

Original Article

Assessment of Knowledge about Standard Precautions and Nosocomial Infection among Nurses Working in Hospitals of Sana'a City, Yemen

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Abstract

Background: Nosocomial infection in healthcare facilities is a major public health problem in most developing countries like Yemen. Nurses as a part of medical staff can play a significant role in prevention and control of nosocomial infection. Thus, it is important to identify the level of their knowledge, and identifying gaps for better intervention.

Objective: This study aims to assess the knowledge of standard precautions and nosocomial infection among nurses working in the governmental and private hospitals in Sana'a city, Yemen.

Methodology: A cross-sectional study was conducted among 196 nurses in governmental, and private hospitals of Sana'a city, Yemen. A structured self-administered questionnaire was used. A scoring system used to assess the knowledge, zero scores was given for the wrong answer and one score was given for the correct answer. Data was analyzed using SPSS version 20 and the associations were tested with chi-square, with a p-value of < 0.05.

Results: The majority of the respondents (63.3%) were < 30 year-old, (64.8%) were males, 43.4% of them have > 5 years' experience, 61.7% of them have a diploma degree, and 53.1% work in private hospitals. The participating knowledge about standard precautions and nosocomial infection was average, below average, good, very good, and excellent (33.2%, 30.6%, and 22.4%, 12.2%, and 1.2%) respectively. The participating knowledge was insignificant associated with (a type of hospital, respondents gender, age group, years of experience, educational level, and working area) ($P < 0.05$).

Conclusion: A majority of the respondents have poor knowledge regarding to standard precautions and nosocomial infections and that's need intensive programs to educate nurses about various aspects of standard precautions and nosocomial infection control.

Key words: Assessment, Nurses' knowledge, standard precautions, nosocomial infection, Sana'a city, Yemen.

Introduction

Nosocomial infection refers to an infection that is acquired during the process of patients' care inside the healthcare facilities (Varshney et al., 2014). It is an infection whose development is favored by a hospital environment (Sternal, Franek, and Pieńkus, 2014). There are many different exposure routes: through injury (cut, prick), through contact with the skin or mucous membranes, through inhalation or through ingestion (Alwabr et al., 2016).

Nosocomial infection poses a real and serious threat to both patients and health care workers. Nurses face a serious danger that may threaten

their life; it is their exposure to blood and body fluids. Indeed, accidental exposure may lead to infections by blood-borne pathogens, particularly hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) (Sabbah I et al., 2013). Data estimate that among the 35 million health care workers worldwide, approximately 3 million experience percutaneous exposures to blood borne viruses each year (2 million HBV; 900,000 HCV and 300,000 HIV) (Ahmed, Hassan, and Abd-Allah, 2008). These injuries are estimated to result in 66,000 hepatitis BV; 16,000 hepatitis CV and 2000 to 5000 HIV infection. More than 90% of these infections are

occurring in low-income countries, and most are preventable (Vaz et al., 2010).

Common pathogens may easily be transmitted through health care workers' hands, equipment, supplies and unhygienic practices (Gichuhi et al., 2015). So, all health care workers should routinely use appropriate barrier precautions to prevent skin and mucous membrane exposure during contact with any patient's blood or body fluids that require universal precautions (Kaur R, Kaur B, and Walia, 2008). Failure to comply with policies and procedures that support the reduction of nosocomial infection or hospital-acquired infection is a recognized and complex problem that may be contributing to the current trend in the world (Abubakar et al., 2015). Therefore, knowledge about the frequency and distribution of nosocomial infection or hospital-acquired infections is important to improve infection control measures as well as to develop effective preventive and curative strategies which, in turn, will help us in decreasing the incidence, morbidity, and mortality (Al-Jubouri, 2014; Masavkar and Naikwadi, 2016). In Yemen, few efforts have been undertaken to raise awareness about infection control precautions among healthcare workers and hospital managers. Additionally, there is a lack of regulations and policies to protect healthcare workers from exposure (Sherah and Jaafar, 2015).

This study aimed to assess knowledge of standard precautions and nosocomial infection among nurses working in the governmental and private hospitals in Sana'a city, Yemen.

