Clinical and Experimental Health Sciences

The Effects of Antenatal Education on Level of Exclusive Breastfeeding in the First Two Months

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ABSTRACT

Objective: Breastfeeding is a wonderful event that requires strength and dedication from mothers. Effective breastfeeding education provided to pregnant women in the prenatal period can increase the success and level of breastfeeding.
This study aimed to determine the effect of prenatal education intervention on the first two-month exclusive breastfeeding level.

Method: This experimental study was carried out at a primary family health center between July 2019 and February 2020. One hundred thirty-three pregnant women were included in the study's control and intervention groups. The Prenatal and postnatal information form, the Infant Feeding Attitude Scale (IIFAS) and the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF) were used to collect the data.

Results: The first two-month exclusive breastfeeding level was 33.1% in the control group and 68.7% in the intervention group ($p < .05$). The exclusive breastfeeding status in the first two months was adversely affected 10.5 times by feeding food other than breast milk as the first food after birth, 4.3 times by using pacifier-bottles, and 2.8 times by not receiving breastfeeding education. The weekly progression of the gestational week had a positive effect by 1.6 times, and each unit increase in the number of daily breastfeeding had a positive effect of five times ($p<.05$)

Conclusion: Prenatal breast milk and breastfeeding education increased the first two-month exclusive breastfeeding level. The education also had a positive effect on daily breastfeeding frequency, pacifier-bottle use, night breastfeeding levels and water use.
Keywords: Pregnancy, prenatal breastfeeding education, effect on breastfeeding

1. INTRODUCTION

The health of individuals is directly related to their nutrition in early infancy. International organizations state that breastfeeding is the most appropriate nutritional choice for the newborns. All newborns should be breastfed immediately after birth and should be exclusively breastfed for the first six months. Afterwards, breastfeeding should be continued with complementary foods for up to two years (1-3).

Growth retardation, infectious diseases, sudden infant deaths, and allergic diseases are less common in breastfed infants (4,5). Breastfeeding protects against postpartum bleeding, ovarian and breast cancer, osteoporosis, and cardiovascular diseases. Breast milk provides support to the family and social economy as it protects against formula food costs and health problems caused by the use of formula (6-8).

The "Breast Milk Promotion and Baby-Friendly Hospitals Program" has been carried out in cooperation with UNICEF in Turkey since 1991. Moreover, breastfeeding and breast milk counseling is provided to all pregnant women under the "Prenatal Care Program" (9). In Turkey, 71.0% of mothers breastfeed for the first time within one hour after birth. Exclusive breastfeeding decreases from 59.0% in the two-month period to 41.0% in the first six months. The median breastfeeding alone duration is 1.8 months. The exclusive breastfeeding level in the first six months is 41.0% worldwide, and according to a previous study, it was 15.0% for Sanliurfa.

Bad habits such as giving water in the early period and using a pacifier-bottle are frequently seen in mothers (10,11). Despite the implemented programs and support, exclusive breastfeeding has not reached desired levels worldwide, as well as in Turkey and in Sanliurfa. Many mothers stop breastfeeding in the first two months after birth, which is caused by the mother not being ready to deal with postpartum difficulties and from being insecure. The main factor that helps mothers feel adequate during breastfeeding by preparing for the breastfeeding process from pregnancy is prenatal breastfeeding education (12,13).

This study aimed to determine the effect of prenatal education intervention and other factors on the level of exclusive breastfeeding in the first two months.

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2. METHODS

2.1. Type of the Study

This study followed an experimental research approach.

2.2. Ethics

Ethics approval was obtained from the University Faculty of Medicine Non-Interventional Research Ethics Committee (08.04.2019/04). Written permission was obtained from Provincial Health Directorate and verbal consent was obtained from all participants.

2.3. Population and Sample of the Study

This study was conducted in a family health center (FHC) located in a semi-urban area between July 2019 and February 2020. The research was conducted in a single health center. The population of the study consisted of women in the last trimester of their pregnancy (27-40 weeks) registered with the FHC. The inclusion criteria were that the participants spoke Turkish and agreed to participate in the research.

