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ORIGINAL ARTICLE

The Effect of the Education about the Practices Supporting Oral Feeding in Preterm Infants on the Knowledge Levels of Health Professionals

Sağlık Profesyonellerine Verilen Preterm Bebeklerde Oral Beslenmeyi Destekleyici Uygulamalar Konusundaki Eğitimin Bilgi Düzeyine Etkisi

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Note

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ABSTRACT

Aim: The study was conducted to investigate the effect of an education program about evidence-based interventions for oral feeding supporting practices in preterm infants on the knowledge levels of neonatal nurses and physicians.
Materials and Methods: The study is a single group study with a pretest-posttest pre-experimental design. It was conducted on 44 healthcare professionals (nurses and physicians) at a medical faculty hospital in Turkey. Data were collected using the Demographic Characteristics Form and the Preterm Infant Feeding Knowledge Form. The participants were divided into groups of 8 to 10 and each education was completed in a single session lasting for about 45 minutes, in a total of five days. The participants completed the pretest prior to the education program. The posttest was administered two weeks after the completion of the education. The data were analyzed using the McNemar test and the paired t test.
Results: The average age of the participants is 26.14±4.81. Of the 44 participants, 86.4% are nurses, 13.6% are physicians, and 88.6% are female. While 63.6% of the healthcare professionals had a Neonatal Resuscitation Program certificate, 70.5% did not have the neonatal intensive care nursing certificate. It was found that 40.9% of the participants did not receive education about preterm infant feeding, while those who received training before were found to have breast milk training in the context of in-service training. The mean pretest rate of correct answers was 58.69%, while the mean posttest rate of correct answers was 78% (p<0.001)
Conclusion: It has been revealed that the education on oral feeding supporting practices in preterm infants improves the knowledge levels of the healthcare professionals.

Keywords: Education; evidence based interventions; NICU; oral feeding; preterm infants

ÖZ

Amaç: Çalışma, preterm bebeklerde oral beslenmeyi destekleyici uygulamalara yönelik kanıta dayalı beslenme protokolleri konusunda bir eğitim programının yenidoğan yoğun bakım ünitesinde çalışan sağlık profesyonellerinin bilgi düzeylerine etkisini belirlemek amacıyla yapılmıştır.
Gereç ve Yöntem: Çalışma, tek grup öntest-sontest deney öncesi tasarımdır. Çalışma, bir tıp fakültesi hastanesinde 44 sağlık profesyoneli (hemşire ve hekim) ile yürütüldü. Veriler "Demografik Özellikler" ve "Preterm Bebek Beslenmesine Yönelik Bilgi Formu" kullanılarak toplandı. Eğitimler 8-10 kişilik gruplar halinde ortalama 45 dakika süren tek oturumda beş günde yapıldı. Eğitim öncesinde öntest ve eğitim tamamlandıktan iki hafta sonra sontest uygulandı. Veriler, McNemar test ve paired t testi ile analiz edildi.
Bulgular: Katılımcıların yaş ortalaması 26,14±4,81'dir. Katılımcıların %86,4'ü hemşire, %13,6'sı hekim ve %88,6'sı kadındır. Sağlık profesyonellerinin %63,6'sının yenidoğan resüsitasyon programı (NRP) sertifikası varken, %70,5'i yenidoğan yoğun bakım hemşireliği sertifikasına sahip değildir. Katılımcıların %40,9'unun preterm bebek beslenmesi hakkında eğitim almadığı, eğitim alanların ise hizmet içi eğitim kapsamında emzirme eğitimi aldıkları belirlendi. Doğru yanıtların öntest ortalaması %58,69 iken, sontest ortalaması %78 dir (p <0,001).
Sonuç: Preterm bebeklerde oral beslenmeyi destekleyici uygulamalar konusunda verilen eğitimin sağlık profesyonellerinin bilgi düzeyini artırdığı saptandı.

