

The seven points of developmental care for preterm neonates: Nurses' knowledge and attitudes in the NICU Room

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Abstract

Preterm neonates (premature infants) are born with various risks that require them to be admitted to the Neonatal Intensive Care Unit (NICU) which is full of stressors. The impact of stressors in the NICU on infants can be minimized by the provision of seven points of developmental care. Unfortunately, the NICU nurses' knowledge and attitude in implementing the seven points of developmental care was still lacking, that not all nurses did. This study aims to identify the effect of education on the seven points of developmental care in increasing the NICU nurses' knowledge and attitude. The pre-experimental research design of one group pretest-posttest was chosen, involving 28 NICU nurses who were selected by using simple random sampling technique. The inclusion criteria of respondents included nurses with more than 1 year of work experience. Education was given 3 times with a duration of 2 hours through online videos. Data were analyzed using the Wilcoxon test. There was a significant increase in knowledge and attitudes on the aspects of stress cues ($p=0.025$), principles of cooperation with family ($p=0.003$), Standard Operating Procedure (SOP) of Cooperation with family ($p=0.012$), Infant Positioning Assessment Tool ($p=0.003$), minimizing pain by touching ($p=0.002$), route of providing nutrition ($p<0.001$), and non-nutritive sucking ($p=0.004$). Education on the seven points of developmental care is able to increase the NICU nurses' knowledge and attitudes in implementing interventions for preterm neonates. The provision of education is required regularly in order to refresh and update information for the NICU nurses so that they are able to provide appropriate, optimal, and up-to-date care for preterm neonates.

Keywords: Education; Seven Points of Developmental Care; Knowledge, Attitudes; NICU Nurses; Preterm Neonates

1. Introduction

Preterm birth, the birth of a babies alive before 37 weeks of pregnancy or 259 days from the first day of the last menstrual period are completed, is still the leading cause of neonatal deaths. The number of deaths among infants under 5 years and neonates globally due to birth preterm complications is 16% and 35%, respectively, of the total live births [1]. The proportion of preterm neonatal deaths in Indonesia is 32.4% and is the second cause of newborn deaths [2]. Furthermore, preterm neonatal deaths can be caused by complications such as infection, asphyxia, hypothermia, and inadequate breastfeeding. An appropriate care environment for treating preterm neonates (premature infants) with all their health risks is in the Neonatal Intensive Care Unit (NICU). Unfortunately, invasive procedures performed in the NICU such as excessive lighting and sound [3], endotracheal suctioning and injection can be stressful to the neonates [4].

Innovative solutions regarding the delivery of care for preterm neonates admitted to the NICU are urgently needed to reduce stress. One of the actions that the NICU nurses can take to minimize the effects of stress on preterm neonates in the NICU is to provide the seven points of developmental care. It aims to promote neonatal growth and development

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during treatment [5]. Several previous studies stated that the provision of the seven points of developmental care is able to reduce the incidence of infection, reduce treatment costs, [6], and speed up discharge [7].

In fact, the provision of nursing care for preterm neonates has not been implemented optimally. Knowledge and practice of the provision of nursing care for preterm neonates by the NICU nurses is still lacking [8,9]. Not all the NICU nurses provide full developmental care for preterm neonates [10]. This is due to the lack of understanding (misconception) and knowledge of nurses on the implementation of the seven points of developmental care in the NICU room. In this case, the solution that can be offered to increase nurses' knowledge and skills in the provision of nursing care for preterm neonates is the provision of education. The provision of education or training can result in the transfer of information and knowledge. The knowledge that is possessed is needed as psychological encouragement or stimulation in generating attitudes and behavior [11], especially in providing care for preterm neonates. Unfortunately, previous studies [12–14] only evaluated the level of nurses' knowledge without providing interventions to increase knowledge and attitudes in carrying out developmental care.

In this study, the researchers provided an intervention in the form of education for the NICU nurses so that the results of the study could also have an impact on increasing nurses' knowledge and attitudes and could be an example of a mode to increase nurses' competence in the provision of care for preterm neonates (premature infants).

Objective

The aim of the study was to identify the effect of education on the seven points of developmental care in increasing the NICU nurses' knowledge and attitude.

2. Material and methods

2.1. Study Design

The research design used was a pre-experimental of one group pretest-posttest involving a group of the NICU nurses who worked at Wahidin Sudirohusodo Hospital.

2.1.1. Intervention

In the first stage, nurses were given a pre-test related to nurses' knowledge and attitudes about the seven points of developmental care for preterm neonates. They were then given treatment in the form of education through socialization related to the seven points of developmental care for preterm neonates. In addition, they were then given a post-test. The treatment success was determined by comparing pre-test and post-test scores.

2.1.2. Setting

The study was conducted at Wahidin Sudirohusodo Hospital, South Sulawesi, Makassar city in Indonesia.

2.1.3. Research Subject

Sampling was conducted by using simple random sampling technique using lottery which obtained 28 NICU nurses as the sample.

