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Research Paper

Exploring Knowledge, Attitudes and Practices of ICU Health Workers Regarding The Spread of Nosocomial Infections (King Khalid Hospital –Najran)

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ABSTRACT:
Background: *Nosocomial Infection is a localized or systemic infection acquired at any health care facility including hospitals by a patient admitted for any reason other than the pathology present during admission. Including an infection acquired in a healthcare facility that manifest 48 hours after the patient's admission or discharge.*
Objective: *Themain aim of this study is toassess the level of knowledge, attitudes and practice of ICU health personnel with regards to the spread of nosocomial infections.*
Methodology: *A cross-sectional and facility based study was conducted from March to November 2016 at King Khalid hospital in Najran, Saudi Arabia. By adopting convenience technique, 50 subjects had been recruited to participate in this study.*
Results: *62% of respondentswere female. The mean age was 29 years. Concerning educational status, 54% of the participants have Bsc. professionally most of them (48%) were nurses. 60% of the participants have less than three year working experience in ICU.86% of them highlighted that hands must be washed with soap and water or even rubbed with alcohol before contacting with patients. Additionally, the result reveals that employees who had master degree or above displayed higher mean knowledge scores as compared to the other two groups (diploma or less & bachelor) (0.7147 & 4.6656) respectively. High significant statistical differences were found between the three academic groups in relation to sharp devices, personal protective equipment (gloves, gowns &masks), care of intravenous infusion therapy, central line care and urinary catheter care (F=4.594, F=7.982, F=5.539, F=4.471, F=15.310, F=4.345) respectively at p < 0.05.*
Recommendation & conclusion: *Health workers in ICU (King Khalid hospital) showed adequate knowledge and faire attitude regarding universal precautions.*
Keywords: *Nosocomial infection, ICU personnel, knowledge, attitude and practices*

I. INTRODUCTION

Infection is one of the most important problems in health care services worldwide. It constitutes one of the most important causes of morbidity and mortality associated with clinical, diagnostic and therapeutic procedures.[1]

Nosocomial infections (Nls) are new localized or systemic infections that develop in patients receiving medical care in a hospital or other healthcare facilities. The infections are not incubating or present during a patient's admission into the healthcare facility and are identified at 48 – 72 hours following the patient's admission.[2] Episodes of Nls are recognized in hospitalized patients world-wide and are prevalent in all age groups. They are caused by pathogens such as bacteria, viruses and parasites present in the air, surfaces or equipment and are often transmitted by indirect and direct contact. Some of the pathogens are resistant to antimicrobial agents.[3]

The burdens of Nls include prolonged duration of hospitalization for patients resulting in increased costs of healthcare and deaths.Implementation of safe patient care activities is the role of healthcare workers such as physicians, dental health care workers and nurses. Therefore these healthcare workers should be familiar with practices to prevent the occurrence and spread of Nls.[4]

Most nosocomial infections are thought to betransmitted by the hands of health care workers. It has long been known that hand hygiene among health care workers plays a central role in preventing the

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transmission of infectious agents. Hand-washing (HW) is the most effective way of preventing the spread of infectious diseases. But despite a Joint Commission requirement that Centers for Disease Control and Prevention handhygiene guidelines be implemented in hospitals, compliance among health care workers remains low. The most dominant species of resident microbiota is Staphylococcus epidermidis. Transient microbiota are microorganisms present, under certain conditions, in any of the locations where resident microbiota are found. Some of these microorganisms colonize the superficial layers of the skin. They are more amenable to removal by routine hand hygiene and such microorganisms are often acquired by healthcare workers during direct contact with patients or contaminated environmental surfaces, within the patient's surroundings.[6]

The reasons for low compliance to hand hygiene have not been defined in developing countries probably due to limited studies on hand hygiene.[7]Nosocomial infections are prevalent nationally and internationally and occur in patients of all age groups. Factors thatcontribute to non compliance to HW among health care workers are: lack of awareness and knowledge among health care workers as regard the importance, techniques, methods and quality of hand hygiene.[9]Moreover human factors that lead to low compliance to hand hygiene are busyness, forgetfulness, low staff to patient ratio and attitudes among staff towards bio-safety.[10]