Anahtar kelimeler: Eğitim; kanıta dayalı uygulamalar; oral beslenme; preterm bebek; YYBÜ

Introduction

The transition from gavage to oral feeding is usually difficult (1). Oral feeding in preterm infants is a complex and dynamic process involving the interaction between oral-motor, neurological, cardiorespiratory, and gastrointestinal systems (2). While oral feeding is an automatically active skill in term babies, this skill needs to be learned in preterm babies. In order for babies to develop their oral feeding skills effectively, the caregiver should support the baby (3, 4).

Neonatal nurses have a primary role in feeding preterm and sick babies (3). Preparation for feeding and evaluation of nutrition are important parts of the routine care provided by neonatal nurses (5). They

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should be able to evaluate infants' readiness for oral feeding and apply evidence-based feeding protocols (such as cue-based feeding, SINC) and therapeutic interventions (such as positioning, bottle flow rate, cue-based feeding, wrapping) (2).

While there are many studies evaluating the transition of preterm infants to oral feeding and evidence-based protocols in the literature (6-8), it is seen that the number of studies evaluating the knowledge of health professionals about oral feeding of preterm infants is limited (2). Thus, this study aims to determine the effect of an education program on the evidence-based feeding protocols for practices supporting oral feeding in preterm infants on the knowledge level of health professionals working in the neonatal intensive care unit.

Research question:

- What is the effect of the education on the evidence-based feeding protocols for practises supporting oral feeding in preterm infants on the knowledge level of health professionals working in the neonatal intensive care unit (NICU)?

Materials and Methods

Study Type

The study is a single group study with a pretest posttest pre-experimental design. It was carried out as a preliminary study of a part of a doctoral dissertation (9).

Sample and Setting

The study was conducted in a third-level NICU in Konya. The research sample consisted of 54 health professionals (45 neonatal nurses, 2 neonatologists, 7 assistant doctors) working in the NICU of the hospital according to the complete count method. Health professionals who could read and write Turkish and who signed the informed consent form were included in the study. The health professionals who did not attend the training sessions full-time, who left the institution, and who left some items in the questionnaire unanswered were excluded from the study. As a result, a total of 10 healthcare professionals withdrew from the study (three neonatal nurses stopped working in the NICU, five nurses could not attend the training sessions full-time, and two nurses did not want to continue). As a result, the study was completed with 44 people (81.5% of the population).

The Education Program

The nurses and doctors working in the NICU were given group education by the researcher in the training room of the unit on evidence-based feeding protocols for practices supporting oral feeding in preterm infants within the scope of developmental care. The education program was developed by the researchers based on the literature (6). Expert opinion was obtained from two professors and a neonatologist in Pediatric Nursing for the evaluation of the educational content. The education content included the topics of importance and implementation of evidence-based feeding protocols, infants' readiness for oral feeding, signs of hunger and stress, factors affecting oral feeding, infants' physiological parameters, and safe feeding strategies (such as positioning, wrapping, external rest, non-nutritive sucking, using slow-flow nipples).

The participants were divided into groups of 8-10 people, and the education program was completed in five days between February 28 and March 13, 2018 in a single session lasting 45 minutes on average. The education was conducted by the first researcher using a powerpoint presentation and videos on oral feeding. Interactive teaching methods such as question and answer, group discussion and brainstorming were used during the education. At the end of the education program, each participant was given an evidence-based feeding protocol for infant feeding.

After the education, a social media (WhatsApp) education group was created to support the success of the training given on evidence-based feeding protocols for practices supporting oral feeding in preterm infants. Information on evidence-based feeding protocol and preterm infant feeding, reminder notes, short videos about feeding, and answers to questions were shared on this group at regular intervals. The content of the messages was prepared within the framework of the information presented in the education program.

Measures

Data were collected using the Demographic Characteristics Form and the Preterm Infant Feeding Knowledge Form.

Demographic Characteristics Form: The form was developed to collect information about the sociodemographic characteristics (age, education, occupation, income level, years of experience in the profession, years of experience at NICU etc.) of health professionals.

