



Original Article

Evidence-Based Practices of Nurses Regarding Nosocomial Infection in ICU: A Descriptive Study

Sumaira Riaz¹, Muhammad Afzal¹, Afsar Ali¹ and Sadia Khan²¹Lahore School of Nursing, The University of Lahore, Lahore, Pakistan²University Institute of Physical Therapy, The University of Lahore, Lahore, Pakistan

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*Corresponding Author:

Sumera Riaz
 Lahore School of Nursing, The University of Lahore,
 Lahore, Pakistan
Sumairiaz44@gmail.com

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ABSTRACT

Nosocomial infections influence patients' lives over lengthy hospitalization, illness, and death, following important costs to both health organizations and society. Evidence-based practice is observed as a system to carry out health care that is additionally effective and important in the current health care setting. **Objective:** To identify the level of evidence-based practices of nurses regarding nosocomial infection in the intensive care units. **Methods:** A cross-sectional descriptive study design was used. The population was the ICU staff nurses of the Tertiary Care Hospital, Lahore. The duration of the study with 09 months after the synopsis approval. The sample size of 72 nurses has calculated a population size 95 confidence interval and a margin of error of 5%. A convenient sampling Technique was used in this study. The questionnaire was consisting of 4 items and 31 questions. Ethical Considerations were maintained. Data were kept confidential and secure by coding. Data were analyzed by SPSS version 21. **Results:** The highest percentage of staff nurses in this study were females (98.6%) and aged between 26-35 years (76.4%) and diploma holder were (69.4%). Nurses who have experience less than 10 years were 45.8%. Most of the participants were performing hand hygiene practicing frequently (59.7%) whereas (16.7%) were performing rarely before contact with patient. Highest percentage of participants (77.8%) were using personal protective equipment's. **Conclusions:** Evidence-Based Knowledge related to nosocomial infection is adequate among nurses. Hand hygiene performance is adequate as compared to international standards.

INTRODUCTION

Evidence-based practices are observed as a technique to carry out health care that is more actual and is important in the current healthcare settings. However, there is frequently little or no evidence to support particular techniques, especially in infection control-related fields of practice, evidence-based practices benefit from representations that regularly rely on empirical data to assess patients and healthcare providers when deciding on the best course of action for a given clinical situation [1]. As stated by Mauldin PD, a number of evidence-based strategies helped to lower the prevalence of healthcare-associated infections (HAI); hand hygiene is by far the best strategy for doing so. Percutaneous injuries brought on by

needles and other sharp objects are what causes the infection. Nosocomial infection is an infection that occur 48 to 72 hours after admission to supplementary healthcare settings; the contagion does not occur during the period of admission and is not in the development duration [2]. An HAI must occur at least 48-72 hours after being admitted to the hospital, 3 days after being discharged, 30 days after the surgical procedure, or 1 year after the transplant. According to the World Health Organization, 1.7 million nosocomial contagions happen yearly and 1 in 29 individuals develop nosocomial infections [3]. Worldwide, the occurrence of these infections differs from 3.5% to 12% in advanced countries and from 7.4% to 19.1% in middle-

income and low-income nations [22]. According to the study conducted in the city of Sindh, Hyderabad Pakistan, the occurrence of hospital acquired infection was 97 out of 333 patients who acquired nosocomial contaminations. Out of these 29 were affected by respiratory tract infections, 38 were from urinary tract infections and 23 (23.7%) suffered from bloodstream infections [4]. However, infection is the major challenge in our hospital these infections are most widespread in the ICUs and in older patients with fundamental diseases and repressed immune systems [5, 6]. According to this event kills 99,000 people yearly and levies \$20,000,000 on society. Nosocomial infection increases the cost and length in hospital and also increases the chances of resistance against antibiotics [7, 3]. Studies discovered that types of nosocomial infections with different rates of spread in the intensive care unit more than 80% of HAI infections include UTI infections, respiratory infections, bloodstream infections, and surgical site infections [8]. The study was aimed to identify the level of evidence-based practices of nurses regarding nosocomial infection in the intensive care units.

