ORIGINAL ARTICLE

Comparison of the Effect of Distance and Face-to-face Breastfeeding Education on Female Nursing Students' Knowledge: A Quasi-experimental Study

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Abstract

Background: Support for breastfeeding by female nursing students has a beneficial impact during the exclusive breastfeeding. This study was conducted to compare the effect of distance and face-to-face breastfeeding education on female nursing students' knowledge.

Methods: This is a quasi-experimental study conducted on 138 female nursing students in their third to eighth semesters at nursing and midwifery school in Shiraz. One hundred and thirty eight students were selected using convenient sampling and divided equally into two experimental groups (face-to-face education with 46 participants and distance education with 46 participants) and one control group (46 participants). Sampling started at the beginning of May 2023 and ended at the end of October 2023. The experimental groups (Groups A and B received face-to-face training and distance education, respectively) received the educational program in three 45-minute sessions over three weeks. Data were collected using a demographic questionnaire and a knowledge questionnaire regarding breastfeeding nutrition at three stages: before, immediately after, and one month after the intervention. The data were entered into SPSS 22 software and analyzed using descriptive and inferential statistics.

Results: There was a statistically significant difference in the two interventional groups compared to the control group regarding the mean score of breastfeeding knowledge immediately ($P=0.049$) and one month ($P<0.001$) after the intervention.

Conclusion: Distance breastfeeding education led to more increase in nursing students' knowledge one month after the intervention, compared to the face-to-face training. It could provide a suitable method for improving the knowledge of health professionals regarding breastfeeding.

Keywords: Breastfeeding, Distance education, Education, Knowledge, Nursing student

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Introduction

Exclusive breastfeeding is the most crucial factor for infants' health; it significantly promotes health and prevents childhood diseases.[1] Infant nutrition from breast milk during the first few hours after birth has positive effects on the infant, as breast milk contains antibodies that strengthen the infant's immune system and is the best nutritional source for infants.[2] The World Health Organization, recognizing the positive effects of breast milk on maternal and infant health, designates it as a high-quality living biological fluid and recommends that all infants should be exclusively breastfed for the first six months and continue to receive breast milk as a complement alongside other foods until the age of 2.[3] The results of a meta-analysis in Iran showed the overall prevalence of breastfeeding was 53% in Iran.[4]

Despite the well-recognized benefits of breastfeeding, many infants are not breastfed during the first months of life, which leads to an increased risk of disease, malnutrition, and mortality.[5] Additionally, formula milk reduces breast milk production and causes breast engorgement.[6] Some experts suggest that in some regions of the world, a decline in breastfeeding is linked to economic, social, cultural, and educational factors, resulting in reduced and delayed breastfeeding initiation, especially during the first six months of life. Few countries have exclusive breastfeeding during the first six months of life.[7] Some factors contributing to low breastfeeding rates in mothers include mother's employment, social and familial pressure, and negative attitudes toward breastfeeding.[8]

Various factors can influence a mother's decision to breastfeed, including the mother's knowledge and skills regarding breastfeeding, support systems, economic status, cultural and social factors, and the skills of healthcare personnel.[9] In addition, a mother requires awareness, knowledge, proper skills, calmness, and self-confidence for successful breastfeeding. Therefore, breastfeeding education and counseling enhance and increase breastfeeding rates.[10] It might be assumed that breastfeeding is a natural process, and every mother should be able to do it without prior preparation and assistance. In lower mammals, time, duration, and the manner of breastfeeding are controlled by genes. However, in higher mammals like humans, patterns and education are necessary.[11] Healthcare professionals, especially nurses, who care for mothers during and after pregnancy play a vital role in educating mothers. However, these professionals need proper education on breastfeeding and its challenges. Choosing the right teaching method is crucial for effective education. Various educational methods such as face-to-face training and distance education are used for training in community health field.[12]

One of the most effective methods for behavior change in learners is face-to-face education, where the instructor and learner directly interact, allowing for questions, answers, and the exchange of opinions. Its main advantage is its nature, as it can involve individuals in discussions, encourage them to change their behavior, and acquaint them with their specific interests.[13] Face-to-face education has a significant impact on increasing learners' awareness, and the use of educational aids such as instructional videos, images, and handouts has also been reported to be effective in breastfeeding education.[14]

