during pregnancy to successfully initiate and sustain breastfeeding after the birth of their child[8,9]. Receiving training on why and how to breastfeed when they are pregnant leads to an increase in women's understanding of this topic and also reinforces positive breastfeeding practices[10].

Today, technology is increasingly used in breastfeeding education and motivation and it is more and more recommended that web-based approaches be employed[11].

In fact, social and physical distancing measures implemented to minimise the transmission of the Covid 19 pandemic, which broke out worldwide, have been largely effective in the continuation of lactation support using the interne[12]. To utilize web-based education, individuals need to have technological tools such as cell phones and computers and be able to use them[13]. In Turkey, as of 2023, 97.7% of adults use cell phones, 97.2% of which are smartphones, and 95.4% use the internet[14].

Web-based technologies, mobile applications, and computer-based e-technologies can create a broader network to provide support to the community when traditional healthcare facilities are insufficient or inaccessible[15]. Studies have shown a noticeable trend towards more web-based options that provide personalized information to support women in their decisions regarding breastfeeding. Providing web-based support to mothers who needs help and support with breastfeeding has the potential to positively impact breastfeeding outcomes.

In the view of all these data, the effectiveness of web-based breastfeeding education in the antenatal period will increase even more. The fact that women have a source of education that is accessible at any time, i.e. a source such as a website, will be the greatest guide in the problems they face in the postpartum period[16].

Hypotheses of the Study:

H1: Web-based breastfeeding education positively affects mothers' infant feeding attitudes.

H2: Web-based breastfeeding education increases mothers' breastfeeding motivation.

H3: Web-based breastfeeding education reduces mothers' postnatal depression.

H4: Web-based breastfeeding education positively affects mothers' self-efficacy concept

H5: Web-based breastfeeding education increases mothers' perception of breast milk adequacy.

H6: Web-based breastfeeding education positively affects coping with breast problems in mothers.

In the literature, we aimed to find solutions to the situations that mothers have the most difficulty in coping with during breastfeeding. Based on this, we aimed to see the maximum positive effect of web-based breastfeeding training on postpartum breastfeeding while establishing our hypotheses.

Methods

The study is a randomised controlled trial. This study was reported in accordance with CONSORT (Consolidated Standards of Reporting Trials) guidelines. (Figure 1)

