

## Research Article

# Investigating the Relationship between Patient Safety and Missed Nursing Care of Neonatal Intensive Care Units

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**Introduction:** Nurses, as one of the key members of the Neonatal Intensive Care Units (NICUs) must observe own baby safety issues in their care. In addition, Making mistakes and missing nursing care causes serious harm to patients and reduces the quality of nursing care. The aim of this study was to determine the relationship between patients' safety and missed nursing care in NICUs.

**Methods:** This cross-sectional and descriptive-correlational study was conducted on 103 nurses of neonatal intensive care units in 2017 using the census methods. The data collection tools included demographic information, a missed care questionnaire, and a patient safety questionnaire. Data were analysed using non-parametric tests with SPSS v19.

**Results:** The mean and standard deviation of observing patient safety and the miss nursing care scores by Neonatal Intensive Care Unit (NICU) Nurses was  $80 \pm 10$  and  $31.42 \pm 4.59$  that the level of the score was moderate. Also, There was no significant correlation between patient safety and missed nursing care ( $p$ -value =0.07).

**Discussion:** The results indicated that the neonatal intensive care unit nurses adhered to patient safety at a moderate level, as well as the mean score of miss nursing care by nurses working in the neonatal intensive care unit. Given the sensitivity of this group of patients, educational planning is needed for the implementation of nursing interventions in order to improve the safety status and reduce the missing care in hospitals.

**Keywords:** Patient Safety; Missed Nursing Care; Neonatal Intensive Care Unit; Nurses

**Introduction**

The infant care department is one of the most sensitive departments of hospital [1]. Caring behaviours in the intensive care unit include all critical patient care services. In this unit, nurses are faced with numerous issues and given the clinical status of patients, they can be the most important influencers on the health of patients [2]. Scholars believe that the most important capital of each organization is its human resource. In this respect, nurses are taken into account as the biggest and the most important human resource in healthcare organizations (Karami, 2017, Nouhi, 2014). Nurses are also a key member of the health care group [3]. They play several roles the most important one of which is caring and is recognized as the central focus of nursing [4]. Nursing care in neonatal intensive care unit is considered one of the most sensitive professional care services due to the high sensitivity of the neonates in terms of care. On the other hand, 10-15% of newborns are admitted to the neonatal intensive care units and the infant mortality rate is a standard indicator for the development of health, education and social care in a country. Therefore, addressing the infants' health is among health care necessities [5]. Luderet et al. 2007 have considered shortage of nurses, high numbers of patients, lack of nurses' time, financial issues and space constraints, lack of adequate training, lack of care, providers and parents' cooperation and busy and full of infant care equipment

environment of NICU as barriers to provide care [6]. Research in the field of care science plays an important role in responding to changes in health patterns [7]. In nursing care, missed care is part of the care process among organizational structures, which is a developing and horrible problem in care provision in which the nurse has not followed or missed health care standards for any reason [8]. This type of care also exists in the neonatal intensive care unit, for example, in addressing the infant admission cares, nurses' functional problems are frequent. For example, in 99% of the cases, the equipment required by the infant is not preheated and the neonatal auxiliary temperature was not controlled every 10 minutes in the first hour in 100% of the cases [9]. Various factors such as labour, environmental characteristics and individual characteristics of nurses have a great impact on missed nursing care [8]. Missed nursing care is often not reported and they are substantially increasing and exacerbating the negative symptoms of patients. One of the most common cases of missed nursing care among the nurses in the neonatal intensive care unit is to forget washing hand and initial assessment of the newborn [10]. Missed nursing care may be considered as one of the important indicators in the quality of nursing care in the neonatal intensive care unit due to the severity of nursing care in infants with poor states and their long-term hospitalization [11]. On the other hand, patient safety is one of the main pillars of nursing care. The American Institute of Medicine has defined safety as prevention of injury to

**Table 1:** Comparison between missed nursing care scores according to the demographic characteristics of the nurses under study.

+		frequency/No %	Test statistic	P-value
<b>Gender</b>	Male	(1)1	*-1/552	0/121
	Female	(99)102		
<b>Age</b>	20-35	(71/8)74	*-2/56	0/01
	36-51	(28/2)29		
<b>Marital status</b>	Single	(27/2)28	*-1/975	0/048
	Married	(72/8)75		
<b>Education</b>	BSc	(90/3)93	* -1/620	0/105
	MSc	(9/7)10		
<b>Position</b>	Head nurse	(3/9)4	* -2/197	0/028
	Nurse	(96/1)99		
<b>Shift</b>	Fixed	(5/8)6	*-1/999	0/046
	Changing	(94/2)97		
<b>Employment</b>	Regular Contractual	(27/2)28	**15/292	0/02
	Temporary contractual	(20/4)21		
	New staffing	(14/6)15		
		(37/8)39		
<b>Work experience in neonatal intensive care unit</b>	0-5	(63/2)65	**12/489	0/014
	05-Oct	(24/3)25		
	Oct-15	(6/8)7		
	15-20	(3/8)4		
	20-25	(1/9)2		
<b>Work experience in medical unit</b>	0-5	(51/4)53	**14/014	0/016
	05-Oct	(23/3)24		
	Oct-15	(12/7)13		
	15-20	(7/8)8		
	20-25	(3/8)4		
	25-30	(1)1		
<b>Total</b>		(100)103		