Preterm Infant Feeding Knowledge Form: The form was developed by the researchers in line with the literature (10, 11) to evaluate the knowledge levels of neonatal nurses and doctors about oral feeding of preterm infants and practices supporting oral feeding. It consists of 16 statements in total, including multiple choice and true-false question types. Correct answers were scored as one (1) and incorrect answers as zero (0).

The content validity of the questionnaire was tested by receiving the opinions of a professional group consisting of two neonatal intensive care nurses

and three academicians (Department of Pediatrics Nursing). The total content validity index (CVI) score of the form is 1.

Data Collection

Data were collected between February and March 2018. One week before the start of the education program, the participants completed the pretest. Two weeks after the program was completed, the posttest was performed by administering the Preterm Infant Feeding Knowledge Form again.

Statistical Analyses

The data were analyzed using SPSS 22 (IBM, New York, United States). Descriptive statistics (mean, standard deviation, percentage, and frequency) was calculated to analyze the sociodemographic data. The McNemar test and the Paired t-test method were used to evaluate the change in the knowledge levels of health professionals. The significance level was set at $p<0.05$.

Ethical Considerations

Ethics Committee approval was obtained from Selcuk University Clinical Research Ethics Committee (2017/34), and institutional permission was obtained from the relevant hospital to conduct the study. Written informed consent was obtained from the participants after informing them about the purpose and methods of the study, possible benefits, and their rights to withdraw from the study.

Results

Sample Characteristics

The demographic characteristics of the participants are presented in Table 1. The mean age of the participants was 26.14± 4.81 years, 88.6% were women, 50% were university graduates, and 86.4% were nurses. It was determined that 61.4% of the participants had 0-5 years of professional experience, 79.5% worked in the NICU for 0-5 years, 63.6% had an neonatal resuscitation program (NRP) certificate, and 70.5% did not have NICU nursing certificate. It was found that 40.9% of the participants did not receive training on preterm infant feeding, and those who received training only received breastfeeding training within the scope of in-service training (Table 1).

Pretest and Posttest Knowledge Levels

It was revealed that the mean score of the participants in the Preterm Infant Feeding Knowledge Form regarding the practices supporting oral feeding was 9.39±2.14 in the pretest and 12.48±1.61 in the posttest. It was found that the posttest knowledge scores of the participants were statistically significant and higher than the pretest scores ($p<.001$) (Table 2).

Table 1. Sociodemographic characteristics of the healthcare professionals (n= 44)

Variables	Number	%
Age (years), (Mean±SD)	26.14± 4.81	
Gender		
Male	5	11.4
Female	39	88.6
Education		
High-school	16	36.4
Graduate	22	50.0
Post-graduate	6	13.6
Occupation		
Nurse	38	86.4
Doctor	6	13.6
Years of experience in the profession		
0-5	27	61.4
6-10	15	34.1
11-20	2	4.5
Years of experience in NICU		
0-5	35	79.5
6-10	8	34.1
11-20	1	2.3
NRP certificate		
Yes	28	63.6
No	16	36.4
Neonatal intensive care nursing certificate		
Yes	7	15.9
No	37	84.1
Received education on preterm infant feeding		
Yes	18	40.9
No	26	59.1

NRP, Neonatal resuscitation program; NICU, Neworn Intensive Care Unit

Table 2. The level of knowledge of healthcare professionals on practices that support oral feeding (n= 44)

Variables	n	Mean ± SD	Min	Max	*t**	*p*
Pre-test	44	9.39±2.14	4	13	-8.509	<.001
Post-test	44	12.48±1.61	10	15		

*paired sample t test; SD, standard deviation.

Table 3 shows the changes in the rates of correct answers in the pretest and posttest to the statements regarding the practices supporting oral feeding. In the pretest, item 10 (15.9%), item 14 (15.9%), item 3 (22.7%),

item 1 (27.3), item 7 (34.1%), and item 15 (34%) were the items with the least correct answers.