Research participants

The population of the study consisted of pregnant women followed up in the Family Health Centres of a district in the north of Turkey. The minimum sample size to be taken in the study was determined by performing Power (Gpower) analysis under the repeated measures analysis of variance test to find the significant difference between the groups. In the analysis, $\alpha=0.05$ and $f=0.6$ (medium effect size) were taken and 90 cases were found sufficient with
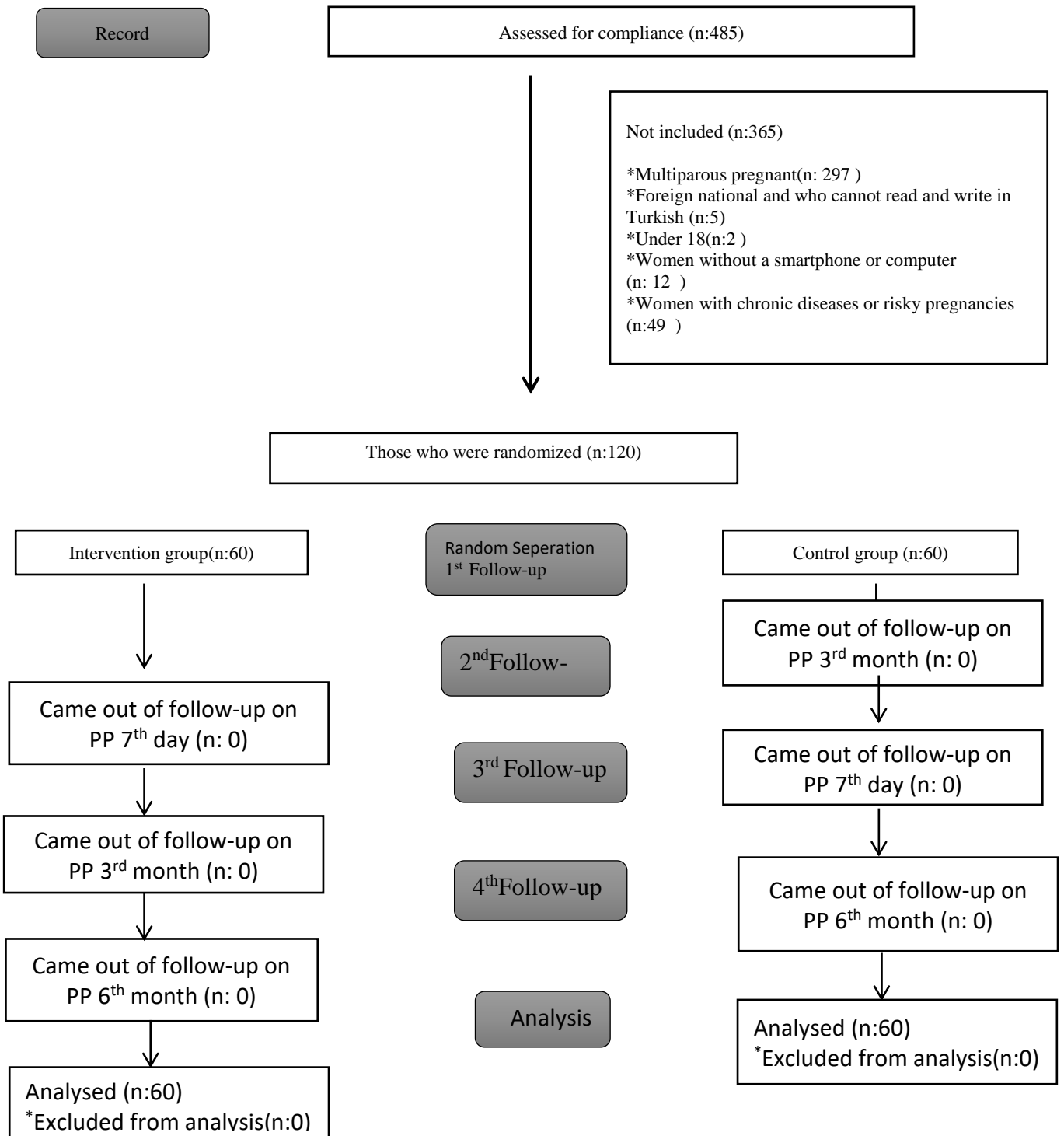
Record

Assessed for compliance (n:485)

Not included (n:365)

*Multiparous pregnant(n: 297)
*Foreign national and who cannot read and write in Turkish (n:5)
*Under 18(n:2)
*Women without a smartphone or computer (n: 12)
*Women with chronic diseases or risky pregnancies (n:49)

Those who were randomized (n:120)

Intervention group(n:60)

Random Seperation
1st Follow-up

Control group (n:60)

Came out of follow-up on PP 7th day (n: 0)

2nd Follow-

Came out of follow-up on PP 3rd month (n: 0)

Came out of follow-up on PP 3rd month (n: 0)

3rd Follow-up

Came out of follow-up on PP 7th day (n: 0)

Came out of follow-up on PP 6th month (n: 0)

4th Follow-up

Came out of follow-up on PP 6th month (n: 0)

Analysed (n:60)
*Excluded from analysis(n:0)

Analysis

Analysed (n:60)
*Excluded from analysis(n:0)

