



**“KNOWLEDGE AND AWARENESS REGARDING INFECTION CONTROL
AMONGST LABORATORY AND NURSING STAFF OF AL- QUWAYYAH GENERAL
HOSPITAL, RIYADH”**

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ABSTRACT

Background and Objectives: Hospital-acquired infection (HAI) is one of the common problems and difficulties faced by hospitals in all countries around the world. Since nurses and Laboratory staffs are part of the healthcare team that plays a unique role in the control of hospital infection, this study is conducted to analyze the knowledge and awareness regarding infection control amongst Laboratory and Nursing staff of the Hospital. **Materials and Methods:** This study was conducted in Al-Quwayiyah general Hospital, Riyadh from August 2015 to October 2016 among 160 staffs. A cross-sectional survey was carried out to identify the level of awareness about HAI among the Laboratory and Nursing staff through questionnaires. The tools were prepared based on the hospital-acquired infection guidelines provided by the World Health Organization (WHO) and Centre for Disease Control (CDC). **Results:** The responses on knowledge and awareness of nursing and laboratory staff on HAI shows that both laboratory (75%) and nursing staff (85%) have good knowledge. **Conclusion:** Based on the findings of this study, it can be concluded that nurses in this study have good knowledge regarding HAI. However, in spite of having knowledge about HAI, their overall knowledge didn't reach the good level. It is suggested to providing training programs for newly joined health workers about infection control at regular intervals.

KEYWORDS: Laboratory and Nursing staff, knowledge, awareness, infection control.

INRODUCTION

For centuries, hospitals have been known as dangerous places. In 1847, Ignaz Semmelweis presented evidence that childbed fever was spread from person to person on the unclean hands of health-care workers.^[1] Semmelweis's findings did not immediately improve sanitary conditions in hospitals, but surgeons gradually adopted aseptic and antiseptic techniques and became leading innovators of techniques to reduce patients' susceptibility to postoperative infections. Concerns about the spread of infection by air, water, and contaminated surfaces gradually changed practices in hospitals, making them safer. During the 1950s, epidemic penicillin-resistant *Staphylococcus aureus* infections, especially in hospital nurses, captured the public's attention and highlighted the importance of techniques to prevent hospital-acquired infections, now also referred to as health-care--associated infections (HAIs; i.e., nosocomial infections).^[2] By the mid-20th century, some surgeons, microbiologists, and infectious disease physicians had focused their studies on the epidemiology and control of HAIs^[3, 4] by the late 1950s and early 1960s, a small

proportion of hospitals had begun to implement programs designed to understand and control HAIs.

The basic role of health care system is providing health facilities to the patients. This is the duties of a hospital to provide the health services for every person in the society. A hospital is an institution to treat the patients. The function of a hospital was to save the health of patients and public health from the diseases. But during diagnosis and treatment of the patients the infectious wastes were generated because these are the higher risk of infectious disease for the patients and staff at hospital.^[5]

Hospital Acquired Infections (HAI) is a major global safety concern for both patients as well as healthcare professionals. Many factors promote infection among hospitalized patients – decreased immunity among patients; increasing variety of medical procedures and invasive techniques creating potential routes of infection; and the transmission of drug-resistant bacteria among crowded hospital populations, where poor infection

control practices may facilitate transmission.^[6] Despite progress in public health and hospital care, infections continue to develop in hospitalized patients and may also affect hospital staff. The burden of HAI is substantial in developed countries, where it affects from 5% to 15% of hospitalized patients in regular wards and as many as 50% or more of patients in intensive care units. In developing countries, the magnitude of the problem remains underestimated or even unknown largely because diagnosis of HAI is complex and surveillance activities to guide interventions require expertise and resources.

HAI is a major health problem in all societies. According to the WHO, 7.1 million cases of HAI occur every year. One out of every 20 people suffers from hospital infection. This leads to 99,000 cases of death every year and imposes an estimated cost of \$ 32 million to society.^[6] On arrival at the hospital, patients do not have HAI but they may develop it during the 72 hours or more after hospitalization.^[7] The WHO has provided a general definition of HAI and has renamed it as healthcare-associated infection. WHO launched its activities in 2005 under the slogan, "clean care is safer care".

