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The Effect of Teamwork Training on Missed Nursing Care among NICU Nurses during the COVID-19 Pandemic

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Keywords:Nursing care;
Teamwork;
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Background: Missed nursing care can cause considerable problems in patients' treatment processes. One way to reduce it and patient safety is teamwork training for nurses. This study aimed to determine the effect of teamwork training on missed nursing care among the nurses in Neonatal Intensive Care Unit (NICU).

Methods: This quasi-experimental study was performed in 2021 (during the COVID-19 pandemic) on 20 nurses working in NICU. Teamwork training was done using the Team STEPPS method. The missed nursing care questionnaire was completed before, immediately and one month after the intervention.

Results: The mean score of missed nursing care decreased from 72.7 ± 4.78 before the intervention to 53.5 ± 6.81 immediately after that, and the difference was statistically significant ($P < 0.01$). The mean score of missed nursing care was 58.2 ± 5.51 one month after the intervention, which was significantly different from that immediately after the intervention ($P < 0.02$).

Conclusion: Teamwork training had a considerable impact on reducing missed nursing care during the COVID-19 pandemic in NICU. Also, too many processes related to admission and discharge is the most important factor that resulted in missed nursing care. We suggest that other tools be utilized to measure the amount of teamwork among nurses in the future. It is recommended to consider teamwork training courses for nurses as a necessary part of in-service training. Conducting teamwork training workshops for nursing students can provide them the knowledge necessary to use teamwork strategies and tools to meet those challenges.

Introduction

The neonatal period refers to the first 28 days of life and is important because most infant deaths in the first year of life occur in the neonatal period.¹ Neonatal mortality accounts for 45% of mortality in children under five², and late fetal and early infantile stage is the period of life that has the highest mortality rate compared to other age groups.³ The neonatal nurse is the first person to identify the potential dangers and critical situations of the neonates and take action to eliminate them and not performing the nursing procedures correctly will have irreparable consequences.⁴ Therefore, specialized nursing care plays an important role in the survival and health of infants.³

Nurses in NICUs face a variety of challenges that can lead to inadequate care and the emergence of numerous problems and difficult conditions for the growth and development of infants. Care challenges in NICUs can be divided into four categories of interactions (professional interactions, interactions with families, interactions with infants), care (routine care, understanding the need for developmental care, and the conflict between traditional and developmental care), NICU structure (non-compliance with physical and equipment standards, survival or mortality causes), nurses' competency (insufficient proficiency and inappropriate employment).⁵ Sometimes nurses realize that it is impossible to fully provide the required nursing care and choose not to perform all the steps and aspects of a nursing care for various reasons, and this leads to a phenomenon called missed nursing care.⁶

Missed nursing care is any type of necessary patient care that is overlooked or significantly delayed. This index is operationally evaluated based on the number of times that nurses have not performed nursing services.⁷ The concept of missed nursing care was first introduced by Kalisch in 2006, who in a qualitative study, identified nine important missed nursing care types

including ambulation, turning, delayed or missed feedings, educating patients, discharge planning, emotional support, hygiene, intake and output documentation, and surveillance.⁸ In NICUs, some degree of missed nursing care has been reported and evaluated. In a study on self-reporting of missed nursing care in NICUs, attention to daily rounds, evaluating the effects of medications 30-60 minutes after injection or according to the protocol, and feeding infants with hunger symptoms were identified as missed nursing care frequently reported by nurses. These nurses identified repeated interruptions in the provision of care for various reasons, the urgency of a patient's condition, an unexpected increase in the number of patients admitted to the ward, or critically ill patients as the main reasons for missed nursing care.⁹ In a study in 2016, Tubbs-Cooley examined NICU wards in Magnet hospitals for differences in the amount of missed nursing care compared to non-Magnet hospitals, and concluded that there were missed nursing care in NICUs of Magnet hospitals, too, and they are no different from non-Magnet hospitals.¹⁰ In a study in the NICUs of six hospitals in Nairobi, Gathara et al. reported that at least 80% of nursing care was provided to only 14% of neonates, with neonatal visits and non-assessments during phototherapy as the most missed nursing care.¹¹ Also, nurses in a study reported lack of sufficient time as the main cause of missed nursing care.¹²