However, numerous challenges in the presence of experienced and expert educators, availability of new educational resources in the region, access to modern educational technologies, and the difficulties of learners attending physical classes have led to the development of non-face-to-face teaching and learning methods using technology.[15] Non-face-to-face education learners can access educational content remotely without face-to-face instruction.[16] This method has no time or location restrictions, allowing individuals to use it at home or in other environments, adjusting the content based on their learning schedules.[17] Distance education or distance

learning is the most common application of information technology, presented online and offline in various forms.[18] Given the general advantages of distance education and its special capabilities in medical education, its integration into the ongoing educational programs of universities and teaching hospitals as a blend of traditional and virtual education seems unavoidable.[19] Results of a review study showed that nursing students had sufficient knowledge of the physiology of lactation but insufficient knowledge of supporting women to decide on the practical aspects of breastfeeding and its challenges for healthy or sick babies. The sources of knowledge including the students' personal experiences and the education and training they received during their nursing course education are considered a cornerstone of breastfeeding success.[20]

However, traditional teaching methods regarding the benefits and management of breastfeeding have not been effective enough in enhancing breastfeeding program implementation. In contrast, using the Internet and technology for education in this field is expected to yield better results. This is because the Internet can combine words, images, videos, and animations. Web-based education is a flexible method that allows learners to acquire necessary information based on their learning needs.[21] Since nurses work alongside mothers from childbirth until discharge from the hospital, they play a crucial role in providing healthcare services to support the initiation and continuation of breastfeeding. A nurse's knowledge of breastfeeding and attitude can influence their supportive behavior. A study in America on the effect of online breastfeeding education on the knowledge of nursing students and nurses showed the positive effects of education on the knowledge of breastfeeding participants in the educational intervention. Therefore, knowledge should be accurate and comprehensive to enhance success in breastfeeding.[22] Weak support for breastfeeding can lead to early cessation of breastfeeding. The results of a systematic review of the midwives' knowledge and attitude and the obstacles and facilities for promoting breastfeeding showed that midwives considered breastfeeding promotion as their important role and were willing to increase their knowledge about it. Therefore, competent counselors and healthcare providers' support for breastfeeding are essential during this period. This support significantly impacts the mother's breastfeeding experience and her decision to continue breastfeeding her infant.[23] There is a need to retrain and complete knowledge about breastfeeding for all health workers who deal with mothers. In many regions of the world, these training courses are part of the training program for nurses and midwives.[24] A study in Ghana which evaluated breastfeeding competencies, training, barriers, and satisfaction of breastfeeding educational experiences among nurses and midwives showed that approximately 80% of the nurses and midwives reported they needed further training/updating on breastfeeding, while 40% reported clinical/professional practice as the significant contributor to their breastfeeding counseling competencies. The commonly reported barriers to breastfeeding counseling were too much workload, inadequate time, and materials for breastfeeding counseling.[25] The results of studies in other parts of the world, including Jordan and Türkiye, indicated the need to strengthen students' educational programs and improve their knowledge about breastfeeding problems.[26, 27]

Nowadays, according to the advantages of distance education and the large volume of required materials, it is better to use this type of education to improve the knowledge of students and nurses, due to the lack of time and need for resources that can be used in the form of self-learning in appropriate situations. Hence, this study was conducted to compare the effect of distance and face-to-face breastfeeding education on female nursing students' knowledge.

Materials and Methods

This is a quasi-experimental study with pre-test and post-test assessments involving two intervention groups and one control group. The target population included all female students of the 3rd to 8th semester of nursing at the Faculty of Nursing and Midwifery of Hazrat Fatimah (PBUH), Shiraz, Iran. Sampling started at the beginning of May 2023 and ended at the end of October 2023. Using the census method, all female students who met the entry criteria were invited to participate in the study. One hundred and thirty eight students were selected using convenient sampling and divided equally into two experimental groups (face-to-face education with 46 participants and virtual education with 46 participants) and one control group (46 participants). The researcher provided the individuals with additional explanations in all three groups. Group A received face-to-face training in a classroom setting. Group B was trained using distance content. Group C, the control group, received routine education according to their curriculum at the nursing school.

Inclusion criteria for the study were willingness to participate, a female nursing student in the third to eighth semester, lack of breastfeeding experience, lack of participation in similar training, and enrollment in the Faculty of Nursing and Midwifery of Hazrat Fatemeh in Shiraz. Exclusion criteria included missing more than one virtual or face-to-face training session, being unwilling to continue cooperation, submitting incomplete questionnaire, or being transferred to other nursing and midwifery schools in other medical sciences universities. Students temporarily who were studying at the Faculty of Nursing and Midwifery in Shiraz from other medical sciences universities for a few courses were also excluded from the study. To prevent the transfer of information between the three groups, the researchers held the training program of groups at the same time; the interventions and control groups were provided with explanations separately. After completing the study, the control group had access to the educational content.

