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The effect of breastfeeding support provided by video call on postpartum anxiety, breastfeeding self-efficacy, and newborn outcomes: A randomized controlled study

Short title: Breastfeeding support provided by video call

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Abstract

Aim: To examine the effects of breastfeeding support given by video call on anxiety, breastfeeding self-efficacy, and newborn outcomes.

Methods: We conducted a randomized controlled experimental trial with 72 women and their babies. Participants were randomly assigned to the intervention (video call) group (VCG: standard care + video call) and control group (CG: standard care). The primary outcomes of this study were the mean postpartum maternal anxiety level and the mean breastfeeding self-efficacy level. The secondary outcome was neonatal outcomes. This study followed the CONSORT–Consolidated Standards of Reporting Trials checklist.

Results: Women in VCG had less anxiety level than the CG at the postpartum 2nd week (mean difference [MD] 25.42, $p = .000$) and 1st month (MD 47.72, $p = .000$). The breastfeeding self-efficacy level of women in the VCG was higher than the CG at the postpartum 2nd week (MD 13.18, $p = .007$) and 1st month (MD 10.1, $p = .001$). The newborns in VCG had higher weight gain and daily breastfeeding frequency than the CG at the postpartum 2nd week (MD 9.64, $p = .001$, MD 2.88, $p = .000$; respectively) and 1st month (MD 47.16, $p = .000$, MD 2.98, $p = .000$; respectively). There were less rate of challenges of breastfeeding, hyperbilirubinemia, and feeding with formula in VCG than the CG at the postpartum 2nd week ($p = .043$, $p = .043$, $p = .039$; respectively).

Conclusions: Breastfeeding support via video calling has positive effects on maternal anxiety, breastfeeding self-efficacy, and newborn health. Postpartum caregivers may benefit from video calling for breastfeeding support.

KEYWORDS

breastfeeding, counseling, midwifery, nursing, postpartum period

1 | INTRODUCTION

Breast milk is the ideal nutrient for babies, and breastfeeding has many benefits for women and infants, including maternal and infant health in terms of immunological, developmental, social, and economic (Giglia & Binns, 2014). Perception of insufficient feeding, mastitis, inflammation of breast, breast tenderness and swelling, sore nipples, engorgement, inability to latch, tongue tie, and inadequate information from healthcare professional unfavorably affect the success of exclusive breastfeeding (Chan et al., 2018; Koçakoğlu & Çadirci, 2020). Postpartum maternal anxiety is also an important risk factor in reducing adequate breastfeeding and exclusive breastfeeding in the first 6 months (Fallon et al., 2016; Shariat et al., 2018).

Breastfeeding difficulties increase the level of anxiety in addition to the impacts of postpartum anxiety on breastfeeding (Mikšić et al., 2020). Also, the milk ejection reflex is impaired as a result of the reduction in oxytocin release under either physical or mental stress, and the difficulty with lactation could be a major source of state anxiety in itself (Cox et al., 2015). Pope et al. (2016) reported that there was a relationship between the woman's mood and breastfeeding attitude. Breastfeeding support is associated with reducing the stress level of the woman and thus positively affecting breastfeeding attitude (Eksioğlu et al., 2016). Breastfeeding self-efficacy (BSE) is defined as a mother's perception of her ability to breastfeed her baby and produce sufficient milk. This is one of the variables that predict exclusive breastfeeding (de Roza et al., 2019).

Women have the challenges of breastfeeding, especially in the early period, which includes the postpartum two weeks (Brown et al., 2016). The women who ceased breastfeeding or initiated with supplementation due to insufficient milk perception at the postpartum 4th week had significantly lower BSE in the early postpartum period, regardless of socio-demographic variables (Galipeau et al., 2018). However, providing professional support to women on breastfeeding increases the success of breastfeeding after discharge (Brockway et al., 2017). A

meta-analysis indicated that supporting women with information and communication technologies in the postpartum period increases the rate of exclusive breastfeeding (10%) in the intervention group. This study demonstrates the importance of uninterrupted counseling to women (Ferraz Dos Santos et al., 2020). Early detection of breastfeeding problems and resolving them as soon as possible is extremely important as it can increase breastfeeding rates (Karaçam & Sağlık, 2018).

In its universal message, United Nations International Children's Emergency Fund (UNICEF) states women should be supported in the postpartum period so that they can breastfeed their babies for a sufficient time and effectively (UNICEF, 2016). In practice, breastfeeding education and support are provided within the scope of prenatal or postnatal discharge training. Nevertheless, at home, women sometimes try to cope with breastfeeding problems on their own. Some women who have problems seek support, while others cannot maintain successful breastfeeding and may experience anxiety related to this situation. As a result, women can often feed their babies with alternative foods instead of breast milk. Because of insufficient breastfeeding, the physical development of the newborn may regress and the health may be adversely affected. Infants mainly feed with breast milk, infant formulas, and/or donor human milk (Kair et al., 2019; Lin et al., 2022). However, it is known that thyroxine, thyroid-stimulating hormone, and sodium, which are effective in the growth and development of newborns, are higher in breast milk than in formula (Lin et al., 2022; Vass et al., 2022). Moreover, the content of the food contains toxic substances originating from raw materials, water or packaging used during production (Chen et al., 2021). Another challenge in alternative options for nutrition, breast-feeding may be only option, since breastmilk banks are not available in many countries, including Turkey (Peila et al., 2017). Breastfeeding is considered the best source of nutrition for babies under six months of age, so it is extremely important to continue breastfeeding. In this respect, there is a need for an education and support system

where women can easily consult their problems and provide follow-up. Interventions via web and mobile-based applications may allow maintaining communication between women and lactation professionals and regular follow-up of the woman and newborn after discharge (Lau et al., 2016). With the increase in technological applications used to provide breastfeeding education and support, there is a need to develop the content of these applications in line with the needs of the woman, newborn, and healthcare professionals, and to analyze their effectiveness in different contexts.