\*Mann–Whitney u; \*\*Kruskal–Wallis.

patients with an emphasis on care provision, including prevention of mistakes, learning from mistakes and creation of a safety culture in organizations [12]. By maintaining patient safety, the probability of success and access to treatment outcomes increases [13]. Safety is one of the vital components of health care quality [14]. Effective safety education provides employees with the knowledge, skills and abilities they need to fulfil their responsibilities safely so that new behaviours are learned and delivered to the workplace. It also helps them to identify workplace hazards and use available techniques to prevent or mitigate these hazards [15]. Making mistakes and missing nursing care in any way in addition to causing serious harm to patients can reduce the quality of nursing care. Considering the necessity of identifying this type of care in the neonatal intensive care unit, this study aimed to determine the relationship between patient safeties and missed nursing care among the nurses of neonatal intensive care units in selected hospitals in Kerman province.

## Methods

This study is cross-sectional and descriptive-correlational

research. The statistical population of this study included all nurses under the supervision of hospitals 1,2,3,4 respectively who were selected by census method (n=103). Ethical considerations were taken into account in this study, such as: obtaining informed consent, maintaining confidentiality, voluntary participation and leaving the study free. The code of ethics is IR.Kmu.REC.1396.2378. The inclusion criteria were: 1) nurses who have at least one month of work experience in the neonatal intensive care unit and 2) nurses who were interested in participation. The data collection tool in this study was questionnaire. Accordingly, a questionnaire consisting of three sections was used i.e. demographic characteristics questionnaire, missed nursing care questionnaire and patient safety questionnaire, which was based on the review of the texts and developed by the researchers.

The questionnaire for missed nursing care includes 23 questions. The items were based on 4-point Likert scale (I always (4 points), frequently (3 points), sometimes (2 points) and rarely (1 point) forget) and whoever has higher rate of missed nursing care receives a higher score. The minimum and maximum scores were 23 and

92 respectively. To evaluate validity the content was presented to ten faculty-nursing members and the necessary changes in the questionnaire were made according to the experts' opinion. Content validity was obtained and its reliability by Cronbach's alpha method was 75%. The patient safety questionnaire consists of 34 questions. Questions were based on 4-point Likert scale (I always (1 point), frequently (2 points), sometimes (3 points) and never (4 points) observe) and anyone who follows safety receives lower score. The minimum and maximum scores were 136 and 34 respectively. To evaluate validity the content was presented to ten faculty-nursing members and some questions were modified, added or removed. This tool was developed by the research team by reviewing the articles. Its reliability was calculated using Cronbach's alpha method as 75%.

## Results

The study samples consisted of 102 women (99%) and 1 male (1%) that 74 (71.8%) subjects were within the age range of 20-35 years and 29 (28.2%) subjects were within the age range of over 35 years old. In terms of marital status, 28 (27.2%) subjects were single and 75 (72.8%) subjects were married. In terms of education, 93 (90.3%) subjects had bachelor's degrees and 10 (9.7%) subjects had master's degree. There were 4 (n = 3.9%) head nurses and 99 (96.1%) nurses based on position. Speaking about the working shift, 6 (5.8%) had fixed and 97 (94.2%) had changing work shifts. There were 28 (27.2%) regular, 21 (20.4%) contractual, 15 (13.6%) temporary contractual and 39 (37.8%) new staffing employees. The mean missed care score was significant in terms of age, marital status, position, work experience in the neonatal intensive care unit, clinical work experience, shift, and type of employment (0.01) (Table 1). There was a weak correlation between the mean of missed care and patient safety among nurses ( $r = .134$ ) (Table 2). The mean and standard deviation of observing patient safety score in neonatal intensive care unit (NICU) Nurses was  $10 \pm 80$ . In other words, the safety of patients in neonatal intensive care unit nurses was at a moderate level and the mean of miss nursing care score in neonatal intensive care unit nurses was  $31.42 \pm 4.59$ ; and as the miss care score is less, the miss care will be lower that this represents the moderate level of miss nursing care (Table 3).