2.3.1. Sample Size

In our previous research in the city, we found the level of only breast milk use in the first 6 months of 52.0%. Since there is no other research conducted in the city on the use of only breast milk, 52.0% was taken as a reference in calculating the sample size (11). In the study, the exclusive breastfeeding level for the first two months was 52.0% with a confidence level of 95% and a power of 80%. At the end of the training, it was aimed to increase the nutritional status of only breast milk by 12% in the first two months (11,14). In the calculation, the necessary sample size formula was used to test a group ratio. The following values are used in the formula:

1.96: Statistical equivalent of 95% confidence interval,

0.52: exclusive breastfeeding reference level,

0.64: target level with 12% increase after training,

0.84: Statistical equivalent of 80% power (Research power is 80%). In light of this aim, the number of participants to be included in both the control and intervention groups was calculated as 133 (15).

2.3.2. Sample Selection-Grouping

In the study, no matching was made between the control and intervention groups in terms of the main variables affecting breast milk. By making a random selection (randomization), the groups will be similar and a sample will be created that will represent the population. The first 133 pregnant women who applied to the FHC and met the required criteria were included in the control group without skipping. Using the same method, the next 133 pregnant women were included in the intervention group without missing any of them. It took seven weeks to identify the participants for the control group and eight weeks to identify the participants for the intervention group.

2.4. Data Collection Tools

The prenatal and postnatal information form, the Infant Feeding Attitude Scale (IIFAS) and the Breastfeeding Self-efficacy Scale-Short Form (BSES-SF) were used to collect the data. The forms were completed using face-to-face interviews with the participants.

2.4.1. Prenatal-Postnatal Information Form

The prenatal information form consisted of 11 questions. In the form, the mother's age, education level, employment status, social security status were requested, along with the father's employment status, family income level, family type, planned pregnancy status, and mother's breastfeeding experience. There were 14 questions in the postnatal information form. In the form, the infant's birth style, birth weight, sex, place of birth were requested, along with the gestational week, the first food given after birth, the first breastfeeding time, the first person to help to breastfeed, pacifier-bottle use status, daily number of breastfeeding, night breastfeeding status and exclusive breastfeeding duration.

2.4.2. Infant Feeding Attitude Scale (IIFAS)

The IIFAS is used to predict breastfeeding time and which formula breastfeeding mothers prefer in infant nutrition. The scale is a five-point likert type, where 1 represents 'strongly disagree' and 5 represents 'strongly agree'. Nine items in the scale contained positive statements about breast milk and eight items were about formula nutrition. The items regarding formula nutrition were scored inversely (1=5, 2=4, 5=1). The participants with a total score of 70-85 were considered to be prone to breastfeeding, a total score of 49-69 represented participants who were undecided in nutritional preference, and a total score of 17-48 represented participants who were prone to formula feeding. Cronbach's alpha internal consistency coefficient was .71 for the scale adapted into Turkish (16). Cronbach's alpha value was found to be .69 in this study.

2.4.3. Breastfeeding Self Efficacy Scale-Short Form (BSES-SF)

This form was created by converting the items of the first form developed by Dennis and Faux (17) in 1999 into future expressions. There were 14 items in the short form. All items were represented by a five-point Likert type rating (1=I am not sure at all, 5=I am always sure). The lowest (14) and the highest (70) scores could be obtained from the scale. Cronbach's alpha value of the form adapted to Turkish was .87 (18). Cronbach's alpha value was found to be .89 in this study.

2.5. Procedure

All participants completed the postnatal information form at the end of the second month after birth. The entired control group was reached after birth. Two participants in the intervention group were excluded from the study due to the death of their infants in the first two months (Figure 1). Antenatal information form, IIFAS and BSES-SF were administered once during the prenatal interview to the groups in the 3rd trimester. The IIFAS and BSES-SF scales were not repeated after birth, as the increase in the level of exclusive breastfeeding in the first 2 months with breastfeeding education meant that the IIFAS and BSES-SF scales were positively affected by the education. It was accepted that both groups received standard breastfeeding counseling from FHC personnel within the scope of prenatal care. After completing the forms, no procedure was applied to the control group, while breastfeeding and breast milk training was provided individually to each participant in the intervention group. In the training, a 15-minute presentation and a video were used. The content included the benefits and content of breast milk, the correct positioning of the baby at the breast, proper breastfeeding and proper infant feeding. At the end of the training, each participant asked her questions in a five-minute question and answer session. A training booklet and brochure were then given to the participants. Educational materials were prepared using the publications of the Ministry of Health of the Republic of Turkey and of UNICEF (19,20). The training content included all the information that the ministry recommended to be provided in the prenatal period.