On the other hand, the COVID-19 pandemic has led to reorganisation of health services to minimise the spread of the virus, with some appointments taking place by telephone or online and restrictions on the attendance of partners during appointments and during the delivery period (Vazquez-Vazquez et al., 2021). COVID-19 restrictions and changes in health management have led to difficulties in face-to-face breastfeeding support in particular (Shukri et al., 2022). Previous studies reported decreased rates of breastfeeding and perceived breastfeeding support during the pandemic and lockdown (Hull et al., 2020; Shukri et al., 2022; Vazquez-Vazquez et al., 2021). In addition, studies conducted during the pandemic period found that the anxiety and stress symptoms of breastfeeding women increased compared to the pre-pandemic period, and these adversely affected breastfeeding (Ceulemans et al., 2020; Fewtrell et al., 2020). Healthcare professionals should benefit from developments in digital health technology to overcome the difficulties experienced in breastfeeding counseling during the pandemic period (Feinstein et al., 2021). Hence, video calls would be a considerable method to provide support to mothers. For this purpose, this study examines the effects of breastfeeding support provided by video call via the Zoom program in the early postpartum period on anxiety, breastfeeding self-efficacy, and newborn outcomes.

2 | METHODS

2.1 | Study design

This study had a prospective, parallel, randomized controlled experimental design. This study followed the CONSORT–Consolidated Standards of Reporting Trials checklist and was registered at www.clinicaltrials.gov (US) with the ClinicalTrials.gov Identifier NCT04929561.

2.2 | Participants and sampling

The study was carried out with 72 women and their babies who applied to the maternity ward of a state hospital in Kahramanmaras, Turkey. The sample size was calculated based on the breastfeeding self-efficacy mean score of a previous study. In this study, the breastfeeding self-efficacy mean score was 63.5 ± 11.2 in the intervention group and 56.3 ± 12.6 in the control group (Tokat & Okumuş, 2013). It was calculated using the G-power 3.1.9.2 program considering a two-point deviation, 80% power, 0.05 alpha error probability, and 0.6 effect size. As a result, the required sample size was calculated as 70 women. Factoring in possible case losses and considering the parametric testing criteria, we planned to invite 78 women into the study.

2.2.1 | Participant eligibility

Inclusion criteria for women were: (a) 18 years of age or older; (b) volunteers for follow-up at the 1-month postpartum period by phone; (c) able to read and understand Turkish; (d) does not have a disease that prevents breastfeeding; (e) have internet access at home or on the phone; and (f) those who have or have volunteered to download the Zoom program on their computer or phone. Inclusion criteria for infants were: (a) born between 37 and 42 weeks of gestation; (b) single live birth; and (c) have no serious congenital anomalies. Exclusion criteria were: (a) HIV-positive status; (b) physical or mental disabilities that prevent participation (e.g., such as schizophrenia and active tuberculosis); (c) newborns with a birth weight of <2500 g; (d) presence of tongue-tie, cleft lip or cleft palate in newborns, and (d) multiple gestations.

2.3 | Randomization, allocation, and blinding

Following recruitment, we divided the pregnant women into an intervention group (VCG: standard care + video call) and a control group (CG: standard care) by randomization (1:1 randomization). The second author generated the number tables using the computer-generated randomization program at the website www.randomizer.org/ performed. Women were randomized to one of the two groups with the use of an opaque envelope technique, with an assignment determined by the computerized random number table. After the computer-based random numbers were generated, the numbers 1-78 and the corresponding group were written on small papers and placed in 78 separate opaque envelopes. For women who met the inclusion criteria, the first researcher pulled an envelope from the box and the woman was assigned to the group in the envelope. The selected envelope was not put back in the box, thus avoiding repeated selections.

Researchers were not blinded to group assignments. Since the intervention part of the research includes counseling, it is impossible to blind the participants and the researcher to the groups.

2.4 | Measurement

2.4.1 | Outcome assessment

The primary outcome of this study was the mean postpartum maternal anxiety level and the mean breastfeeding self-efficacy level. The secondary outcome was neonatal outcomes; newborn weight, daily breastfeeding frequency, the challenges of breastfeeding, food intake other than breast milk, neonatal hyperbilirubinemia not requiring phototherapy, need for phototherapy, and neonatal death. We evaluated primary and secondary outcomes at 2 weeks and 1 month after birth.

2.4.1.1 | Primary outcome

The primary outcome of this study was the mean postpartum maternal anxiety level (mean ± SD) of the women at 2 weeks and 1 month after birth. Maternal anxiety level was assessed 2 weeks and 1 month after birth using the Postpartum Specific Anxiety Scale. The other main outcome of the study was the mean breastfeeding self-efficacy level at 2 weeks and 1 month after birth (mean ± SD) and measured with the Breastfeeding Self-Efficacy Scale-Short form.