Figure 1: CONSORT flow diagram

80% power. Considering the loss of follow-up, the sample number was increased to 120. 120 pregnant women were included in the study, 60 pregnant women in each group. When the sample size was 120 cases, the power of the analysis was checked again. The power of the study was calculated using 'G. Power-3.1.9.2' software. As a result of the analysis applied to a total of 120 people, 60 in the Intervention Group (IG) and 60 in the Control Group (CG), the effect size was found to be 0.8 at $\alpha= 0.05$ level and the power of the study calculated as post-hoc was calculated as 0.95. The inclusion criteria were being a primiparous pregnant woman, being between 24 and 36 weeks pregnant, having no risks with the pregnancy, having a primary school education at least, having internet access, owing and being able to use a smartphone/computer and volunteering to take in the research. The exclusion criteria were having chronic diseases, not speaking Turkish, not being able to answer the data collection forms and scales, and potentially having communication problems in the first six months of their child's life. The study included women with 24-36 weeks of pregnancy who were followed up in Family Health Centres in a district between 1 March 2023 and 01 March 2024. Fig 1

Data collection tools

Pregnant Data Collection Form: It is a form prepared by the researcher including socio-demographic characteristics. In the form consisting of 9 questions, there are questions such as the woman's age, occupation, whether she wants pregnancy and whether she goes to regular follow-ups.

Postnatal Information Form: The form to be applied to the mothers after birth consisted of 6 questions. It includes questions such as how the baby was delivered, the baby's weight at birth, and when breastfeeding began.

IOWA Infant Feeding Attitude scale: This was developed by De La Mora and Russell in 1991[17]. The objective of this scale is to evaluate women's attitudes towards breastfeeding and to predict the length of breastfeeding and mothers' preference for breast milk or formula to feed their infants. The scale is a 5-point Likert scale. Of the 17 items in the

scale, 9 include positive statements regarding breastfeeding and 8 items contain positive statements about formula feeding. Items related to formula feeding are reverse scored (1=5, 2=4, 5=1). A minimum score of 17 points (indicating a positive attitude towards bottle feeding) and a maximum score of 85 points (indicating a positive attitude towards breastfeeding) are obtainable from the attitude scale. Women who have a total score between 70-85 are seen as being predisposed to breastfeeding, those between 49-69 are seen as being undecided in their feeding preference, and those between 17-48 are seen as being predisposed to formula feeding. In the Turkish adaptation of the scale the Cronbach's alpha internal consistency coefficient was 0.71.

Edinburgh Depression Scale: Edinburgh Postnatal/Postpartum Depression Scale (EPDS) is a self-assessment scale developed to assess depression in the postnatal period and to measure the level and severity of depression[18]. It was adapted into Turkish by Engindeniz et al.[19]. The scale consists of a total of 10 questions. Each question provides a four-point Likert-type measurement. Items in questions 3, 5, 6, 7, 8, 9 and 10 of the scale are scored as 3, 2, 1, 0 and show gradually decreasing severity. Items in questions 1, 2 and 4 of the scale score 0, 1, 2, 3 and show increasing severity. The total minimum score is 0, while the total maximum score is 30.

IMDAT Scale (Scoring System for the Amount of Milk Received by the Infant): This scale was designed by Feride Yiğit in 2008 in accordance with the literature in order to evaluate the amount of breast milk the infant receives. The section contents of the form were abbreviated to form the word IMDAT in Turkish to evoke the baby's request for help. The form consisted of five sections: urine amount, breast condition, stool amount, weight and satisfaction. The characteristics of each section were evaluated on the basis of 0,1,2 points and 10 full points were accepted as the best breast milk intake and 7 and below were accepted as inadequate breast milk intake[20].

Breastfeeding Self-Efficacy Scale: This scale was designed by Dennis and Faux to evaluate the breastfeeding self-efficacy levels of mothers.

Aluş Tokat conducted the Turkish validity and reliability study of the scale[21,22]. The Breastfeeding Self-Efficacy Short Form is a 5-point Likert-type scale. The minimum score is 14, while the maximum score is 70. A higher score represents higher breastfeeding self-efficacy[23]. The difference between the prenatal form and the postnatal form of the scale is the use of 'future tense' in the scale items. In the original study of the scale, the Cronbach's alpha value of the prenatal form was 0.87 and the Cronbach's alpha value of the postnatal form was 0.86[24].