In the posttest conducted two weeks after the education program, half and more than half of the participants (50-72.7%) gave a correct answer to the items answered incorrectly in the pretest (items 1, 3, 7, 10, 15). It was observed that the rate of correct answers to item 14 was less than half (36.4%). In the posttest, it was seen that all the participants (100%) answered items 5, 6, 12, and 13 correctly.

While items 1, 2, 3, 7, 10, 12, 13, and 15 in the Preterm Infant Feeding Knowledge Form showed a statistically significant change in the posttest compared to the pretest ($p<0.05$), other items in the form (items 4, 5, 6, 8, 9, 11, 14, and 16) did not show a statistically significant change ($p>0.05$) (Table 3).

Table 3. Changes in the rate of the correct answers of the participants in the preterm infant feeding knowledge form (n= 44)

Items*	**Pre-test**		**Post-test**		**p**
	n	**%**	**n**	**%**	
1. Within the scope of "Synactive Theory", heart rate and respiration show the baby's condition in the autonomic subsystem. (Correct)	12	27.3	26	59.1	***0.003***
2. Positioning, kangaroo care, family involvement in care, pain management, ensuring the order of sleep and wakefulness, collective care, and arranging the physical environment are included in the individualized developmental care approaches. (Correct)	27	61.4	40	90.9	***0.002***
3. Joining the hands in the midline is among the infant's self-regulation behaviors. (Correct)	10	22.7	27	61.4	***<.001***
4. An increase/decrease in respiratory rate is among the stress symptoms in infants. (Correct)	30	68.2	24	54.5	0.210
5. Hand or fist sucking is one of the infant's signs of hunger. (Correct)	40	90.9	44	100	0.125
6. Breast milk is the first choice for infants to switch to oral feeding. (Correct)	44	100	44	100	>.999
7. Non-nutritive sucking can be applied with expressed breast or pacifier. (Correct)	15	34.1	32	72.7	***0.002***
8 Kangaroo care increases mother-baby attachment and breast milk, positively affects the baby's oxygen saturation and sleep regulation, and reduces stress. (Correct)	37	84.1	39	88.6	0.688
9. Neurological maturity, light and sound level of the NICU, sucking-swallowing-respiratory coordination, milk flow rate from the bottle, and strategies used by the nurse during feeding are among the factors that affect the oral feeding of the baby. (Correct)	41	93.2	41	93.2	>.999
10. The semi-elevated side-lying position is the recommended position for oral bottle feeding of premature infants and its effectiveness has been proven. (Correct)	7	15.9	22	50	***<.001***
11. Being physiologically stable, coordinating sucking-swallowing-respiratory functions, managing secretions, keeping the body in flexion posture and maintaining non-nutritive sucking skills are among the signs of readiness for oral feeding. (Correct)	34	77.3	37	84.1	0.581
12. *Therapeutic tasting* is the method applied by dripping one drop of milk at a time from the breast of the mother or from a 1 ml syringe to the pacifier. (Correct)	34	77.3	44	100	***0.002***
13. Test weight is the correspondence of baby's 1 gram weight increase to 1 cc of breast milk. (Correct)	20	45.5	44	100	***<.001***
14. Breast milk should be hand expressed in the first days; two breasts should be expressed at the same time with an electric double pump in the following days, and breast milk should be expressed at least six times, preferably 8-12 times. (Correct)	7	15.9	16	36.4	0.064
15. After cooling the freshly expressed milk for at least 1 hour in the refrigerator, it can be combined with milk expressed several times during the same day. Expressed milk is stored on the middle shelf and back of the refrigerator or freezer for 3 hours at room temperature, 3 days in the refrigerator, and 3 months in the deep freezer. (Correct)	15	34.1	28	63.6	***0.004***
16. In order to ensure success in the transition of the baby to oral feeding, developmental feeding skills and non-nutritive sucking should be supported, nutritional tips should be defined, oral intake readiness should be evaluated, kangaroo care should be applied, the team should cooperate, and parents should be trained. (Correct)	40	90.9	41	93.2	>.999

* The McNemar test was used to compare the rate of correct answers.

