

The Impact of a Neonatal Sleep Care Training Program on Nurses' Knowledge and Performance in Neonatal Intensive Care Units

Abstract

Background: Sleep is essential for organizing and maturation of the brain in premature infants; it also plays a role in maintaining the natural balance between different nervous centers. Given the role of nurses in neonatal sleep care, this study aimed at assessing the impact of a training program on the nurses' knowledge and performance in a Neonatal Intensive Care Unit (NICU). **Materials and Methods:** In this quasi-experimental study which structured into three stages, 35 nurses working in an NICU in Isfahan, Iran, were included. The neonatal sleep training program was in the form of a lecture with questions and answers and then placing posters and booklets in the NICU. The data were collected by a questionnaire for nurses' knowledge and performance assessment which its validity and reliability were determined through content validity and internal consistency, respectively. The nurses' knowledge was assessed via 40 multiple-choice questions before, immediately after, and 1 month after the training program, and their performance was evaluated before and 1 month after intervention using 15 multiple-choice questions. The data were analyzed by descriptive and inferential statistics using the SPSS software version 16. **Results:** The results showed that the mean score of nurses' knowledge after training has significantly increased as compared to before training (33.33 (4.4) vs. 19.33 (4.1)) ($P < 0.001$); however, the score of performance was slightly improved although it did not reveal any significant differences ($P = 0.07$, 42.6 (7.6) vs. 45.1 (7.8)). **Conclusions:** The results indicated that this method of training program could lead to an increase in nurses' knowledge, but it did not significantly improve their performance. It may be due to a low number of training sessions; therefore, it is recommended to implement long-term training programs in this field.

Keywords: Care, Neonatal Intensive Care Unit, neonatal sleep, nursing knowledge, nursing performance, training program

Introduction

At present, the highest number of admissions to hospitals in the Neonatal Intensive Care Units (NICUs) is allocated to premature infants.^[1] Premature babies are embryos which are obligated to have their growth and development outside the uterine, in the critical period that the brain has the most rapid speed of growth compared to any other time of life.^[2] Sleep is essential for organizing and maturation of the brain, especially in premature infants,^[3-6] so promoting neonatal sleep is considered as a critical component of providing appropriate developmental care in premature infants hospitalized in NICUs.^[3-6] In addition, sleep promotes neuronal maturation, facilitates learning, reinforces memory, and brain formation.^[7,8] Furthermore, sleep deprivation in healthy infants leads to short-term changes in heart function and duration of subsequent sleep cycle and increases

respiratory problems. However, attention to the sleep-wake pattern of premature and term sick infants might prevent stress among them and reduces energy expenditure and physiological instability. Thus, the identification of sleep-wake states in each newborn is necessary for providing better developmental care.^[5] Several studies have demonstrated that many factors may cause disorders in sleep-wake states and disrupt neonatal sleep cycle during hospitalization period in NICUs. The most common and the most important factor is multiple manipulations of the newborns by their caregivers^[9,10] while enough sleep will be provided through attention to improvement of sleep time planning, improvement of the environment, and the use of different method of cares inducing sleep promotion.^[11] Neonatal sleep care program is a unique and family-centered

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approach which reduces environmental stress and promoting overall well-being.^[12] Moreover, scientific evidence suggests that nurses' knowledge and improvement of their performance have an important role in sleep health.^[13] According to the researcher's experience, it seems that nurses' knowledge and performance in the field of sleep health are not sufficient and desirable in NICUs; accordingly, educational interventions may be effective in improving nurses' performance in the field of sleep health. Therefore, the purpose of this study is to evaluate the effectiveness of training programs in this regard.

Materials and Methods

This study was a three-stage quasi-experimental study in 2015. All the nurses working in NICU (40 people) of an educational hospital affiliated to Isfahan University of Medical Sciences were included through a census sampling method. Nurses having at least 6 months experience of working in the NICU and willingness to participate in the study were among the inclusion criteria. The partial completion of the questionnaires was considered as the exclusion criteria. The data gathering tool was a researcher made, self-report questionnaire including three parts. The first part was related to demographic characteristics, and the second and the third parts were made for evaluation of nurses' knowledge and performance. Nurses' knowledge was assessed by 40 multiple-choice questions so that the correct answer was given a score of 1, and if more than one option or a wrong option was selected, it was given a score of 0. Nurses' performance was also evaluated via 15 multiple-choice questions scored by using a Likert scale. The options, i.e. "always," "often," "sometimes," and "rarely" were given scores of 4, 3, 2, and 1, respectively. The variation range of the scores for this part was between 15 and 60. The validity of the data collection instrument was calculated using content validity and its reliability was computed through internal consistency and measurement of Cronbach's alpha coefficient which was 0.837 for the questions in the knowledge part and 0.893 for the ones in the performance part.

The educational content of the training program was prepared based on existing scientific contents in relevant books and including neonatal sleep physiology, identification, and how to control the factors facilitating and disrupting sleep and their impact on infants health. To gathering data in the preintervention time (the pretest), the questionnaire was first completed by the subjects. Then, the nurses were divided into five groups; each includes eight persons and the training program was set in 5 subsequent days for each group, each session 1 h at the times of changing work shift. The education presentation was in the form of lecture, question and answer, and with the use of PowerPoint software. After ending the training sessions, researcher made educational posters were installed in the ward, and educational booklets were placed in NICU.

To administer the posttest, knowledge-measurement questionnaires were completed immediately and also 1 month after training program by the nurses, and performance questionnaires were also filled in 1 month after training program by them. The analysis of the data was conducted through the SPSS Software Version 16 (SPSS Inc., Chicago, IL, USA) using descriptive (frequency, mean, standard deviation) and inferential statistics including paired *t*-test and ANOVA with repeated measures. The $P < 0.05$ was considered statistically significant.

