

Effect of Standardized Guidelines on Nurses' Knowledge and Practices Regarding Prevention of Infection in Burn Patients

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ABSTRACT

Background: Burn injuries bear a considerable public health issue all over the world and it is considered among the most distressful and painful injuries.

Objectives: To assess the effect of standardized guidelines on nurse's knowledge and practices regarding the prevention of infection among burn patients.

Methodology: This cross sectional study was carried out in the burn unit of BVH Bahawalpur in collaboration to the University of Lahore from July 2021 to March 2022 on stastically calculated sample of 95 nurses. After taking the ethical approval and informed consent a questionnaire was used to collect the data. Then an educational intervention was provided to all the participants by dividing in groups three days a week in total 16 weeks. Post-intervention data was collected by using the same questionnaire. Data was entered and analyzed by using SPSS.

Results: A total of 95 nurses were included in present study consisting of 15 (15.8%) male nurses and 80 (84.2%) female nurses in this study. Overall mean age of nurses remained to be 37.14±8.51 years. A poo knowledge and practices were revealed in pre-intervention group while significant improvement ($p<0.05$) was observed for both in post-intervention group.

Conclusion: At present poor knowledge and unsatisfactory practices of nurses were revealed in a tertiary care hospital however, a great improvement was observed after intervention in a kind of educational intervention and practical observation.

Keywords: Knowledge, Practices, Nurses', Healthcare, Tertiary care, Burn patients.

INTRODUCTION

Burn injuries bear a considerable public health issue all over the world and it is considered among the most distressful and painful injuries. Although management for burn injury has been significantly improved from few decades in terms of lowering mortality and improving treatment outcomes, On the other hand evidences presented the associations of burn injury with different secondary diseases which arise long after recovery from primary injury.¹ Millions of burn cases are reported every year. Approximately, 180,000 deaths occur due to burning every year². Eventually, the mortality rate among burn patients is also reported as very high in low and middle-income countries³.

Burn injuries usually take a long time to heal. Specialized facilities are the focus among priorities for stabilization of patient, prevention from infection and optimization of functional recovery of organs. Antimicrobial treatment is also highly recommended to recover the burn patient's health. Further studies also propose various types of dressing for faster recovery of⁴.

Burn patients experience a vast majority of complications depending on the involvement of the area, the severity of the burn, the degree of the tissue damage, and the location of the affected area⁵. One of the most serious complications however, is wound infection. The maximum numbers of deaths are reported due to burning wound infection and become a challenging.⁶ Sepsis not only affects the localized area but affects multiple systems. Similarly, 50 to 80% of burn patients died due to sepsis and its associated infection whereas it has been greatly neglected and excluded from studies related to sepsis.^{7, 8}

Approximately, 68.7% of burn patients got an infection. These infections lead to septicemia (19.4%), pneumonia (15.7%), and urinary tract infections (9.7%). The most common bacteria involved are G-Negative bacterial strains (54.5%) and yeasts (13.4%).⁹ Survivors of burn injuries have been found to be associated with different physiological issues and desire professional support for full adjustment after complementary treatment from burn units.¹⁰

Burn patients need standard precautions for infection control. Nurses are the largest workforce in the health discipline and among the primary caregiver in the care of burn patients.¹¹ Moreover, nurses play a key role in breaking the chain of infection among burn patients. Therefore, nurses' knowledge and practices

based on standard guidelines is pivotal in the prevention of infection in either way that on the one hand improve faster recovery and on the other hand reduce the morbidity and mortality rate in burn patients.¹²

Unfortunately, nurses reported poor knowledge and practice towards infection control among burn patients and a recent study proposed to organize modern periodic trainings in healthcare organization to improve the practices based on clinical protocols developed by background unit specific knowledge.⁶ Standard nursing care ensures the safety and may lead to healthy recovery among burn patients. Interventional guidelines for the nurses regarding infection prevention among burn patients revealed a positive effect on nurses' knowledge and practices.¹³

As it is fact that patients with burn injuries are more susceptible to infections than other patients. Therefore, the objective of this study is to assess the effect of standardized guidelines on nurse's knowledge and practices regarding the prevention of infection among burn patients

MATERIALS AND METHODS

This cross sectional study was carried out in the burn unit of BVH Bahawalpur during July 2021 to March 2022.

Sample Size: A samle size of 95 participants was calculated by taking a confidence level of 95%, absolute precision as 9%, and the expected percentage of impaired knowledge score as 72.5%.¹²

Inclusion and Exclusion Criteria: All the registered nurses of both gender and working in burn units from at least 6 months at BVH Bawalpur were included in this study. The managerial level nurses such as head nurses, supervisors, and student nurses, nurses on rotation and nurses who already receive any education/workshop on infection prevention among burns were excluded from this study.

