An Investigation of the Effect of the Designed Program of Nurses' Participation on the Frequency of Missed Nursing Care in Neonatal Intensive Care Unit (NICU) of Shahid Sadoughi Hospital, Yazd, Iran

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Abstract

Introduction: Missed nursing care is one of the indicators of nursing care quality and can result in fatal and permanent disabilities, especially in neonatal intensive care units (NICU) due to the unique needs of newborns. Therefore, it is crucial to manage these errors, especially in NICU. The purpose of this study was to investigate the collaborative and participatory program on the frequency of missed nursing care.

Method: The present study was interventional and quasi-experimental. Using a missed nursing care questionnaire, the researcher investigated all types of care errors for two months in the NICU. Then, a care error management program was developed and implemented in the NICU with the help of personnel participation for six months. Using the same questionnaire, the impact of the interventions was assessed at the conclusion.

Results: According to the study's conclusions, the highest improvement rates were found in the care categories of teaching parents about home care, preparing parents for discharge, prescribing PRN medications for a maximum of 15 minutes, and comprehensive physical examinations. In addition, unfortunately, some services, such as pain management using both pharmaceutical and non-pharmacological methods, and the effectiveness of

medications 30 to 60 minutes after the prescription, did not improve despite the interventions that were carried out.

Discussion and Conclusion: According to the findings of the study, it is recommended that a participatory error management program be developed with the help of the involved group and the support of the hospital's senior and executive management team to reduce errors, particularly nursing care errors.

Keywords: Personnel participation, Missed nursing care, Management

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Introduction

In health and treatment systems, nurses make up the largest group. They play a variety of roles, including providing high-quality care, ensuring patient safety, boosting health, easing patient suffering, etc.(1) Nurses are the most important hospital staff members in hospitals because they provide care and work to increase patient safety and manage and decrease errors(2). Patient safety is regarded as a crucial component of the quality of care and is a major concern for the healthcare system. Errors are a part of professional life, and medical and nursing errors are frequent and unavoidable factors that affect patient safety(3). Nursing errors are complicated and have an impact on patient care(3). Omission or missed nursing care is one of these types of errors(4). Any aspect of nursing care that is overlooked or delayed and causes problems is referred to as "missed nursing care(4-7).

One of the leading causes of missed nursing care is a lack of human and material resources(8, 9). Furthermore, studies have shown that a lack of human resources is one of the causes of missed nursing care(10). According to one point of view, missed nursing care is caused by a lack of resources or a high volume of requests(6). Prioritizing the patient's needs, according to some nurses, is another reason for missed nursing care(11).

Missed nursing care can lead to a poor prognosis for patients, which can affect the quality of care and result in complications like death and disability. Missed nursing care is one of the indicators of the quality of nursing care(8). Missed nursing care can result in serious complications for patients, according to research into the causes of patient mortality(5). The patient's negative experience with the facility(12, 13), an increase in hospital infections, patient falls, and pressure ulcers are additional effects of this error. However, it also has an impact on the nurses themselves, causing physical and mental exhaustion and leaving the work(12).

The priority of nurses has an impact on patients' educational, emotional, and psychological needs. Incomplete or missed nursing care is a major issue in departments, especially special wards. One of the most significant missed nursing care is the inability to control vital signs, according to an

analysis of the causes of patient mortality(5). Because nurses reported missing at least one care during each shift, it appears that missed nursing care is a widespread issue(14). Additionally, studies have revealed that between 10% and 27% of nurses make mistakes when providing care(9)

Holistic care with minimal complications is one of the most important duties of nurses in neonatal intensive care units (NICU). The infant death index is a critical indicator of the healthcare system and a highly sensitive issue. As a result, high-quality care is required in the NICU where one of the most vulnerable departments in the hospitals. In this regard, the care in this department must be given serious consideration, and the nurses working in this department recognize their unquestionable role (1).

