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Performance of Nurses in Parenteral Nutrition-related Care at Tabriz University of Medical Sciences NICUs

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ABSTRACT

Nutritional care is of vital importance for premature infants, and minimize the loss of body storages at whom is unable to meet his caloric requirement. With regard to the necessity of conformity and proximity of the care services to the standards as much as possible, the present study is aimed to investigate the nurses' performance in PN-related care at NICUs (Neonatal Intensive Care Units) of the hospitals of Tabriz University of Medical Sciences. The present descriptive study was conducted on 70 nurses working at NICUs of the hospitals affiliated to Tabriz University of Medical Sciences. Data collection was performed using a three-part checklist containing the information on the nurses' performance status in terms of the PN procedure standards before, during, and after providing the care services (pre, peri, and post-PN procedure). Furthermore, in order for data analysis, SPSS-21 software and descriptive statistics were used. The result showed that the maximum and minimum performance scores were related to the pre-PN and peri-PN care stages, respectively. In terms of the PN standards observance level, findings indicated that performance of the nurses was, in most of the cases, at a moderate level at all three pre, peri, and post-PN stages. Nurses have direct impacts on patient care as well as its consequent outcomes. Since neglecting the importance of the PN-related care at NICUs may lead to irreparable damages to the infants due to their high vulnerability, it is essential to hold training session for the medical treatment staff in order to promote the standard practical methods.

Key words: Nurses, Care, Parenteral Nutrition (PN), Premature Infant

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INTRODUCTION

Nutritional care is of vital importance for premature infants, since they are deprived of the nutrient resources, which are obtained via placental feeding, and exposed to a high rate of extra-uterine (ectopic) growth. Other high-risk infants also have special nutritional needs depending on their metabolic requirements associated with the disease and instability of the physiological conditions. The PN is provided in order to initiate the nutritional support for premature and high-risk infants; thus, it can be an appropriate approach in cases that enteral feeding

is not possible or the infant is unable to meet his calorie requirement [1].

Parenteral nutrition was first introduced by Dudrick in 1960 [2], the primary purpose of which is to minimize the loss of storages within body and preserve them[1].Furthermore, PN is one of the most common and major therapeutic methods at the early stage of life of the preterm infants with birth-weight of less than 1500 g[3]. For this group of infants, the PN procedure must be initiated as soon as possible in the first 24 hours of their life in order to prevent neural and physical growth and development disorders [4, 5].

In 2009, the National Center for Health Statistics (NCHS) reported that infants account for 33% of the patients receiving PN [6]. Also, in USA, more than 70% of the infants at NICUs and nearly 16000 infants at home receive PN [7]. The PN has led to alteration and evolution of the science of neonatology. In a study, the survival rate of the infants with gastroschisis in USA was reported to be 90-97% [8, 9]; in comparison, the mortality rate in less developed countries varied between 40-100%, depending on the applied surgical and medical methods including access to PN[10].

In a study conducted in the hospitals in Tehran, Najafi et al. showed that the care providers were far from the standards in terms of providing the nutritional care for premature infants, so that it seemed that the nutritional care services were not included in the ordinary care program in majority of the cases[11]. Results of the study conducted by Kraft et al. in Germany showed that provision of the PN procedure for admitted patients were not in accordance with the predetermined instructions and guidelines [12]. Moreover, in a study conducted in New Zealand, Kurmac et al. concluded that a significant number of the admitted infants would fall below the percentile during the first month of their lives, which might imply nonconformity of the nutritional care with the relevant standards [13]. Also, results of Vafaei et al. indicated that the nurses exhibited poor performance in the PN procedure [14].

One of the effective members of the healthcare team (health staff) is the nurse who, by having the essential insight and necessary clinical skills, can directly provide and perform the special infant care, which is an especially important issue[15]. Having the knowledge of the effects of prematurity on the digestive system's function, nutritional needs of the premature and high-risk infants, as well as the nutritional supportive approaches, the neonatal nurses can have a better assessment of the infant's nutritional status and also manage it more appropriately [1]. At ICUs, due to the high sensitivity of care and its full association with the progressing care technologies, on the one hand, and the increasing use of PN among infants considering its possible side-effects, on the other hand, the services provided by the nurses in this regard are vitally important for life and survival of the infants; thus, quality of the care services provided by the nurses must be maintained at a desirable level. Hence, it seems necessary to increase the capability and improve the quality level of the nursing services by investigating and evaluating the nurses' performance and compare it with the relevant standards [16]; besides, while evaluating the nursing performance, the nursing care can be controlled meticulously in the meantime, and the strengths and weaknesses can be also extracted [12]. All members of the treatment staff are committed and responsible to provide each individual patient with the highest-quality services in accordance with the standards, and should be also accountable in this regard; accordingly, they are obliged to know the care standards, should improve their performance to the standard level, and must monitor and prove the continuous and permanent accordance and conformity of their performance with the given standards.