Hepatitis continues to be a major health problem in Saudi Arabia and also worldwide. Although hepatitis B and A vaccines were approved in late 1981 and in 1992^[8, 9], respectively, hepatitis A and B continue to be the most frequently reported vaccine-preventable diseases. Occupational exposure to hepatitis B is a well-recognized risk of health care workers who report 800000 cut and puncture injuries per year. Of the total proportion of health care workers exposed to blood borne pathogens annually, 5.9% have been exposed to hepatitis B virus infection. In developing regions almost 40 to 65% of hepatitis B virus infections are due to percutaneous occupational exposure while it is 10% in developed regions owing to usage of hepatitis B vaccination and post exposure prophylaxis.^[10] The major route of hepatitis B transmission in occupational exposure is through cuts and needle stick injuries, and the most common mode of transmission is through blood. Therefore, an awareness of blood borne infections such as hepatitis B, their various routes of transmission, prevention by vaccination and knowledge of safe practices will go a long way towards safeguarding the well-being of these young people, who are the health care providers of the future.^[11]

The Ebola virus is regarded as the prototype pathogen of viral hemorrhagic fever, causing severe disease and high case-fatality rates.^[12] Hajj (pilgrimage) to Mecca, KSA is the largest mass gathering in the world. Each year, KSA receives more than 2 million pilgrims and millions of Mu'tamirs from all over the world. This vast gathering might represent a health risk to the Kingdom. Work force from Ebola struck countries may be another risk. The Kingdom health authorities have taken strict measures to prevent the risk of introduction of Ebola virus to Saudi

Arabia through imposing travel restrictions and denying visas to travelers from countries afflicted by Ebola. Nevertheless, it is important to promote the general awareness and knowledge of the public about this serious disease and to implement strict health precautions.^[13] It has been documented in several epidemiological studies that healthcare workers such as physicians, dentists and nurses are implicated in the transmission of nosocomial infections. So many authors have explored the knowledge and practices of nurses and health professionals are limited. Therefore, it is important to further investigate the impact of knowledge and practices of nurses with regard to the degree of the infection control. Assessing compliance with infection control measures in any health care setting is vital. Regular updating and strengthening of infection control practices should be one of the priority function of any place where health services are rendered. The present findings from this study will add to the existing literature and may be used in developing interventions to increase infection control practices in hospitals. Our main objective is conducting and developing of knowledge and awareness regarding infection control among Laboratory and Nursing staff in Al-Quwayyah Hospital, KSA.

MATERIALS AND METHOD

We conducted a cross sectional study on selected 160 laboratory and Nursing staff of Al-Quwayyah General Hospital, Riyadh, from August 2015 to October 2016.

Study design: A cross sectional survey using a self-administrated Questionnaire for the participants. The study population has made up into 2 groups Laboratory and Nursing staff. All participants in the study voluntarily gave their consent before being enrolled.

Sample collection: Questionnaires were presented in English and Arabic. The survey was carried out in divided sessions. Participants were given a questionnaire and explanation was provided to assist them in completing the questionnaire. Participants who face problem in understanding were interviewed with understandable language. The information obtained through the questionnaires included age, gender, nationality, marital status, experience and awareness question about HAI. Participants were encouraged to seek vaccination for HAI.

The tools were prepared based on the HAI guidelines provided by the World Health Organization (WHO) and Centre for Disease Control (CDC). The tools were pre-tested before data collection and proper approval was obtained from the appropriate authority prior to the study. The limitation of the study was that the HAI control practices could not be observed but evaluated based on a self-designed questionnaire and interview schedule. Although the questionnaire was anonymous, verbal consent was obtained from all participants. Clear clarification and explanation was given by medical student for each statement and way of filling the

questionnaire. This study was approved by the ethical and scientific research committee of the college.