Inadequate Milk Perception Scale: This scale was designed by McCarter-Spaulding in 2001 and the Turkish validity and reliability study was conducted by Gökçeoğlu[25,26]. The scale includes six questions. The first question is not scored. The remaining questions of the scale are aimed at measuring the perception of inadequacy of breast milk. The questions require scoring between 0-10. While '0' indicates that the milk is perceived as completely insufficient and '10' indicates that it is perceived as completely sufficient, a minimum score of 0 and a maximum score of 50 can be obtained from our scale. In the original scale, the Cronbach's alpha value was 0.81.

Breastfeeding Motivation Scale (BMS): The BMS was designed by Peleg et al. in 2015 based on self-determination theory. The Turkish validity and reliability of the scale was conducted by Şahin and Özerdoğan[27,28]. The scale has a 4-point Likert-type structure in order to evaluate each item that determines the situation to be measured. In the primiparous breastfeeding motivation scale, which consists of a total of 23 items, 2 items have a negative and 21 items have a positive meaning. Accordingly, the lowest obtainable score is 23, while the highest is 92. The values obtained in the study were close to 92, indicating high motivation. In the Turkish validity and reliability study of the scale, the Cronbach's alpha value was found to be 0.887[28].

Breastfeeding Breast Problems Form: This form was created by the researchers after reviewing the literature. In order to reveal the breast problems experienced during breastfeeding period, it examines the following areas: fullness/softness of the breasts, pain in the breasts, colour of the breasts, temperature of the breasts, milk flow from the breasts, nipple problems, nipple size, nipple discharge/infection parameters.

Intervention and Control group

Pregnant women attending family health centres and who met all the required criteria were placed randomly in either the control or experimental group.

The first interview was conducted in family health centres. Informed consent was obtained from the pregnant women in the experimental and control groups. The website was explained to the pregnant women in the experimental group and a username-password was given to access the website. The contact information of the responsible researcher was shared and it was made clear to the women that they were able to reach out and receive advice and counselling if they experienced any problems. No information regarding the website was provided to the control group. The Pregnant information form, IOWA infant feeding attitude scale and antenatal breastfeeding self-efficacy scale were administered to both groups.

The 2nd follow-up interview was conducted on the 7th day after delivery. Postnatal information form, IMDAT scale, Inadequate milk perception scale, Edinburgh depression scale, Breastfeeding motivation scale and Breastfeeding breast problems form were applied to women in the experimental and control groups.

The third follow-up interview was conducted at the 3rd month after delivery. IMDAT, Inadequate milk perception scale, Postnatal breastfeeding self-efficacy scale, Edinburgh depression scale and Breastfeeding breast problems form were applied to the women in the experimental and control groups.

The 4th follow-up interview was conducted at the 6th month after delivery. IMDAT, Inadequate milk perception scale, Postpartum breastfeeding self-efficacy scale, Edinburgh depression scale, IOWA infant feeding scale, Breastfeeding motivation scale and Breastfeeding breast problems form were applied to women in the experimental and control groups.

Women in the experimental group continued to use the website as often as they wanted during the study.

Randomization

Primiparous pregnant women were placed randomly in the experimental group and the control group. Randomization was conducted using the https://www.graphpad.com/quickcalcs/randomize2/ program, which generated a list of random numbers. An independent statistician determined, before the study, the group assignment for those participants who met the inclusion criteria; this was done on the basis of their order of admission to the outpatient clinics. Randomisation was not based on any characteristics.

Website training modules

The educational content on the website is structured into 4 modules, to be completed sequentially. The module contents are as follows:
Module 1: Importance of Breastfeeding, Characteristics of Breast Milk, Benefits of Breastfeeding for Mother and Baby.
Module 2: Changes in the Breasts during Pregnancy, How is Breast Milk Produced?, How Should Breast Care from Pregnancy Onwards?, What is Composition of Breast Milk?, What is Differences of Breast Milk and Other Milks?, How Can I Increase Breast Milk ?
Module 3: When to Start Breastfeeding?, How Often to Breastfeed?, How to Place the Baby on the Breast?,What are the Breastfeeding Positions?, How to Know When the Baby is Full?
Module 4: What are Common Breastfeeding Issues and Solutions?, What is Insufficient Milk Supply?, Methods for Expressing Breast Milk, Breast Milk Storage Conditions.