Tubbs-Cooley and co-workers have reported a significant association between missed nursing care and patients' treatment processes. When nurses substitute oral feeding with gavage feeding for reasons not related to the newborn's clinical condition (no action is taken by nurses to start oral feeding at the appropriate time), it takes significantly more days for the infant to fully develop its oral feeding ability and subsequently be discharged from the NICU.¹³ Other studies also found that missed nursing care reduces the overall quality of patient care, job satisfaction of the nurse^{14,15}, patient

satisfaction with the treatment process^{15,16}, increases the risk of unwanted complications¹⁷, lost length of stay, and the possibility of readmission.¹⁴

In general, missed nursing care is one of the important indices of the quality of nursing care.⁸ As a result, it is important to study the factors that affect it and improve nursing care. On the other hand, other studies have demonstrated the essential role of teamwork in reassuring patients of safety and quality of care.¹⁸ According to a qualitative study, the conceptual analysis of teamwork in healthcare is a dynamic process consisting of two or more individuals with appropriate healthcare skills and backgrounds who share common health goals and seek to assess, plan, or evaluate patient care in a coordinated manner, both physically and mentally.¹⁹ Effective teamwork in nursing makes a significant contribution to improving the quality of healthcare by reducing errors^{20,21}, missed nursing care²², the time required to do procedures²³, improving communication between patients, families, and therapists.²⁴ In a study on Icelandic nurses, Bragadóttir et al. concluded that missed nursing care, in addition to being significantly associated with age, place of work and shortage of nursing staff, also had a significant inverse relationship with the amount of teamwork.²⁵ One study reported that 66% of nurses had a positive attitude towards teamwork, and this can help identify roles and responsibilities, creating transparency at work, and increasing the quality of nursing care.²⁶

Considering the importance and impact of missed nursing care on patients' treatment outcomes and the scanty studies on the impact of teamwork on reducing missed nursing care, especially in NICUs in Iran, the present study aimed to determine the effect of teamwork training with team STEPPS method on missed nursing care and its related factors among NICU nurses during the COVID-19 pandemic.

Materials and Methods

This quasi-experimental study was conducted

on 20 NICU nurses in the Bushehr Shohadaye Khalije Fars Hospital in 2021 (during the COVID-19 pandemic). Due to the small size of statistical population, the census method sampling was used, and the questionnaire was distributed to the total statistical population before, immediately after, and one month after the intervention.

The inclusion criteria were having at least two months of work experience in the NICU, willingness to participate in the study, and not attending a teamwork training course in the last six months. The exclusion criteria were failure to answer the questionnaire items, working in auxiliary shifts at the NICU (very few working shifts and only when needed), and the end of the service period before the end of the study.

Data collection tool was a questionnaire to assess missed nursing care in the NICU and the questionnaire was answered based on the latest working shift of the nurse because in the last shift, nurses remember more accurately the missed nursing care compared to the previous shifts. The Missed Nursing Care Survey (MISSCARE Survey) in adult's wards was developed by Kalisch and Williams in 2009. It has three parts: Items on demographic characteristics and job satisfaction of nurses, items on the frequency of missed nursing care in the relevant wards (Section A) and items on the reasons for missed nursing care in the wards (Section B). Cronbach alpha values ranged from 0.64 to 0.86. Confirmatory factor analysis demonstrated a good fit of the data. Pearson correlation coefficient on a test-retest of the same subjects yielded a value of 0.87 on part A and 0.86 on part B.²⁷ In 2014, Tubbs-Cooley et al. modified the questionnaire according to the specific conditions and characteristics of the NICU. They retained the overall structure of the questionnaire but modified items in Section A according to the NICU's special care and added items to Section B based on feedback from NICU nurses.⁹ To confirm the validity and reliability of the Persian version of the tool, Emami

et al. assessed the questionnaire by a qualitative review method by 20 nurses participating in two different health systems. The review continued until all participating nurses agreed on the content, meaning, and terms of the audit. The reliability of Section A and B was 87% and 86%, respectively. The questionnaire was also presented to ten professors of the School of Nursing and neonatologists, and after obtaining their comments, the validity of the questionnaire was checked again.²⁸