II. JUSTIFICATION OF THE PROBLEM

Nosocomial infections have been recognized as a problem affecting the quality of healthcare and aprincipal source of adverse healthcare outcomes. It has been documented in theliterature that within the realm of patient safety, these infections have serious impact. Increasedhospital stay days, increased costs of healthcare, economic hardship to patients and their familiesand even deaths, are among the many negative outcomes.These findings are indicative of the enormous economicburden associated with nosocomial infections. Studies that have examined the impact of nosocomial infections caused by antibioticresistantpathogens at asingle center in United States and 281 laboratories that served 791hospitals in Europe, showed that infections caused by antibiotic resistant pathogens wereassociated with increased mortality rates, increased lengths of hospital stay and higher healthcarecosts compared to the nosocomial infections caused by pathogens susceptible to antibiotics.[12,13]

III. MATERIAL AND METHODS

This is a cross-sectional and facility based study that was conducted from March to November 2016atKing Khalid hospital in Najran, Saudi Arabia. By adopting a convenience sampling technique, 50 subjects had been recruited to participate in the current study. The principle method for data collection was structured questionnaire, interview and observational check-list. The questionnaire was composed of sections. Section one for demographic data, while section two containing questionsfor assessing the level of knowledge, while section three for assessing the attitude, additionally, section four to evaluate the practices of the subjects.
A pilot study was conducted for checking the appropriateness of wording and responses.

IV. STATISTICAL METHOD

Data was coded and elaborated by statistical package for the social sciences (SPSS), version 20 (IBM, SPSS, Chicago, Illinois USA). Descriptive statistics were calculated for every measured variable. The P-value for statistical significance was set at (0.05), so any value less than ($P<0.05$) was interpreted as statistically significant.

V. RESULTS

50 study subjects responded with response rate of 98.6%. In this study, majority of respondents, 62% were female. The mean age of the respondents was 29 years with minimum age of 19 and maximum 48 years. Concerning educational status majority of the participants (54%) has Bsc. Professionally most of the respondents (48%) were nurses. Majority of the study participants, (60%) had less than three year working experience in ICU as shown in table 1.

Table 1: Socio demographic characteristics of the study population in ICU (n=50)

Variable	Characteristics	Frequency	%
Age	18–29	26	52%
	30–39	18	36%
	>40	6	12%
Sex	Male	19	38%
	Female	31	62%
Marital status	Single	14	28%
	Married	32	64%
	Divorced and Widowed	4	8%
Profession	Physician	15	30%

	Nurse	24	48%
	Cleaners	8	11.3
	Others	3	10.1
Educational status	Diploma or less	18	36%
	Bsc	27	54%
	Master degree and above	5	10%
Service year in health facility	<3 years	30	60%
	3 -6 years	11	22%
	>6 years	9	18%

Table 2: Represents the number and percentage of personnel's responses regarding attitude towards infection control in relation to hand hygiene.

Variables	Yes		No		Total	
	N	%	N	%	N	%
1- Before contact with immune compromised patients, hands must always be washed with soap and water or rubbed with alcohol.	43	86%	7	14%	50	**100%**
2- Washing hands with alcohol is, for PT with a normal immune system, only necessary before simple surgery and caring for wounds.	41	82%	9	18%	50	**100%**
3- Hands should be washed before starting work on the ward.	40	80%	10	20%	50	**100%**
4- I Visibly soiled hands must be washed with water and soap.	35	70%	15	30%	50	**100%**
5- It is the duty of every hospital employee to keep their hands as free of bacteria as possible.	36	72%	14	28%	50	**100%**
6- After handling of soiled linen, hands must be washed or rubbed with alcohol.	41	82%	9	18%	50	**100%**
7- Nails should be cut short, clean and well-cared for.	40	80%	10	20%	50	**100%**
8- On wards employees should use disposable tissues for blowing their nose.	**43**	**86%**	**7**	**14%**	**50**	**100%**