STATISTICAL ANALYSIS

The statistical analysis of data was performed by using SPSS version 17.0 software. All values are expressed as mean \pm SD. Chi-square test was used to assess the association between categorical variables; chi-square test was used to compare the knowledge level of laboratory and Nursing staff. The significant level is set at $p < 0.05$ for all statistical procedure.

RESULTS

Of the 180 questionnaires distributed, 160 completed questionnaires were selected for analysis. The socio-demographic characteristic of the participants are listed in Table 1.

The questions on knowledge and awareness were categorized under the following heads: standard precautions, staff precautions, mode of transmission, biomedical waste management, disinfectants and general knowledge of the staff's regarding HAI.

In Table 2, shows the knowledge of Laboratory and Nursing staffs about safety precautions. The responses on knowledge and awareness of nursing and laboratory staff on HAI shows that both laboratory 100% and nursing 100% staff have good knowledge regarding infected patient they says that the patient must be isolated. In this study 88.75% of the nursing and 77.5% of the laboratory staff says that we can control droplet infection by face mask. 88.75% of laboratory and 91.25% of the nursing staff says they always wash their hand or use hand rub after removing gloves. At the same time 92.5% of the laboratory and 96.25% of the nursing staff believe that hand washing with soap water is sufficient.

Most of the laboratory staff (98.75%) as well as nursing staff (99%) say that hospital staffs must regularly change their aprons and outer clothing. Similarly (97.75%) laboratory and (98.75%) nursing staff stated that hospital staff should be careful about personal hygiene.

89.75% of the laboratory and 86% of the nursing staff have the knowledge about which vaccine should be taken before joining the hospitals. At the same time both laboratories (43.75%) and nursing (38.75%) staff has poor knowledge regarding number of shots required for a full courses of hepatitis B vaccine.

The Table 3, shows the knowledge of Staffs about mode of transmission of HAI. In which shows that 64% of laboratory and 78% nursing staff know that the most common rout of infection is through "Air". Where 36% of the laboratory and 22% of the nursing staff think it's through blood and person to person contact. But most of the laboratory 92.5% and nursing 86.5% knew that hepatitis-A does not spread through blood.

The knowledge of staffs about biomedical waste management findings shows that there was a high level of awareness amongst laboratory (98.75%) and nurses (97.5 %) about bio medical waste management. Both laboratory (89.5%) and nursing staff (93.5%) says article used by patient should be properly disinfected. Meanwhile their knowledge regarding disinfecting the liquid waste was 92.5% and 75% respectively as shown in Table 4.

Finally Table 5, shows the general knowledge of the staff about HAI. The data has given in this table reveal that 93% of the laboratory and 95% of nursing staff have good knowledge about Ebola virus. At the same time only 76.5% of the laboratory and 81.5% of the nurses responded that they inform the higher authorities about HAI when only it led to a death.

Table 1: Demographic characteristic of the participants

Character	n (%)
Age (Years)	25 — 47
Mean age \pm S.D	18.2 \pm 3.2
Sex	
Male	61 (38.1%)
Female	99 (61.87%)
Nationality	
Saudi	68 (42.5%)
Non Saudi	92 (57.5%)
Marital status	
Single	55 (34.37%)
Married	105 (65.62%)
Experience	
0-5	71 (44.37%)
6-10	89 (55.62%)