METHODS

A descriptive cross-sectional study design was used. This study was conducted in the Tertiary Care Hospital in Lahore and the study duration was 9 months. All staff nurses who were working in the Intensive Care Unit (ICU) were invited to participate in the study. A purposive study technique was used to select study participants. Registered Nurses involved with patient care, aged between 21 to 40 years with a minimum experience of 1 year who gave their consent to participate in the research study were selected. Nurses with MSN qualifications or previously taken infection control training in the past two months were excluded from this study. Primarily, 85 nurses were selected for the study. Keeping in view, the evidence-based practices of nurses regarding nosocomial infection in the intensive care units, the structured questionnaire was synthesized. To achieve the study objective and for the convenience of study participants, the questionnaire was divided into 5 sections. In Section 1, 4 questions (Table-1) were designed to obtain the demographic characteristics of participants. 6 questions (Table-2) related to the hand hygiene performance of the participants were included in section 2. Personal protective equipment usage by the participants was assessed with the help of 6 questions (Table-3) in section 3 of the structured questionnaire. Section 4, consisting of 14 questions (Table-4) was designed to assess injection safety measures by the participants. Environment cleaning by the participants was determined by 4 questions (Table-5). The questionnaires were distributed during the study period during scheduled

meetings. A total of 85 questionnaires were distributed, however, only 72 questionnaires were completed, and therefore, they were included in the final analysis. All parameters in the questionnaire sections 2 to 5 were assessed with "Frequently," "Sometimes," "Rarely," and "Never," options. Data were kept confidential and secure by coding. Data were analyzed by using SPSS version 21.0. Descriptive statistics were used to determine percent and number. A p-value of ≤ 0.05 was applied as statistically significant. Written consent of this study was obtained both from the hospital and all staff nurses before data collection.

RESULTS

The data were collected from 85 participants 13 questionnaires were not filled out correctly. Data were uploaded on SPSS. The data were analyzed by using frequencies and percentages. Data have displayed on the table for interpretation. According to gender, there were 71 females and only one male participant, mostly age of the participants was 26-35 years 55 (76.4%), about 50 (69.4%) were diploma holders and others were BSN/BSN (Post RN), mostly females' experience was less than 20 years 68 (94.4%) as shown in table 1.

Variables	Categories	Frequencies (%)
Gender of the Participants	Male	1(1.4)
	Female	71(98.6)
	Total	72(100)
Age of the Participants	21-25	10(13.9)
	26-30	39(54.2)
	31-35	16(22.2)
	36-40	7(9.7)
	Total	140(100)
Education of the Participants	Diploma	50(69.4)
	BSN/BSN (Post RN)	22(30.6)
	MSN	0(0)
	Others	0(0)
Total	72(100)	
Experience of the Participants	Less than 10 Years	33(45.8)
	11-20	35(48.6)
	21-30	2(2.8)
	31-40	2(2.8)
	Total	72(100)

Table 1: Demographic Characteristics of Participants

There were 6 questions related to the hand hygiene performance of the participants. In the question "before contact with the patient" 43(59.7%) participants frequently wash their hands before interaction with the patients, 16 (22.2%) sometimes wash their hands before contact with the patients. 12 (16.7%) rarely and 1(1.4%) never wash their hand before contact with the patients. 44 (61.1%) frequently, 16 (22.2%) sometimes, and 12 (16.7%) rarely use hand hygiene before performing aseptic tasks. 33 (41.7%)

frequently, 25 (34.7%) sometimes, 16 (22.2%) rarely, and 1 (1.4%) never perform hand hygiene after contact with the patient. In the question of "After contact with objects in the immediate vicinity to the patient" 29 (40.3%) frequently, 17 (23.6%) sometimes, 25 (34.7%) rarely, and 1 (1.4%) never perform hand hygiene. After interaction with blood, fluids, or dirtied surfaces 55 (76.4%) frequently, 14 (19.4%) sometimes, and 3 (4.2%) perform hand hygiene as shown in table 02. and after removing the gloves 22 (30.6%) frequently, 31 (43.1%) sometimes, 17 (23.6%) rarely and 2 (2.8%) never perform hand hygiene, as shown in table 2.