Table 2 represents the personnel's responses regarding attitude towards infection control in relation to hand hygiene subscale. As reflected in this table there is a positive attitude of nurses towards infection control in relation to hand hygiene. It is clear that high percentage of the studied sample that represent (86%) highlighted that hands always must be washed with soap and water or even rubbed with alcohol before contacting with immune compromised patients. This table also shows that (82%) of the studied sample reported that washing hands with alcohol is so crucial and important before simple surgery or caring for wounds or PT with a normal immune system. Moreover (80%) of the subjects believe that hands should be washed before starting work on the ward. Furthermore (70%) of the selected sample insisted that soiled hands must be washed with water and soap. Additionally (72%) of thestudied sample stated that it is the duty of every hospital's employees to keeptheir hands free of bacteria as possible. On the other hand (82%) of the surveyed sample argue that hands must be washed or even rubbed with alcohol after handling soiled linen. While (80%) believe that nails should be cutshortly, cleaned and well-cared for. Furthermore, (86%) of the studied sample insisted that employees inwards shouldуse disposable tissue papers for blowing their noses as illustrated in this table .

Table 3 Reflects the number and percentage of sample's responses regarding attitude towards infection control in relation to personal hygiene and personal equipment. (n=50)

Variables	Yes		No		Total	
	N	%	N	%	N	%
1- For every patient who has to be nursed with gloves, the employee has to change the gloves .	43	86%	7	14%	50	**100**
2- Non-sterile gloves must be worn in case of contact with non-intact skin.	47	94%	3	6%	50	**100**
3-I Non-sterile gloves must be worn for each direct patient contact.	41	82%	9	18%	50	**100**
4-Sterile gloves must be worn during insertion of urinary catheter.	40	80%	10	20%	50	**100**
5- Sterile gloves must be worn in case of contact with mucous membranes.	38	76%	12	24%	50	**100**
6-Handling of soiled and clean linen must be separated	38	76%	12	24%	50	**100**
7-Disposable aprons should be worn when there is a	35	70%	15	30%	50	**100**

risk that clothing or uniform may become exposed to blood, body fluids, secretions, with the exception of sweat.						
8- I Personnel are allowed to eat or drink when caring for patients.	**29**	**58%**	**21**	**42%**	**50**	**100**

Table (3) represents the health workers' responses regarding attitude towards infection control in relation to personal hygiene and personal equipment subscale it is obvious in this table there is a positive attitude of nurses towards infection control in rational to personal hygiene. The result of first studied tool concluded that (86%) of the surveyed sample stated that for every patient who has to be nursed with gloves, the employee has to change the gloves. Moreover a very high percentage of the sample that represents (94%) reported that non-sterile gloves can be worn in case of contacting with non-intact skin. On the other hand (82%) argued that non-sterile gloves can be worn for each direct patient care. This table also concluded that (80%) of the studied subjects agreed to wear sterile gloves during insertion of urinary catheter. Additionally(76%) of the selected subjects highlighted the importance of wearing sterile gloves too when getting in contact with mucous membranes. Furthermore a recognized percentage of the studiedsample (76%) pointed that handling of soiled and clean linen must be separately. The seventh tool inthis tableis about the usage of disposable aprons that should be worn whenever there is a possible risk that clothing or uniform may become exposed to blood, body fluids, or secretions, with the exception of sweat at a rate of (70%). Finally, and very interesting that slightly above half (58%) of the studied sample agreed that Personnel are allowed to eat or drink when caring for patients.