When the participants in the experimental group logged into the website for the first time, they were given a username and password and explained how to use the website. In case of any problems, an e-mail address and telephone number were shared for counsellor support. Users were able to enter the training modules in order. After the 1st module was completed, a short test was applied at the end of the training and the participant who scored enough points could proceed to the second module training. Modules could be followed sequentially and participants who did not get enough points from the end-of-module test were forced to repeat the module.

Statistical analysis

The IBM SPSS 27 program was used to evaluate the data[29]. Kurtosis and skewness values were used to examine the assumption of normality within and between groups. The values obtained were observed to be in the range of '±3' and were thus normally distributed[30-33]. Independent two sample t test was employed for comparing demographic characteristics and scale scores by group. In the examination of categorical demographic characteristics by groups, the chi-square test was employed if all of the expected values observed were greater than 5, and the Fisher exact test was employed if any of the expected values were less than 5[34].

The comparisons of the measurement tools of the experimental and control groups were analysed by independent samples t-test. The comparisons of the measurement tools of the experimental and control groups were analysed by independent samples t-test. In intragroup comparisons of the scale scores obtained after the web-based trainings, dependent samples t-test was employed for two-time data, and the repeated measures variance test was employed for three-time measurements. Multiple comparisons were evaluated using the Bonferroni corrected Z test. The results of these analyses were presented as mean, standard deviation (Mean ± SD), median, minimum and maximum (Median (Min- Max)) for quantitative data and as frequency (n) and percentage for categorical data. The statistical significance level was considered as 'p<0.05' in all calculations and interpretations.

Ethical considerations

Permission to conduct the research was obtained from the Clinical Research Ethics Committee of Kastamonu University on 11 January 2023 (Decision No: 2023-KAEK-3) and from Kastamonu Health Directorate on 28 February 2023

(Decision no: E-44008972-929). The study was registered in ClinicalTrials.gov (registration number: NCT06443801). Data were gathered from the primiparous pregnant women followed up in Kastamonu Taşköprü Family Health Centres between 1 March 2023 and 1 March 2024.

The purpose and content of the research were explained verbally to the women. Furthermore, all the women in both groups gave their voluntary consent in written form, and permission was received to use all the scales employed in data collection. The women were informed of their right to discontinue their participation in the research at any time.

Results

The average age of the women in the experimental group was 27.15±3.87 the average age of those in the control group was 29.87±3.78. When we look at the mean gestational weeks, the women in the experimental group were 31.95±2.95 weeks pregnant, while the mothers in the control group were 30.4±3.55 weeks pregnant.

Table 1 shows that a statistically significant difference was found between the experimental and control groups with regard to age, gestational week, educational status, type of family, employment status, intended/planned pregnancy and regular follow-up visits during pregnancy (p<0.005)

Table 2 shows that when the responses of the experimental and control groups to the postnatal information form on the 7th postnatal day, there was a statistically significant difference between the mothers' breastfeeding status during the first 30 minutes after birth (p<0.001). In addition, a significant difference could be seen between the IMDAT scale, Inadequate milk perception scale, Edinburgh depression scale, Breastfeeding motivation scale and Breast problems form scores between the two groups (p<0.001). The mothers who received web-based breastfeeding training breastfed their babies within the first half hour, had high breastfeeding motivation, were aware that their milk was quite sufficient for their babies and were prepared for breast problems.

When the cronbach alpha values of the scales are analysed, it is seen that the scale of inadequate milk perception is highly reliable and the other scales are quite reliable.

Table 3 shows that there was a significant difference between the experimental and control groups with regard to IMDAT scale scores, insufficient milk perception scores, breastfeeding self-efficacy scores and breast problems scores (p<0.001). When we examined the Cronbach's alpha value of IMDAT scale and breast problems form, it was observed that they were sufficiently reliable. Cronbach's alpha values of inadequate milk perception scale and postpartum breastfeeding self-efficacy scale were found to be highly reliable. The data obtained at the 3rd postnatal month show the positive effect of web-based breastfeeding education given during pregnancy and continued during breastfeeding.

