

The Effect of Touching the Sole of the Infant's Foot on Starting Times of Sucking and Sucking Efficiency: A Randomized Controlled Study

Safiye Ağapınar Şahin¹ , Sibel Öztürk¹ ,
Nazlı Akar² 

¹Department of Midwifery, Ataturk University, Faculty of Health Science, Erzurum, Türkiye
²Kafkas University Faculty of Health Science, Kars, Türkiye

Abstract

Background: The early initiation of breastfeeding ensures the attachment between the mother and the infant and regular production of breast milk.

Aim: The aim of the study was to evaluate the effect of touching the infant's sole on grasping/latching on the breast.

Methods: The study's type was a randomized controlled experimental design. The sample of this study included 78 infants randomized in a maternity hospital in the Southeastern Anatolia Region of Türkiye. Infants who did not suck and latch on the breast at the end of the first 30 min after birth were included in the study. The study data were collected using the personal information form, Bristol Breastfeeding Assessment Scale, and a stopwatch. Data were analyzed using the Shapiro-Wilk test and the independent t-test.

Results: The mean to the breast of the starting times of sucking the infant in the experimental group was 104.71 ± 61.90 , and the mean to starting times of sucking the infant in the control group was 214.95 ± 106.20 . Touching the soles of the infants in the experimental group significantly reduced the starting time of grasping/latching on the breast.

Conclusion: Touching the sole was effective in shortening the time of sucking touching the sole of infants is effective in starting sucking earlier. Touching the soles of the infant's feet also positively affected the newborn's sucking ability.

Keywords: Breast milk, breastfeeding, infant, latching, mother, sucking

Introduction

Breastfeeding constitutes the basis of children's health, development, and survival.¹ The World Health Organization and United Nations International Children's Emergency Fund recommend initiating breastfeeding within the 1st h after birth.^{2,3} The early initiation of breastfeeding ensures the attachment between the mother and the infant and the regular production of breast milk.⁴ There are many studies in the literature emphasizing the importance of the early initiation of breastfeeding.⁵⁻⁷ Early breastfeeding initiation is also extremely important for reducing late and early neonatal mortality.⁸ While only 50% of infants in the world were breastfed within the 1st h of life,⁹ 71% of infants in Türkiye were breastfed within the 1st h after birth.⁴

There are many factors that prevent the early initiation of breastfeeding. Among these factors, there are postpartum fatigue, cesarean delivery, settings where the mother and infant are separated, not breastfeeding colostrum, and cultural practices directed toward different foods and beverages.^{8,10-11} Problems with breastfeeding emerge more frequently in the early postpartum period.¹² Studies have indicated the problems with breastfeeding included the infant's failure to suck, difficulty in sucking, not sucking well on the 1st day, nipple problems, insufficient breast milk, the infant's inability to grasp the breast, the inability to latch on the breast, and the inability to latch on the breast due to breast engorgement.¹³⁻¹⁷ These problems experienced in the early postpartum period lead to the early cessation of breastfeeding.^{18,19} Therefore, it is important to intervene in these problems related to breastfeeding early. According to Cadwell, the American Academy of Pediatrics also recommends that breastfeeding-related conditions such as position, grasping/latching on the breast, and milk transfer should be observed and recorded at least twice after birth by trained professionals.²⁰ This recommendation indicates the necessity of health-care professionals' support for breastfeeding.

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Corresponding author: Sibel Öztürk
E-mail: sibelc-06@hotmail.com

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There are studies in which health-care professionals support breastfeeding with education and counseling.²¹⁻²³ In randomized controlled studies on breastfeeding initiation and increasing breastfeeding time, education, counseling, and professional support were provided.²⁴⁻²⁶

There were no results of interventional studies for ensuring that infants who could not latch on the breast could latch on the breast. However, in the qualitative study performed by Colson et al,²⁷ a strong correlation was observed between the mouth and the foot in latching on the breast. Furthermore, a correlation was also stated between reflexes and grasping the breast. With the help of this study, a perspective for the development of a technique to have infants latch on their breasts will be provided to breastfeeding educators in Türkiye. The necessity of this study is evident when the effects of breastfeeding on maternal and infant health and the benefits of initiating and maintaining breastfeeding are considered. This study was conducted to evaluate the effect of touching the infant's sole on grasping/latching on the breast.