Due to the vitality of PN for the newborn population, and also regarding the pediatrics-related superiority of the hospitals located in Tabriz over other ones in the northwestern part of Iran, it is strictly felt to be necessary to make attempts in order to achieve the maximum proximity and conformity of the care services with the given standards. Hence, the present study is aimed to investigate and evaluate the PN-related nursing care status at NICUs in the hospitals of Tabriz University of Medical Sciences.

MATERIALS AND METHODS

Aimed to determine the NICU nurses' performance in terms of performing the PN procedure among the admitted infants and compare it with the currently existing standards, the present descriptive study was conducted at the hospitals affiliated to Tabriz University of Medical Sciences during December 2016 to July 2017.

The sample population of the present study included 70 nurses working at NICUs of the hospitals of Tabriz University of Medical Sciences, the lowest educational level of whom was BS degree in nursing. In case of deciding, for any reason, not to continue cooperation and leave the research project, the sample was excluded from the study. Each nurse was observed 4 times, so that the total number of observations mounted to 279 cases. Furthermore, the caring procedure was recorded by the researcher at those hours when the PN is commonly performed.

In this study, the research environment included the NICUs of the super-specialty hospitals of Tabriz University of Medical Sciences. These medical centers were selected because of the fact that the students were usually present there most of the time, and also the nurses were used to be present there as well, so that the presence of the researcher did not cause sensitivity among them and also did not incite them to exhibit unreal and counterfeit behavior. After obtaining the required permissions from the Research Vice Chancellor of Tabriz University of Medical Sciences, the Chairman of the School of Nursing and Midwifery of Tabriz University of Medical Sciences, and the Regional Committee of Research Ethics of Tabriz University of Medical Sciences with code NO. IR.tbzmed.Rec.1395847, and obtaining the Letter of Recommendation from the School of Nursing and Midwifery of Tabriz University of Medical Sciences, by coordinating the arrangements with authorities of the hospitals, the researcher introduced himself to the selected centers. Subsequently, after obtaining the informed consent of the nurses, the researcher referred to the intended research fields at the morning working shift holding the checklist with himself. Within the study fields, he observed the nurses' performance status in terms of providing and performing the PN-related care services for the infants, and thereby recorded the results of observations by selecting a choice from among the choices provided in the checklist.

Data collection was performed using a 3-part checklist containing the information on the standard PN-related care procedure for infants, which has been developed based on the standards found in medicine and nursing reference books, articles found on credible and valid scientific websites, as well as the available instructions and guidelines (according to Mosby Nursing Skill website):

Part-A: Part A of the checklist was focused on determining the nurses' performance status in terms of the PN procedure standards before performing the care, and consisted of 10 questions, some of the statements of which included: hand hygiene before contacting the infant, identifying the infant using two identifiers, control and approval of physician.

Part-B: This part of the checklist was aimed to determine the nurses' performance status in terms of the PN procedure standards during performing the care, and consisted of 34 questions, some of the statements of which included: washing hands before preparing the PN solution, wearing sterile gloves, controlling the infant's central venous line.

Part-C: The third part of the checklist seeks to determine the nurses' performance status in terms of the PN procedure standards after performing the care, and consisted of 12 questions, some of the statements of which included: washing the catheter with saline solution, daily weighing of the infant, controlling the infant's blood sugar according to the physician's order.

Subsequently, the current status of the PN as well as its relevant care was examined using the aforementioned examination checklist, and thereby the cases of inconformity with the given standards were specified. In terms of criteria, the checklist included four items: (1) Yes (score:2), (2) To some extent (score:1), (3) No (score:0), and (4) if there was no choice for the item, no score was assigned, so it was not regarded while calculating the total score. First, the total scores were calculated for each part of the checklist. Scores of the parts A, B, and C of the checklist ranged between 0-20, 0-68, and 0-24, respectively. Sum of the scores of the three parts (A, B, and C) was considered as the total score, which ranged between 0-112. Afterwards, the obtained scores were converted into percentage, and then divided equally into four domains of "Very poor" (<25%), "Poor" (25-50%), "Moderate" (50-75%), and "Good" (>75%). Furthermore, analysis of the data was performed using SPSS-21 and descriptive statistics.

Face and content validity of the instrument was evaluated through a survey among 10 neonatologists and nursing professors. For this purpose, a copy of the questionnaire was given to

each of them; then, after collecting their opinions, the necessary modifications and corrections were applied on the questionnaire and checklist.

Moreover, reliability of the checklist was evaluated through the observers' reliability. Accordingly, the first 10 samples were scored by two observers simultaneously, and then the coefficient of agreement between the observers was calculated, yielding the value of 0.7, which was acceptable.

RESULTS

Results of the data analysis for demographic characteristics of the nurses working at NICUs showed that women composed 100% of the sample population. The average age of the studied nurses was 33.92±5.85 years. The average job background of the studied nurses was 8.74±5.46 years; also, the average job background of the studied nurses working at children wards was 5.65±4.24 years. The maximum number of under-care infants for each nurse at a working shift was 5.26±1.90 infants.