## Discussion

Given the unique aspects and complexity of the infant's care environment, in addition to the vulnerability of the neonate population, the risk of medical errors increases in such environments, and since nurses are in direct contact with patients, they play a significant role in preventing the onset of problems and timely detection of errors. The results of this study showed that the level of safety of patients in nurses working in neonatal intensive care units was moderate. In a study by Eunhee Cho et al., titled "Nurse staffing level and overtime associated with patient safety, quality of care, and care left undone in hospitals", the results showed that about 16% of nurses reported poor patient safety, which was low and consistent with the present study [16]. In Arshadi Bostanabad et al's study titled "assessment of nursing safe performance in neonatal intensive care units of Tabriz", it was concluded that the safety performance of nurses was 78%, which is in a safe area that is in line with the results of the present study [17]. The results of Bayatmanesh et al., entitled "evaluation of Patient-Related Nursing Care with Standards in Intensive Care Unit (ICU)" performed on nurses at the intensive care unit showed that the score

**Table 2:** The relationship between missed care and the patient safety among the studied nurses.

Variable	Correlation coefficient	P-value
Observing patient safety Missed care	**0/134	*0/07

\*The mean difference of 0.05 is significant; \*\*Spearman.

**Table 3:** The mean and standard deviation of observing patient safety and missed care in studied nurses.

Variable	Maximum-minimum score	Mean (SD)
Observing patient safety	63-110	(10±)80
Missed care	25-48	(59/4±)31/42

of compliance rate of nursing care associated with patient safety was undesirable compared to the checklist which was not consistent with the results of the present study. The reason for this inconsistency is difference sample size, statistical sample different from work history and the amount of scientific information [18]. The recent studies indicate that neonatal intensive care unit is one of the most sensitive departments of the hospital [1]. Care behaviours in the intensive care unit include all critical cares dependent on patient's life.

Given the clinical situation of patients, nurses in intensive care units can be the most important influencers on patients' care [2]. Therefore, nurses play a significant role in maintaining and providing patient safety. In spite of the importance of patient safety, factors such as inappropriate work shifts, lack of human resources, lack of proper equipment and facilities and performing roles contrary to the caring role of a nurse provides the context for the occurrence of nursing work errors and reduced patient safety [19]. Others also believe that human errors are more likely to lead to drug mistakes and damage to patient safety than management, system and environmental factors [20]. The above-mentioned points indicate nurses' human errors and lack of facilities and labour can be the reason for moderate observance of the safety in neonatal intensive care unit.

Another study by Sloane et al. titled "Effect of Changes in Hospital Nursing Resources on Improvements in Patient Safety and Quality of Care" indicated that changing nurses' work environment and education is consistent with improving the quality of care and safety and improving the quality of nursing care and making changes in their work environment increased patient safety. The results of this study were in contrast with this study in terms of significance and the cause of this conflict could be intervention and changes to improve the service and the quality of nursing care [21]. Linda H Aiken et al. in "Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States" concluded that patient satisfaction, quality and safety of care were higher in hospitals with appropriate work environment and professional staff. Therefore, with increasing competence and expertise of nurses in providing care, patients' safety increased. The results of this study are inconsistent with the results of this study in terms of the significance of these correlations. The cause of this conflict is the difference between the nurses' work environments, the number of studied nurses and the extent to which nursing care is consistent with international standards [22].

According to the results of recent research, one of the most important goals of a health care organization is to prevent damage to the patient and the risk of harm to the health and provide health

services [23]. Implementing nursing care and completing them is considered a safety concern for patients because by any negligence in providing caring underestimating the safety of patients, the health of patients is at stake. Moreover, the results of the studies showed that there is a correlation between patient safety and nursing care [22] When the organizational context is improved, employees will be more satisfied and have a greater tendency to implement and integrate clinical risk management in practice. Favourable working conditions, safety, and physical and mental health will be improved for patients and staff [24] and the amount of missed nursing care decreases. Considering that, proper care is a kind of patient's safety, by the reduction of the missed care, the patients' safety increases, which is necessary for the satisfaction of patients with nurses [21,22].

The results of this study showed that according to the nurses, patient safety is considered moderately in neonatal intensive care unit in the selected hospitals of Kerman province. The mean score of missed nursing care was relatively low in the neonatal intensive care unit, which indicates that this group does not have a proper care level according to the sensitivity of this group. Further, the results indicated that the missed nursing care by nurses working in the neonatal intensive care unit was limited and most nurses tried to implement standard nursing care in the department. From the point of view of the relationship between patients' safety variables and missed nursing care, the results showed that there was no significant relationship between the patient's safety score and the demographic variables of nurses. It is suggested to the nurses who play a central role in the health care system to enhance their own information and knowledge on patient safety and apply it in their care.

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