The students in both intervention groups A and B, in addition to routine education, attended the sessions conducted by the researcher over three consecutive weeks, (one session every week) with each session lasting 45 minutes. The research objectives were explained, participants signed written consent forms, and a knowledge assessment questionnaire was completed by students of three groups. Then, three face-to-face sessions were held in Group A, while Group B received three distance sessions. Group C received only routine education provided by the nursing faculty. The education of group A was conducted through lecturing and PowerPoint presentation with questions and answers. The education of group B was delivered using the Navid system (the university-approved virtual learning system for students) through instructional videos and written and visual materials. The content of education in both interventional groups are shown in Table 1.

Table 1: Educational breastfeeding contents for female nursing students in interventional groups

Sessions	Educational Content
First	Benefits of breastfeeding for infants and mothers, the advantages of initiating breastfeeding immediately after birth, common misconceptions about breastfeeding, and issues with artificial feeding.
Second	Review of the content from the first session, problems related to initiating breastfeeding, especially in mothers who have had a Cesarean section, various breastfeeding positions with the help of a doll or instructional video, considerations for medication interventions, and temporary or permanent contraindications to breastfeeding, a summary of the topics covered.
Third	Review of the content from previous sessions, signs of proper latching of the infant, effective sucking signs, hunger cues and satiety signs in the infant, appropriate breastfeeding techniques, and methods to increase maternal milk production and its preservation, a summary of the topics covered.

After completing the interventions, the breastfeeding knowledge questionnaire was completed by two interventional and one control groups immediately and one month later.

Demographic information such as age, marital status, academic semester, clinical work experience, and the duration of clinical training in the obstetrics department was collected. Students' knowledge was assessed using a breastfeeding knowledge questionnaire. The questionnaire comprised 20 questions and was developed based on the content of the "Promotion of Breastfeeding Nutrition" textbook provided by the Ministry of Health and Medical Education of Iran for health volunteers. For this reason, the questionnaire was psychometrically evaluated based on the opinion of experts, and face and content validities were determined.

In this study, quantitative methods were used to determine the face and content validity of the questionnaire. The opinions of 10 Shiraz University of Medical Sciences faculty members, experts in breastfeeding education and tool development were considered. We used a 5-point Likert scale for responses, including "completely important" (5), "somewhat important" (4), "moderately important" (3), "slightly important" (2), and "not important at all" (1). The face validity of all questionnaire items was above 1.5 and was confirmed. Content validity was assessed by calculating the average content validity index (CVI) of all questionnaire items. In this study, the content validity ratio (CVR) was equal to 0.81, which is considered acceptable. Additionally, the calculated CVI was 0.81, which was deemed appropriate. The reliability of the instrument was evaluated using Kuder-Richardson, and the obtained value was 0.66. Thus, the instrument had an appropriate validity and reliability. In this questionnaire, a correct answer gets 1 score, and a wrong answer or I don't know gets 0 marks. The scores range from 0 to 20. A higher score was indicative of higher knowledge about breastfeeding.

To assess the normality of data distributions, we employed the Shapiro-Wilk test. ANOVA and Chi-Square tests were used for data analysis in SPSS software version 22. The significance level was set at 0.05.

All Interventions performed in the current study were in accordance with the Ethics committee of Shiraz University of Medical Sciences (approval number: IR.SUMS.NUMIMG.REC.1401.065). They were assured that the information obtained from them would remain confidential. In addition, the research objectives were explained, and written informed consent was obtained from the participants for their participation in the study. They were informed of their right to withdraw from any study stage with no effect on their educational progress. To uphold ethical principles, we made the educational content available to the control group as an educational booklet after the intervention was finalized.

Results

The present research was conducted on 138 female nursing students from the third to eighth semesters of Hazrat Fatemeh School of Nursing and Midwifery. In the statistical analysis before the intervention, the three groups showed no statistically significant differences in demographic and educational characteristics ($P<0.05$) (Table 2). The ANOVA test showed that there was no statistically significant difference between the three groups regarding the age variable ($P<0.443$).

Based on the results in Table 3, there was no statistically significant difference in the mean knowledge score of the three groups before the intervention ($P=0.615$). Immediately after the intervention, the mean knowledge score in the two intervention groups increased and there was a significant difference among the three groups ($P<0.049$). One month after the intervention, there was a significant difference in students' knowledge scores among the three groups ($P<0.001$) (Table 3).