Methodology

A cross-sectional study was conducted to assess the knowledge about standard precautions and nosocomial infection among 196 nurses working in the departments of Emergency, Abdomen, and surgery at governmental hospitals of (Police, Republic, and 48th) and private hospitals of (Al-Moutawakel, Consultant, and Azal) in Sana'a city, Yemen, during the period from March to May 2015. In total, from the 220 questionnaires distributed, 196 were returned fully completed, giving a response rate 89.09%. The inclusion criteria are nursing staff working in departments of Emergency, Abdomen, and surgery in (Police, Republic, and 48th, Al-Moutawakel, Consultant, and Azal) hospitals.

Data was collected using a structured self-administered questionnaire, which had been

designed after an extensive literature search. This questionnaire was used in a similar study (Pratheeksha, 2010).

The questionnaire was divided into two main components. The first part included socio-demographic characteristics such as (age, gender, qualification, years of experience, hospital type, and place of work), the second part included twenty-seven multiple choice questions reflecting the knowledge of the nurses towards the concept of standard precautions and nosocomial infection such as (hand hygiene, hospital acquired infection, needle stick injuries, immunization, blood and body fluid isolation, and sterilization of equipment). The participants were requested to respond to questions according to their own awareness about the subject. The questionnaire was validated by experts at Ministry of Public Health and Population, Yemen and the reliability of the questionnaire was determined through a test-retest method using 20 copies of the questionnaire at Hospital of Sciences and Technology, Sana'a. The Pearson's coefficient was calculated. The coefficient of 0.81 was determined which indicated the reliability of the questionnaire.

A scoring system was used giving a value of one score of each correct item, and a value of zero scores for the wrong item. Scores of each respondent were calculated by adding the scores of all items of the questionnaire. The score was converted to percentage and level. The knowledge score's levels were considered below average with a percentage of $\leq 59\%$; average knowledge with a percentage of 60-69%; good knowledge with a percentage of 70-79%; and very good knowledge with a percentage of 80-100%. Data were coded and analyzed using Statistical Package for Social Science (SPSS) software version 16. Data were presented using descriptive statistics in form of frequencies and percentages for qualitative variables, and mean and standard deviation (SD) for quantitative variables. Chi-square test was used to determine association and a statistical significance was assessed at $P < 0.05$.

Results

Table 1 shows demographic characteristics of the studied sample. It clarifies that the nurses working in governmental hospitals were (46.9%) and (53.1%) of them works in private hospitals. The majority of them were between 20-30 year-old (63.3%) and male (64.8%).

Table 1: Socio-demographic characteristics of respondents (n=196)

Variables	Freq.	%
Sex		
Male	127	64.8
Female	69	35.2
Age Group (years)		
20 - 30	124	63.3
> 30	72	36.7
Work Experience (years)		
< 3	35	17.9
3-5	76	38.7
> 5	85	43.4
Level of Education		
Diploma degree	121	61.7
Bachelor's degree	68	34.7
Postgraduate	7	3.6
Type of Hospital		
Governmental	92	46.9
private	104	53.1
Name of Hospital		
48 th	34	17.3
Police	30	15.3
Republic	28	14.3
Consultant	29	14.8
Al-Moutwakel	33	16.8
Azal	42	21.4
The department		
Emergency	67	34.2
Abdomen	71	36.2
Surgical	58	29.6

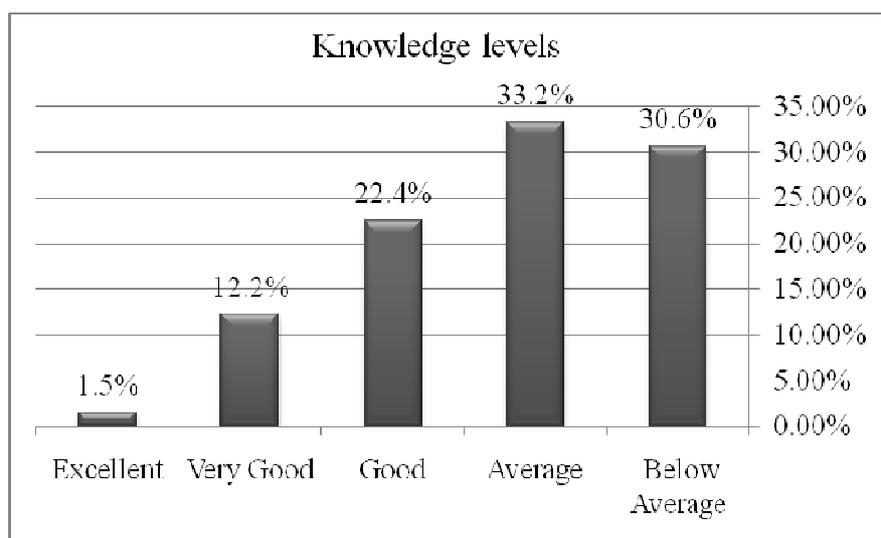
**Figure 1: Knowledge levels about standard precautions and nosocomial infection (n= 196)**