Research Hypotheses

The research hypotheses of this study are:

- **H₁:** Touching the sole of the foot increases the effectiveness of sucking.
- **H₂:** Touching the sole of the foot shortens the time of starting to suck.

Materials and Methods

Design and Setting

The study was conducted using a randomized controlled experimental design between January 2020 and December 2020 in the postpartum clinic of a state hospital in the Southeastern Anatolia Region of Türkiye.

Sample

The study population comprised infants who were born after 37 weeks of gestation and met the inclusion criteria. The study sample consisted of infants who met the inclusion criteria and their mothers who agreed to participate in the study between the specified dates. A pilot study including 20 experimental and 20 control groups was conducted to perform the power analysis of the study since there was no similar study in the literature. The sample size of the study was calculated according to the mean and effect size values determined as a result of the pilot study. According to the pilot study, the effect size was found as 1.15. The result showed that a sample size of 56 would be large enough to detect significant differences (a power of 95%, an effect size of 1.15, α of 0.001). To avoid missing data, 78 infants were recruited. The sample was divided into two groups: experimental ($n=39$) and control ($n=39$). When the power of the study was calculated again after the study was completed, the G-power of the study was determined to be 0.99.

Randomization and Blinding

Randomization was performed using the Urn method.^{28,29} While white balls represented the experimental group, red balls represented the control group. When it was determined that the infants met the inclusion criteria, the researcher placed balls in a bag and asked a midwife working in the unit during that period to draw a ball out of the bag. Since we had a data collector, we could not assign her as a blind evaluator during the study. Infants were assigned to the experimental

or control group based on the ball's color, thus ensuring their random distribution. The inclusion criteria of the study included mothers who had a vaginal delivery, mothers without any breast problems, mothers with term delivery, infants with a birth weight of 2000–4000 grams, mothers with a single and live infant, mothers without risky pregnancy, and risky delivery, infants with a 1th–5th min Apgar score of seven and above, infants without neonatal complications, mothers willing to breastfeed. In addition, the exclusion criteria of the study were cesarean section, the presence of any anatomical problem that may prevent mothers from breastfeeding (small nipple, flat nipple, etc.), the presence of an anatomical problem that will prevent the infant from sucking (cleft palate, cleft lip, etc.), no neurological problems in the infant and mothers with a risky pregnancy and risky delivery.

Instruments

The data were collected using the personal information form, the Bristol Breastfeeding Assessment Tool, and a stopwatch (Samsung Galaxy J7 prime).

Personal information form

This form, prepared by the researchers, consists of four questions about the mother's age, educational status, parity, and infant's birth weight.

Bristol Breastfeeding Assessment Scale

It was developed by Jenny Ingram in.³⁰ Dolgun et al performed the scale adaptation to Turkish and its validity and reliability study.³¹ This scale was developed to evaluate common breastfeeding problems and breastfeeding efficiency in the postpartum period. The midwife/nurse observes the mother and fills out the scale while the mother is breastfeeding her infant. The application time of the scale is 5–10 min. While Cronbach's alpha value of the original version of the tool was 0.68, it was found to be 0.77 in the Turkish adaptation study. In this study, Cronbach's alpha value of the scale was 0.87.

The BBAS is a Likert-type scale consisting of 4 items: "*swallowing*," "*sucking*," "*holding*," and "*positioning*." Each item in the scale is scored between 0 and 2 points. The highest and lowest scores obtained from the scale are 8 and 0, respectively. While lower scores indicate that breastfeeding is not effective, high scores indicate that breastfeeding is effective.

Stopwatch

It was used to determine the infant's starting time of latching on the breast and sucking (in seconds).

Procedure

Whether mothers hospitalized in the postpartum clinic experienced any problems with breastfeeding was determined by the breastfeeding nurse and researcher NA. Infants who did not suck and latch on the breast at the end of the first 30 min after birth were included in the study. The infants determined by the researcher were randomized and assigned to the groups. Verbal and written consent was received from the mothers of the infants included in the study.