Table 2: Characteristics of female nursing students

Variable	Control N (%)	Distance Education N (%)	Face to Face	Chi-square	P value*
Academic Term					
Term3	7(15.2)	5(10.9)	8(17.4)	12.078	0.28
Term4	5(10.9)	11(23.9)	10(21.7)		
Term5	7(15.2)	6(13)	5(10.9)		
Term6	12(26.1)	6(13)	14(30.4)		
Term7	8(17.4)	12(26.1)	3(6.5)		
Term8	7(15.2)	6(13)	6(13)		
Marital Status					
Married	20(43.5)	30(65.2)	21(45.7)	5.280	0.071
Single	26(56.5)	16(34.8)	25(54.3)		
Having child					
Yes	11(23.9)	16(34.8)	11(23.9)	1.186	0.403
No	35(76.1)	30(65.2)	35(76.1)		
Having Clinical Experience					
Yes	21(45.7)	17(37)	18(39.1)	0.781	0.677
No	25(27.3)	29(63)	28(60.9)		
Duration of Training in Obstetrics and Gynecology ward					
More than one month	25(54.3)	28(60.9)	30(65.2)	1.149	0.563
Less than one month	21(45.7)	18(39.1)	16(34.8)		

*Chi-square test

Table 3: Comparison of the mean scores of nursing students' knowledge about breastfeeding between the interventions and control groups

Group	Before Intervention Mean±SD	Immediately after Intervention Mean±SD	One month after the Intervention Mean±SD	F-statistic	P value*
Distance Education	18.17±1.22	19.19±0.68	19.35±0.57	24.743	<0.001
Face-To-Face Education	18.39±1.14	19.11±0.90	19.28±0.66	12.081	<0.001
Control	18.37±1.12	18.67±0.89	18.78±0.84	2.284	0.106
P value**	0.615	0.049	<0.001		

*Repeated Measures ANOVA; **One way ANOVA

Pairwise comparison between the groups using the Bonferroni method showed that immediately after the intervention, there was no significant difference between the two intervention groups (P<0.63), but one month after the intervention, there was a significant difference between the distance and face-to-face groups (P<0.03).

Discussion

The results of this study indicated that the impact of educational intervention was effective and increased the students' knowledge, However, the mean score of knowledge in students who were in the distance education group was higher than the face-to-face education group one month after the intervention. A scoping review about education of undergraduate health students related to lactation reported that students had improved their knowledge and attitudes (59%), breastfeeding support skills (45%), and confidence (10%).[28] The results of a meta-analysis show that to improve the support that nurses offer to women, they need to be well educated and trained in infant feeding to feel empowered and enabled to accomplish their role.[29] Nursing students need additional training before entering the maternity and newborn wards.[20] A study showed that breastfeeding education programs can improve midwives' knowledge about breastfeeding. However, breastfeeding

educational programs had limited effects on initiation and the duration of breastfeeding.[30]

In the current study, distance education in the promotion of breastfeeding significantly affects the knowledge of female nursing students. In a previous study, after the use of a web-based educational program, the knowledge scores regarding breastfeeding in the nursing students and nurse practitioners/ midwives were significantly higher than those in the control group, which aligns with the present research results.[22] Another study on the effectiveness of online breastfeeding training to increase the knowledge of healthcare workers reported increased knowledge of breastfeeding self-efficacy.[31] A study in Mexico showed that even semi-virtual training for health workers could improve their knowledge and performance to support breastfeeding mothers.[32]

Numerous studies have been carried out on the use of distance methods in breastfeeding training, some of which being done during Corona. They all emphasize the effect of this training method on different groups of personnel and students.[33-36]

Due to the changes in the educational needs of students today, distance education is given great importance and these methods can be used in many fields, including the improvement of students' knowledge; also, students can access the content at times convenient for them and as often as necessary. Despite the growing awareness surrounding the benefits of breastfeeding and the need for evidence-based breastfeeding practices, research has found that healthcare professionals lack the knowledge and skills to support infant feeding effectively.[37] It seems that according to the working conditions of nurses and nursing students in terms of work shifts, distance education is a suitable option for improving the knowledge of these groups.

The strength of this study is the comparison of two methods of teaching students in one of the important issues in neonatal health, breastfeeding. One limitation of the present research is the lack of an investigation into the long-term effectiveness of these educational interventions due to time constraints. It is recommended that future research should be conducted longitudinally on the effect of exclusive breastfeeding education on nursing students, and the effects should be monitored over a longer period.

Conclusion

The results of this study demonstrated that distance breastfeeding education led to more increase in nursing students' knowledge one month after the intervention compared to face-to-face training. It is worth mentioning that educational software and distance learning resources can provide a suitable platform for improving the knowledge of health professionals regarding breastfeeding.

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Authors' Contribution

FV, MK, and LZ developed conceptualization and methodology. FV and MK performed data collection, data processing, and interpretation. FV and MK wrote the first draft of the manuscript. FV, MK, and LZ conducted critical revisions for important intellectual content. All authors thoroughly reviewed and revised the manuscript and approved the final version for publication. The corresponding author confirms that all individuals listed have met the authorship criteria, and that no eligible contributors have been excluded.

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Conflict of Interest: None declared

Declaration on the use of AI

The authors of this manuscript declare that artificial intelligence was not used at any stage of conducting, collecting, and analyzing data, or writing the article.

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