Table 4 shows that there was a significant difference between the experimental and control groups with regard to IMDAT scale scores, insufficient milk perception scores, breastfeeding self-efficacy scores, IOWA Infant feeding scale scores and breastfeeding motivation scores (p<0.001). A statistically significant difference was found between the mean scores of the breastfeeding breast problems scale (p<0.001), and the mean score of the experimental group was 0.4, while the mean score of the control group was 0.97. The reason why women who did not receive web-based breastfeeding education stated that they had almost no breast problems at the 6th month interview was because they stopped breastfeeding early. The data obtained at the 6th postnatal month show the positive effect of the web-based breastfeeding education given during pregnancy and continued during breastfeeding. When the cronbach alpha values of the scales used were examined, it was found that the inadequate milk perception scale, breastfeeding self-efficacy scale, IOWA Infant feeding attitude scale and breastfeeding motivation scale were highly reliable. IMDAT and Breastfeeding breast problems form cronbach alpha values were found to be sufficiently reliable.

Table 1: Investigation of socio-demographic and some pregnancy characteristics by groups

Variables	Experimental group(n=60)	Control group (n=60)	Test sta.	P
Age	27.15 ± 3.84	29.87 ± 3.78	3.906	**<0.001[t]**
Pregnancy week	31.95 ± 2.95	30.4 ± 3.55	-2.601	**0.010[t]**
Education Status				
Primary School	13 (21.7)[b]	1 (1.7)[a]		
Elementary School	12 (20)[a]	21 (35)[a]		
High school	22 (36.7)[a]	20 (33.3)[a]	14.366	**0.002[f]**
University	13 (21.7)[a]	18 (30)[a]		
Family Type				
Nuclear family	53 (88.3)	38 (63.3)	10.231	**0.001[x]**
Extended family	7 (11.7)	22 (36.7)		
Work Status				
No	40 (66.7)	58 (96.7)	-	**<0.001[f]**
Yes	20 (33.3)	2 (3.3)		
Social Security Status				
Yes	60 (100)	60 (100)	-	1.000
Pregnancy Planned?				
No	0 (0)	12 (20)	-	**<0.001[f]**
Yes	60 (100)	48 (80)		
Regular follow-up during pregnancy?				
No	0 (0)	12 (20)	-	**<0.001[f]**
Yes	60 (100)	48 (80)		

t: Independent two-sample t test, x: Pearson chi-square test, f: Fisher's exact test, a-b: No difference between groups with the same letter (Bonferroni corrected Z test), mean ± SD, n (%) '- ': The test statistic could not be calculated

Table 2: Day 7 postnatal data

Variables	Experimental group (n=60)	Control group (n=60)	Test sta.	P	Alfa
Baby Weight (kg)	3.18 ± 0.25	3.18 ± 0.24	-0.074	0.941[t]	
Baby Height (cm)	50.3 ± 0.74	50.22 ± 0.61	0.670	0.504[t]	
Mode of Birth					
Caesarean Section	31 (51.7)	29 (48.3)	0.133	0.715[x]	
Vaginal Birth	29 (48.3)	31 (51.7)			
Anomaly/Disease in the Baby					
No	60 (100)	60 (100)	-	1.000	
Breastfeeding in the first half hour after birth					
No	0 (0)	50 (83.3)	-	**0<.001[f]**	
Yes	60 (100)	10 (16.7)			
Need for Breastfeeding Support/Assistance after childbirth					
No	28 (46.7)	20 (33.3)	2.222	0.136[x]	
Yes	32 (53.3)	40 (66.7)			
IMDAT Scale	7.33 ± 0.8	5.28 ± 0.96	12.750	**<0.001**	0.733
Inadequate Milk Perception Scale	42.63 ± 2.64	34.57 ± 2.37	17.635	**<0.001**	0.955
Edinburgh Depression Scale	5.72 ± 0.85	9.17 ± 3.88	-6.729	**<0.001**	0.733
Breastfeeding Motivation Scale	73.8 ± 6.03	58.5 ± 3.23	7.326	**<0.001**	
Integrated Regulation	35.6 ± 3.08	29.17 ± 1.79	13.989	**<0.001**	0.909