2.4.1.2 | Secondary outcome

The secondary outcome was neonatal outcomes; newborn weight, daily breastfeeding frequency, the challenges of breastfeeding, food intake other than breast milk, neonatal hyperbilirubinemia not requiring phototherapy, need for phototherapy, and neonatal death. Hyperbilirubinemia was considered when the newborn's serum bilirubin level is 5 mg/dL and above. The routine blood test was not performed for this condition, and the results of the blood analysis performed in newborns, who were suspicious and diagnosed by the doctor, were examined, and it was understood that hyperbilirubinemia was present. The weights of the newborns were obtained from the records taken from the family medicine and hospital records at the 2nd week and 1st month after birth. Neonatal outcomes were evaluated using the follow-up form at 2 weeks and 1 month after birth.

2.5 | Instruments

The study data were collected with the Women and Newborn Information Form, Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF), Postpartum Specific Anxiety Scale (PSAS), and Follow-up Form. The Women and Newborn Information Form and the Follow-up Form were questionnaires developed by researchers based on the literature.

The Women and Newborn Information Form was used in the study and developed by the researchers based on the literature, comprising 30 questions (Dai et al., 2013; Flaherman et al., 2016; Utami et al., 2019). The questions were about socio-demographic and obstetric

characteristics of the women; gender, mode of birth, gestational age, and birth weight of the newborn.

The BSES-SF was developed by Dennis and Faux (1999). Later, the short form of the scale was developed by Dennis (2003) by reducing it. The BSES-SF is a 14-item instrument developed to measure breastfeeding confidence. All the items are preceded by the statement "I can always" and are anchored by a 5-point Likert-type scale, with 1=not at all confident and 5=always confident. All the items are presented positively and the scores are summed up to produce a final score ranging from 14 to 70, with the higher scores indicating better breastfeeding self-efficacy. Turkish validity and reliability of the scale were done by Tokat and Okumuş (2013). In the same study, Cronbach's alpha coefficient for internal consistency was 0.86 postnatally. Permission was obtained from the responsible author for the use of the scale in this study.

The PSAS was developed to evaluate anxiety symptoms specific to the postpartum period (Fallon et al., 2016). The scale consists of 51 items and has the following four sub-dimensions: maternal competence and attachment anxiety (Items 1-15), infant safety and welfare anxiety (Items 16-26), practical infant care anxiety (Items 27-33), and psychosocial adjustment to motherhood (Items 34-51). Responses to the items are rated on a 4-point Likert scale. Responses to the items are rated on a 4-point Likert scale ranging from 1 to 4 (1=never, 2=sometimes, 3=often, 4=almost always). It means that those who score 73 and below on the scale have low postpartum anxiety levels, and those who score 101 and above have a high level of anxiety. Turkish validity and reliability of the scale were done by Duran (2020) and the Cronbach alpha coefficient was found to be 0.91. Permission was obtained from the responsible author for the use of the scale in this study.

Follow-up Form was developed by the researchers based on the literature, and comprised 14 questions (Souza et al., 2020; Tang et al., 2019; Utami et al., 2019). The form was prepared by

us to be used in two follow-ups 2 weeks and 1 month after birth, with the same questions but some differences in expression. In both forms, there were 7 questions each questioning the newborn's current weight, daily breastfeeding frequency, health status, and nutritional intake other than milk, according to the relevant process.

2.6 | Data collection

In standard care in the hospital where the research was conducted, the practices of supporting breastfeeding in the first half-hour after birth, encouraging breast milk intake, and breastfeeding the newborn at 3-hour intervals are carried out. In the study, all women in the intervention and control groups were given standard care about breastfeeding the newborn as well as approximately 30 minutes of breastfeeding education was given by a researcher (DA) before discharge. All women in this study were asked to use a diary for 1 month after birth. In this diary, they were told to write down the weight of the newborn (2 weeks after birth and 1 month after birth), daily breastfeeding frequency, the challenges of breastfeeding, their use of food other than breast milk (other milk or formula), the development of jaundice, and the need for phototherapy.

Data collection was conducted from 1 March 2021 to 18 February 2022. All data collected in this study was performed with standardized procedures. Women hospitalized in the postpartum clinic were evaluated by a researcher for eligibility criteria. Those who met the eligibility criteria were asked whether they agreed to participate in this study. After the informed consent procedures, women and their babies were randomly assigned to groups. Then, each woman filled out The Women and Newborn Information Form by face-to-face interview method. Follow-up form, PSAS, and BSES were sent as an online questionnaire via e-mail to the woman's e-mail address 2 weeks and 1 month after birth. The interventions made to the control and intervention groups during the research process are given below.

2.6.1 | Control group

The control group (CG) did not do any intervention during the 1-month period after discharge.

2.6.2 | Intervention group (Video call group)

Women in the intervention group (video call group-VCG) were given breastfeeding support through one-on-one video calls during the first 2 weeks after birth. The training videos were not used during video calls but virtual conversations were conducted using the video software feature. Video calls were held three times a week, six times in total, via the Zoom program. Video call sessions were planned and conducted as follows; (1) introductory speech assessing the woman's general condition, (2) observing the woman's breastfeeding (breastfeeding position, holding the breast and newborn breast), and (3) answering the woman's questions.