2.6. Statistical Analysis

A two-step approach was applied in the analyses. In the first stage, the effectiveness of the educational intervention was evaluated. In the second stage, the effect of the educational intervention was re-examined by the researchers together with the factors that were not taken under control. The Kolmogorov-Smirnov test was used to determine the suitability of the data for a normal distribution. Descriptive statistics (number, percentage, median, minimum and maximum), the Mann-Whitney U-test, and the chi-squared tests were used to compare the control-intervention groups and to determine the factors affecting the first two-month exclusive breastfeeding status. Logistic regression analysis was performed to evaluate the effect of educational intervention on the first two-month exclusive breastfeeding status together with other variables. The variables with significant effect in univariate analyses were as follows: breast milk and breastfeeding education status, mother's education status, type of birth, first food given after birth, breastfeeding status in the first half hour, pacifier-bottle use status, night breastfeeding status, gestational week, birth weight, daily breastfeeding number, BSES-SF score, and IIFAS. The Backward Stepwise (conditional) method was followed in the logistic regression analysis.

3. RESULTS

The control and intervention groups were similar in terms of major prenatal variables that may affect the breastfeeding status (*p*>.05) (Table 1).

Table 1. *Distribution of prenatal variables of mothers by control and intervention groups*

	Control Group		Intervention Group			
Characteristics	**N**	**%***	**N**	**%***	**χ^2**	**p**
Educational status						
Illiterate	38	28.6	27	20.6	4.09	.53
Literate (not finished elementary school)	14	10.5	17	13.0		
Elementary school	33	24.8	42	32.1		
Secondary school	25	18.8	21	16.0		
High school	10	7.5	8	6.1		
University and higher	13	9.8	16	12.2		
Employment status						
Working	16	12.0	22	16.8	0.86	.35
Not working	117	88.0	109	83.2		
Employment status of fathers						
Working	121	91.0	110	84.0	2.35	.12
Not working	12	9.0	21	16.0		
Income level						
Income less than expenses	95	71.4	102	77.9	1.12	.28
Income is equivalent to expenses and higher	38	28.6	29	22.1		
Social security status						
Yes	72	54.1	65	49.6	0.37	.54
No	61	45.9	66	50.4		
Family type						
Extended	45	33.8	40	30.5	0.19	.65
Nuclear	88	66.2	91	69.5		
Planned pregnancy						
Yes	92	69.2	90	68.7	0.00	1.00
No	41	30.8	41	31.3		
Breastfeeding experience						
Yes	104	78.2	94	71.8	1.13	.28
No	29	21.8	37	28.2		
	Median (Min. – Max.)		**Median (Min. – Max.)**		**MWU**	**p**
Age of mother	27(16-42)		27(16-41)		8085.0	.31
Number of children	2(0-9)		2(0-9)		8018.5	.25
BSES-SF score**	53(26-68)		52(32-70)		8632.0	.89
IIFAS* scale score**	58(39-83)		59(50-70)		7775.5	.13