In this study, the content of the training taken from the Team Strategies and Tools to Enhance Performance and Patient Safety (STEPPS) Team, resulted from more than two decades of research by the US to develop the best teamwork training system for medical staff.²⁹ Agency for Healthcare Research and Quality provides a set of flexible, evidence-based tools and strategies to improve patient safety and reduce missed nursing care through improving communication and other teamwork skills. Team STEPPS enhances teamwork skills in four main areas: leadership (ability to lead and coordinate team members, assign tasks, evaluate group performance, motivate subordinates, plan, organize and maintain a positive group environment); position control (tracking the performance of other team members to ensure that work goes on as expected and appropriate methods have been applied); mutual support (providing feedback and coaching to improve performance and assist a teammate in doing a task, when a mistake occurs, or completing the work of team members who have a high workload); and communication (start of the message by the sender, receipt and acceptance of the message by the recipient, and confirmation of the message by the original sender) (Table 1).²⁹

The trainings were provided to the nurses by “train the trainer” technique, so that first the head nurse learned the necessary training in relation to teamwork using Team STEPPS method in two days in a thoroughly planned manner. Then he presented the trainings to the nurses for one month and in seven sessions,

with the participation of the researcher, in the form of explaining and presenting the materials using PowerPoint™ and in combination with presenting different pre-designed scenarios and discussing them. For effective learning and in order to make enough time to discuss the topics, the number of participants in each session did not exceed 10 people, the length of the sessions was 1 hour and each topic was taught in two working shifts so that all nurses had the opportunity to attend the sessions. The purpose and content of each training session was as follows. MISSCARE survey was completed by nurses before, immediately after, and one month after the intervention. Table 1 shows the content of educational sessions for NICU nurses. This table was prepared based on MISSCARE Survey and modified the questionnaire by Tubbs-Cooley et al.⁹ according to the specific conditions and characteristics of the NICU. Also, it was approved by four experts with PhD degree in healthcare services management.

The data were analyzed in SPSS software version 24. P value less than 0.05 was considered statistically significant. For qualitative variables, the chi-square test and Fisher’s exact test were used, while for quantitative variables, paired t-test was used when the data were assumed to be normal, and Mann-Whitney non-parametric test was employed when the data did not follow a normal distribution.

All participants in the study were informed of the study objectives and signed a written informed consent form and were assured of the confidentiality of their personal information and the voluntary nature of participation.

Results

The mean age of nurses was 33.9 ± 6.36 years, the mean work experience was 95.3 ± 57.34 months, and the mean work experience in NICU was 53.7 ± 36.75 months. The maximum number of working shifts that nurses could have during a month was 24 shifts. Table 2 shows the results related to the demographic characteristics of nurses.

Table 1. The content of educational sessions for NICU nurses

| Session | Purpose | Educational content |
|---------|--|---|
| 1 | Introduction, acquaintance, and expression of purpose Introduction and review of teamwork | Familiarity with the staff and the initial practice of teamwork, training goals, training programs for future sessions, required training supplies, review of barriers to teamwork, introduction of Team STEPPS plan and how it was developed, the results of benefiting from effective teamwork skills and its characteristics. |
| 2 | Familiarity with the team structure and role of NICU nurses and other ward members in the neonatal care team | Defining the team, considering the infant and its family as a member of the care team, the responsibility of clinical teams towards infants and their families and how to communicate with them, the responsibility of the patient’s family as members of the care team towards nurses, multi-team system for neonatal care, key members of the care team, teams designed for emergencies, coordinating teams, subordinate and support services, the role of hospital managers in the performance of care teams |
| 3 | Teaching how to communicate properly between NICU nurses | Explaining how communication affects team processes and outcomes of nursing care, defining a standard and effective communication, identifying challenges and shortcomings in communication between NICU nurses, learning the tools and strategies that can lead to communication improvement in NICU nursing teams |
| 4 | Leadership and crisis management training for NICU nurses | Teaching the extent and effect of leadership on team processes and outcomes of neonatal treatment, explaining the different types of team leadership, teaching activities that are effective in a successful team leadership, explaining the tools that should be used for team leadership in critical situations and the different scenarios in NICU |
| 5 | Training NICU nurses to effectively monitor and control situations | Explaining the extent and impact of effective nursing supervision on team processes and patient treatment outcomes, training STEP as a mental and reminiscent tool for NICU nurses to help effectively monitor critical situations and dominate the environment [including paying attention to the neonatal clinical condition, to team members, to the environment, and moving towards goals], continuous and very precise mindfulness training to monitor all neonatal changes, identifying barriers to NICU nurses for effective situational monitoring and awareness, creating a shared mental image of position monitoring and control among nurses. |
| 6 | Training NICU nurses to support each other | Explaining the extent and effect of mutual support of nurses on team processes and outcomes of neonatal treatment, teaching specific strategies to create and develop more mutual support among NICU nurses, determining specific tools to facilitate mutual support of nurses, explaining problem-solving strategies in the treatment setting |
| 7 | Summarizing the training provided in the previous six sessions and addressing nurses’ problems | Nurses were asked to explain how and in what clinical context they use each of the tools and strategies learned in this training plan, and they were also given the opportunity to practice by creating simulated situations. Simultaneously with monitoring their performance, the observed problems were resolved. |