A pilot study was conducted with 10 women to determine the number and duration of video calls. We found that most women were reluctant for video call every day of the week. When we asked the women how often they wanted to meet, they were interviewed 3 times a week at equal intervals, as most of them wanted to meet every other day. In this preliminary application, we determined that the interview times lasted approximately 15-20 minutes. However, there was no time limit in the interviews, time was allocated to answer women’s breastfeeding questions. In the research, interviews made by video call were at most 40 minutes long.

2.7 | Ethical considerations

Ethical approval was obtained from the Research Ethics Committee of the Kahramanmaras Sutcu Imam University (Institutional Review Board Approval No. 296). Participation was voluntary and all participants gave written informed consent; we informed participants that they could withdraw from the study at any time.

2.8 | Statistical analysis

Data were analyzed with the Statistical Package for the Social Sciences (SPSS) 22.0 package program. We employed the Shapiro-Wilk-W test to assess whether the continuous variables

were normally distributed. The descriptive statistics were applied (number, percentage, and mean ± standard deviation) for participant characteristics. The pre-protocol analysis type was used for the study. We compared the data in the VCG and CG using the Mann–Whitney U test, t test, chi-square, and fisher's exact test. $P < .05$ was considered significant.

3 | RESULTS

3.1 | Study characteristics

A total of 113 people were interviewed in the study. Of these, twenty-nine were excluded because they did not meet the inclusion criteria and six did not agree to participate in the study. Seventy-eight women and their babies were included in the study and were randomly divided into groups. A total of seventy-two women and their babies were included in the study, and the process is summarized in Figure 1. No unfavorable effect developed and needed to be stopped during the study.

Data on maternal and newborn characteristics are shown in Table 1. In the study, the mean age of women in VCG was 29.94 ± 5.47 years and those in the CG were 28.05 ± 6.07 years. There was no difference between the groups ($p > .05$). The characteristics of both groups were similar in terms of education, profession, income status, health insurance, parity, pregnancy planning, and receiving breastfeeding education ($p > .05$). There was no difference between the mean gestational weeks of newborns in VCG as 39.83 weeks + 2.3 days and those in the CG as 40.05 weeks + 1.2 days. The birth weight of the newborns was no statistically significant between groups (VCG: 3314.59 ± 368.09 g; CG: 3354.28 ± 319.09 g; $p > .05$). In the study, the cesarean section rate was higher in the CG than in VCG, but the difference was not statistically significant but it may be clinically significant (VCG: %18.9; control: %31.4; $p > .05$).

3.2 | Characteristics of primary outcomes of the study

There were statistically less PSAS mean scores in VCG (23.15 ± 35.75) compared with the CG (48.57 ± 12.00) at postpartum 2nd weeks (mean difference [MD] 25.42, 95% CI [87.17-107.79], $p = .000$) and at postpartum 1st month (VCG: 74.30 ± 25.78, CG: 122.02 ± 44.71, MD 47.72, 95% CI [-63.54-29.96], $p = .000$). At the postpartum 2nd week, the mean BSES score was significantly higher in the VCG (42.31 ± 16.00) than in the CG (29.13 ± 10.00) (MD 13.18, 95% CI [36.43-40.66], $p = .007$). In addition, when the mean BSES scores in the 1st month were compared, we determined the women in VCG (44.51 ± 11.36) scored statistically higher than those in the CG (34.41 ± 12.52) at postpartum 1st month (MD 10.1, [95% CI: 4.50-15.79], $p = .001$) (Table 2).

3.3 | Characteristics of secondary outcomes of the study

The newborn results of the two groups at the postpartum 2nd weeks and 1st month were given in Table 3. In the evaluation, the newborns in VCG (107.75 ± 11.98 g) had a higher weight gain compared to the CG (98.11 ± 10.41 g) at the 2nd week (MD 9.64, 95% CI [4.55-14.93], $p = .001$) and at the 1st month (VCG: 384.10 ± 49.02 g, CG: 336.94 ± 55.53 g, MD 47.16, 95% CI [367.34-400.34], $p = .000$). We determined that the newborn's daily breastfeeding frequency in the VCG in the 2nd week, (VCG: 8.62 ± 1.36, CG: 5.74 ± 1.50, MD 2.88, 95% CI: 2.27-3.54, $p = .000$) and the 1st month (VCG: 8.00 ± 1.26, CG: 5.02 ± 0.99, MD 2.98, 95% CI: 7.62-8.43, $p = .000$) were higher than in the CG. We determined that newborns in the VCG (5.4%) had less challenges of breastfeeding at the 2nd week compared to the CG (22.9%) ($p = .043$). There were statistically less rate of feeding with formula in VCG (2.7%) compared with the CG (17.1%) at postpartum 2nd weeks ($p = .039$) and at postpartum 1st month (VCG: 2.7%, control: 14.7%, $p = .020$) (Table 3).