Figure 1:

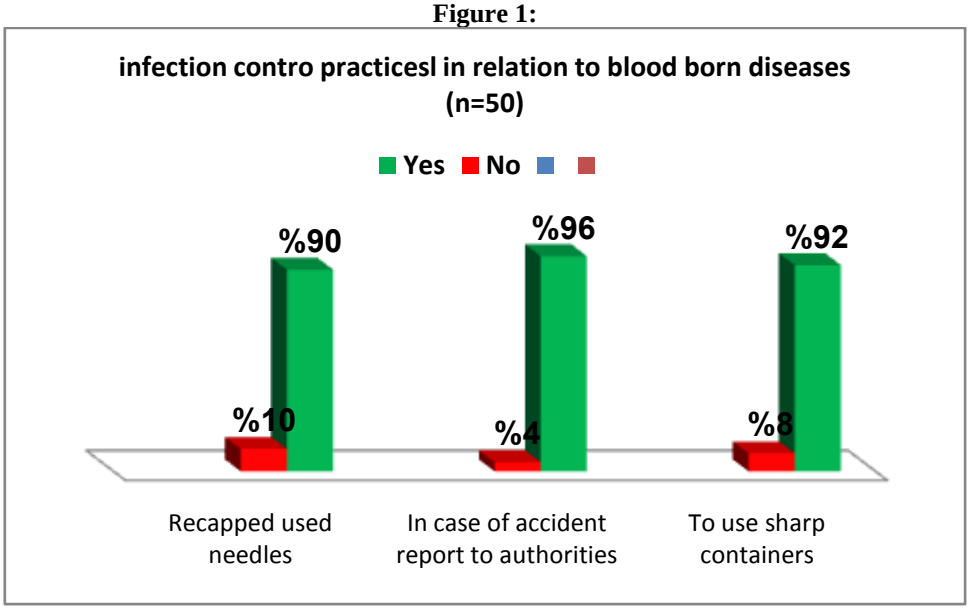

Table 4: represents Mean knowledge and mean practices scores in relation to their qualification

Qualification	No.	Knowledge scores				Practices scores			
		Mean	SD	F	Sig.	Mean	SD	F	Sig.
Diploma or less	18	0.6045	0.18037	4.531	0.012	4.5000	0.65771	0.727	0.484
Bsc	27	0.6533	0.16486			4.5542	0.56404		
Master or higher	5	0.7147	0.16885			4.6656	0.36740		

(n=50)

Table 4: shows comparison of the studied sample mean knowledge and mean practices scores in relation to their qualification. It reveals that Employees who had master degree or above displayed higher mean knowledge scores as compared to the other two groups (diploma or less & bachelor) (0.7147 & 4.6656) respectively. Significant statisticaldifferences were found in the mean knowledge scores only (F= 4.531) at $p < 0.05$ (.012).

Table 5: One way ANOVA for Comparison of the Studied Sample Mean Performance Scores in Relation to their Qualification (n=50)

Variables	Master or higher	Bcs	Diploma or less	Anova *P- value*
Hand Hygiene.	8.0±1.5	7.3±2.7	7.3±1.3	F=2.034 (.137)
Sharp Devices	7.2±0.7	6.7±1.5	6.5±0.7	F=4.594 (.013)*
Linen Management.	3.8±0.5	3.0±1.5	3.6±0.7	F=5.367 (.007)
Waste Disposal	1.6±0.3	1.5±0.5	1.5±0.3	F=2.655 (.007)
Personal Protective Equipment	10.0±1.0	9.1±2.3	8.7±1.0	F=7.982 (.001)**
Personal hygiene	3.3±0.5	2.9±0.7	2.9±0.7	F=5.539 (.006)**
Care of IV infusion therapy	7.0±0.7	6.2±1.9	6.3±0.8	F=4.471 (.015)*
Care of suction of respiratory tract	6.2±0.8	5.8±1.6	5.8±0.7	F=1.391 (.255)
Wound care	4.2±0.6	3.8±1.6	3.8±0.7	F=2.856 (.064)
Central line care	5.5±0.8	4.0±1.6	4.4±0.8	F=15.31 (.000)*
Urinary catheter & chest tubes care	4.4±0.5	4.3±0.8	4.0±0.5	F=3.001 (.056)

** Significant at p. < 0.005 * Significant at p. < 0.05

Table (5) shows comparison of the studied sample mean performance scores in relation to their qualifications. Itclarifies that employees whohad master degree or higher displayed higher mean performance scores as compared to the other two groups(Bsc& diploma or lower). High significant statistical differences were found between the three groups in relationto sharp devices, personal protective equipment (gloves, gowns &masks), care of intravenous infusion therapy, central linecare and urinary catheter care (F=4.594, F=7.982, F=5.539, F=4.471, F=15.310, F=4.345) respectively at p < 0.05.