Question	Frequently F (%)	Sometime F (%)	Rarely F (%)	Never F (%)	Total F (%)
Before contact with the patient	43(59.7)	16(22.2)	12(16.7)	1(1.4)	72(100)
Before performing an aseptic	44(61.1)	16(22.2)	12(16.7)	0	72(100)
After contact with the patient	30(41.7)	25(34.7)	16(22.2)	1(1.4)	72(100)
After contact with substances connect with patient	29(40.3)	17(23.6)	25(34.7)	1(1.4)	72(100)
After interaction with blood, fluids, or dirtied surfaces	55(76.4)	14(19.4)	3(4.2)	0	72(100)
After removing gloves	22(30.6)	31(43.1)	17(23.6)	2(2.8)	72(100)

Table 2: Hand Hygiene Performance of the Participants

In the section on personal protective equipment usage by the participants, nurses 56 (77.8%) frequently and 14 (19.4%) sometimes wear gloves for possible contact with fluids, as shown in table 03. 31(43.1%) frequently, 27(37.5%) sometimes, 10 (13.9%) rarely, and 4 (5.6%) never wear the same pair for the different patient as shown in table 03. There was a mixed response from the participants about the wash gloves for the determination of reuse, 22 (30.6%) frequently, and 34 (47.2%) never wash gloves for the purpose of reuse of gloves.. Nurses wear gowns to protect skin and clothing 42 (58.3%) responded was frequent, 20 (27.8%) responded sometimes, 9 (12.5%) responded was rare, and 1(1.4%) responded was never as shown in table 03. 15 (20.8%) frequently, 28 (38.9%) sometimes, 19 (26.4%) rarely, and 10 (13.9%) nurses never wear the same gown for different patients as shown in table 03. 35 (48.6%) nurses wear protective equipment to avoid splashes and other body fluids., 25 (34.7%) sometimes, 7 (9.7%) rarely and 5 (6.9%) never wear mouth, eye and nose protection during procedures as shown in table 3.

Question	Frequently F (%)	Sometime F (%)	Rarely F (%)	Never F (%)	Total F (%)
Nurses wear gloves for possible interaction with blood, fluids, non-intact skin, mucous membranes, or contaminated equipment	56(77.8)	14(19.4)	2(2.8)	0	72(100)
Wearing the same pair of gloves	31(43.1)	27(37.5)	10(13.9)	4(5.6)	72(100)

Nurses do not wash gloves for the determination of reuse	22 (30.6)	3 (4.2)	13(18.1)	34 (47.2)	72(100)
Nurses wear gowns throughout the interaction with blood or body fluids is expected	42 (58.3)	20 (27.8)	9(12.5)	1(1.4)	72(100)
Nurses do not wear the same gown for the care of more than one patient.	15 (20.8)	28 (38.9)	19(26.4)	10(13.9)	72(100)
Nurses wear nose, mouth, and eye protectors during events that are probable	35 (48.6)	25 (34.7)	7(9.7)	5(6.9)	72(100)

Table 3: Personal Protective Equipment Usage by the Participants

Injection Preparation techniques 48 (66.7%) frequently, and 12 (16.7%) sometimes. Safety measures related to syringes and needles are used for only one patient, 62 (86.1%) frequently, 8 (11.1%), and 2 (2.8%) rarely. The frequent response was 25 (34.7%), the sometimes response was 22(30.6%), the rare response was 14(19.4%), and the Never response was 11 (15.3%). Responses of nurses regarding single-dose medicine used for only one patient were 52 (72.2%) frequently, 8 (11.1%) sometimes, and 12 (16.7%) rarely. 63 (87.5%) frequently, 9 (12.5%) sometimes used medication used for only one patient. In the question of multi-dose vials usage, the response was 37 (51.4%) frequently, 31 (43.1%) sometimes, and 4 (5.6%) rarely as shown in table 5.