In the 2nd week, hyperbilirubinemia developed in 5.4% of the newborns in VGG and in 22.9% of the CG, and this difference was statistically significant ($p = .043$). There was no statistical difference between the groups in terms of receiving phototherapy treatment, and none

of the newborns had hyperbilirubinemia and need for phototherapy in the 1st month. In addition, neonatal mortality was not determined in any of the newborns (Table 3).

4 | DISCUSSION

This study determined that breastfeeding support given by video call six times (three times a week, at equal intervals) during the first 2 weeks after birth had positive effects on maternal anxiety and breastfeeding self-efficacy, and newborn health outcomes. In our knowledge, this is the first study to show that breastfeeding support provided video call is an effective way to protect women against anxiety, increase breastfeeding self-confidence and improve newborn health.

Breastfeeding has an important role for women as well as for newborns in the postpartum period. Studies show that breastfeeding is an effective method in reducing the level of postpartum maternal anxiety (Fallon et al., 2016; Mikšić et al., 2020; Paul et al., 2013). Similarly, in our study, the anxiety levels of women in VCG at the postpartum 2nd week and 1st month were significantly lower than those in the control group. There is a need for new studies evaluating the effect of video call on maternal anxiety.

Breastfeeding self-efficacy is an important indicator of breastfeeding success (Mikšić et al., 2020). In the literature, it is seen that factors such as breastfeeding experience, positive breastfeeding attitude, verbal persuasion about breastfeeding, pain, fatigue, anxiety, and receiving breastfeeding counseling affect breastfeeding self-efficacy (Dai et al., 2013; Ishak et al., 2014; Mikšić et al., 2020). In both assessments made at second week and first month, it was determined that breastfeeding support given by video call increased breastfeeding self-efficacy. Similarly, in a pilot study examining the effects of training and support (including breastfeeding) provided by video call during antenatal and postpartum periods in India, it was determined that women in the intervention group had higher self-confidence (Friesen et al., 2015). The internet-based education and group conversation over Zoom positively affect

breastfeeding attitude and increase breastfeeding confidence (Hannula et al., 2014; Lau et al., 2016; Robinson et al., 2019). These findings are important in terms of showing that different telehealth methods can be used to increase breastfeeding self-efficacy.

The World Health Organization (2022) recommends that infants be fed with breast milk as often as they want day and night according to their demand; The American Academy of Pediatrics (2004) and The Academy of Breastfeeding Medicine (2017) also recommend breastfeeding frequency to be 8-12 times a day in the first period. In our study, the mean daily breastfeeding frequency until the 2nd week of newborns included in VCG was 8.6 and the mean was 5 in the control group; this difference was found to be statistically significant. In addition, in the 1st month follow-up, the mean daily breastfeeding frequency of newborns in VCG were higher than those in the control group. This finding is significant that it shows that supporting breastfeeding with video call in the postpartum period affects the breastfeeding success positively. The increase in the frequency of breastfeeding in newborns has a very essential role in weight gain (Hassan & Zakerihamidi, 2018). Likewise, this study also determined that the newborns in VCG had a higher weight gain compared to the control group, both in the 2nd week and in the 1st month. This may be due to the higher frequency of daily breastfeeding in newborns in VCG in our study. In addition, the fact that the anxiety levels of women in VCG in our study were lower than those in the control group may have positively affected the weight gain of the newborns. In a study, it was determined that there was excessive weight loss in the babies of women with high anxiety levels in the postpartum 2nd week (Flaherman et al., 2016). Women with high anxiety and stress start complementary foods for their babies in the first six months (Hurley et al., 2015). In addition, women with high postpartum anxiety resort to shorter breastfeeding times and more formula supplements, which negatively affects the baby's weight (Fallon et al., 2016). As far as we know, these findings are important as it is the first study

showing that breastfeeding support given by video call has a positive effect on daily breastfeeding frequency and weight gain in the newborn.

The women have challenges of breastfeeding, especially in the early period, including the postpartum two weeks (Brown et al., 2016; Chrzan-Dętkoś et al., 2021; Thurgood et al., 2022). Therefore, it is crucial to support breastfeeding in the first 2 weeks after birth. In our study, it was determined that women in VCG had less challenges of breastfeeding compared to those in the control group in the follow-up at the 2nd week. Similarly, in another randomized controlled study using technology-based breastfeeding education, the women in the intervention group had less challenges of breastfeeding than those in the control group (Souza et al., 2020). In other studies, in the literature, using different technology methods of breastfeeding support, it is seen that educational game, electronic leaflet media, web-based support, and video conferencing methods affect breastfeeding results positively (Friesen et al., 2015; Silva et al., 2017; Tang et al., 2019; Utami et al., 2019). These findings are important in terms of showing that incorporating video call into routine care in breastfeeding is effective in solving the challenges of breastfeeding with breastfeeding training and support.

In our study, we found that newborns in the control group were fed more formula than those in VCG, both at second week and at first month. Similarly, in a meta-analysis that included 16 studies from 6 countries, it was seen that technologies (web-based interventions, text messaging, CD-ROM, e-prompts, and interactive computer agents) increased the rates of exclusive breastfeeding of newborns at 4 weeks postpartum (Lau et al., 2016). In another randomized controlled trial conducted in China, rate of exclusive breastfeeding in the first 6 months postpartum was higher in the intervention group supported by phone call, text, or video/audio support (Ke et al., 2018). According to these findings, continuation of breastfeeding support with methods that provide mutual interaction in the early and long-term postpartum may have reduced the use of formula as it facilitates the solution of challenges of breastfeeding.