According to a study, the parental support and teaching subscales were the nursing care that was missed the most frequently in the NICU, while care coordination and discharge planning were the least frequently involved(15). Additionally, there is a direct correlation between workload and missed nursing care in this department (16). This section lists the causes of this type of error as frequent disturbances, critical baby conditions, and sudden changes in the number of babies and workload(17).

Considering the importance of the care provided in the NICU, as well as the fact that previous studies have shown that notifying employees of orders and department letters are ineffective in preventing and reducing errors, but that employee participation and the creation of motivational and participatory processes can help in error management, the researchers in this study sought to use an approach that involved personnel in the planning and management of errors.

Method

This quasi-experimental and interventional study was conducted in the neonatal intensive care units (NICU) of Yazd hospitals with 30 beds. The study's statistical population was comprised of all of the hospital's neonatal and intensive care unit nurses, who were selected by the census. The inclusion criteria for the study were at least one year of experience in the neonatal intensive care unit and a bachelor's degree in nursing. A total of 40 nurses participated in the study. The study was also conducted with the participant's consent and the researcher's permission from the Shahid Sadoughi University of Medical Sciences in Yazd.

The instrument that was used for the collection of data was a three-section questionnaire on missed nursing care in the NICU. The validity of the questionnaire was confirmed with the assistance of experts' opinions, and the reliability of the questionnaire was obtained at 87% through the use of Cronbach's alpha in the Emami et.al (2018)'s study.

The first section of the questionnaire contains questions about personal and social characteristics, such as age, shift type, number of shifts, number of patients in each shift, educational degree, work experience, work experience in the neonatal intensive care unit, and type of employment.

The second section of the assessment questionnaire for missed nursing care included 34 essential care in the NICU. For each of these items, four Likert options were created, including "there was no problem," "I did it completely," "I did it partially," and "I forgot it."

The researcher first visited the NICU and then introduced the concept of missed nursing care to the nurses during their training class. Then, instruction was provided on how to complete the checklist of missed nursing care. Therefore, the checklist was emailed to them, and they were required to complete it at the end of their shift. This process continued for two months with the researcher emphasizing the confidentiality of the error report and avoiding contact with the person who reported the error.

In the subsequent section of the study, the nurses of the NICU were asked, during meetings, to identify the causes and solutions for error management in the department based on the available resources. In this section, six focus groups were held in the presence of registered nurses to discuss the causes of 33 missed care and proposed solutions. During a joint meeting, a consensus was reached on 24 of the 70 proposed solutions to reduce these errors. According to the urgency, necessity, appropriateness, feasibility, budget, research team readiness, majority agreement, compliance with educational standards and Ministry of Health policies, these 24 solutions were classified into 4 categories as follows:

- *Human resource management* entails enhancing the fit of nurses to the bed, managing tasks, simplifying processes, and managing tasks outside of a nurse's job description.
- *Improving the error management system* involves analyzing the root causes of errors, legalizing the department's current issues, providing feedback and sharing errors, and legalizing order writing.
- *Participation of the mother in care* includes empowering the mother in care and legitimizing her participation in care.
- *Educating and fostering a culture of safety* includes comprehensive training of nurses, holding classes on safety and error, holding joint classes with the medical group, and the initial inspection of equipment and connections.

The solutions were then put into practice over four months with the help of the hospital's executive team and participation from the hospital staff, and after that, for the final two months, data was gathered and compared to the earlier stage.

The data were analyzed using descriptive statistics, such as mean, mean and ratio, chi-square test, etc.

Results

The findings of the study revealed that there are a total of 40 female nurses working in the department, with an average age of 33 years, a standard deviation of 7.6 years, a range of ages from 24 to 49 years old, and a minimum age of 24. They had an average work experience of 9 years, with a standard deviation of 5.9 years. Their work experience ranged from 1 year to 20 years in the extreme. The average frequency of time they had spent working in a neonatal intensive care unit was 5.8 years, with a standard deviation of 3.3 years. The smallest amount of time they had spent there was 1 year and the longest was 16 years. The standard deviation was 0.7, the minimum number of patients per shift was 2, and the maximum was 6 patients. The average number of patients per shift was 3.8 patients. The typical number of shifts worked in a given month was 25, on average. Additionally, 73% of the nurses were married, 50% of the nurses held permanent civil employment, 25% percent held contractual employment, and the remaining nurses held corporate and project employment.