Table 2: Association between the nurses' demographical characteristics and their knowledge (n=196)

Variables	Knowledge levels					Total	P -Value
	Below average	Average	Good	Very Good	Excellent		
Sex							
Male	41	44	29	11	2	127	0.357
Female	19	21	15	13	1	69	
Total	60	65	44	24	3	196	
Age Group (years)							
20 - 30	38	43	27	16	0	124	0.232
> 30	22	22	17	8	3	72	
Total	60	65	44	24	3	196	
Work Experience (years)							
< 3	10	13	6	6	0	35	0.167
3-5	29	28	14	4	1	76	
> 5	21	24	24	14	2	85	
Total	60	65	44	24	3	196	
Level of Education							
Diploma degree	39	41	26	13	2	121	0.779
Bachelor's degree	20	23	15	9	1	68	
Postgraduate	1	1	3	2	0	7	
Total	60	65	44	24	3	196	
Type of Hospital							
Governmental	29	27	24	9	3	92	0.193
private	31	38	20	15	0	104	
Total	60	65	44	24	3	196	
Name of Hospital							
48 th	3	15	9	6	1	34	0.001
Police	4	8	13	3	2	30	
Republic	22	4	2	0	0	28	
Consultant	8	14	4	3	0	29	
Al-Moutwakel	10	16	5	2	0	33	
Azal	13	8	11	10	0	42	
Total	60	65	44	24	3	196	
The department							
Emergency	20	18	20	7	2	67	0.412
Abdomen	25	25	13	7	1	71	
Surgical	15	22	11	10	0	58	
Total	60	65	44	24	3	196	

Respondents with diploma degree and bachelor's degree made up the highest proportions, (61.7 %) and (34.7%) respectively. Those with working experience >5 years were about 85 respondents (43.4%). Figure 1 indicates that the participating knowledge was average, below average, good, very good, and excellent (33.2%, 30.6%, 22.4%, 12.2%, and 1.2%) respectively. The knowledge was significantly associated with the hospital's name ($P = 0.001$). In addition, there was no association with sex ($P = 0.357$), age ($P = 0.232$), work experience ($P = 0.167$), education ($P = 0.779$), The hospital type ($P = 0.193$) and the department ($P = 0.412$) (Table 2).

Discussion

This study assessed knowledge of nurses about standard precautions and nosocomial infection. In the present study, the majority of the nurses (63.8%) had poor knowledge. The low level of knowledge might be due to poor infection control programs and policies. Additionally, attributed to the insufficient information of knowledge the lack of training and continuing education about standard precautions and nosocomial infection.

This finding agreed with the results obtained from previous studies. A previous study conducted in Yemen revealed the low awareness

of knowledge about infection control (Sherah and Jaafar, 2015). A study conducted in Saudi Arabia indicated a significant lack of knowledge among healthcare workers regarding personal protective equipment uses as a standard precautionary measure for infection control (AL-Saleh, Ibrahim, and Lillian, 2014). A study conducted in Iran indicated that 67.9% of the nursing staff had an average knowledge and 29.9% had good knowledge about infection control (Abubakar et al., 2015). A study conducted in Iraq indicated that the majority of the sample (69%) have poor knowledge toward nosocomial infection (Al-Jubouri, 2014). A study conducted in India reported that knowledge about nosocomial infection was the lowest among the nurses and healthcare workers (72.54%) (Varshney et al., 2014). Other study conducted in India reported that 41.1% and 33.03% of the participants respectively had intermediate and high level of knowledge about infection control (Kalantarzadeh et al., 2014). A study conducted in Nepal reported that only 22% had correct knowledge of universal precautions (Timilshina, Ansari, and Dayal, 2011). A study conducted in Nigeria indicated that only (28.75%) of the respondents had good knowledge of the components of standard precautions (Ghadamgahi et al., 2011). This study agreed with the previous studies mentioned above may refer to the similarity of socio-economic and cultural factors to those countries.