The data were collected by conducting face-to-face interviews using the personal information form created by the researchers and the BBAS and through the researcher's observation. The duration of the infant's grasping of the breast was identified using a stopwatch.

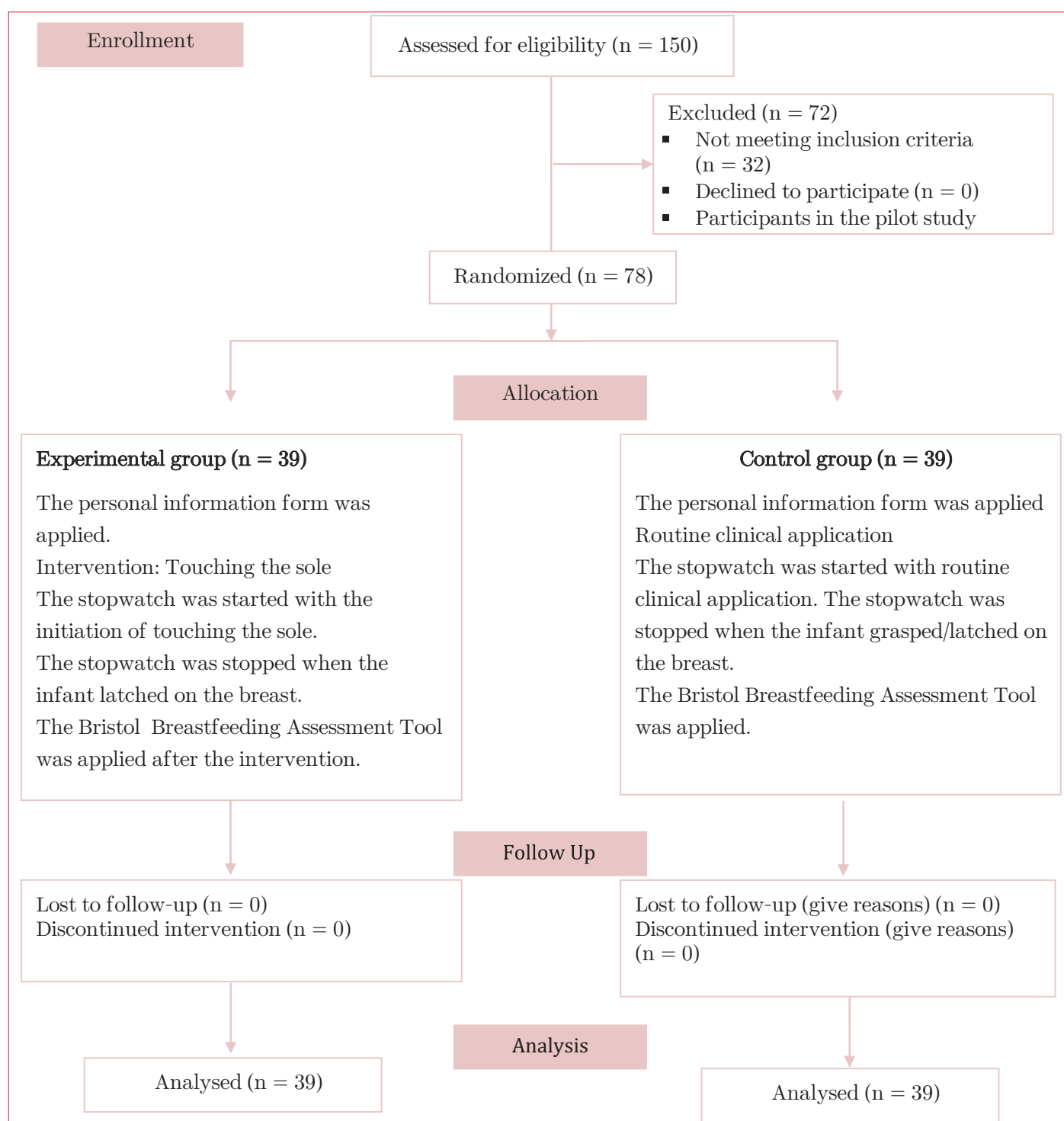


Figure 1. Flow chart of the study.