Question	Frequently F (%)	Sometime F (%)	Rarely F (%)	Never F (%)	Total F (%)
Injection Preparation techniques	48 (66.7)	12(16.7)	11(15.3)	1(1.4)	72(100)
Syringes and needles are used for only one patient	62 (86.1)	8 (11.1)	2 (2.8)	0	72(100)
The rubber septum on a medicine vial is sterile with alcohol prior to piercing	18 (25)	14 (19.4)	13(18.1)	27 (37.5)	72(100)
Medication containers protocols	25 (34.7)	22 (30.6)	14 (19.4)	11(15.3)	72(100)
Single-dose medication is used for only one patient.	52 (72.2)	8 (11.1)	12 (16.7)	0	72(100)
Medicine management tubing and connections are used for one patient	63 (87.5)	9 (12.5)	0	0	72(100)
Multi-dose vials usage protocols	37 (51.4%)	31(43.1%)	4 (5.6%)	0	72 (100%)
Multi-vial protocols for storage	35 (48.6)	22(30.6)	12(16.7)	3(4.2)	72 (100)
Disposed of all sharps in a puncture-resistant sharps container.	57 (79.2)	12 (16.7)	2 (2.8)	1(1.4)	72 (100)
All controlled substances are kept locked within a safe area.	27 (37.5)	31 (43.1)	14(19.4)	0	72 (100)

Nurses wear a face mask when placing a catheter or injecting material into the epidural or subdural space	33 (45.8)	30 (41.7)	9 (12.5)	0	72 (100)
Provides tissues and no-touch containers for disposal of tissues	19 (26.4)	40 (55.6)	13 (18.1)	0	72 (100)
Provides resources for execution of hand hygiene in or near waiting areas.	26 (36.1)	26 (36.1)	17 (23.6)	3 (4.2)	72 (100)
An auto-disabling lancing device is used for every patient	40 (55.6)	18 (25)	10 (13.9)	4 (5.6)	72 (100)

Table 4: Injection Safety Measures Used by the Participant

In the section on environment cleaning by the participants, there were 4 questions. Regarding the question of high-touch surfaces in rooms being cleaned and disinfected after each procedure, the responses were 50 (69.4%) frequently, 19 (26.4%) sometimes, and 3 (4.2%) rarely. 47 (65.3%) frequently, 22 (30.6%) sometimes, and 3 (4.2%) rarely responses High-touch exteriors in rooms wherever surgical or additional invasive actions are cleaned and then sterile after each procedure. The question of cleaners and antiseptics are used in agreement with the producer's instructions, the responses 41 (56.9%) frequently, 26 (36.1%) sometimes, 5 (6.9%) were rarely. Nurses engaged in environmental scrubbing wear suitable Personal protective equipment to prevent contact with infectious agents or chemicals the responses were 42 (58.3%) frequently, 21 (29.2%) sometimes, and 9 (12.5%) rarely as shown in table 5.

Question	Frequently F (%)	Sometime F (%)	Rarely F (%)	Never F (%)	Total F (%)
High-touch surfaces in rooms are cleaned and then disinfected after each procedure	50 (69.4)	19 (26.4)	3 (4.2)	0	72 (100)
High-touch exteriors in rooms wherever surgical or additional invasive actions are cleaned and then sterile after each procedure.	47 (65.3)	22 (30.6)	3 (4.2)	0	72 (100)
Disinfectants and cleaners are used in accordance with the producer's guidelines	41 (56.9)	26 (36.1)	5 (6.9)	0	72 (100)
Nurses betrothed in environmental cleaning wear suitable Personal protective equipment to prevent exposure to chemicals or communicable agents (Personal protective equipment)	42 (58.3)	21 (29.2)	9 (12.5)	0	72 (100)