**Column Percentage,*

***BSES-SF: Breastfeeding Self Efficacy Scale-Short Form*

****IIFAS: Infant Feeding Attitude Scale*

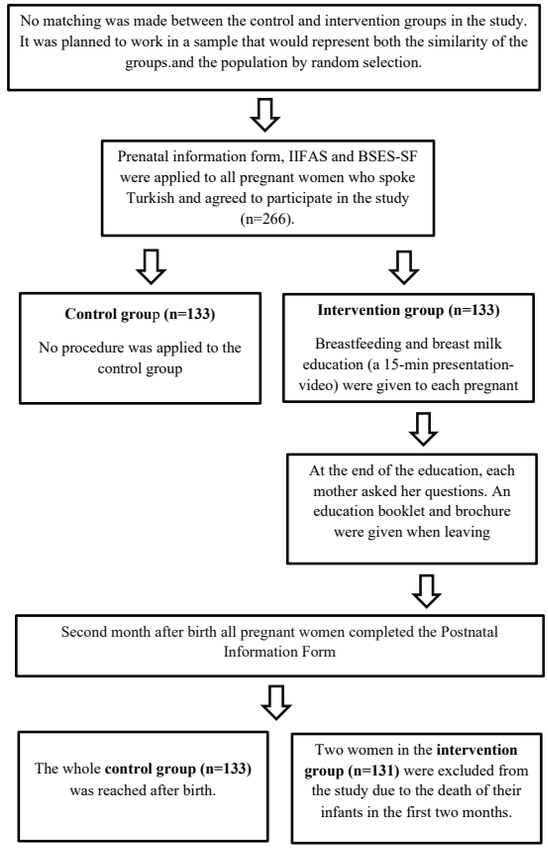

Figure 1. *CONSORT Flow diagram*

The median age of the participants in the control and intervention was 27, and the median number of children they had was two. The median self-efficacy score was 53 in the control group and 52 in the intervention group. The median IIFAS score in the control group was 58, 4.0% of the group were inclined to formula, 9.0% were inclined to breastfeed, and 88.0% were undecided about the way of feeding their baby. The median IIFAS score in the intervention group was 59. 2.3% of the group were inclined to breastfeed, and 97.7% were undecided on the choice of nutrition *(p*>.05) (Table 1).

Initiation of breastfeeding in the first half hour was 43.6% in the control group and 48.1% in the intervention group. Of the participants who started breastfeeding after the first half hour, 44.1% stated that their baby had a health problem, 24.5% stated that they did not have milk, 22.4% stated that their health problems and 9.1% did not want to breastfeed. There was no difference between the control and intervention groups in terms of the variables of first food given and breastfeeding status in the first half hour after birth (*p*>.05). Pacifier-bottle use was higher in the control group (73.7%) than in the intervention group (54.2%) (*p*<.05). The night-time breastfeeding levels of the participants in the intervention group was 96.9% better than the control group (88.7%) (*p*<.05) (Table 2). The median number of breast feedings per day was higher in the intervention group (10 times a day) than in the control group (eight times a day) (*p*<.05) (Table 2).

Table 2. *Distribution of breastfeeding characteristics by control and intervention groups*

Characteristics	Control Group N	Control Group %*	Intervention Group N	Intervention Group %*	χ^2	p
First food after birth						
Breast milk	79	59.4	90	68.7	2.092	.148
Other	54	40.6	41	31.3		
Breastfeeding within the first half hour after birth						
Yes	58	43.6	63	48.1	0.369	.544
No	75	56.4	68	51.9		
Pacifier-bottle use						
Yes	98	73.7	71	54.2	10.049	**.002**
No	35	26.3	60	45.8		
Night breastfeeding status						
Yes	118	88.7	127	96.9	5.510	**.019**
No	15	11.3	4	3.1		
Daily number of breastfeeding	**Median (Min. – Max.)**		**Median (Min. – Max.)**		**MWU**	**p**
	8(0-13)		10(0-13)		5444.5	**<.001**

**Column Percentage*

Table 3. *Distribution of the first two-month exclusive breastfeeding status by control and intervention groups*

Variable	Control Group N	Control Group %*	Intervention Group N	Intervention Group %*	χ^2	p	OR	95% Confidence interval
First two-month exclusive breastfeeding								
Yes	44	33.1	90	68.7	32.091	**<.001**	2.1	1.66-2.85
No	89	66.9	41	31.3	32.091			

**Column Percentage, OR: Odds Ratio*

The first two-month exclusive breastfeeding was 33.1% in the control group and 68.7% in the intervention group, which indicated that the breast milk and breastfeeding education increased the first two-month exclusive breastfeeding level 2.1 times (*p*<.05) (Table 3).

The participants in the control and intervention groups stated that the most common reason for not only feeding breast milk for the first two months was due to insufficient breast milk. This was followed by drinking water and health problems in the babies, respectively. From the distribution of reasons for not only feeding breast milk in the first two months, which is common for both groups, insufficient milk (32.7%) and drinking water (20.0%) were lower in the intervention group than in the control group (67.3% and 80.0%, respectively) (*p*<.05). Except for breast milk and breastfeeding education, the factors affecting exclusive breastfeeding in the first two months were examined. The level of exclusive breastfeeding in the first two months of illiterate women was lower (30.8%) (*p*<.05).