Measures

Experimental group

Infants who did not suck or grasp the breast within the first 30 min after birth were included in the experimental group. The researcher started the intervention at 30 min after birth. The stopwatch was started as

soon as the researcher with her fingertips began to touch the soles of the foot of the infants in the experimental group in a caressing manner (the researcher touched the infant's sole in a caressing manner while the infant was on the mother's chest). As soon as the infant latched onto the breast, the stopwatch and the intervention (touching the sole in a caressing manner) were stopped. The time it took for the infants in

the experimental group to latch on/grasp the breast was determined by a stopwatch. After the practice, the BBAT scale was filled out by the researcher through observation. The researcher also evaluated the infant's sucking efficiency using the BBAT scale.

Control Group

Infants who did not suck or grasp the mother's breast within the first 30 min after birth were included in the control group. After the personal information form was filled out for the mothers in this group, the researcher performed the routine practice (routine practice: The lactation nurse in the clinic tries to support the newborn by placing it on the mother's breast.) in the clinic. During the routine practice, the stopwatch was started. The stopwatch was stopped as soon as the infant latched onto the breast. As a result of the researcher's observation, the infant's sucking efficiency was evaluated using the BBAT.

Data Analysis

The data obtained from the study were analyzed using the Statistical Package for the Social Sciences for Windows 22.0 program. The Shapiro-Wilk test was used to determine the compliance of variables to normal distribution. The Chi-square and independent t-tests were performed to compare the demographic characteristics of the mothers and infants to show that the experimental and control groups had similar characteristics. The independent t-test was conducted to evaluate the starting time of sucking and sucking efficiency of the experimental and control groups.

Ethical Considerations

Approval was obtained from Atatürk University Non-Interventional Clinical Research Ethics Committee (Approval Number: B.30.2.0.01.00/78, Date: 16.01.2020) before starting this study. Institutional permissions were obtained from the institutions where the study would be conducted (87825162-774.99). The informed consent of the individuals participating in the study was obtained. Necessary permissions were obtained for the use of the scales. The study was carried out following the principles of the Declaration of Helsinki.

Results

Of the mothers in the experimental group, 41% were in the 24-28 age groups, 53.9% were high school graduates, and 51.3% were primiparous. Of the mothers in the control group, 38.4% were in the 24-28 age group, 43.5% were high school graduates, and 46.1% were primiparous. Upon evaluating the similarity between the experimental and control groups, no statistical difference between the groups was observed (Table 1).

Table 2 presents the starting times of grasping the breast of the infants in the experimental and control groups. While the infants in the experimental group started to suck approximately 1.5 min after the intervention (104.71 ± 61.90), the infants in the control group started to suck approximately 3.5 min later (214.95 ± 106.20). In the study, the difference between the groups was statistically significant ($P=.0002$) (Table 2).

When the mean scores of sucking efficiency of the infants in the experimental and control groups were compared, the mean score of the infants in the experimental group was higher than the infants in the control group. Touching the soles of the infants in the experimental group positively affected the holding position of the mother

Table 1. Comparison of the descriptive characteristics of the mothers and infants (n=78)

	Experimental*		Control*		Statistical evaluation
	X±SD		X±SD		
Age	25.79±4.46		24.90±4.68		t=0.871 P=0.386
Birth weight**	3040.51±587.69		3056.15±628.35		t=0.114 P=0.909
	n	%	n	%	
Age					
18-23	12	30.8	15	38.4	χ²=10.045 P=0.593
24-28	16	41.0	15	38.4	
29-35	11	28.2	9	24.2	
Educational Status					
Primary school	13	33.3	19	48.7	χ²=2.167 P=0.338
High school	21	53.9	17	43.5	
University	5	12.8	3	7.8	
Parity					
Primiparous	20	51.3	18	46.1	χ²=0.659 P=0.414
Multiparous	19	48.7	21	53.9	
*n=39 ** (gr).					

*n=39 ** (gr).

