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Does A Training Program Improves Neonatal Nurses' Knowledge and Practice Towards Developmental Positioning of Premature Infants?

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Abstract

Premature infants face many challenges in different areas of development especially while staying in the Neonatal Intensive Care Units (NICUs). Developmental care is a strategy used to reduce the annoying effects of these challenges and help premature grow normally; developmental positioning is an essential part of developmental care measures. The **aim** of this study was to evaluate the effect of a training program on level of knowledge and practice among neonatal nurses towards developmental positioning of premature infants. Material and Methods: An interventional research study design was conducted in NICUs including 102 nurses at three hospitals in Khartoum State, Sudan. Data were collected using three tools to collect the required data. The levels of knowledge and practice were evaluated pre-training, immediately after training, and after six months of training. Results: There were statistically significant differences between nurse's levels of knowledges and practices on developmental positioning for premature infants in all the three phases of evaluation. Conclusion: a training program was an effective method to upgrade neonatal nurses' levels of knowledge and practice towards development positioning of preterm infants.

Keywords: Nursing training; Premature infants; NICU; Developmental Positioning.

1. Introduction

Infant delivery before completing 37 gestational weeks is considered prematurity [1]. The highest percentage of admissions to NICUs is allocated to premature infants [2]. Preterm infants face many challenges during staying in NICUs, which is completely different from intrauterine. The intrauterine fetal position required for fetal development is characterized by extreme containment and flexion. In addition, the intrauterine environment is dark, quiet, maintains the sleep cycle, and easily accessible to the mother through auditory, chemosensory, and somatosensory pathways, this environment promotes fetal growth and development [3]. The baby in the NICU is exposed to painful procedures, light, noise, handling, lack of containment, separation from mother, reduced ability to move, and interrupted sleep. These factors have a negative impact on an infant's brain development, which may lead to short-term and long-term complications [4].

In addition, premature babies have low muscle tone and have not achieved physiological flexion as they have missed out on some or all the essential stages of muscle tone development in the womb [5]. Improper positioning may cause muscle contractures that interfere with the infant's neurologic and psychomotor development. Therefore, preterm babies require support to facilitate and maintain postures that enhance motor control and physiological functioning and reduce their stress [6]. One strategy for reducing the irritating effects of these challenges and helping premature infants grow normally in NICU is developmental care (DC). Developmental care is "services provided by neonatal nurses and other care providers in order to minimize stress and help preterm infants cope better with NICU environment" [7]. DC principles include protecting position, reducing noise and light, family involvement, minimal handling, kangaroo mother care, swaddling and bathing, and minimizing stress and pain [8, 9] . The important part of developmental care that has been found to be more beneficial in NICU is developmental positioning.

Developmental positioning includes placing the preterm infant in a position same as the position in the utero, extremities tucked and flexed, back and shoulders rounded, hands to face, maybe prone, supine, or side lying [10] . Keeping premature infants in this flexed position helps them to become as stable as they were in the uterus [7]. Positioning of infants is one of the nursing interventions in the NICU. Developmental positioning or developmental supportive position improves postural, physiologic, and musculoskeletal outcomes as well as improves sleep states of premature infants, in addition it earlier feeding success, reduces developmental delays, reduces ventilation time, reduces need for oxygen, fasters weight gain, decreases use of sedation, and reduces hospital costs. In general, NICU environment that promotes developmental care can decrease the premature infant's length of stay, decrease the total cost, and improve patient outcome [10].

Despite developmental care becoming a worldwide standard for range of nursing and medical interventions implemented internationally in (NICUs), there remains a gap in nurse's knowledge and practice in all principles of developmental care [7]. However developmental positioning is an essential skill for NICU nurses, and the Infant Positioning Assessment Tool is an available valid and reliable tool, used as standardize developmentally supportive positioning practices in the (NICU), there have been limited used it [11]. Nurses have important roles in managing preterm babies in NICU including infant positioning, which affects the recovery and outcomes. Thus, the current study aimed to was to evaluate the effect of a training program on level of knowledge and practice among neonatal nurses towards developmental positioning of premature infants.

2. Methodology

2.1. Aim of the Study

Evaluate the effect of a training program on level of knowledge and practice among neonatal nurses towards developmental positioning of premature infants.

2.2. Hypothesis of the Study

A training program is an effective method to improve the level of knowledge and practice among neonatal nurses towards developmental positioning of premature infants.

2.3. Study Design

An interventional study design was used (pre-test and post-test design).

2.4. Study Setting

The current study was carried out at the NICUs in three main hospitals in Khartoum state, Sudan (Soba University Hospital, Omdurman Maternity Hospital, and Jafar Ubin Auf Hospital). These three hospitals were selected based on the availability of good specifications for NICU such as trained medical and nursing staff, medical devices and equipment, and availability of good environment in terms of lighting and spaces.

2.5. Sample Size

All neonatal nurses in the previously mentioned hospitals (102 nurse).