SD: Standard deviation. n= number of samples

Table 2: Staff's Knowledge about standard precautions and safety precautions

Standard precautions	LS		NS		X ²	p
	n	%	n	%		
Question (response)						
Infectious patient must be isolated?	(80)	100%	(80)	100%		
Those who are suffering from disease should be kept away from work until completely cured?	(72)	90%	(77)	96.25%	1.03	0.37
Do you always wash your hands or use hand rub after removing gloves?	(71)	88.75%	(73)	91.25%	1.21	0.25
Hand washing with soap and water is sufficient?	(74)	92.5%	(77)	96.25%	1.08	0.35
Hospital dust must be controlled by (correct answer)	(66)	82.5%	(70)	87.5%	3.22	0.02
We can control droplet infection by face mask?	(62)	77.5%	(71)	88.75%	3.87	0.03
Proper bed spacing is one of the preventive measures for droplet infection?	(58)	72.55%	(79)	98.75%	5.71	0.01
Staff Precautions						
Hospital staff should regularly change their aprons and outer clothing's?	(79)	98.75%	(79)	98.75%	1.02	0.35
Hospital staff should be careful about personal hygiene?	(78)	97.75%	(79)	98.75%	1.09	0.31
Which of the following vaccine must be taken at the time of joining of hospital? (Hep A, Hep B, Hep C, Tetanus)	(71)	89.75%	(69)	86.25%	2.34	0.20
Number of shots in a full course of Hepatitis B vaccine is?(1x, 2x,3x,4x)	(35)	43.75%	(31)	38.75%	2.21	0.17
Categories of exposure of infection to the staff include non-intact skin exposure?	(61)	76.25%	(65)	81.25%	3.56	0.02

LS: laboratory Staff, NS: Nursing Staff, n: Number of samples, X²: Chi-square, p<0.05 significance.

Table 3: Staff's Knowledge about mode of transmission of HAI

Mode of transmission	LS		NS		X ²	p
	n	%	n	%		
Questions						
The most common rout of infection is through Air?	(51)	64%	(62)	77.5%	8.92	0.01
The causative agent of SARS is "corona virus"?	(77)	96.25%	(79)	98.75%	3.21	0.02
Is Ebola virus transmitted through food?	(56)	70%	(70)	87.5%	6.42	0.01
Which of the following infection transmitted through blood? (Hep A / HIV)	(74)	92.5%	(69)	86.25%	2.56	0.01

LS: laboratory Staff, NS: Nursing Staff, n: Number of samples

Table 4: Staff's Knowledge about Biomedical waste management and disinfection

Biomedical waste management	LS		NS		X ²	p
	n	%	n	%		
Questions						
Color coded bin should be used for biomedical waste?	(79)	98.75%	(78)	97.5%	1.89	0.41
Bio medical waste should be segregated at source?	(79)	98.75%	(77)	96.25%	1.54	0.33
Disinfection						
Sodium hypochlorite is used in laboratory for disinfecting the liquid waste?	(74)	92.5%	(60)	75%	3.68	0.01
The article used by patient should be properly disinfected?	(72)	89.5%	(75)	93.75%	2.74	0.02

LS: laboratory Staff, NS: Nursing Staff, n: Number of samples, X²: Chi-square, p<0.05 significance.

Table 5: General knowledge of staff's about HAI

General knowledge of staff's about HAI	LS		NS		X ²	p
	n	%	n	%		
Only big hospital required infection control committee?	(76)	95%	(77)	96.25%	1.59	0.03
Is there vaccine for Ebola Virus?	(75)	93.75%	(76)	95%	2.48	0.02
Is it possible to cure from Ebola?	(70)	87.5%	(72)	90%	3.65	0.04
Do you inform your higher Authority in case of HIA?	(61)	76.25%	(65)	81.25%	4.37	0.06
Common HIA in hospital are blood stream infections?	(62)	77.5%	(69)	86.25%	6.26	0.01

LS: laboratory Staff, NS: Nursing Staff, n: Number of samples, X²: Chi-square, p<0.05 significance.

DISCUSSIONS

HAI is a common problem all over the world. Therefore, up to date knowledge and nursing skills can play important roles in infection control. Hospital staff should have the opportunity to practice infection control on a day-to-day basis as an integral part of patients' care. That's why the current study was carried out.