Furthermore, the study's findings revealed that the interventions affected the care. In this way, care such as Attending rounds, especially during shift handover, Considering oral care of the babies under ventilator, Making parents participated in babies care, Teaching parents about home care such as taking medications, Starting oral feeding at the first opportunity and feeding at a specified time, Transferring all vital information about the baby during the shift handover to other hospital staff, Changing the position of the baby at least every 2 hours, Prescribing PRN drugs for a maximum of 15 minutes, Titrating oxygen, Providing supportive-developmental care (nest and skin-to-skin care), Doing central venous line care and checking it according to the protocol, Taking care of the peripheral venous line according to the protocol, Checking critical tests and dependent vital signs according to the protocol, Controlling and responding to alarms in a timed method, Presenting skin care according to the protocol or as needed such as bathing, Controlling the safety of the side rails of the beds in every shift or according to the protocol, Administrating of drugs within a maximum period of 30 minutes before or after the scheduled time, Focusing on re-evaluating the babies based on their condition, Feeding the babies as soon as needed, Reviewing high-risk drugs according to the protocol, Doing comprehensive physical examination, Preparing the parents for discharge, Observing the 8 rights of medication, had improved (Table No. 1)

However, compared to other improved care, the rate of improvement for the following care was highest: preparing parents for discharge; teaching parents about home care, such as medications; prescribing PRN drugs for a maximum of 15 minutes; and comprehensive physical examination. The lowest rate of improvement was for control care and timed alarm response; reviewing high-risk drugs following the protocol, and adhering to the 8 rights during medication administration.

Table 1. Distribution of Care Frequency Before and After Improved Care Interventions

Care Type		Completely	Partially	Not at all	Mean (SD)
Attending rounds, especially during shift handover	Before	210 (47.5%)	192 (43.4%)	40 (9%)	1.6(0.6)
	After	228 (70.2%)	95 (29.2%)	2 (0.6%)	1.3(0.4)
Considering oral care of the babies under a ventilator	Before	185 (46.3%)	123 (30.8%)	92 (23%)	1.8(0.8)
	After	114 (41.2%)	161 (58.1%)	2 (0.7%)	1.6(0.5)
Making parents participate in the babies care	Before	124 (30.8%)	174 (43.2%)	105 (26.1%)	1.9 (0.7%)
	after	155 (50.7%)	100 (32.7%)	51 (16.7%)	1.7(0.7)
Teaching parents about home care such as taking medications	Before	77 (20.6%)	55 (14.7%)	242 (64.7%)	2.4(0.8)
	After	125 (46.8%)	124 (46.4%)	18 (6.7%)	1.6(0.6)
Starting oral feeding at the first opportunity and feeding at a specified time	Before	0 (0%)	93 (37.1%)	158 (62.9%)	2.6(0.4)
	After	77 (36.8%)	34(16.3%)	98 (46.9%)	21.1(0.9)
Transferring all vital information about the baby during the shift handover to other hospital staff	Before	249 (56.6%)	176(40%)	15 (3.4%)	1.5(0.5)
	After	(87.7%) 285	37(11.4%)	3(0.9%)	1.1(0.3)
Changing the position of the baby at least every 2 hours	Before	141(32%)	294 (66.1%)	5(1.1%)	1.7(0.4)