However, this study result disagreed with the results obtained from previous studies. A previous study conducted in Jamaica indicated that the majority (64.0%) of the health care workers had knowledge of universal precautions while just over one-quarter had no knowledge (Vaz et al., 2010). A study conducted in Australia indicated that the participants demonstrated a considerably stronger level of knowledge on the topic of standard precautions (88.9%) (Mitchell et al., 2014). A study conducted in Ethiopia indicated that majority of the respondents (84.2%) had good knowledge regarding infection prevention (Gulilat and Tiruneh, 2014). A study conducted in Vietnam indicated that the large percentages of correct responses to the items about knowledge of standard precautions (range for individual items 83.9% -99.2%) (Thu et al., 2012). This study disagreed with the previous studies mentioned above may refer to the difference of socio-economic and cultural factors to those countries.

In this study, the results of table 2 reflects that there is an insignificant relationship between nurses' age and their knowledge toward standard precautions and nosocomial infection, this results might relate to inadequate training for the nurses about standard precautions and nosocomial infection. This result agreed with the results obtained from a previous study done in Iraq indicated that there is no relation between nurses' age and their knowledge of nosocomial infection (Al-Jubouri, 2014). However, is incompatible with the results obtained from a study conducted in Poland indicated that there is a significant association between nurses' age and their knowledge toward nosocomial infection ($P=0.001$) (Sternal, Franek, and Pieńkus, 2014).

This study result also showed an insignificant relationship with nurses' gender and their knowledge toward standard precautions and nosocomial infection. This result agreed with the results obtained from a previous study conducted in Iraq indicated that there is no relation between nurse's gender and their knowledge toward nosocomial infection (Al-Jubouri, 2014). While incompatible with the results obtained from a study conducted in Jamaica indicated that the knowledge of universal precautions was highest among women compared with men (Vaz et al., 2010).

Relative to educational levels, this study results showed an insignificant relationship between nurses' educational level and their knowledge of standard precautions and nosocomial infection. This result incompatible with previous studies. A study conducted in Iraq indicated that there is a significant association between nurses' educational level and their knowledge of nosocomial infection (Al-Jubouri, 2014). A study conducted in Poland indicated that there is a significant association between nurses' educational level and their knowledge of nosocomial infection ($P=0.000$) (Sternal, Franek, and Pieńkus, 2014).

Concerning to the nurses' work experience, this study result showed an insignificant relationship between the nurses' work experience and their knowledge of standard precautions and nosocomial infection, this might relate to inadequate training for the nurses about standard precautions and nosocomial infection during the previous years of working. This result agreed with the results obtained from a previous study done in Iraq indicated that there is an

insignificant association between the knowledge and the years of employment (Al-Jubouri, 2014).

Regarding of the hospital type, this study results showed an insignificant relationship between the hospital type and their nurses' knowledge toward standard precautions and nosocomial infection, this might due to ignoring attention to implementing training courses of standard precautions and nosocomial infection in both the governmental and private hospitals.

Relative to the nurses' working area, this study results showed an insignificant relationship between the nurses' working area and their knowledge of standard precautions and nosocomial infection, this might due to ignoring to implement additional training courses of standard precautions and nosocomial infection for the nurses that working in the more sensitive department.

In relation to the hospital name, this study results showed a significant relationship between the hospital name and their nurses' knowledge toward standard precautions and nosocomial infection, this might due to the facts that, some hospitals might implement training courses relative to standard precautions and nosocomial infection more than others.

Conclusion

Nursing staff had inappropriate knowledge regarding of standard precautions and nosocomial infections, there is a significant need to intervention programs that associated with standard precautions and nosocomial infection control to increase nurses' knowledge in order to adopt appropriate health behaviors and positive attitudes.

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