The responses on knowledge and awareness of nursing and laboratory staff on HAI shows that both laboratory 100% and nursing 100% staff have good knowledge regarding infected patient they says that the patient must be isolated. In this study 88.75% of the nursing and 77.5% of the laboratory staff says that we can control droplet infection by face mask and 88.75% of laboratory and 91.25% of the nursing staff says they always wash their hand or use hand rub after removing gloves. At the same time 92.5% of the laboratory and 96.25% of the nursing staff believe that hand washing with soap water is sufficient. In this session the nursing staff shows little higher knowledge than that of laboratory staff because they are more closely deals with the patient than laboratory staff.

Yang Luo *et al.*,^[14] in China on 1,444 nurses and Gould *et al.*,^[15] on 173 nurses working in three wards (ICU, Medical-Surgical wards) assessed that the knowledge of nurses about standard precautions as low. This is not consistent with the finding of the present study.

Sodhi *et al.*,^[16] revealed that more than 90% of nurses had a very good knowledge of infection control. Chan's study^[17] also showed 56% of nurses had a good knowledge about infection control and 79% of them had a good practice in relation to standard precautions for infection control. Similarly our study shows (91.5%) of the nurses showed good knowledge about standard and staff precaution than that of laboratory staff.

It is important to note that the knowledge of nurses about HAI depends on many factors, including individual and educational characteristics, training courses, managerial and motivational factors. Suchitra *et al.*,^[18] suggested that the development of a continuous training program for all health care workers is necessary. Hand hygiene has always been considered one of the corner stone of infection control, but adherence to recommendations for hand hygiene practices remains extremely low in most of the health care settings.^[19] Strict adherence to universal precautions is a crucial measure to prevent HAI.

Akyol *et al.*,^[20] noted that the hand hygiene compliance by health care workers was at a poor level. In this study both laboratory (97.75%) and nursing (98.75%) staff have good knowledge regarding hand hygiene and personal hygiene, which is similar to the study done by Nasirudeen *et al.*,^[21] on the knowledge and practice in Singapore showed that 66.3% of health workers had a good practice and 48.9% of them had a good knowledge about hand hygiene.

In the present study provide the majority of the study group had received hepatitis B vaccine emphasizing the hospital policies to be vaccinated when employed new health workers to deals with exposure to blood borne pathogens and needle stick injuries. In this study both nursing (87.5%) and laboratory (80.75%) staff have average knowledge regarding mode of transmission which is similar to the other study conducted by Hema *et al.*,^[22] in India in which they also assed the average knowledge of nurses about mode of transmission.

Hospital waste is one of the most important sources of HAI; hence, proper handling of hospital waste is essential. Nurses and laboratory workers are the key person as far as handling of sharp and infectious waste is concerned, therefor they must understand the role of hospital waste management to prevent HAI.^[23] In our study both laboratories (97.5%) and nursing staff (98.75%) have good knowledge regarding biomedical waste management which is found to be higher than what was reported by Hema *et al.*, 2012, in which hospital workers having a poor knowledge regarding biomedical waste management.^[22]

Overall in this study both nursing and laboratory staff has good and average knowledge regarding HAI respectively. But Mahmoudi *et al.*,^[24] stated that the having of knowledge does not lead to good practice, so attitudes should also be changed and belief structures should be reworked in a rigorous and scientific manner to achieve proper practice.

There are some limitations for this study is that the sample population does not represent all nurses of the Riyadh city, Saudi Arabia.

CONCLUSIONS

Majority of the Laboratory and Nursing staff were aware about HAI yet there is a gap in knowledge in some points. Based on the findings of this study, it can be concluded that nurses in this study having a good knowledge regarding HAI than that of Laboratory staff. However, in spite of having knowledge about HAI, their overall knowledge didn't reach the optimum level.

RECOMMENDATIONS

The current study recommends the following suggestions.

- Updating knowledge and practice of nurses and laboratory staff through continuing in medical educational programs.
- Emphasizing the importance of following latest evidence – based education / training programs.
- Providing training programs for newly joined health workers about infection control at regular intervals.
- Implementation of the quality accreditation programs in hospitals, it will improve the quality of health workers.

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