Table 3 shows the mean missed nursing care. The mean missed nursing care was 72.7 ± 4.78 before the intervention, 53.5 ± 6.81 immediately after the intervention, and 58.2 ± 5.51 one month later (Table 3).

Based on the results of paired t-test (Table 4), there was a significant difference in the mean score of missed nursing care among the studied nurses between before the intervention and immediately after it ($P = 0.01$), and immediately after the intervention and one month later by t-test ($P = 0.021$).

Regarding the factors related to missed

nursing care, the results showed that “large volume of activities related to admission and discharge” is the most important factor related to missed nursing care, so that the effect of this factor was considered “very important” by 95% of nurses before the intervention, 90% of them immediately after the training, and 80% of them a month later. Lack of time, lack of nursing staff, and large amount of information to be recorded were other important factors that for more than 70% of nurses before and after the intervention had a “very important” impact on the missed nursing care.

Table 2. Frequency distribution of demographic characteristics of the subjects

| Variable | Component | N (%) | Variable | Component | N (%) |
|---|-----------|----------|---|-----------|----------|
| Mean number of shifts per month | 16 | 1 (5) | Mean number of patients per shift | 2 | 13 (65) |
| | 20 | 6 (30) | | 3 | 7 (35) |
| | 22 | 7 (35) | | Total | 20 (100) |
| | 24 | 6 (30) | | | |
| | Total | 20 (100) | | | |
| Type of working shifts | Morning | 1 (5) | Last working shift (before intervention) | Morning | 10 (50) |
| | Combined | 19 (95) | | Evening | 4 (20) |
| | Total | 20 (100) | | Night | 6 (30) |
| | | | | Total | 20 (100) |
| Number of patients in the last shift (before intervention) | 2 | 11 (55) | Last working shift (immediate after intervention) | Morning | 6 (30) |
| | 3 | 8 (40) | | Evening | 7 (35) |
| | 4 | 1 (5) | | Night | 7 (35) |
| | Total | 20 (100) | | Total | 20 (100) |
| Number of patients in the last shift (immediate after the intervention) | 2 | 6 (30) | Last working shift (one month after the intervention) | Morning | 5 (25) |
| | 3 | 13 (65) | | Evening | 6 (30) |
| | 4 | 1 (5) | | Night | 9 (45) |
| | Total | 20 (100) | | Total | 20 (100) |
| Number of patients in the last shift (one month after the intervention) | 1 | 1 (5) | | | |
| | 2 | 6 (30) | | | |
| | 3 | 11 (55) | | | |
| | 4 | 2 (10) | | | |
| | Total | 20 (100) | | | |

Table 3. Mean score of missed nursing care before, immediately and one month after the intervention

| Group | Number | Mean ± SD |
|----------------------------------|--------|-------------|
| Before the intervention | 20 | 72.7 ± 4.78 |
| After the intervention | 20 | 53.5 ± 6.81 |
| One month after the intervention | 20 | 58.2 ± 5.51 |

The findings of this study indicated that from the point of view of all nurses studied, lack of familiarity with equipment and procedures, lack of knowledge about job descriptions and lack of knowledge about the patient’s need for care had no effect on missed nursing care.

