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ORIGINAL ARTICLE

Nurses' performance concerning sterilization while performing nursing techniques in ICU wards of educational hospitals affiliated to Birjand University of Medical Sciences

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Abstract

Introduction: As a key member of the healthcare workforce, nurses play an important role in patient care. Nursing care performance, especially sterilization, is of significant importance in provision of health and prevention of complications such as hospital infections. This study aimed to investigate nurses' performance concerning sterilization while performing nursing techniques in ICU wards of educational hospitals affiliated to Birjand University of Medical Sciences.

Methods: In this descriptive-analytic study, 36 nurses working in the ICU ward were selected by census method. A researcher-made observational checklist with three choices for each item was designed to check the sterilization techniques used by nurses in terms of obtaining intravenous (IV) access (10 items), *suctioning of the endotracheal tube* (7 items), and dressing (8 items).For each technique, a total score of≥75% was considered as good, between 50-75% as moderate, and <50% as poor performance. Content validity was used to confirm the validity of the checklist, and Cronbach's alpha was calculated 0.67 to confirm its reliability. Data were analyzed in SPSS (version 16) using independent t-test at the significant level of $P<0.05$.

Results: Mean score in the suction technique (out of 21) was 15.3±0.88 for which 8.3% of participants had good and 91.7% had moderate performance. As for the dressing technique, the mean score (out of 24) was 18.1±0.68 for which 46.4% of participants had good and 53.6% had moderate performance. Mean score in the obtaining IV access (out of 30) was 18.64±1.03 for which 100% of participants had moderate performance. No poor technical performance was observed, nor was there a Significant differences between the participants' demographics and their performance.

Conclusions: Nurses' performance concerning sterilization techniques used in the ICU wards was moderate. Considering the results, periodic re-education programs are suggested to improve nurses' performance.

Key Words: Performance, Nurses, ICU

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Introduction

As a key member of the healthcare workforce in hospitals, nurses play a significant role in patient care. Thus, their improved caring performance is a major facilitator of patient recovery and a contributor to an earlier discharge of the patient [1].

Considering nursing care standards in practical areas is a main duty of nurses. These standards are necessary in order to elevate (improve) care quality, decrease cost, and prevent such complications as nosocomial infections [2]. Nosocomial infections are among the major health hazards worldwide. Despite advances in their control and prevention, they are still a main complication of treatment, leading to death in a d*ramatic extent* [3].

Recent research indicates that these infections cause 98,000 losses and 29 billion dollars per year among which the urinary system, vascular catheters, respiratory system [4], and wound infection [5] have been reported. Their development priority also varies in different studies.

These infections tend to be more prevalent in the intensive care units because of the intensity and instability of patient's status and frequent need for high-risk, invasive interventions [6]. In this regard, hindering the possibility of infection, controlling and managing the infection, and applying preventive guidelines lie evidently within the domain of nurses' responsibilities [7]. Nurses can play a major role in protecting ICU patients from hospital infections by holding proper scientific knowledge of different nosocomial infections, their effects on patients, the way pathogens are transferred, and their facilitators; nurses also need to identify potential individuals in risk of infections, have proper belief in and attitude towards prevention of infections, and finally apply improperly sterilization principles while performing care techniques [2, 4, 8, 9].

Concerning performance of ICU nurses' in terms of prevention and control of infections while engaged in nursing techniques, previous research has shown controversial results. Dehghani et al reported performance mean scores of ICU nurses concerning suction, gavage and extubation of patients as below standard [2]. Allahbakhshian et al also reported mean scores of ICU nurses concerning airway suction, *Obtaining IV access*, and dressing as moderate [8]. However, Zandieh et al considered ICU nurses' performance as satisfactory in terms of observing infection control standards at the time of intravenous injections and wound dressing [10]. Similarly, Thomson et al have reported performance scores of most nurses concerning *suctioning of the endotracheal tube* as satisfactory [11].

This study aimed to investigate nurses' performance concerning sterilization while performing nursing techniques in ICU wards of hospitals affiliated to Birjand University of Medical Sciences.

Methods

All the nurses working in the ICU wards of Imam Reza and Valiasr hospitals of Birjand, Iran, were selected by the census method. A checklist was used to collect data which consisted of two parts: demographics of nurses including age, sex, tenure, work shift, type of employment, and the university the nurse had graduated from; the second part covered items enquiring about the sterilization techniques used by nurses at the time of obtaining vein catheter (10 items), suction*ing of the endotracheal tube* (7 items), and dressing (8 items). The items were prepared according to the Textbook of Nursing Care Checklist [12]. The validity of the checklist was confirmed by five faculty members from the Nursing and Midwifery Faculty of Birjand University of Medical Sciences, Iran, and its reliability was calculated as 0.67 according to Cronbach's alpha. The items were completed in *a three-point scale by researcher(s)* of a three-response scale (1=Non-performance, 2=imperfect performance; 3=perfect performance). While engaged in the techniques, the nurses were observed four times. The final score was the average of the four scores. Nurses' performance was categorized in three levels where a total score of≥75% was considered as good, between 50-75% as moderate, and <50% as poor performance.