Table 4. *Logistic regression model of factors affecting the first two-month exclusive breastfeeding status (latest model, step 6)*

Variables	B	Standard deviation	p	OR	95% Confidence interval
Pregnancy week	-0.4	0.2	.044	0.6	0.40-0.98
Not taking breast milk as the first food after birth	2.3	0.7	.002	10.5	2.45-45.36
Not using pacifier-bottle	1.4	0.5	.004	4.3	1.61-11.94
Daily number of breastfeeding	-1.4	0.2	.000	0.2	0.14-0.37
Not receiving breast milk and breastfeeding education	1.0	0.4	.029	2.8	1.11-7.09

OR: Odds Ratio

Among the prenatal variables questioned, the mother's employment status, father's employment status, income level, social security status, family type, planned pregnancy status, and breastfeeding experience variables did not affect the first two-month exclusive breastfeeding status (p>.05). When the effect of the variables encountered during and after birth was examined, it was determined that the first two-month exclusive breastfeeding level was higher in the participants who had a normal birth (57.3%) than those who gave birth by c-section (42.1%); higher in those who received breastfeeding as the first food in the first half hour (66.3%) than in those who did not (39.2%); higher in those who did not use pacifier-bottles (83.2%) than those who did (32.5%); higher in those who breastfed at night (54.7%) than those who did not (0.0%); higher in those who received prenatal breastfeeding education (68.7%) than those who did not (33.1%) (p<.05).

The baby's gender, place of birth, and first breastfeeding assistant variables did not affect the first two-month exclusive breastfeeding level (p>.05). The first two-month exclusive breastfeeding infants were found to have a higher gestational week, birth weight, daily breastfeeding number of mothers, self-efficacy score, and IIFAS score than non-breastfeeding infants (p<.05). The maternal age and number of children variables did not affect the first two-month exclusive breastfeeding status (p>.05).

In the logistic regression model, the exclusive breastfeeding status in the first two months was adversely affected 10.5 times by feeding food other than breast milk as the first food after birth, 4.3 times by using pacifier-bottles, and 2.8 times by not receiving breastfeeding education. The weekly progression of the gestational week had a positive effect by 1.6 times, and each unit increase in the number of daily breastfeeding had a positive effect of five times (p<.05) (Table 4).

4. DISCUSSION

The study was conducted in a region with low-income families. Most of the participants had primary or lower educational levels, were unemployed, and had no social security. A large family structure is often seen in the region (Table 1). In this study, as a result of the educational intervention, the level of exclusive breastfeeding increased 2.1 times in the first two months (Table 3). In the study, an increase was achieved with breastfeeding education, well above the target of 12%. Some studies in the literature also support this result (21,22). In another study, the exclusive breastfeeding status of mothers who did not receive prenatal breastfeeding education was adversely affected 1.73 times in the 6th week and 1.92 times in the 3rd month (23). Mattar et al (24) increased the exclusive breastfeeding level by 29% in the first six weeks with prenatal breastfeeding education. Individual prenatal breastfeeding education applied by Chekol et al (25) to mothers increased breastfeeding rates in the second week after birth and positively affected the duration of breastfeeding. However, in a study conducted in Hong Kong, prenatal breastfeeding education could not increase the exclusive breastfeeding levels in the 6th postnatal week or in the 3rd postnatal month. Researchers argued that prenatal breastfeeding education alone was insufficient in societies with high breastfeeding levels and should be supported by postnatal education (26). Consistent with the results, in this study, conducted in the region where education and socioeconomic levels were low, it was determined that prenatal breastfeeding education achieved more success in exclusive breastfeeding and the education had much more positive effects (27).

The prenatal breastfeeding education applied in this study also had a positive effect on the frequency of pacifier-bottle use, night breastfeeding, and breastfeeding (Table 2). Nonetheless, the first food and first breastfeeding time after birth did not demonstrate any positive results after the education. It is understood that prenatal breastfeeding education alone is not sufficient in the onset and continuation of breastfeeding in the early period and the counseling and support provided by postnatal hospital health personnel in the are also vital (26).

In the study, the breastfeeding level was 98.5% in the control and intervention groups for a while. The continuation of breastfeeding for the desired period is a substantial problem. Breast milk and breastfeeding education provided a significant increase in the first two-month exclusive breastfeeding level. However, it should not be overlooked that other factors are also effective on the process. The use of pacifier-bottles decreased the first two-month exclusive breastfeeding by 4.4 times (Table 4). In many studies, it has been reported that the use of pacifier-bottles adversely affects breastfeeding and shortens the duration of exclusive breastfeeding. These apparatuses used to calm the infant cause nipple confusion in the infant. This confusion leads to less breastfeeding and reduced milk production, thus, early introduction of additional food for the baby (11,28,29). The negative effects on breastfeeding make it necessary to combat pacifier-bottle

use. This research has shown that the use of pacifier-bottles can be reduced from 73.0% to 54.0% with education.