2.6. Inclusion and Exclusion Criteria

Female and male nurses which working in NICUs at the previously mentioned hospitals.

2.7. Tool of Data Collection

Three tools were used to collect the required data. The **first** tool was an interviewing questionnaire used to collect the general characteristics of the studied nurses. The **second** tool was a questionnaire used to assess the nurse's knowledge including positioning guideline, behavioral cues guideline, developmental care guideline and developmental positioning guideline. The questionnaire was composed of 30 closed ended questions. The **third** tool was a checklist. It was developed based on Infant Positioning Assessment Tool to assess nurses' practice about nesting technique as a developmental positioning in NICU. It was composed of 13 items including preparation of equipment, performing hand hygiene, making a suitable nest, etc.).

2.8. Validity of Tools

The tools were presented in initial form to a panel of four experts in the academic and clinical fields of Neonatal Medicine and Pediatric Nursing to ensure the formulation of questionnaire phrases, appropriateness of alternatives of each paragraph and scientific health and language safety, and the necessary modification of tools were done. The internal consistency of tools was assessed; it equal (0.948) approximately (0.95).

2.9. Reliability of Tools

A pilot study was conducted randomly on (10%) of study sample (not included in the study sample) to test reliability, feasibility of tools, Cronbach's coefficient alpha was used to check reliability of tools. The reliability of tools was (0.898 & 0.826).

2.10. Phases of Assessment

Pre-Implementation of Program: prior applying the educational intervention: The researcher prepared the needed equipment to apply the program, included computer, overhead projector, pictures, posters, and practical equipment which help nurses to create nest such as (sheets, blanket roll, doll baby etc.). The total number of nurses was divided into small groups. The researcher assessed nurse's knowledge and practice before educational intervention by using the structured tool.

2.11. Implementation of Program

The demonstration session was done. Each group attended two sessions, theoretical and practical. The first educational session was in the form of lecture covering various teaching methods such as PowerPoint presentation, group discussion, poster, pictures, and video, which is emphasized on developmental care (definition, aims, elements, definition of developmental positioning of premature infants, the positive and negative effect of developmental positioning, the problems which resulting incorrect body position in NICU, advantages and disadvantages of supine, prone, and lateral positioning in NICU, and major consideration of infants positioning in NICU, etc.). The practical session involved creating appropriate nesting techniques such as developmental positioning (supine, prone, or side-line), and demonstrating correct positioning of infant (prone, supine, or side lying). Each session lasts about two hours. Posters and pictures were placed in NICU as well as soft copy of power point presentation and video film.

2.12. Post-Implementation of Program

The nurse's knowledge and practice were evaluated immediately and after six months of implementation of training sessions.

2.13. Ethical Considerations

Approval from the Scientific Committee in National Ribat University, Faculty of Nursing and approval from Ministry of Health Research Department was obtained to conduct this study. was obtained. The neonatal nurse's consent was obtained after explaining the aim and process of the study.

2.14. Statistical Analysis

The collected data was coded and entered the excel program. Data were analyzed using Statistical Package for Social Science (SPSS), Software, version 20. Frequency and percentage were used to describe different nursing characteristics. One sample (t) test was used to determine the levels of nurses' knowledge and practice before educational intervention. Paired sample t-test was used to compare between nurse's knowledge and practice before educational intervention, immediately and six months after the implementation of the training program. Correlation between nurse's knowledge and demographic variables was done using correlation coefficient. All the statistical analyses were performed at the significance level of less than 0.05.

3. Results

Table (1) illustrates the general characteristics of the NICU nurses. Regarding nurses age, slightly less than one third of nurses (32.4%) were in the age group (25-29). Most of them were females (98.0%). Regarding educational level, about two thirds of the studied nurses had a bachelor's degree in nursing (66.7%). Slightly more than one third of them had experience from a year to less than four years (34.3%). It was noticed that 93.1% of the studied nurses didn't attend training courses about developmental care.

Table (2) shows high statistically significant differences between the mean scores of nurses' knowledge and practice before and immediately after the training program at p-value (0.001 & 0.003) respectively.

Table (3) mentions high statistically significant differences between the mean scores of nurses' knowledge and practice immediately and after six months of the training program at p-value (0.001 & 0.002) respectively.

Table (4) notices statistically significant correlations between the mean scores of nurses' knowledge and general characteristics of nurses (age, years of experiences, and training courses).

Tables:

Table-1. General Characteristics of the Studied Nurses (n= 102).

Characteristics of Nurses	Frequency	Percent
Nurses age		
20-24	16	15.7
25-29	33	32.4
30-34	14	13.7
35-39	14	13.7
40-44	14	13.7
>44	11	10.8
Sex		
Male	2	2.0
Female	100	98.0
Marital status		
Single	57	55.9
Married	39	38.2
Divorced	4	3.9
Widowed	2	2.0
Education degree		
Diplomas	9	8.8
Bachelor	68	66.7
Master	25	24.5
Years of experience in NICU		
Less than 1 year	16	15.7
1 Year less than 4 years	35	34.3
4 years less than 7years	14	13.7
7 years less than 10 years	13	12.7
More than 10 years	24	23.5
Previous training courses of developmental care		
Trained	7	6.9
Not trained	95	93.1

Table-2. Means and Standard Deviations of Total Knowledge and Practice Score among the Studied Nurses Before and Immediately After Program (n= 102).