After obtaining the required permissions and informed consents and notifying the head-nurses of the study, a trained observer recorded nurses' sterilization performance at three work shifts (morning, afternoon, night) for three months.

Data were analyzed in SPSS (version 16) using independent t-test at the significant level of $P<0.05$.

Results

The demographics of the 36 ICU nurses who were willing to participate in the study indicated that 25 (69.4%) were female, 20 were below 30 years of age (55.6%) and of less than 5 years of tenure, 25 (69.4%) were married, 31 (86.1%) had

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Table 1: Comparison of nurses' performance mean scores in suction, dressing, and establishing vein catheter by some demographic variables

Variable		Performance (Mean±SD)		
		Suctioning of the endotracheal tube	Wound dressing	Obtaining IV access
Age (years)	<30	15.07±0.6	17.98±0.69	18.66±1.04
	≥30	15.59±1.1	18.27±0.66	18.62±1.04
	P-value	0.08	0.27	0.91
Gender	Female	15.32±1.02	17.79±0.72	18.7±1.09
	Male	15.18±0.45	18.43±0.43	18.54±0.91
	P-value	0.58	0.1	0.7
Tenure (years)	<5	15.11±0.62	17.98±0.71	18.6±1.06
	≥5	15.54±1.12	18.25±0.63	18.7±1.02
	P-value	0.14	0.31	0.77

circulatory work shifts, and 21 (58.3%) were graduated from state universities.

Nurses' mean score in the suction technique was 15.3±0.88 (out of 21) for which three nurses (8.3%) had good and 33 participants (91.7%) had moderate performance. No one had a weak performance. The completed checklists indicated that in 97.2% of cases, nurses did not wash hands prior to the technique and use Normal Saline Sterile for suctions. In addition, nurses did not apply sterile gloves before suctions in 86.1% of cases.

As for the dressing technique, the mean score was 18.1±0.68 (out of 24) for which 13 nurses (46.4%) had good and 15 participants (53.6%) had moderate performance. No one had a weak performance. The checklists indicated that in 75% of cases, nurses did not wash hands prior to the technique and did not apply sterile gloves before suctions in 69.4% of cases.

Mean score in the establishing vein catheter technique was 18.64±1.03 (out of 30) for which 100% of participants had moderate performance. No poor or good technical performance was observed. In 94.4% of cases, nurses did not wash hands prior to the technique; they did not apply povidone-iodine to clean the IV sites in 88.9% of cases.

Furthermore, there was not a Significant differences between the participants' demographics and performance (Table 1).

Discussion

Findings of the study indicated that ICU nurses' overall performance in terms of observing sterilization principles was moderate which are in line with findings from Allahbakhshian [8] and Toulabi [13]. Deghani's study showed that nurses' performance mean score in some nursing techniques is lower than the existing standards [2], whereas Jonsson evaluated the performance of ICU nurses in Finland concerning infection control activities as good [14]. Nazari [15] also reported nurses' viewpoints of their performance in preventing and controlling infection as satisfactory. The incompatibility of these findings can be attributed to the difference in educational programs, continuous controls, and the clinical environment's facilities and conditions. Kelly [16] believes that factors affecting the clinical environment including sufficient time and staff, consideration of care standards, and sufficient protection of nurses are effective in improving care quality provided by nurses. As for nurses' self-*reporting of performance*, Kelly believes that nurses and employees always report more than what they do. That is why in studies that build on self-report, satisfactory performance can be expected.

Almost none of the participants washed their hands before performing the techniques in this study. Similar findings were reported in Allahbakhshian [8], Khatunghanbari [9], Zandieh [10], and Bingham [18]. However, Jansson [14] reported that most nurses (72.2%) cleansed their hands and wore sterilized gloves before suctioning of tracheal tube. Tompson [11] has also confirmed this finding. Based on their self-report, nurses have been reported to have a satisfactory performance concerning hand washing and cleansing prior to nursing techniques [19]. In addition to environmental circumstances and facilities, this difference can be related to nurses' attitudes and continuous control and evaluation. Hand *hygiene compliance* and sterilization principles in such techniques as wound dressing and catheter are

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considered as fundamental factors for prevention of nosocomial infections especially among hospitalized patients in ICU wards [4, 5].

In this study, there was no significant correlation between the participants' demographics and performance which is similar to Dehghani's study [2].

Conclusions

On the basis of the results, it is suggested to hold in-service educational programs concerning nosocomial infections prevention and control methods and clinical skills for nurses, as well as to provide protocols for standard nursing techniques including obtaining IV access, wound dressing, airway management.

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