In this study, the failure to start breastfeeding the newborn negatively affected the continuation of the first two-month exclusive breastfeeding by 10.3 times (Table 4). Across Turkey, food intake before breastfeeding is an essential problem with 24.0% (10). The first feeding of the newborn with breast milk after birth increases the likelihood of successful breastfeeding continuation (30).

Feeding the newborn with substances or liquids before breastfeeding is called prelacteal feeding (19,20). Prelacteal feeding, which is defined as not performing the first breastfeeding, leads to the failure of mother-infant contact. This results in the absence of milk and the continuation of nutrition with foods other than breast milk (31). Especially during c-section deliveries, problems are encountered in the first breastfeeding due to delays in milk production and surgical site pain. Mothers who give birth by c-section are at higher risk of performing the first feed with foods other than breast milk compared to mothers who give birth naturally (32,33). As a matter of fact, in this study, exclusive breastfeeding was found to be lower in the participants who gave birth by c-section (42.1%) than those who had a natural birth (57.3%). Hospitals also play a large role in starting the first postnatal nutrition with foods other than breast milk. In the first feed, the encouragement of health personnel in hospitals, especially regarding the use of formula, causes the first step to be taken incorrectly. Therefore, the behavior of the healthcare personnel in directing the mother is crucial for the continuation of exclusive breastfeeding (34). Early initiation of breastfeeding is a requirement of being a baby-friendly hospital. In this respect, the fact that all births took place in the hospital should be seen as an advantage in the study and it should be considered as an important opportunity to start breastfeeding (35).

In this study, the most common reason for mothers to start breastfeeding late is due to health problems in their infants. It is estimated that premature births contribute to health problems that occur in the first moments of life. Starting breastfeeding and continuing breastfeeding in premature babies is more difficult than in full-term babies. The need to stay in incubators and receive health care increases in premature births. It causes delays in mother-infant contact, thus, delays in the first breastfeeding. Preterm births also reduce exclusive breastfeeding levels (36).

As a matter of fact, in this study, the increase in gestational week positively affected the first two-month exclusive breastfeeding by 1.6 times. The increase in the number of daily breastfeeding in the study positively affected the first two-month exclusive breastfeeding by five times. (Table 4). One of the main criteria for adequately producing breast milk and continuing breastfeeding is the number of daily breastfeeding (11,37). Prenatal breastfeeding education provided a successful increase in breastfeeding frequency. The increase in the frequency of breastfeeding meets the need for water as well as adequate breastfeeding. In countries with hot climates, mothers worry that their babies are thirsty. Nevertheless, a baby who receives enough breast milk, the majority of which is water, can meet all their water needs. Water use was found to be the second most common cause of deterioration of the first two-month exclusive breastfeeding status in the study. The hot summer season in Sanlıurfa is the main reason for this perception (11). In a study conducted in Mauritius, the most common reason that negatively affected exclusive breastfeeding was giving water to babies. This reason was followed by starting work and the lack of milk (38).

In this study, the most common reason for an early transition to additional food was the lack of milk. Mothers are concerned that their milk will not be sufficient especially in the first days after birth due to reasons such as having a premature baby, c-section delivery, incorrect positioning and attachment, and incorrect breastfeeding (36). Many studies have demonstrated the concern that breast milk will not be sufficient as the main reason for the early transition to supplementary food (39,40). 60% of mothers, who start breastfeeding, stop breastfeeding earlier than the recommended period. Mothers most often have this feeling when their babies cry a lot and stop breastfeeding regardless of their baby's age and start formula food or additional food (41). In accordance with the literature, breast milk and breastfeeding education provided an improvement in both drinking water levels and in the perception of lack of milk in the intervention group (13).

Limitations of the Research

In the study, it was preferred to study the short-term results of the first two months due to the difficulties in follow-ups and the time constraints in the field in showing the effect of prenatal education on the status of exclusive breastfeeding.

5. CONCLUSION

Breast milk and breastfeeding education increased the first two-month exclusive breastfeeding level by 2.1 times. The educational intervention had a positive effect on daily breastfeeding frequency, night breastfeeding level, pacifier-bottle use habit, insufficient breast milk perception, and water use. Early onset and continuation of breastfeeding depend on qualified prenatal breastfeeding education and effective support mechanisms in the maternity hospital.

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Author Contributions:
Research idea: SG, İK

Design of the study: SG, İK
Acquisition of data for the study: SG
Analysis of data for the study: SG, İK
Interpretation of data for the study: SG
Drafting the manuscript: SG, EB
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