Variables	Before Program	Immediately After Program	t-test	p-value
Knowledge	11.24±3.90	20.18±3.61	19.987	0.001**
Practice	3.69±2.01	9.39±2.05	23.900	0.003**

Table-3. Means and Standard Deviations of Total Knowledge and Practice Score Among the Studied Nurses Immediately and Six Months After Program (n= 102).

Variables	Immediately After Program	Six Months After Program	t-test	p-value
Knowledge	20.18±3.611	22.10±3.120	5.703	0.001**
Practice	9.39±2.054	11.21±2.600	6.594	0.002**

Table-4. Correlations between General Characteristics and Nurse's Knowledge Through Stages of Training Program (n= 102).

Variables		Age	Gender	Marital Status	Educational degree	Years of experiences	Training courses
Before program	P-value	0.008**	0.409	0.409	0.409	0.005**	0.010*
Immediately after program	P-value	0.000**	0.791	0.791	0.791	0.000**	0.087
After six months of program	P-value	0.001**	0.682	0.682	0.682	0.009**	0.123

****.** Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed).

4. Discussion

The current study aimed to evaluate the effect of a training program on level of knowledge and practice among neonatal nurses towards developmental positioning of premature infants. The results of the study achieved the aim and accepted the research hypothesis. As regards to the general characteristics of the nurses who participated in the current study, the results found 66.7% of nurses had bachelor's degree and 98.0% of the participants were females. This result is agreed with Bakhshi, *et al.* [12], who investigated the impact of instructions on the developmental status of premature infants on the clinical practice of NICU nurses, they found most of the sample (97.6%) were females. On the other hand, the current study disagreed with Bakhshi, *et al.* [12] in the educational level of nurses, who found most of the nurses (83%) had post graduate education.

Regarding training courses on developmental care, the present study found (93.1%) of nurses did not receive any training course. Similarly, Ahmed and Mohammed [13], who assessed the effect of learning package regarding nesting and swaddling for premature infants on nurse's knowledge and performance in NICU, they observed (83.1%) did not received any previous training courses about developmental care. Another study conducted by Mohammed, *et al.* [14], who found all the nurses participated in the study did not receive any previous training courses about developmental care of preterm infants. This result needs deep insight from nursing authorities, it needs challenging political efforts to upgrade the nurses' knowledge.

Regarding correlations between general characteristics and nurse's mean scores of knowledges, the results indicated that there was positive correlation between nurse's knowledge and their age, that means the age is a factor that led to increase nurse's knowledge. Also, the study results indicated that there was no statistically significant correlation between nurse's knowledge and their sex; the sex had no effect on nurse's knowledge. This may be due to the small proportion of males participated in the current study. Moreover, there was a positive correlation between years of experience and level of knowledge; the knowledge increases among nurses who have the longest working period.

The results of the study revealed that the training program had a positive effect on the level of knowledge and practice towards the developmental positioning, this result illustrated that there is a lack of information about developmental positing in NICU; this may be due to the developmental care is informal education, which require to add it in nursing curriculum. This finding is matched with the results of Nasef [15], who found that all preterm infants had an unacceptable positioning before program implementation. As shown in the results of the current study, the nurses' level of knowledge and practice were increased immediately after the implementation of the training program. These findings are in accordance with Masri et al, who evaluated the effectiveness of an educational intervention in improving infant positioning. They found the mean score of nurses' knowledge was improved significantly after educational program [16].

Moreover, a study done by Kim and Kim [17], assessed the knowledge and performance of developmentally supportive positioning for premature infants among NICU nurses. They found statistically significant of nurses' knowledge and performance as result of educational intervention. The present study shows statistically significant differences between the mean score of nurse's knowledge and practice about developmental positioning immediately and six months after the implementation of training program; the scores were increased. The current study is supported by Bakhshi, *et al.* [12], who confirmed that the mean score of nurse's performance on development positioning was increased after the intervention. However, nurse's knowledge and practice were improved, so educational intervention led to improving nurses' knowledge and practice regarding developmental positioning of premature infants immediately after implementation and after six months of implementing compared with before program scores.

5. Conclusion and Recommendations

Based on the results of the current study, training programs have a positive change in nurse's knowledge and practice about the developmental positioning for preterm babies. Continuous training for nurses is recommended to improve their performance. Availability of policies and updated guidelines should be applied in NICU. Conducting more research studies regarding developmental care in NICU is required.

Conflicts of Interest

Authors declare that there is no conflict of interest.

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