Table 2. Comparison of the starting times of sucking of the experiment and control groups*

Groups	X $\pm$ SD	Statistical evaluation
Experimental	104.71 $\pm$ 61.90	t=11.403 p=0.0005
Control	215.02 $\pm$ 106.24	

*The mean time is evaluated in seconds.

Table 3. Evaluation of the sucking efficiency of the infants in the experimental and control groups

Groups	X $\pm$ SD	Statistical evaluation
Experimental	6.38 $\pm$ 1.59	t=3.377 p=0.001
Control	4.89 $\pm$ 2.31	

and the infants' sucking and latching on the breast. In the study, the difference between the groups was statistically significant ($P=.001$) (Table 3).

Discussion

The WHO recommends that all mothers be supported to breastfeed within the 1st h after birth.³² Health-care professionals' support for breastfeeding and lactation is very important in the postpartum

period.³³ Support provided to breastfeeding mothers also constitutes the basis of qualified health-care professional care.³⁴ It is important to support mothers on basic issues such as positioning, latch, and the signs of adequate nutrition to ensure successful breastfeeding.³⁵ In our study, touching the infants' soles may be one of the supports provided to mothers for breastfeeding.

In our study, it was determined that the infants in the experimental group with a problem of grasping/sucking on the breast started to suck in approximately 1.5 min, while the infants in the control group started to suck in approximately 3.5 min. Touching the soles of the infants in the experimental group significantly reduced the starting time of grasping the breast. This result supports hypothesis H₁. With the effect of touching the infant's soles, the search and sucking reflex of the infant was stimulated, and as a secondary effect, the infant may have latched on the breast. Touching the infant's soles may have also directly stimulated latching on the breast. In the literature, it is stated that healthy term newborns have innate reflexes and abilities such as finding the nipple, grasping the breast, and initiating breastfeeding. In contemporary theories on breastfeeding, it is also observed that the focus is set on supporting a relationship-centered breastfeeding experience, including innate breastfeeding abilities.³⁶ The intervention in our study may have positively affected grasping the breast, one of the innate abilities, and stimulated the reflexes. Likewise, in the study conducted by Colson et al,²⁷ it was found that there was a strong correlation between the mouth and the foot in latching on the breast, and when mothers spontaneously touched the feet of their infants, the Babinski reflex, lip and tongue reflexes were stimulated, resulting in grasping the breast. These findings support the efficiency of our intervention. The high mean score for sucking efficiency of the infants evaluated on the BBAT scale in the experimental group supports this result.

According to the present study, the sucking efficiency of the infants in the experimental group was higher than the infants in the control group. The caressing touches of the researcher midwife on the soles of the infants in the experimental group to ensure that the infants could be sucking/grasping the breast may have positively affected the infants' grasping/sucking on the breast. The decrease in grasping duration in the experimental group in Table 2 also supports this result. The positive effect of sucking on the breast included in the total score may have increased the mean score in the experimental group.

Limitations

The lack of studies evaluating sucking and sucking efficiency by touching the sole of the foot is the limitation of the study.

Conclusion

In line with the study results, touching the infant's sole can be integrated into health-care professionals' practices. Owing to this practice, the early initiation of breastfeeding for 1.5–2 min can positively affect the infant's health and the work performance of the midwife. The time savings achieved from practice may provide health-care professionals with an opportunity to take care of infants more. The early initiation of breastfeeding with this practice may contribute to mother–infant attachment and regular breast milk production. The early initiation of breastfeeding also contributes to the attachment between the mother and the infant and the regular production of

breast milk. The intervention that was implemented in this study may be added to the curriculum of midwifery education. This intervention may be made prevalent through in-service training programs to be organized by hospital administrators and provincial directorates of health. It may be included among the breastfeeding policies of the Ministry of Health. Repeating this study with a larger sample may increase its reliability.

Ethics Committee Approval: Ethic committee approval was obtained from Atatürk University Non-Interventional Clinical Research Ethics Committee (Approval Number: B.30.2.0.01.00/78, Date: 16.01.2020) before starting this study.

Informed Consent: Written informed consent was obtained from the mothers who agreed to take part in the study.

Peer-review: Externally peer-reviewed.

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Declaration of Interests: The authors have no conflict of interest to declare.

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