In addition, we think that breastfeeding support given by video call method in our study decreased maternal anxiety level and also reduced the use of formula. Other studies in the literature support this situation. Studies show that increasing the level of postpartum anxiety increases the use of formula (Fallon et al., 2016; Fukui et al., 2021). These findings are important in terms of showing that the use of video call in breastfeeding support is an effective method to increase exclusive breastfeeding.

As recommended by the AAP, increasing the daily breastfeeding frequency may reduce the severity of neonatal hyperbilirubinemia (American Academy of Pediatrics, 2004). The results of another study showed that as the frequency of breastfeeding increased, the hyperbilirubinemia level decreased due to the increase in defecation and meconium excretion (Chen et al., 2015). In our study, the rate of development of hyperbilirubinemia was significantly lower in newborns with VGG when compared to the control group at the 2nd week follow-up. We think that this is due to the fact that newborns in VCG are breastfed more frequently. This finding is important in that it shows that supporting breastfeeding with video call is an effective method in preventing hyperbilirubinemia in newborns.

In addition, the findings of our study show the importance of providing breastfeeding support via telehealth during the COVID-19 pandemic. The pandemic has led to a subsequent lockdown, some restrictions on face-to-face care during childbirth and the postpartum period, and the reorganization of health services to minimize the spread of the virus (Vazquez-Vazquez et al., 2021). The COVID-19 pandemic and subsequent lockdown and social distancing have created some difficulties among women, particularly in breastfeeding support (Feinstein et al., 2021; Shukri et al., 2022). Previous studies reported decreased rates of breastfeeding and perceived breastfeeding support during the pandemic and lockdown. A study reported that during the quarantine period, women perceived highly insufficient breastfeeding support, had stopped breastfeeding, and started complementary foods earlier than planned (Shukri et al.,

2022). In an online survey conducted by the Australian Breastfeeding Association to assess the concerns of mothers seeking breastfeeding support during the pandemic, womens' main concerns were related to insufficient milk or weight gain of baby, and painful breasts. Notably, concerns were exacerbated by the lack of health care access as well as the lack of face-to-face health services because of fear or unavailability (Hull et al., 2020). Another study conducted in the United Kingdom reported that nearly half of women who gave birth during the pandemic period did not receive breastfeeding support (Vazquez-Vazquez et al., 2021). On the other hand, it is very useful to benefit from telehealth applications that can provide remote breastfeeding support to overcome these negative consequences that emerged during the pandemic process (Feinstein et al., 2021). Our study findings are important in terms of showing that breastfeeding support via video calls, which is one of the telehealth applications, can be used to maintain breastfeeding during the pandemic processes.

5 | LIMITATIONS

This study has some limitations. First, the follow-up period of the study was limited to 1 month. In addition, research can be strengthened by conducting a longitudinal study and following women at six months and one year postpartum. Secondly, home visits could not be performed because the study was conducted during the COVID-19 pandemic. Therefore, the weights of the newborns were obtained from family practices and hospital controls. Third, statistical analyzes include only group comparisons without controlling for potential covariates. Therefore, it was not possible to specify the cause of the results or the direct effects.

6 | CONCLUSIONS

In this study, breastfeeding support given by video call during the first 2 weeks after postpartum birth reduced maternal anxiety level in the 2nd week and 1st month and increased breastfeeding self-efficacy. In addition, it was concluded that this support increases weight gain and the daily breastfeeding frequency in newborns and reduces the rates of feeding with formula, in the 2nd

week and 1st month, and decreases the challenges of breastfeeding and hyperbilirubinemia during the postpartum 2nd week. As far as we know, these results are important in that they are one of the first studies to evaluate the effect of breastfeeding support with video call in the postpartum period on the anxiety level of women and newborn outcomes. Based on these results; (1) healthcare professionals who provide care in the postpartum period should also prefer the video search method for breastfeeding support, (2) healthcare professionals should take steps to develop care models that also use telehealth methods in cases where it is difficult to maintain face-to-face breastfeeding support during the COVID-19 pandemic and future public health problems, (3) Health institutions should include remote breastfeeding support in their institutional policies, and (4) in order to contribute to scientific knowledge, researchers should plan new studies that determine the effects of video calling intervention in newborns with different characteristics.