	After	157 (48%)	(51.1%) 164	0(0%)	1.5(0.5)
Prescribing PRN drugs for a maximum of 15 minutes	Before	139(47.3)	27(9.2)	128(43.5)	1.9(0.9)
	After	204(85.4)	19(7.9)	16(6.7)	1.2(0.5)
Titrating oxygen	Before	172(40.3)	146(34.2)	109(25.5)	1.8(0.7)
	After	241(74.6)	63(19.5)	19(5.9)	1.3(0.5)
Providing supportive-developmental care (nest and skin-to-skin care)	Before	198(48.6)	66(16.2)	143(35.1)	1.9(0.9)
	After	183(59.6)	89(29)	35(11.4)	1.5(0.6)
Doing central venous line care and checking it according to the protocol	Before	107(26.8)	211(52.9)	81(20.3)	1.9(0.6)
	After	175(57.9)	125(41.4)	2(0.7)	1.4(0.5)
Taking care of the peripheral venous line according to the protocol	Before	81(18.5)	324(74.1)	32(7.3)	1.9(0.4)
	After	146(45.6)	149(46.6)	25(7.8)	1.6(0.6)
Checking critical tests and dependent vital signs according to the protocol	Before	130(38.9)	149(44.6)	55(16.5)	1.8(0.7)
	After	131(55.3)	106(44.7)	0	1.4(0.4)
Controlling and responding to alarms in a timed method	Before	171(38.9)	265(60.2)	4(0.9)	1.6(0.5)
	After	163(50.2)	161(49.5)	1(0.3)	1.5(0.5)
Presenting skin care according to the protocol or as needed such as bathing	Before	171(38.9)	265(60.2)	4(0.9)	1.7(0.5)
	After	167(52.7)	144(45.4)	6(1.9)	1.5(0.5)
Controlling the safety of the side rails of the beds in every shift or according to the protocol	Before	56(12.8)	118(26.9)	265(60.4)	2.5(0.7)
	After	130(40)	66(20.3)	129(39.7770	2(0.8)

Administrating of drugs within a maximum period of 30 minutes before or after the scheduled time	Before	262(52.8)	90(21)	112(26.2)	1.7(0.8)
	After	218(70.6)	83(26.9)	8(2.6)	1.3(0.5)
Focusing on re-evaluating the babies based on their condition	Before	171(39)	206(46.9)	62(14.1)	2.1(0.6)
	After	117(37.6)	100(32.2)	94(30.2)	1.9(0.8)
Feeding the babies as soon as needed	Before	131(36)	118(32.4)	115(31.6)	1.9(0.8)
	After	148(54.2)	67(24.5)	58(21.2)	1.7(0.8)
Reviewing high-risk drugs according to the protocol	Before	153(36.7)	215(51.6)	49(11.8)	1.7(0.7)
	After	154(47.7)	143(44.3)	26(8)	1.6(0.6)
Doing a comprehensive physical examination	Before	101(24.3)	216(51.9)	99(23.8)	2(0.6)
	After	164(60.3)	99(36.4)	9(3.3)	1.4(0.5)
Preparing the parents for discharge	Before	45(13.2)	3(0.9)	293(85.9)	2.7(0.6)
	After	137(48.9)	92(32.9)	51(18.2)	1.7(0.7)
Observing the 8 rights of medication	Before	207(47.2)	221(50.3)	11(2.5)	1.5(0.5)
	After	215(66.2)	102(31.4)	8(2.5)	1.4(0.5)

Some care showed a slight improvement (average increase of less than 0.1), including psychological support for the mother and family, fluid intake and excretion control, taking samples and performing tests, monitoring vital signs, and detailed charting of all care provided (Table 2).

Table 2. Distribution of the Frequency of Relatively Improved Care

Care Type		**Completely**	**Partially**	**Not at all**	**Mean (SD)**
Psychological support for the mother and family	Before	219 (59.2%)	94(25.4)	57(15.4)	1.56(0.7)
	After	157(56.9)	89(32.2)	30(10.9)	1.53(0.6)

Fluid intake and excretion control	Before	130(38.9)	149(44.6)	55(16.5)	1.30(0.4)
	After	252(77.5)	67(20.6)	6(1.8)	1.24(0.4)
Taking samples and performing tests	Before	319(91.9)	3(0.9)	25(7.2)	1.15(0.5)
	After	252(89.4)	26(9.2)	4(1.4)	1.12(0.3)
Monitoring vital signs	Before	171(39)	206(46.9)	62(14.1)	1.75(0.6)
	After	124(38.4)	180(55.7)	19(5.9)	1.67(0.5)
Detailed charting of all care provided	Before	268(60.6)	171(38.7)	3(0.7)	1.40(0.5)
	After	215(66.2)	107(32.9)	3(0.9)	1.34(0.4)