Table 1: Socio-demographic and Job-related characteristics of NICU nurses participated in the study (n=70)

Variables	NICU (n=70)
Sociodemographic characteristics of nurses	
Gender N. (%)	
Male	0(0)
Female	70(100)
Marital status	
Single	12(17.2)
Married/other	58(82.9)
Level of Education	
Bachelor	63(90)
Master of Science	7(10)
Participation in moral training workshop during work time, N. (%)	
NO	55(78.5)
YES	15(21.5)
Job-related characteristics	
Workplace type	
Fixed	5(7.2)
Shift	65(92.8)
Employment status	
Official	32(45.9)
Non Official	38(54)

In addition, some of the demographic characteristic of the under-care infants were investigated and described as well. Accordingly, the average fetal age of the under-care infants was 32.26±3.85 weeks, and also their postnatal age was 8.81±12.59 days. Besides, the average weight of the observed infants was 1875.39±867.08 g. (Table-3)

Investigating the nurses' performance status at three stages of before, during, and after the PN procedure (pre, peri, and post-PN procedure stages) showed that the highest score of performance belonged to the care before the PN procedure, while the lowest performance score was related to the care during the PN procedure. (Table-2)

Table 2: Performance status of nurses in PN-related care

Variable	Mean (%)	SD (%)	Max (%)	Min (%)
Before performing PN	71.59	10.96	85	55
During performing PN	60.16	3.51	72	47
After performing PN	65.80	14.61	75	25
Total score	65.85			

In terms of the PN standards observance level, findings of the present study showed that at all three stages of before, during, and after the PN procedure, performance of the nurses was at moderate level. (Table-3)

Table 3: Frequency distribution of quality level of PN-related care standards

Variable	Very poor (<25%)	Poor (25-50%)	Moderate (50-75%)	Good (>75%).
	N (%)	N (%)	N (%)	N (%)
Before performing PN	0(0)	0(0)	171(61.3)	108(38.7)
During performing PN	0(0)	2(0.7)	277(99.3)	0(0)
After performing PN	1(0.4)	37(13.3)	241(86.3)	0(0)

DISCUSSION AND CONCLUSION

In the present study, which was aimed to investigate the nurses' performance in terms of the PN-related care at educational and treatment centers affiliated to Tabriz University of Medical Sciences during December 2016 to July 2017, the PN-related care among infants was investigated at three stages of before, during, and after the PN procedure. The performance score of the PN-related nursing care at NICU, and in all the care domains in general, was 50-75 (68.85%). A study on the standard conformity rate of the nutritional care among premature infants has reported the value of 68.9% for conformity of the provided care with the relevant given standards in all areas of the study[11]. Also, in another study conducted to investigate the nursing care among infants with

NRDS (neonatal respiratory distress syndrome), the nutritional nursing care for these infants was reported to be at a moderate level (56%)[17], which is consistent with results of the present study. This can be attributed to the ignorance of the care providers in this regard as well as the failure in clinical education and supervision of the nursing managers; so that, in most of the cases, the nutritional care is not included in the ordinary care program.

Moreover, another study on the effect of comprehensive parenteral nutrition training program on awareness and performance of nurses at NICUs showed that the nurses' awareness was significantly improved after the training program, but their performance exhibited no significant difference before and after the intervention. Hence, there is a gap between the knowledge and performance of the nurses in administering the PN[14], which seems to reveal the necessity of implementing retraining programs.

In the present study, the nurses' performance scores before performing the PN procedure were higher than other stages, which can be attributed to the lack of awareness and knowledge on the PN instructions and guidelines at the pre and post-PN procedure stages.

Another finding of the present study is the moderate level of quality of the nurses in terms of the PN-related care standards, which is consistent with results of a study conducted in Germany in order to investigate the PN quality among hospitalized patients, indicating that the PN is not provided in accordance with the predetermined guidelines[12]According to these results, improving the quality of the nutrition therapy requires creating a nutritional support team. Furthermore, since the results of the above-mentioned studies showed that the nursing care associated with infants' nutrition (including PN) is far from the care standards, it seems necessary to conduct further studies and hold training sessions for the treatment staff in order to improve the standard practical methods.

Nursing profession is one of the largest resources of workforce in the field of health care nationwide. Nurses have direct impacts on the patient care as well as its consequent outcomes [18]. Since neglecting the importance of nutritional care at intensive care units may lead to irreparable damages to the infants due to their high vulnerability, again it seems essential to put more importance and focus on training the care providers and improving their awareness and knowledge of nutritional care, especially the parenteral nutrition-related care more than ever. Moreover, modifying and correcting the afore-mentioned problems can lead to reduced costs, controlled infections, reduced length of hospital stay (LOS) of infants, as well as cost-savings for families and medical system. Considering the far distance between the provided care services and the relevant standards, it is proposed to conduct more detailed and more precise researches at other places as well as other time periods.

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