AUTHOR CONTRIBUTIONS

Deniz Akyıldız and Betül Bay were involved in the design of this research. Deniz Akyıldız collected data, and Deniz Akyıldız and Betül Bay conducted data analysis. Both authors drafted the manuscript and approved the final version.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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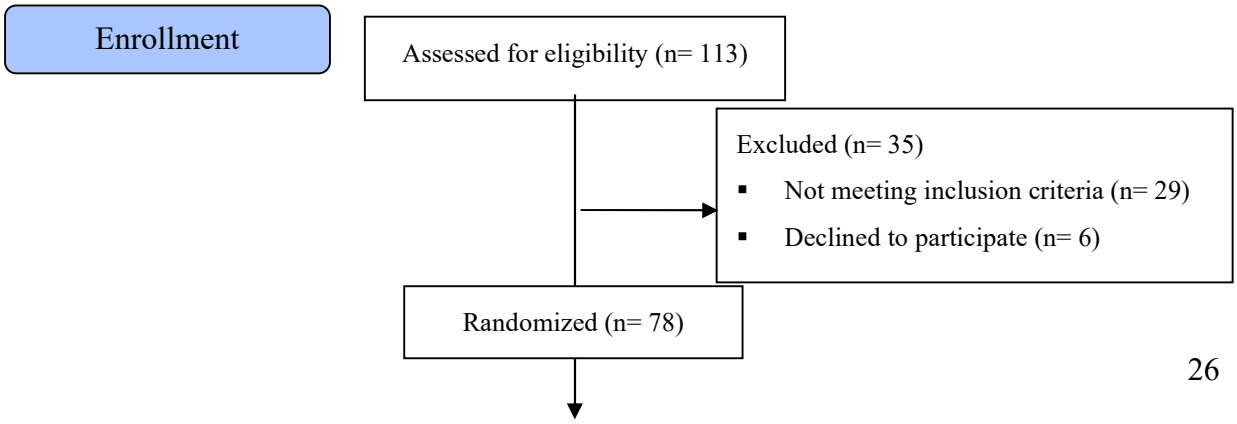
FIGURE AND TABLES



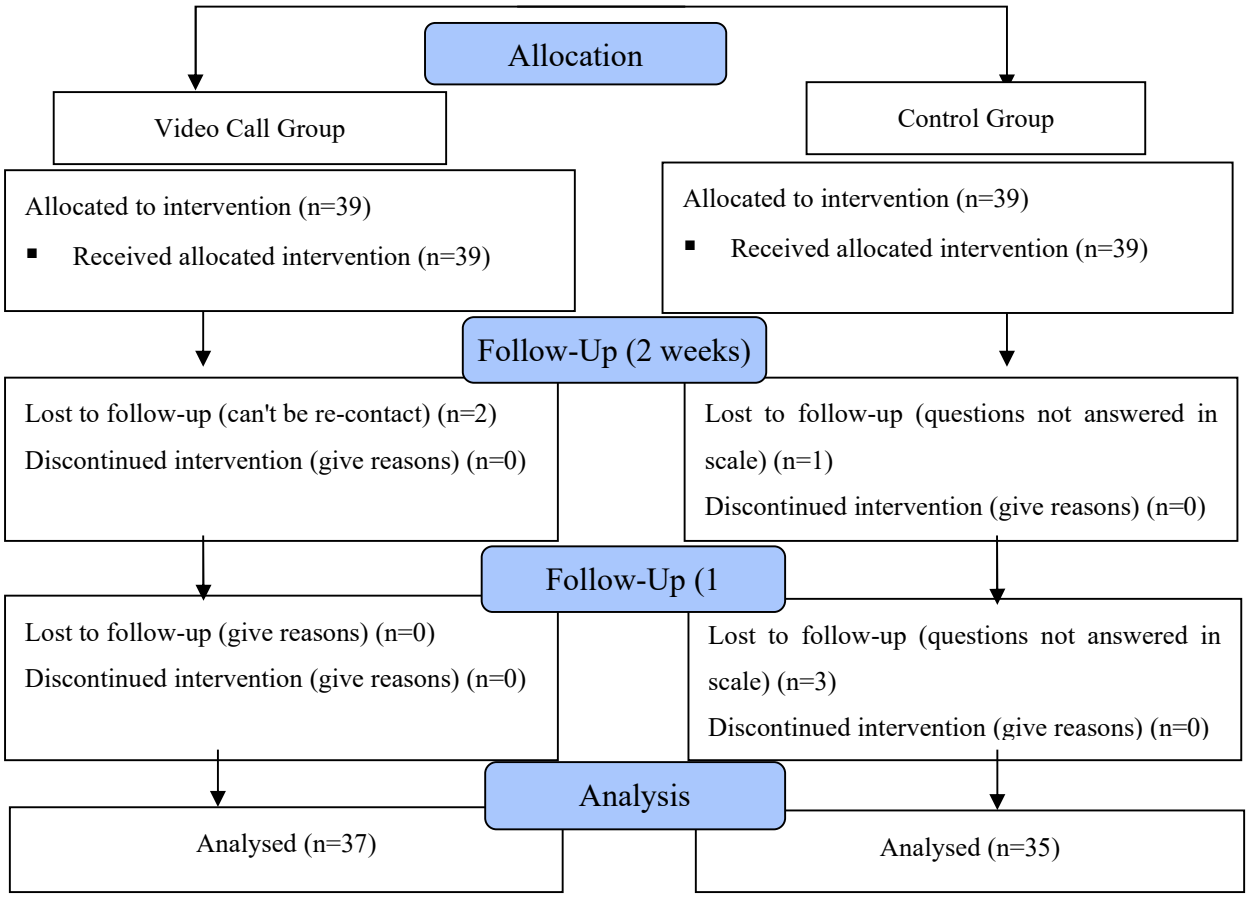


FIGURE 1 Research process CONSORT flow diagram

Table 1 Women's baseline characteristics, including relevant newborn characteristics (N = 72)