2.2. Instruments

The assessment instrument for nurses' knowledge and attitudes was based on the concept of the seven points of developmental care for preterm neonates covering seven indicators: healing environment, cooperation with family, positioning preterm neonates, sleep-wake/calm, protecting preterm neonatal skin, minimizing stress and pain, as well as optimizing nutrition coupled with Family Centered Care (FCC) indicator. The items in this instrument have been declared through the process of instrument testing. Knowledge was assessed by 8 statement items and a choice of true or false answers. Attitudes were assessed with 13 statement items and answer choices ranging from strongly disagree to strongly agree.

2.3. Data analysis

Data analysis was conducted to determine whether there was an effect of the education of the seven points of developmental care for preterm neonates on the NICU nurses' knowledge and attitudes. Data were processed using SPSS software (version 22. Inc. Chicago, IL USA). Meanwhile, data of respondents' characteristics were analyzed using

descriptive analysis displaying mean, SD, frequency and percentage of data. The research hypothesis test was carried out using the Wilcoxon test with a significance level of 0.05.

3. Results and discussion

Respondents' characteristics showed that there were more female nurses (82.1%) than male nurses. Most of the nurses had completed Ners program (67.9%). The mean of nurses' age was around 34 years, and they had been working on average for 9 years and 8 months (Table 1).

Table 1 Distribution of respondents' characteristics (n=28)

Characteristics	n	%
Sex		
Male	5	17.9
Female	23	82.1
Last Education		
D3 (Diploma III) Nursing	2	7.1
S1 Nursing (Nursing Bachelor's Degree)	7	25.0
Ners Program	19	67.9
Age (mean, SD)	34.14	5.40
Length of work experience (mean, SD)	9.82	5.27

Nurses' knowledge on the seven points of developmental care for preterm neonates seemed to slightly increase after education, but the results of statistical test showed that there was no significant difference in nurses' knowledge before and after education. From the eight statement items, there was a significant increase in knowledge on stress cue items with a mean difference in score increase of 0.18. Thus, it could be concluded that there were differences in knowledge on stress cues before and after education (Table 2).

Table 2 Comparison of nurses' knowledge on the seven points of developmental care for preterm neonates before and after education

Knowledge	Pre	Post	p-value*
Healing environment	0.79 ± 0.418	0.75 ± 0.441	0.763
Principles of cooperation with family	0.89 ± 0.315	1.00 ± 0.000	0.083
SOP of Cooperation with family	0.82 ± 0.390	0.89 ± 0.315	0.414
Sleep-wake/calm scale	0.39 ± 0.497	0.39 ± 0.497	1.000
Minimizing pain by touching	0.86 ± 0.356	0.82 ± 0.390	0.739
Stress cues	0.75 ± 0.441	0.93 ± 0.262	0.025
Route of providing nutrition	0.64 ± 0.488	0.82 ± 0.390	0.166
Non-Nutritive Sucking	0.36 ± 0.488	0.29 ± 0.460	0.593
Knowledge score	0.68 ± 0.150	0.73 ± 0.145	0.167

*Wilcoxon test

Nurses' attitudes on the seven points of developmental care for preterm neonates showed a significant increase after education with a mean difference of 0.18. This is supported by the results of statistical test showing that there were differences in nurses' attitudes before and after education. There were six of 13 statement items having significant differences before and after education (Table 3).

Table 3 Comparison of nurses' attitudes on the seven points of developmental care for preterm neonates before and after education

Attitudes	Pre	Post	p-value*
Quiet environment	1.57 ± 0.690	1.54 ± 0.693	0.813
Healing environment	3.50 ± 0.694	3.54 ± 0.693	0.792
Principles of cooperation with family	2.82 ± 0.819	3.46 ± 0.744	0.003
SOP of Cooperation with family	3.21 ± 0.630	2.68 ± 0.945	0.012
Infant Positioning Assessment Tool	2.89 ± 0.567	3.46 ± 0.693	0.003
REM sleep	3.25 ± 0.645	3.00 ± 0.720	0.131
Sleep-wake/calm scale	3.25 ± 0.701	3.18 ± 0.670	0.644
Minimizing pain by touching	2.75 ± 0.887	3.39 ± 0.786	0.002
Stress cues	3.18 ± 0.670	2.93 ± 0.766	0.197
Skin protecting procedure	3.39 ± 0.685	3.32 ± 0.723	0.627
Route of providing nutrition	2.61 ± 0.629	3.46 ± 0.693	<0.001
Non-Nutritive Sucking	1.57 ± 0.690	2.21 ± 0.738	0.004
Family Centered Care Principles	3.43 ± 0.690	3.50 ± 0.694	0.608
Attitudes score	2.87 ± 0.353	3.05 ± 0.463	0.008

*Wilcoxon test

The results of the study generally showed a significant increase in the NICU nurses' attitudes in the provision of the seven points of developmental care, but there was no increase in knowledge. Nurses' knowledge was mathematically increased after education, but statistically it did not show any significant results. It could be due to the fact that nurses already had basic knowledge on the seven points of developmental care. Demographic characteristics of nurses, such as length of work experience, are related to the level of knowledge on the seven points of developmental care. Nurses with experience working in the NICU room for at least 1 year have better knowledge than novice nurses [15]. The mean length of work experience of nurses in this study was 9.82 years. Long working experience allows nurses to know and learn the seven points of developmental care so that knowledge has been formed. The longer the work, the more information is obtained, thereby increasing a person's knowledge which becomes the basis for taking action [16].