Ethical considerations

The researchers started the sampling after obtaining the ethical code (No. 393760) and written approval from the administrators of the educational hospital and in coordination with the authorities of the neonatal ward as well as explanations about the research objectives. Before the study, consent forms were obtained from the participants, and they were noted that they are free to withdraw the study at any time during the study. They were also ensured about the confidentiality of data.

Results

Findings indicated that five nurses out of forty participants were excluded from the study due to the partial completion of questionnaires. The mean age of the subjects was 35.97 (5.93) years old, with a minimum age of 27 and maximum age of 50. Other demographic characteristics of the subjects are shown in Tables 1 and 2. In terms of the nurses' knowledge about infants' sleep health, analysis of variance with repeated measurement showed that the means of scores had significant differences at different times ($P < 0.001$). The least significant difference test revealed that the means of score immediately after and 1 month after training were significantly higher than that of before training ($P < 0.001$). However, the means of knowledge score immediately after and 1 month after training were not significantly different [Table 3].

Regarding performance of nurses, the paired *t*-test showed that the mean score of nurses' performance at the time of before intervention had no significant difference with that of it 1 month after the intervention ($P = 0.07$) [Table 3].

Discussion

In the present study, we assessed the impact of a training program including sleep physiology in newborn infants and the methods of identifying disruptive factors affecting sleep on nurses' knowledge and performance. The results showed that the mean score of nurses' knowledge was low before training as it was less than half of the total score. It may be due to no attention to infants sleep and its importance in nursing curriculum.

Before the intervention, the mean score of nurses' performance was on the average level. This finding may

be due to the self-reporting questionnaire. Moreover, the results showed a significant increase in the mean score of knowledge immediately after the training program in comparison with the score before the training. The results of this study were consistent with previous studies that revealed the mean score of nurses' knowledge in the fields of developmental care, baby bath, and neonatal intensive care significantly increased after training programs compared with those of before training;^[14-16] other training programs for nurses have been also accompanied by increasing their knowledge.^[17-19] In the present study, the results demonstrated that the mean score of nurses' knowledge at 1 month after the intervention was less than immediately after it, in fact, training program, if not repeated, may lose its impact on nurses' awareness over time and is not with favorable outcomes. In this line, other studies have also shown that the impact of the educational nurses' programs on their knowledge will decrease over

time.^[19,20] Therefore, it is necessary to use appropriate educational program with more frequent sessions to sustain their impact. In the present study, findings showed that although nurses' knowledge had improved after training, their performance regarding neonatal sleep was not significantly different from before the intervention; while in the previous studies, increasing knowledge has been associated with improvement of nurses' performance.^[14,17,18,20] Lack of facilities and equipment in NICUs, inappropriate ratio of number of nurses to patients, and inadequate environmental space in the NICU could be the reasons behind this discrepancy. On the other hand, because the health care system is doctor dominance in Iran and adherence to doctor's orders even in the field of nursing care is obligatory, this may lead to the fact that nurses cannot provide required care for premature infants on the basis of the nursing process and the cares are given based on routine nursing.

Table 1: Distribution of Neonatal Intensive Care Unit Nurses in terms of marital status and type of employment

| Variable | Number (Percentage) |
|-----------------|---------------------|
| Employment type | |
| Official | 5 (14.3) |
| Contractual | 8 (22.9) |
| Contract | 22 (62.9) |
| Total | 35 (100) |
| Marital status | |
| Married | 24 (68.6) |
| Single | 11 (31.4) |
| Total | 35 (100) |

Table 2: Statistical Indicators of Demographic Variables of Neonatal Intensive Care Unit Nurses

| Variable | Minimum | Maximum | Mean (SD) |
|----------------------------------|---------|---------|--------------|
| Age | 27 | 50 | 35.90 (5.93) |
| Duration of work as nurse (year) | 3 | 23 | 12.14 (5.85) |
| Duration of work in NICU (year) | 1 | 18 | 8.20 (5.38) |

NICU: Neonatal Intensive Care Unit, SD: Standard deviation

Table 3: Comparison the mean scores and standard Deviation of Nurses' Knowledge and performance in different times

| Variable | Mean (SD) | | | Statistical |
|-------------|-----------------|----------------------------|------------------------|--------------------------|
| | Before training | Immediately after training | 1 month after training | |
| Knowledge | 19.33 (4.13) | 33.34 (4.46) | 31.35 (6.45) | $F=73.89$ $P: <0.001$ |
| Performance | 42.62 (7.63) | | 45.12 (7.82) | $t=0.19$ $P: 0.07$ |

SD: Standard deviation

Previous studies have also shown that neonatal care is mostly done based on the nursing routines in NICUs and without any regard to infants' sleep-wake states.^[10,21] For example, in one study, it was revealed that infants were manipulated more than 200 times during a day in the NICU; hence, with frequent manipulations, an infant cannot obviously have calm and favorable sleep-wake conditions.^[9] Over time, the impact of training on knowledge and performance is slightly blurred. Therefore, to have sustainable impacts, educational programs should be implemented and repeated with short intervals. The limitation of this study was that the evaluation of nurses' performance in the field of sleep health was done by a self-report questionnaire, not by checklist and direct researcher observation. The shortage of nurse to patient and performing doctor-centered care by the nurses may be among the other limitations of this study.

Conclusion

The results of this study showed that although teaching on the basis of lecture (PowerPoint presentation), question and answer, and poster installation related to neonatal sleep care improves nurses' knowledge, it could not change their performance; thus, it is necessary to identify the obstacles to this issue.

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Conflicts of interest

There are no conflicts of interest.

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