Variables	**Video call group (n=37)**	**Control group (n=35)**	***p*-value***
Woman			
Age, Mean (SD)	29.94 (5.47)	28.05 (6.07)	.847
Education, n *(%)*			
Primary school	6 (16.2)	8 (22.9)	.238†
Secondary school	14 (37.8)	6 (17.1)	
High school	15 (40.5)	17 (48.6)	
University	2 (5.4)	4 (11.4)	
Employment status, n *(%)*			
Housewives	24 (64.9)	19 (54.3)	.191
Employed	13 (35.1)	16 (45.7)	
Family socio-economic status, n *(%)*			

Low	8 (21.6)	11 (31.4)	.345
Middle	29 (78.4)	24 (68.6)	
Health insurance, n *(%)*			
Yes	35 (94.6)	32 (91.4)	.597†
No	2 (5.4)	3 (8.6)	
Parity, n *(%)*			
Primiparous	20 (54.1)	12 (34.3)	.092
Multiparous	17 (45.9)	23 (65.7)	
Intention of pregnancy, n *(%)*			
Planned	27 (73.0)	21 (60.0)	.243
Unplanned	10 (27.0)	14 (40.0)	
Breastfeeding education, n *(%)*			
Yes	23 (62.2)	17 (48.6)	.246
No	14 (37.8)	18 (51.4)	
Newborn			
Gestational age at birth, weeks + day	39.83 (2.3)	40.05 (1.2)	.996
Birthweight, grams, Mean (SD)	3314.59 (368.09)	3354.28 (319.09)	.135
Gender, n *(%)*			
Female	16 (43.2)	19 (54.3)	.349
Male	21 (56.8)	16 (45.7)	
Mode of birth, n *(%)*			
Vaginal	30 (81.1)	24 (68.6)	.220
Caesarian	7 (18.9)	11 (31.4)	

Abbreviations: SD, standard deviation.

Note: Data are presented mean ± SD and n (%);*t test for continuous data and Chi-square test for categorical data, †Fisher's exact test.

Table 2 Assessment of PSAS and BSES scores use with comparison analyses in postpartum 2nd week and 1st month (N = 72)

Variables	**Video call group (n=37)**		**Control group (n=35)**		**Mean difference *[CI 95%]***		***p*-value**
2 weeks postpartum	**Median**	**IQR**	**Median**	**IQR**			
PSAS	23.15	35.75	48.57	12.00	25.42	[87.17-107.79]	**.000***
BSES	42.31	16.00	29.13	10.00	13.18	[36.43-40.66]	**.007***
1 month postpartum	**Mean**	**SD**	**Mean**	**SD**			
PSAS	74.30	25.78	122.02	44.71	47.72	[-63.54-29.96]	**.000**†
BSES	44.51	11.36	34.41	12.52	10.1	[4.50-15.79]	**.001**†

Abbreviations: PSAS, Postpartum Specific Anxiety Scale; BSES, Breastfeeding Self-Efficacy Scale; IQR, interquartile range; SD, standard deviation; CI, Confidence Interval.
Note: *Mann–Whitney U test; †t test; The bold values are represented as $p < .05$.

Table 3 Assessment of neonatal outcomes use with comparison analyses in postpartum 2nd week and 1st month (*N* = 72)

Continuous Variables	**Video call group (n=37)**		**Control group (n=35)**				
2 weeks postpartum	**Mean**	**SD**	**Mean**	**SD**	**Mean difference**	***[CI 95%]***	***p* value***
Increased weight, grams	107.75	11.98	98.11	10.41	9.64	[4.55-14.93]	**.001**
Daily breastfeeding frequency	8.62	1.36	5.74	1.50	2.88	[2.27-3.54]	**.000**
1 month postpartum							
Increased weight, grams	384.10	49.02	336.94	55.53	47.16	[367.34-400.34]	**.000**
Daily breastfeeding frequency	8.00	1.26	5.02	0.99	2.98	[7.62-8.43]	**.000**
Categorical Variables							
2 weeks postpartum	**n**	**%**	**n**	**%**	***p* value***		
The challenges of breastfeeding							
Yes	2	5.4	8	22.9	**.043**		
No	35	94.6	27	77.1			
Formula feeding							
Yes	1	2.7	6	17.1	**.039**		
No	36	97.3	29	82.9			
Hyperbilirubinemia							
Yes	2	5.4	8	22.9	**.043**		
No	35	94.6	27	77.1			
Phototherapy							
Yes	1	2.7	4	11.4	.193		
No	36	97.3	31	88.6			
Neonatal mortality							
Yes	0	0.0	0	0.0	-		
No	0	0.0	0	0.0			
1 month postpartum							
The challenges of breastfeeding							
Yes	1	2.7	5	14.7	.081		
No	36	97.3	29	85.3			
Formula feeding							
Yes	1	2.7	7	20.6	**.020**		
No	36	97.3	27	79.4			
Hyperbilirubinemia							
Yes	0	0.0	0	0.0	-		
No	0	0.0	0	0.0			

Phototherapy					
Yes	0	0.0	0	0.0	-
No	0	0.0	0	0.0	
Neonatal mortality					
Yes	0	0.0	0	0.0	-
No	0	0.0	0	0.0	

Abbreviations: CI, Confidence Interval.

Note: Data are presented mean ± SD and n (%); *t test for continuous data and Fisher's exact test for categorical data; The bold values are represented as $p < .05$.