Research Instruments: Data was collected using the standard WHO Questionnaire on knowledge and practices of nurses regarding infection prevention in burn patients. The questionnaire is divided into three sections. Section "A" is consisting of the socio-demographic profile of the participants. Section "B" is consisting of questions regarding the knowledge of nurses towards the prevention of infection among patients with burn injuries. Section "C" is consisting of questions regarding the practice of nurses

towards the prevention of infection among patients with burn injuries. A pilot study was carried out on a 10% sample to measure the reliability of the study. The reliability of the study was in normal ranges (Cronbach's Alpha = 0.79).

Data Collection Procedure: After taking ethical approval and consents from all the participants. Pre-interventional data was collected using a validated questionnaire. Sixteen weeks interventions were applied to educate the nurses regarding standard guidelines of infection prevention among burn patients. Post-interventional was collected using the same questionnaire.

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26.

RESULTS

A total of 95 nurses were included in present study consisting of 15 (15.8%) male nurses and 80 (84.2%) female nurses in this study. Overall mean age of nurses remained to be 37.14±8.51 years. Nurses were segregated in different age groups and highest frequency of (32.6%) nurses was remained in each group of 30-39 years and 40-49 years. Only 8 (8.4%) nurses were found in age group of ≥50years and above as depicted in Figure 1.

An overall mean nursing experience in burn management unit was found to be 1.97±0.78 years. Female nurses presented a higher mean experience of 1.99±0.79 years as compared to male nursing experience of 1.87±0.74 years however the difference remained insignificant (p = 0.584). A 33.7% of the nurses agreed that they face barriers to adhere aseptic technique in management of burn patients while 52.6% claimed that they have been trained with standard operating procedures in management of burn

patients. Questions regarding nurses' knowledge about burn and related infections were asked as in already designed questionnaire and proportions of responses were presented in table 1. A clear difference in pre-intervention and post-intervention knowledge may be observed with significant difference (p<0.05) in all the questions.

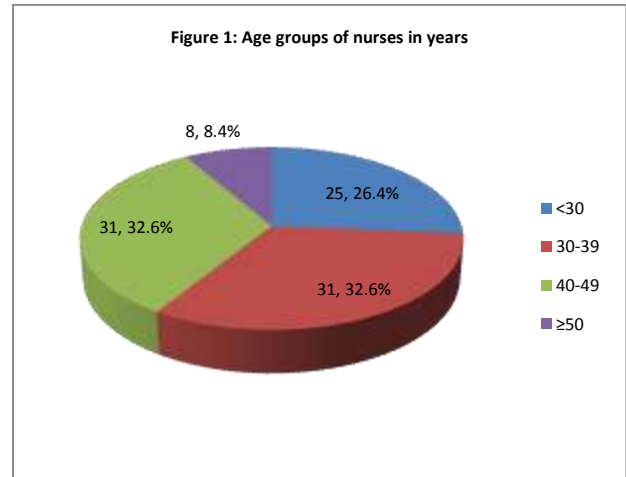


Table 1: Comparison of knowledge about burn & its associated infections among pre and post intervention groups

Burn & its associated infections		Group				p-value
		Pre-intervention		Post-intervention		
		n	%	n	%	
Burn patients are unique due to propensity to disperse microbes in environment	No	43	45.3	3	3.2	0.000
	yes	52	54.7	92	96.8	
Did you know that the about referral criteria of Burn patients?	No	55	57.9	3	3.2	0.000
	yes	40	42.1	92	96.8	
Did you know that which zone is located in the center of burn wound?	No	75	78.9	6	6.3	0.000
	yes	20	21.1	89	93.7	
Did you know that the soak the burn in cool water, then treat it with a skin care product like aloe vera cream or an antibiotic ointment?	No	24	25.3	1	1.1	0.000
	yes	71	74.7	94	98.9	
Did you know that the one of major burn infection is burn wound cellulitis?	No	50	52.6	4	4.2	0.000
	yes	45	47.4	91	95.8	
Did you know that the common cause of fever in burn patients is systemic inflammatory response not a pathogenic action of microorganisms?	No	51	53.7	2	2.1	0.000
	yes	44	46.3	93	97.9	
Did you know that the burn wound cellulitis is most common infection in burn patients?	No	79	83.2	4	4.2	0.000
	yes	16	16.8	91	95.8	
Did you know that the sepsis syndrome clinically manifested by following, bloodstream infection, Fluid loss, including low blood volume, dangerously low body temperature?	No	12	12.6	1	1.1	0.000
	yes	83	87.4	94	98.9	

Second portion of knowledge questionnaire asked about the awareness of microorganisms and culture of burn wound clearly shows that pre-intervention knowledge was very poor in all the questions and significantly (p<0.05) improved after intervention as depicted in table 2.