Table 5: Environment Cleaning by the Participants

DISCUSSION

This study purposed to assess the level of evidence-based practices regarding nosocomial infection at tertiary care

public sector hospitals. Out of 72 participants, 71 were females. The majority of nurses' experience was 26-35 (Mean 30.5) years. A study was conducted by ZIPPIA in the United States, using a database of more than 30 million profiles of nurses, it is founded that there are 61298 nurses working in a critical care setting in the United States, from these 81.1% are females and other 18.9% are males, Average age of nurses 43 years old. which means still there is low induction of males in public sector hospitals and nurses' age is also low than in the United States [9]. The majority of nurses were diploma holders (69.4%) and 94.4% of nurses had the experience of fewer than 20 years. A study was conducted in the Tshwane region of Gauteng Province in which it was found that the ICU nurses' normal age was 45 years, and 59.1% (n=91) had other qualifications in critical nursing. The majority of the nurses were having a diploma (51.2%; n=79), with a mean working experience of 12.55 years [10]. In the hand hygiene performance of the nurses, most nurses frequently washed their hands (Mean=37.2). Most nurses frequently wash their hands before contact with patients (59.7%), before performing a sterile technique (61.1%), or after interaction with fluids, blood, or dirtied surfaces (76.4%). But lesser after interaction with the patient (41.7%), After contact with substances in the instant vicinity of the person (40.3%), and after removing gloves (30.6%) and performing hand hygiene in the ICU. A study was conducted in India by Sharma *et al.*, in which overall hand hygiene was 43.2% (394/911) [11]. In a study in Jakarta, Indonesia there was statistical betterment in the median of hand hygiene due to evidence-based practices. Knowledge of nurses related to hand hygiene was also improved (from 15 to 22, $p < 0.001$) [12]. Best evidence-based practices related to hand hygiene can reduce the chances of infection among patients [13]. Practices of nurses wearing gloves for potential contact (frequently, 77%) there was a mixed response to nurses regarding wearing the same pair of gloves do not wash the gloves for the purpose of use again, and wear gowns to defend the skin, and clothing throughout the surgical procedure or other activities is 43.1%, 30.6%, and 58.3% frequently respectively. A study was conducted in India, and the response rate was only 25 from 22 states. Personal protective equipment practices varied among states, and private and government hospitals. After training, there were significant improvements regarding Personal protective equipment practices. There was a disinclination to Personal protective equipment reuse. In all, 71% were unaware/hesitant about Personal protective equipment inventory [14]. For the injection safety measures used by the nurses, the mean score was 38.7/72. The response regarding the usage of injections through an aseptic technique was to clean the area from contamination or

contact with blood, fluids, or contaminated equipment (66.7%). Needles and syringes are used for only one patient (86.1%). The response related to medication administration tubes, and connectors used for only one patient was 87.5%, and related to other injections safety measures was a mixed response. The same study was conducted among Egyptian and Saudi nurses which found that 98.8% of nurses were aware of evidence-based safe injection practices, and 95.2% were conscious about the sharp disposals during the injection procedure. A study was conducted at Jimma University in which they found only 28.7% had good knowledge about injection safety practices and 25.5% had good injection safety practices [15]. One more study was conducted in Egypt in which mean of safe injection practices in two hospitals were 27.13 and 27.39. Evidence-based environment cleaning practices were found to frequently mean 45/71 and sometimes practice mean was found 22/77 [16]. A study was conducted in Australia where it was found that cleaning responsibilities varied and there was some confusion regarding the application of dissimilar disinfectants after the cleaning when patients were discharged with a history of infection. In one more study conducted in India 55.3% of participants were having knowledge related to environmental cleaning practices [17-20]. In one more study evidence-based cleaning and specific guidelines play important role in the environment [21].

CONCLUSIONS

Evidence-Based Knowledge related to nosocomial infection is adequate among nurses. Hand hygiene performance is adequate as compared to international standards. Personal Protective Equipment practice are poor. Injection safety practices were better in some protocol among nurses. Environment cleaning practice were found better. This is highlighted that training ICU nurses according to international standards can improve the evidence-based practices of nurses. Regular interval programs of training for nurses are best for nosocomial infection in patients.

Conflicts of Interest

The authors declare no conflict of interest.

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