Discussion

The findings of the present study showed that teamwork training for nurses can reduce missed nursing care. According to a study, missed nursing care has a significant and inverse relationship with the mean teamwork between nurses.³⁰ In the present study with purpose of

determining the effect of teamwork training on missed nursing care among the nurses in Neonatal Intensive Care Unit (NICU), the researchers with complete awareness of this issue, tried to institutionalize “patient-centered” (and not nurse-centered) performance among NICU nurses.

It was well explained frequently during the trainings that although caring for patients in the ward was provided as case method, nurses should know that all members of the nursing team are responsible for all patients in one working shift and where necessary, they should prioritize work, interact and support other colleagues to provide complete patient care. Hajinabi et al. conducted a study aimed at determining the relationship between patient safety and teamwork among nurses and in a report consistent with the present study stated that teamwork and patient safety are directly related and increasing teamwork can reduce nursing errors.³¹

Table 4. Paired t-test results of the comparison of mean score of missed nursing care

| Group | T statistic | Degrees of freedom | Significance level |
|---|-------------|--------------------|--------------------|
| Before the intervention - after the intervention | 11.566 | 19 | 0.001 |
| After the intervention - one month after the intervention | -2.523 | 19 | 0.021 |

Similar to the present study, Kalisch et al. taught teamwork with the “train the trainer” technique and suggested that teamwork has led to a reduction in missed nursing care. In their intervention, after designing different scenarios, they practically simulated them and practiced various group strategies by playing a role in different pre-designed situations.³² Also, Kalisch designed the Nursing Teamwork Survey (NTS) tool to measure the amount of teamwork among nurses³³, and both he and other researchers used it to measure the amount of teamwork and its comparison with missed nursing care.^{22,30,32,34} Regarding the factors related to missed nursing care, the results showed that from the point of view of NICU nurses, they were well acquainted with the equipment and procedures, considered all nursing care necessary to accelerate the process of healing newborns, and were well aware of their job descriptions. Therefore, these three components would not contribute to creating the ground for missed nursing care. From the nurses’ point of view, the large volume of activities related to admission and discharge, lack of time to complete time-consuming care and lack of nursing staff can be very important reasons for missed nursing care as the nurses stated in the present study. Meanwhile the large volume of activities related to the admission and discharge of patients is the main factor for missed nursing care. In a study also stated exactly the same factors as the main reason for missed nursing care.³⁵ The present finding is also consistent with the results of some studies^{7, 36-40}, such that the importance of “nursing staff shortage” in causing missed nursing care did not reduce much even after providing teamwork training to nursing staff. This issue indicates the need for nursing managers in all decision-making levels to pay more attention to the lack of nursing staff, because otherwise it can have devastating effects on the treatment of patients and lead to more burnout of nurses.

Teamwork is a very important component

that if nurses learn its skills and tools, their attitude towards the work environment and interaction with other colleagues will change and ultimately lead to improving the safety and treatment quality of patients. By teamwork training, nurses learn to direct patient care in critical situations, to support their colleagues when their workload increases or need help, to communicate clearly and securely with each other, constantly monitor ward conditions and ultimately share their understanding of patients’ and ward condition with other colleagues.

Although in the present study, we tried to design diverse clinical scenarios and hold discussion about them to teach teamwork to nurses in a practical way, due to the lack of willingness of nurses in the study, simulation of different situations and role-playing by nurses was not conducted. Nonetheless, the researcher believes that practicing teamwork strategies and tools in the form of role-playing can lead to deeper and more stable learning in nurses.

Conclusion

Teamwork training had a considerable impact on reducing missed nursing care during the COVID-19 pandemic in NICU. Also, large volume of activities related to admission and discharge is the most important factor caused missed nursing care. We suggest that other tools be used to measure the amount of teamwork among nurses in the future. It is recommended to consider teamwork training courses for nurses as a necessary part of in-service training. By holding teamwork training workshops for nursing students, they can be provided with the knowledge needed to use teamwork strategies and tools to meet those challenge.

Conflict of Interest

The authors have no conflict of interest.

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