Intrinsic Motivation and Identified Regulation	19.05 ± 1.9	15 ± 1.65	12.479	**<0.001**	0.877
Internalised Regulation-Social Approval	6.4 ± 0.74	5 ± 1.01	8.666	**<0.001**	0.962
Internalised Regulation-Social Pressure	6.35 ± 1.02	4.5 ± 0.77	11.196	**<0.001**	0.912
External Regulation - Additional Benefits	6.4 ± 0.98	4.83 ± 0.38	11.585	**<0.001**	0.697
Breastfeeding Breast Problems Form	3.88 ± 0.9	5 ± 1.84	-4.217	**<0.001**	0.793

t: Independent two sample t test, mean ± SD, IMDAT: Evaluation of the amount of milk received by the infant,

Table 3: Postnatal 3rd month data

Variables	Experimental group (n=60)	Control group (n=60)	Test sta.	p^t	Alfa
IMDAT Scale	9.05 ± 0.81	6.33 ± 1.19	14.623	**<0.001**	0.743
Inadequate Milk Perception Scale	46.58 ± 0.74	28.83 ± 2.02	63.927	**<0.001**	0.990
Postpartum Breastfeeding Self-Efficacy Scale	58.65 ± 1.75	31.72 ± 6.64	30.383	**<0.001**	0.986
Breastfeeding Breast Problems Form	0.4 ± 0.67	3.25 ± 2.17	-9.731	**<0.001**	0.786

t: Independent two sample t test, mean ± SD, IMDAT: Evaluation of the amount of milk received by the infant

Table 4: Postnatal 6th month data

Variables	Experimental group (n=60)	Control group (n=60)	Test sta.	p^t	Alfa
IMDAT Scale	9.52 ± 0.68	6.97 ± 1.21	14.278	**<0.001**	0.727
Inadequate Milk Perception Scale	46.37 ± 0.97	21.42 ± 2.89	63.384	**<0.001**	0.996
Postpartum Breastfeeding Self-Efficacy Scale	57.15 ± 1.4	25.27 ± 1.67	113.492	**<0.001**	0.992
IOWA Infant Feeding Attitude Scale	74.47 ± 2.29	42.95 ± 1.63	86.886	**<0.001**	0.985
Breastfeeding Motivation Scale	81.53 ± 4.87	55.62 ± 4.2	31.197	**<0.001**	
Integrated Regulation	41.78 ± 2.19	28.08 ± 1.79	37.489	**<0.001**	0.969
Intrinsic Motivation and Identified Regulation	19.73 ± 1.82	14.75 ± 2.46	12.609	**<0.001**	0.927
Internalised Regulation-Social Approval	6.42 ± 0.77	4.18 ± 0.6	17.826	**<0.001**	0.891
Internalised Regulation-Social Pressure	6.5 ± 0.68	4.13 ± 0.34	24.173	**<0.001**	0.882
External Regulation - Additional Benefits	7.1 ± 0.6	4.47 ± 0.5	25.993	**<0.001**	0.829
Breastfeeding Breast Problems Form	0.4 ± 0.67	0.97 ± 1.48	-2.697	**0.009**	0.746

t: Independent two sample t test, mean ± SD, IMDAT: Assessment of the amount of milk received by the infant

Discussion

We conducted a randomised controlled study to reveal the how web-based breastfeeding education and training on postpartum breastfeeding self-efficacy affected breastfeeding motivation and success in primiparous pregnant women. Significant differences emerged between the control and experimental groups with regard to breastfeeding self-efficacy, breastfeeding motivation, perception of insufficient milk and depression in the postnatal period.