Discussion

Nurses and doctors play an important role in the planning, evaluation, and safe and successful management of oral feeding of preterm infants. In this study, the knowledge levels of health professionals working in the NICU were evaluated before and after an education program on evidence-based feeding protocols for practices supporting oral feeding in preterm infants. The posttest results revealed that the knowledge scores of the participants increased significantly after the education program compared to the pre-training scores (Table 2). Thus, it can be said that the education program was effective in increasing the knowledge level of health professionals. In the literature, it is stated in various studies that trainings given to health professionals increase the level of knowledge and improve practices (12-15).

It is considered important to include information and practices regarding evidence-based feeding protocols and practices supporting oral feeding in the education programs provided to health professionals in the NICU. The use of these evidence-based practices and protocols by health professionals in the unit and their involvement in care can provide significant success in the feeding of preterm infants (16). In line with professional development, supporting health professionals with evidence-based practices and new knowledge can improve the infant's feeding skills (16, 17).

It was observed that in the unit where the study was carried out, the health professionals have adopted a feeding approach based on traditional and individual preferences in equipping preterm infants with oral feeding skills. For example, according to an approach based on body weight and gestational week, doctors and nurses evaluate the readiness of the preterm infant for oral feeding and make the decision to start or maintain oral feeding (18). In this context, it is critical for health professionals, especially nurses, who are primary caregivers, to be able to manage this process well. In addition, mothers who try to improve their infants' oral feeding skills may receive a variety of feedback from health professionals, which may cause stress in mothers and which may delay the transition of preterm infants to oral feeding (19). Therefore, it is important that healthcare professionals provide parents with consistent, accurate and valid information.

In the study, some of the correct answers given to the items in the Preterm Infant Feeding Knowledge Form, which includes practices that support oral feeding, came to the fore. Breast milk is indisputably in the first place in the feeding of a premature baby. The American Academy of Pediatrics (AAP) states that breast milk should always be the preferred food type in premature infants because of its beneficial biological content and reducing the risk of necrotizing enterocolitis (20). In the study, it is seen that all of the health professionals (100%) already had this knowledge before the education program (Item 6). Mothers who cannot breastfeed for various reasons express their milk and store it under appropriate conditions (21). It is seen that the majority of health professionals (63.6%) answered the item containing information on breast milking and storage conditions correctly after the training (Item 15). Our study revealed that the level of knowledge about evidence-based interventions to support oral feeding skills of infants was quite high (over 90%) before and after the education program (Item 16). It was also observed that all of the participants (100%) learned the therapeutic tasting application method with the training given (Item 12) (Table 3), which is an important indicator for the effectiveness of the education program. On the other hand, it was observed that the rates of correct answer did not change in some items, which suggests that long-term, detailed trainings should be provided regarding the knowledge these items contain.

Strengths and Limitations

Developing the education program in line with an evidence-based guide is the strength of the study. However, the study includes some limitations. Firstly, due to the pretest effect influencing internal validity and the application of the knowledge form twice (pretest-posttest), the items may be familiar to the participants or they may have done research on the items. Therefore, the posttest scores of the participants may have been affected. Another limitation of the study is that the data collection tools are based on self-report. Finally, the study was conducted in a single center, which limits the generalizability of the findings.

Conclusion and Recommendations

The results of the study indicate a significant improvement in the knowledge level of health professionals after the training on the practices supporting oral feeding. This improvement had a positive effect on the knowledge levels of health professionals. In addition, it can be said that there is a need for continuous and repeated effective training on oral feeding skills of preterm infants in order to increase the knowledge and awareness levels of health professionals and to see the reflections of these repeated trainings on clinical practice.

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