VI. Discussion

This study showed that knowledge and awareness of universal precautions among some health care professionals working at ICU was variable. The majority (53.9%) of the health care workers had faire knowledge of universal precautions while just over one-quarter had no knowledge.The results of this study concur with those of Abou El-Eneinand El Mahdy,who reported that 94.9% of medical doctors in Thailand had knowledge of standard precautions. Surprisingly, only approximately one-tenth of the porters had knowledge of universal precautions.[14]

The satisfactory knowledge that was noticed in the current study regarding: standard precautions; transmission of blood borne diseases; and methods used to prevent infection such as rules of eating and drinking in the intensive care unit; and immunization against disease among majority of the studied sample. These findings are in agreement with that of Karabayet al who reported acceptable knowledge level regarding modes of transmitting diseases.[15]

However, Whitby et al. illustrated that, the minority of their studied nurses and laboratory technicians had unsatisfactory knowledge about mode of transmitting blood born diseases and their signs and symptoms.[16]That is why BasuurahandMadani, revealed that frequent updating of nurses knowledge coupled with regular surveillance, help to give the most recent and best care to the patients. This from the researcher's point of view could direct the attention toward continuing education of critical care health workers about methods of utilizing infection control standard precautions especially where the studied sample had various educational background and had years of experience of less than 10 years, so require periodical update of their knowledge.[17]

Concerning assessment of health workers' performance regarding infection control standard precautions, the current study demonstrates that, more than half of the studied sample had satisfactory performance level. As well, the majority had satisfactory performance regarding personal hygiene through: removing their jewelries during handling/caring for patients; keeping finger nails short and clean; andwearing clean and tidy unit uniforms. What nurses do in the current study could be based on what explained by Chistiaenset al., regarding wearing rings, where they increase the total bacterial colonization of the hands and reduce the success of alcohol-based hand disinfection.[18]

In relation to wastes and sharp disposal, ICU health personnel used sharp container for needles and sharp devices, used red bags for infamous and pathologic waste and black bags for general wastes.In this regards,Lam et alreported that most needle-stick injuries occurred during syringe recapping or bending after use. As well, needle sticks were found to be correlated with nurses daily working hours.[19]That is why WHO, strongly recommended that all health care workers with infections should report their needle-stick incidents for further evaluation and management.[20]

VII. CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it can be concluded that health workers in ICU (at King Khalid hospital) showed an adequate knowledge and a fair level of awareness among medical doctors, nurses and other health personnel towards universal precautions. These findings suggest that training of health care workers to increase their knowledge about blood-borne pathogens and universal precautions could improve their use of universal precautions. The increasing availability of personal protective equipment and compliance with standard precautions in hospitals in Jamaica should reduce health care workers' risk of blood-borne pathogen exposure.

The health care workers have to build a positive attitude that hand hygiene is an important part of their work in preventing the risk of cross transmission of potentially harmful multi drug resistant nosocomial pathogens.

The current study recommends the following:

- Updating knowledge and performance of ICU health workers through continuing in-service educational programs.
- Emphasizing the importance of following latest evidence-based practices of infection control in continuing education / training programs.
- Strict observation of personnel' performance/ utilization of infection control standard precautions and correction of poor practices by the infection control team are required.
- Providing training programs for newly joined ICU staff about infection control standard precautions and at regular intervals.
- Availability of all facilities and equipments required for applying infection control standard precautions.

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