This shows that web-based breastfeeding education has a positive effect on mothers' breastfeeding success and coping with breastfeeding problems in the postnatal period. In

this context, the aim of the web-based breastfeeding education given during the prenatal period was to give the women confidence in their own ability to breastfeed. Thus, women with high breastfeeding motivation believed that their own milk was sufficient for their babies and experienced the process in the best way by having sufficient knowledge against possible problems during the breastfeeding period[35].

WHO and UNICEF emphasise the importance of early breastfeeding in the postpartum period. It is reported that 42% of all newborns worldwide, mostly in low- and middle-income countries, are introduced to the breast in the first hour of life. In the study examining the effect of breastfeeding trainings given in the prenatal period

on breastfeeding success and breastfeeding self-efficacy, the first breastfeeding hours of the mothers in the intervention group and the mothers in the control group were found to be similar and 82.1% of the mothers breastfed their babies within the first hour[36]. In the results of our study, all of the mothers in the group receiving breastfeeding training breastfed their babies in the first half hour.

With the Covid process, the positive effect of online trainings given to primiparous pregnant women on breastfeeding motivation and self-efficacy perception was observed, especially by utilising current technological developments in breastfeeding education[37].

It was determined in a randomised controlled study that online video-assisted breastfeeding education increased the perception of self-efficacy in primiparous pregnant women[38].

Educational interventions for prenatal breastfeeding increase women's knowledge about breastfeeding and encourage positive breastfeeding practices. Face-to-face, individual/group education, technology-based breastfeeding education interventions increase the level of knowledge about breastfeeding and mothers tend to initiate breastfeeding and continue breastfeeding for longer periods[39,40].

A study evaluating the impact of smartphone-based daily feedback and counselling platforms on breastfeeding through a postnatal multidisciplinary breastfeeding support team reported that the intervention group had higher breastfeeding rates at 6 weeks (96.9% vs. 82.0%) and 3 months (81.4% vs. 69.0%) postpartum compared to the control group[41].

One study found that it was harder to improve breastfeeding self-efficacy in primiparous pregnant women because they were experiencing breastfeeding for the first time, and that the probability of them stopping breastfeeding when faced with difficulties was higher.[9] For this reason, breastfeeding education to be given especially to primiparous mothers during pregnancy is very important in initiating and maintaining breastfeeding and in creating the perception of self-efficacy in the mother.

In the study in which a mobile breastfeeding education programme was developed and applied in the antenatal period, breastfeeding

self-efficacy levels of mothers were found to be higher in the intervention group than in the control group in the follow-ups conducted at the 1st, 4th and 6th weeks after birth[42]. In another randomised controlled study, online breastfeeding counselling given to primiparous mothers had a positive effect on their breastfeeding self-efficacy and depression in the first six months after birth[43].

In this context, providing breastfeeding education during pregnancy would be very useful and, if possible, mothers should continue to be supported, especially in the first six months after birth. Our study and many studies in the literature also emphasise that breastfeeding education should start during pregnancy. Internalisation of the education received while pregnant and the ability to obtain the correct information in the postnatal period will increase the mother's self-confidence, breastfeeding motivation and help her to manage the stress she will feel about breastfeeding.

Conclusion

As a result of the study, the positive effects of the web-based breastfeeding training given to primiparous pregnant women on their breastfeeding self-efficacy, breastfeeding motivation, and postpartum depression were revealed by providing counselling support during the first six months after delivery. By making use of technological developments, the importance of breastfeeding education, especially from pregnancy, should be recognised by everyone.

In future studies, in order to increase the effectiveness of Web-based breastfeeding education programmes, it should be ensured that interventions are implemented both prenatally and postnatally, that they are regular and continuous, that women can access them whenever they want and that there is no time limit.

It is recommended to carry out studies that require continuous support and follow-up starting in the antenatal period and lasting for 2 years after birth.

It may be useful to include people who will support the mother (father, etc.) in the training.

It can be ensured that women who receive training can be brought together within the possibilities to support each other or to make them more stress-free and ready for breastfeeding by sharing information.

Author contributions

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