Moreover, by reviewing per-item on the knowledge variable, it was found that there was a significant increase in knowledge on stress cues. Neonates or newborns who are admitted to the NICU are exposed to complex, multisensory exposure to a lack of supportive stimuli for their development. The NICU is an environment full of stressors such as the noise of tools, other acute patient events, strong lighting, conversations between health workers in the room which are abrasive for neonates because of their unpredictable tone, pattern, and intonation [17–20]. Strong lighting can also cause physiological dysregulation and result in poor visual development of neonates [21]. This condition is certainly very stressful for neonates, whose signs are very easily observed through changes in vital signs. Measurement of vital signs is mandatory and routine for nurses to monitor the condition of preterm neonates. It is certainly natural that there is increased knowledge on stress cues after education. An information that has been processed and practiced on a regular basis will be more memorable than just memorized.

More importantly, in general, nurses' attitudes in the provision of the seven points of developmental care has increased significantly after being given education. This is in accordance with the results of previous studies that the provision of education is able to improve attitudes and practices of providing the seven points of developmental care by the NICU nurses [22–24]. Attitude is a closed individual response that involves opinion and emotional factors towards certain stimuli [25]. It refers to the ideas or beliefs that a person has. The right attitude can improve the quality of practice and vice versa [26]. The provision of education is a method for forming the right attitude through providing information.

Per-item separately on the attitude variable, attitudes towards infant positioning assessment tool showed a significant increase after education. This result is consistent with previous study that after providing education on the seven points of developmental care, nurses' attitudes towards infant positioning increased significantly [27]. Providing proper

positioning is essential to facilitate the development of preterm neonates. They have weak muscles, so they have difficulty or are not strong enough to support movement against gravity. If not treated promptly, it can have a negative impact on the movement pattern of their skeletal muscles in the future [28].

In the item of minimizing pain by touching, there was also increased score from pre to post-test significantly. The results of this study are in line with previous studies which claimed that after education, nurses' ability to manage patient pain increased significantly, including the use of assessment tool and non-pharmacological therapy [29–31]. Preterm neonates admitted to the NICU undergo various procedures that cause pain, such as suction, intravenous (IV) access, and installation of a ventilator [32]. The results of this study are in line with previous studies which stated that the effectiveness of touching in the procedure for drawing blood can reduce pain, in which there is a significant difference in mean heart rate, oxygen saturation and duration of crying [33].

The items of principles of cooperation with family and Standard Operating Procedure (SOP) of cooperation with parents also experienced a significant increase after the provision of education. Quality and frequency of parental involvement in providing care while in the NICU play an important role in discharge planning. In addition, family involvement with the right SOP can lead to positive experiences (humanizing) for preterm neonates, health workers, and parents. Care that involves family (Family Centered Care/FCC) in principle is a model of preterm neonatal nursing care in an intensive room by involving parents to care for them in the guidance and direction of nurses [34]. This model views that children are an inseparable part of parents and parents have a major influence on the health and recovery of children [35,36]. The results of this study are in line with previous study that after education, nurses become more aware of care that involves families, especially for infants who are cared for in the NICU [37].

Attitudes on the route of providing nutrition also increased significantly after the provision of education. It is similar to previous studies that education can improve the practice of providing nutrition, especially through the nasogastric tube in the NICU [38,39]. In preterm neonates, several reflexes such as suckling and swallowing with breathing do not form until 32 weeks of gestation. In this condition, nutrition has not been fulfilled orally, but usually through a nasogastric tube [40].

Besides, increasing nurses' knowledge and attitudes cannot be separated from the educational process. Although education appears to be able to increase knowledge and attitudes, it turns out that there are other factors affecting, such as previous experience, length of work experience, and age that have an effect on knowledge [41]. Nurses who have older age are also associated with experience, and a longer length of work experience tends to have better quality of work and knowledge [42,43]. This good basic knowledge was reflected in a good pre-test score. Thus, even though education had been given, by having good initial/basic knowledge, there was an increase in knowledge in the post-test although it was not high and even statistically insignificant.

4. Conclusion

The provision of education on the seven points of developmental care is generally able to significantly improve the nurse's attitude in the provision of the seven points of developmental care for preterm neonates, but there is no increase in knowledge. This is because nurses who are older and have worked as nurses for a long time allow them to gain information/knowledge from experiences or seminars. This condition causes the initial knowledge (pre-test) to be quite good. Thus, after the provision of education, there is an increase in knowledge but statistically insignificant. In addition, the provision of education should be done regularly as an attempt to refresh and update information about the seven points of developmental care that nurses receive. There was still a need for continuity or provision of education on the seven points of developmental care periodically. Besides being useful for refreshing the implementation of interventions, the provision of regular education is also useful for providing the latest updates regarding the seven points of developmental care. Accordingly, in this case, nurses can provide optimal, quality, and up-to-date care.

Compliance with ethical standards

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Approval of Conflict of interest

We have no conflict of interest to declare.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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