Unfortunately, some of the care did not improve despite the interventions, which included pain assessment, pharmaceutical, and non-pharmacological pain management, infection control precautions according to the protocol, checking the effectiveness of the drugs 30 to 60 minutes after the prescription, responding to the mother's request within 5 minutes, and hand hygiene (Table 3), with the examination of the pain having the highest rate of non-improvement and hand hygiene having the lowest rate.

Table 3. Distribution of the Frequency of Care without Improvement

Care Type		**Completely**	**Partially**	**Not at all**	**Mean (SD)**
Checking the effectiveness of the drugs 30 to 60 minutes after the prescription	Before	77 (18.9%)	245 (60.2%)		2(0.6)
	After	72 (23.3%)	135 (43.7%)		2.1(0.7)
Pain assessment	Before	117(37.1)	141(44.8)	57(18.1)	1.8(0.7)
	After	85(30.6)	125(44.9)	68(24.4)	1.9(0.7)
Pharmaceutical and non-pharmacological pain management	Before	120(33.9)	108(30.5)	126(35.6)	2(0.8)
	After	55(19.8)	130(46.8)	93(33.5)	2.1(0.7)

Infection control precautions according to the protocol	Before	199(45.3)	211(48.1)	29(6.6)	1.6(0.6)
	After	126(38.8)	174(53.5)	25(7.7)	1.7(0.6)
Hand hygiene	Before	386(87.5)	52(11.8)	3(0.7)	1.13(0.3)
	After	282(86.8)	40(12.3)	3(0.9)	1.14(0.3)
Responding to the mother's request within 5 minutes	Before	273(73.4)	77(20.7)	22(5.9)	1.3(0.5)
	After	192(67.8)	67(23.7)	24(8.5)	1.4(0.7)

Discussion

Nursing care is very important in the neonatal intensive care unit (NICU), and missed nursing care harms the patient, family, and hospital staff, and it is one of the challenges of nursing today. Therefore, nursing managers must take steps to manage missed nursing care.

The results of this study revealed that the most frequently missed nursing care included preparing parents for discharge, starting oral feeding at the first opportunity, checking the safety of bedside rails every shift or following protocol, educating parents about home care needs like medications, emphasizing re-examination of the babies based on their conditions, doing a thorough physical examination, and verifying the efficacy of medications 30 to 60 minutes after the prescribed dose. However, the least missed nursing care involved monitoring fluid intake and excretion, taking samples and testing, checking vital signs, responding to the mother's request within 5 minutes, and keeping a detailed chart of all completed care.

According to Tabs Koli et al, the most frequently missed nursing cares in the neonatal department include rounds, taking care of the baby's mouth under the ventilator, teaching the mother, preparing for discharge, and oral feeding, while hand hygiene and medication are the least missed nursing cares(17) .

In addition, Khajooe et al. stated in their study that care such as measuring vital signs and keeping a detailed chart of the care provided was among the least missed nursing care, which was consistent with the findings of our study(18). Reports may be generated as a result of an accurate sheet for recording these cases in the file, which assists nurses in the accurate recording. Also, vital sign recording is very important and vital, and it is emphasized in the shift handover, and it is one of the less frequently missed nursing care. Furthermore, head nurses, supervisors, and so on pay more attention to this issue from a supervisory standpoint.