Table 2: Comparison of Knowledge of microorganisms & culture of burn wound in pre and post intervention groups

Knowledge of Microorganisms and Culture of Burn Wound		Group				p-value
		Pre-intervention		Post-intervention		
		n	%	n	%	
Did you know that the burn wounds initially colonized with gram-positive organisms?	No	61	64.2	3	3.2	0.000
	yes	34	35.8	92	96.8	
Did you know that the exogenous microorganisms are more resistant as compared to endogenous	No	64	67.4	2	2.1	0.000
	yes	31	32.6	93	97.9	
Did you know that the principal causative agent of burn cellulitis gram positive organisms?	No	30	31.6	2	2.1	0.000
	yes	65	68.4	93	97.9	
Did you know that the routine surveillance cultures should be taken after 3 months?	No	67	70.5	3	3.2	0.000
	yes	28	29.5	92	96.8	
Did you know that the Semi Quantitative swab culture provide information about the presence of microorganisms on the external catheter surface?	No	73	76.8	3	3.2	0.000
	yes	22	23.2	92	96.8	

Third portion of knowledge questionnaire asked about the awareness infection control in burn unit also showed that pre-intervention knowledge was very poor in all the questions and significantly (p<0.05) improved after intervention as depicted in table 3.

Table 3: Comparison of Knowledge about infection control in burn unit among pre and post intervention groups

Knowledge of infection Control		Group				p-value
		Pre-intervention		Post-intervention		
		n	%	n	%	
Did you know that the contact precautions are most effective than other precautions?	No	85	89.5	3	3.2	0.000
	yes	10	10.5	92	96.8	
Did you know that the plants and flowers harbor resistant organisms that are why these are not allowed in burn unit?	No	23	24.2	1	1.1	0.000
	yes	72	75.8	94	98.9	
Did you know that the "According to Spaulding classification of medical devices, which come in contact with mucous membranes or non-intact skin require high level of disinfection as semi critical item?"	No	32	33.7	2	2.1	0.000
	yes	63	66.3	93	97.9	
Did you know that the CDC guidelines of disinfection, Immersion time of equipment for high level disinfection (HLD) with 2.4 % glutaraldehyde?	No	76	80.0	3	3.2	0.000
	yes	19	20.0	92	96.8	
Did you know that the high touch surface areas must be clean and disinfect?	No	38	40.0	4	4.2	0.000
	yes	57	60.0	91	95.8	

Last portion of knowledge questionnaire asked about the awareness of infection control during care of burn patients again showed that pre-intervention knowledge was very poor in all the questions and significantly ($p < 0.05$) improved after intervention as depicted in table 4.

Table 4: Comparison of Knowledge about infection control during care of burn patients among pre and post intervention groups

Infection Control During Care of Burn Patients		Group				p-value
		Pre-intervention		Post-intervention		
		n	%	n	%	
Did you know that the chlorhexidine bath and its suggested frequency in burn patients for prevention of infection in burn patients?	No	54	56.8	2	2.1	0.000
	yes	41	43.2	93	97.9	
Did you know that the factor including high antibiotic pressures, high colonization pressures, need for intensive medical and surgical therapy, and a vulnerable, immune-compromised patient leads to acquisition of antibiotic resistant organism in burn patient?	No	47	49.5	3	3.2	0.000
	yes	48	50.5	92	96.8	
Did you know that the preparation of the isolation room or area, ensure that appropriate hand washing facilities and hand-hygiene supplies are available?	No	21	22.1	2	2.1	0.000
	yes	74	77.9	93	97.9	
Did you know that the precautions such as hand washing and barrier nursing, efficient cleaning and decontamination of hospital equipment, are most important for prevention of MRSA in burn patients?	No	49	51.6	2	2.1	0.000
	yes	46	48.4	93	97.9	
Did you know that the burn Patients require additional infection control precautions?	No	54	56.8	3	3.2	0.000
	yes	41	43.2	92	96.8	
Did you know that the nasal decolonization of MRSA patients done by mupirocin?	No	67	70.5	3	3.2	0.000
	yes	28	29.5	92	96.8	
Did you know Aquatic environment of hydrotherapy room is difficult to decontaminate?	No	84	88.4	4	4.2	0.000
	yes	11	11.6	91	95.8	
Did you know that the specific antiseptic such as Chlorhexidine gluconate recommended for hand washing?	No	49	51.6	3	3.2	0.000
	yes	46	48.4	92	96.8	
Did you that the Important step during removal of personal protective equipment?	No	24	25.3	2	2.1	0.000
	yes	71	74.7	93	97.9	

Assessment of nurses was done regarding adherence to aseptic technique during dressing of burn patients in the wards and horrible outcomes were observed while after intervention a significant (p values < 0.05) differences were observed in all parameters of aseptic technique as presented in Table 5.

Table 5: Assessment on the adherence of aseptic technique during procedure of burns dressing among pre and post intervention groups

Aseptic Adherence Technique Checklist		Group				p-value
		Pre-intervention		Post-intervention		
Gowning	Proper	28	29.5	50	52.6	0.000
	Improper	44	46.3	43	45.3	
	Not Done	23	24.2	2	2.1	
Wearing face mask before procedure	Proper	54	56.8	77	81.1	0.001
	Improper	41	43.2	18	18.9	
	Not Done	0	0.0	0	0.0	
Use of a cap	Proper	28	29.5	55	57.9	0.000
	Improper	28	29.5	37	38.9	
	Not Done	39	41.1	3	3.2	
Surface disinfection	Proper	17	17.9	53	55.8	0.000
	Improper	48	50.5	40	42.1	
	Not Done	30	31.6	2	2.1	
Shoe cover	Proper	11	11.6	41	43.2	0.000
	Improper	33	34.7	52	54.7	
	Not Done	51	53.7	2	2.1	

DISCUSSION

Knowledge of nurses in management of patients in specialized care circumstances has a fundamental importance as they are the front line force in healthcare management and stay with indoor patients for the maximum time as compared to any other healthcare staff or even home mates of the patients. In burn unit

specifically, nurses are sought to have sufficient knowledge of patients' management as well as infection control measures.¹⁴

At present it is revealed that the nurses do not had appropriate knowledge of infection control specifically and various categories of infection control. Thus the results are in concomitant to the findings of another study that revealed as 89% of the nurses

do the job as practice only and were not involved in in-service educational opportunities. That's why they consisted unsatisfactory knowledge and therefore gained <75% scores in practices.⁶

Similar findings were revealed by a study presented that only 15.3% nurses gained more than 50% grades with average proportion of correct answers remained only 39.7%. Appropriate oral fluid resuscitation among individuals with mass burn injuries was recognized by only 53.6% nurses. Pre-transport intubation to tackle the suspects of inhalation injuries were recognized by only 44.6% of the nurses. Fewer as 5.4% nurses answered correctly about management of second degree burn injuries. Study also explored that place of working and work experience did not affect the level of knowledge and recommended the continuing education of nurses for better management of burns and emergencies.¹⁵

A study reported a moderate knowledge and attitude with poor practices and recommended practical educational interventions for healthcare staff to avoid transmission of various nosocomial infections hence to improve the healthcare standards.¹⁶ A study in Yemen presented 61.2% male nurses and 56.5% had <5 years of job experience. The study also concluded that nurses had flaws in awareness and practices of nosocomial infections control and recommended to establish associated healthcare policy¹⁷ in concomitant to present findings. An Egyptian study recommended the availability of infection control manuals and written guidelines must be present in burn units for healthcare staff in general and for nurses in particular.¹⁸

A study done in Lahore, Pakistan has also reported a low level of knowledge and unsatisfactory practices regarding prevention of infection control in burn units and proposed the need of training courses for adequacy of practices.¹⁹ Patients with larger burns are recommended to be isolated in separate rooms for prevention from cross contaminations. Laminar air flow has also been found to be the effective method of prevention from infections.²⁰ Similarly bath protocol with chlorhexidine two times a day has also been proven in decreasing the nosocomial infections up to zero present.²¹ Results are not agreed with findings presented a good knowledge of preventing hospital acquired infections among 76% nurses.²²

Knowledge of nurses in present study was low regarding various resistant microorganisms, and findings are in concomitant to the findings demonstrating a need of infection control education among 90% the nurses and most of the healthcare staff.²³ A study demonstrated that none of the nurses presented satisfactory practices⁶ as in present study.

Transmission of burn wound infections also follows the universal rule including three components; contagion causing infection, method of transmission and susceptibility of patient to acquire infection. Hand hygiene is the prime phase for the success in controlling transmission of infection in burn units and everywhere in intensive care. A poor compliance to hand hygiene has been observed in present study is in agreement to the study presented only 41% of compliance however a significant improvement was observed after intervention program.²⁴

In conclusion, knowledge and practices of nurses are crucial in standard management and better outcomes of burn patients. At present poor knowledge and unsatisfactory practices of nurses were revealed in a tertiary care hospital however, a great improvement was observed after intervention in a kind of educational intervention and practical observation. This denotes that an adequacy in training, workshops or educational sessions may enhance the professional skills of nurses not only in burn units but also in other intensive care units.

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