According to the findings of our studies, the program that was developed with the participation of the department personnel had a significant effect in reducing the number of nursing care that was missed. As a result, the majority of care improved a result of the implementation of this change program. However, the hospital must consider the error management program to be one of its strategic priorities, and this program ought to be revised and communicated on an annual basis. Our study revealed that almost all care improved, except for pain management and the efficacy of medications. This may be because nurses are unfamiliar with these cares and lack the necessary knowledge, information, and skills in this area. As previously mentioned, the lack of knowledge and the improper attitude of nurses in this field are two factors contributing to their weakness, and educational programs have not yet been able to address these issues. As a result, it is advised that nurses be trained using both face-to-face and electronic methods (19, 20) . Therefore, based on the researcher's limitations during the implementation of the change plan, it appears that training sessions with new and combined methods should be conducted continuously, and injecting motivation for the nurses of the NICU should be taken into consideration under the working nature of the department to see the improvement of the department's pain management care and medication administration.

According to the findings of the previous studies, missed nursing care is associated with the working environment of the personnel, and the frequency of this missed nursing care varies from one unit to another(6). The aforementioned problem is therefore crucial, and each unit's specific causes may vary. Involving the people involved in the process is one of the best ways to implement change, and one of the ways to involve personnel was to include them in all phases of change. As a result, the researcher decided to carry out a study with the involvement of the personnel from the very beginning, that is, from problem identification to solution development and implementation with the assistance of the personnel. Concerning this, the results showed that there was a noticeably lower number of missed nursing care after the solutions were put into place.

Another way to reduce missed nursing care is to improve teamwork (6). Nursing is a profession in which collaboration improves patient safety and the quality of nursing care. The best teamwork, according to researchers, occurs in the NICU(6). Furthermore, Kalisch et al. stated that teamwork has an effective effect on missed nursing care(21). Taking into account the issues and the solutions provided by his colleagues, and even involving all the personnel in solving the problem, the researcher strengthened the teamwork in the department, which appears to be one of the reasons for the improvement in missed nursing care.

According to the study's findings, human resource management is related to care errors, and as a result, a lack of human resources, a lack of resources, and communication issues are the main causes of missed nursing care incidents(9). However, these are not the only causes of missed nursing care and further research in this area is necessary. Lack of personnel satisfaction is another cause of missed nursing care, and there is a link between hospital staff satisfaction and missed nursing

care(7). Other factors cited for missed nursing care include the rise in admissions and the dearth of supporting human resources(11). In this study, the researcher arrived at the aforementioned conclusions by taking into account the involvement of the hospital staff; similarly, the solutions put forth by the hospital staff members included more nursing hospital staff and departmental support like a secretary. Additionally, by involving the hospital staff in identifying the issues and suggesting solutions with their input, the satisfaction of the hospital staff was also taken into consideration, resulting in the successful management of many missed nursing cares as a result of these interventions.

The support of the hospital's executive management team for patient safety, particularly errors, was another factor in the management of missed nursing care in the current study. As a result, solutions were proposed with the involvement of the employees in the hospital's executive team, and after being approved by the relevant units, they were implemented and organized. Researchers and organizational support believe that management support for patient safety is effective in managing these types of errors(22) and these findings are consistent with the results of our study. The hospital executive management team's attitude toward errors is crucial because it can serve as the foundation for voluntary reporting of errors, the identification of their nature and type, and the subsequent development of plans to reduce them(23).

In addition, the management of non-nursing human resources or support was an additional method for minimizing errors in this study. This result was consistent with the findings of Hessel et al.'s study, suggesting that human resource management and the use of support hospital staff are among the factors that contribute to the reduction of missed nursing care.(22). Griffiths et al. believed that adding support forces does not have a significant impact on missed nursing care (5), which contradicts the findings of our study. In situations where the nurse is required to perform non-nursing tasks, such as in our research environment, it appears that automatically adding a support force reduces the nurse's unnecessary activities and frees up time for care. Creating an environment without blame and punishment, providing feedback on errors to personnel, and fostering constructive communication were also employed to reduce errors. This result was also consistent with the findings of Hessel et al.'s study, in which the researcher cited proper communication during errors, constructive feedback, and the creation of a fear-free environment as mitigating factors(5).

In conclusion, based on the findings of the study, it is recommended to develop a collaborative error management program with the support of the hospital's executive management team and to create an environment free of blame and punishment to reduce the errors of all medical groups, particularly the nursing team.

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