

## INFECTION CONTROL: STANDARD PRECAUTION MEASURES KNOWLEDGE, ATTITUDE AND PRACTICE OF MEDICAL DOCTORS AND NURSES

### Abstract

#### Background:

The emergence of life-threatening infections has highlighted the need for efficient infection control programs in all health care settings. These programs are used to support hospitals in reducing the risk of health-care-associated or nosocomial infections.

#### Method:

Descriptive cross sectional study was conducted between March - August 2018, in 254 nurses and 283 doctors employed in 3 teaching hospitals by a questionnaire, and data was analyzed using statistical package of social science (SPSS) 23.

#### Result:

429 out of 537 completed the questionnaire with response rate (79.9%), from them (52.9%) doctors and (47.1 %) nurses. (39.6%) of doctors and (53.5%) of nurses had a good level of knowledge, about (96%) of doctors and (97%) of nurses washing their hand after handling any body fluids, this indicates that nearly nurses and doctors have similar level of practice and also positive attitude. (91.1 %) of doctors and (85.6%) of nurses believe that they can be source of transmission of infection.

#### Conclusion:

Based on the findings of our study the majority of nurses had good knowledge in compare to doctors who had fair knowledge, with positive attitude and practice of both doctors and nurses toward infection control program.

### Introduction:

Hospital –acquired infections (HAI) also known as nosocomial infections (NIs) spread worldwide and affect both developed and developing countries. It is a significant burden both for the patient and public health (1). Hospital acquired infection can be defined (An infection acquired in hospital by patient who was admitted for a reason other than that infection) (2).

#### Prevalence and Causes:

Many different pathogens may cause nosocomial infections such as bacteria, viral and parasites. The infecting organisms vary among different patient, health care settings, different facilities, and different countries (3).

In Sudan data regarding nosocomial infections are few. According to statistics from World Health Organization (WHO) today 1,400,000 patients directly and indirectly suffer from side effect of nosocomial infection (4) and in the United States, the Centers for Disease Control and Prevention estimated roughly 1.7 million hospital-associated infections, from all types of microorganisms, including bacteria and fungi combined, cause or contribute to 99,000 deaths each year.(5).

NIs have significant consequences on patients, their families, and the community as a whole. The most common consequences of NIs are increased morbidity, mortality, and length of hospitalization. Such consequences contribute substantially to raise both the direct and indirect cost of the health care services, which result in additional costs to treat infected cases. Hence, such issue wastes the available resources which are not already enough, especially in developing countries (6).

### **Infection Control:**

The emergence of life-threatening infections have highlighted the need for efficient infection control programs in all health care settings. This programs are used to support hospitals in reducing the risk of health-care-associated or nosocomial infections (7).These infection prevention measures can be cost effective and can yield substantial return on their investment .However, some measures will be more cost effective than others, achieving the same clinical goals .(8)

### **Definition of Infection Control:**

WHO describes the infection control protocol as a various practices which, when used appropriately, restrict the spread of infections by focusing on monitoring and prevention of transmission of infections between patient and other patients, health care workers and visitors. (7)

Infection control occupies a unique position in the field of patient safety and quality universal health coverage (1). Inadequate infection control favors the spread of microorganisms in health care facilities that might cause health care associated infections (HAIs). HAIs aggravates the patient's general health status resulting in additional prescription of antibiotics, leading to increased cost for patients and the health care systems, antibiotic resistance as well as increase length of hospitalizations. (9)

## **Standard Precautions:**

Standard precautions are work practice that are required for basic level of infection control for all body substances (except sweat and tears) of all people considered to be potential source of infection and will help in preventing spread of infection between person to another (10) and should be performed for the treatment and care of all patient regardless of their infection status. These standard precautions include:

Hand washing and antisepsis (hand hygiene).

Use personal protective equipment when handling blood, body substance, excretion and secretion.

Appropriate handling of patient care equipment and soiled linen.

Prevention of needle stick/sharp injuries.

Environmental cleaning and spills management.

Appropriate handling of waste.(7)

There are many precautions can prevent transmission of pathogens e.g.:

1. Contact precautions are intended to prevent transmission of infectious agent, which are spread by direct or indirect contact with patient or patient's environment. (11)

2. Droplet precaution are intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions. (11)

3. Airborne precaution prevent transmission of infectious agents that remain infectious over long distances when suspended in the air. (11)

**Role of Doctors in infection control:** Complying with practice approved by the infection control committee, and the recommendations of antimicrobial use committee regarding the use of antibiotics. Notifying cases of hospital acquired infection to the team as well as the admission of infected patients and protecting their own patients from these infections. Finally instituting appropriate treatment for any infection. (1)

**Role of Nurses in infection control:** Nurses play a major role in preventing and control of infection at primary, secondary and tertiary level .(12) They are responsible for providing medication, dressing, sterilization, disinfection and involved in more contact with patients and other healthcare workers. Therefore they are more exposed to barriers NIs. (6)

## **Literature Review:**

In study conducted in two intensive care units (ICUs) in India for nurses showed that: The collective KAP score of all the participants is good (85%) which indicates that average levels of knowledge are balanced by good attitude and very good practices. However, good knowledge is crucial for ensuring expected levels of infection control practices, and hence ensures patient safety.

(2)

A study conducted in hospital of Kerman city showed 74.5% of nurses had good knowledge about hand hygiene, 70.5% of nurses took good attitude toward hand hygiene. Most of nurses 87.5% had good performance about hand hygiene. (4)

A study conducted in Abha city (Saudi Arabia) showed 58.7% of nurses receiving on job training in infection control, 51.38% received training in infection control in dialysis unit. 94.5% reported hand washing after removing gloves, 89% before wearing gloves, 59.6% after preparation of dialysis machine, 87.8% wearing gloves when preparing dialysis machine, 72.5% when putting patient on dialysis, 67.9% when providing patient care, 67% when taking patient on dialysis and 56.9% when handling care equipment. (17)

A study conducted in south west Ethiopia in Mizan –Aman general hospital found that majority of health care workers' knowledge, attitude and practice toward standard precaution were not sufficient, favorable and safe enough to the expected standard. (18)

A study conducted in Queen Elizabeth Central Hospital in Blantyre-Malawi included clinicians and medical students in this hospital showed adherence to hand hygiene was found to be 23%. (19)

A cross-sectional survey conducted in Juba teaching hospital (South Sudan) showed gaps in knowledge of hand hygiene among health care providers at this hospital. (20)

The finding of a study conducted in surgical wards in Omdurman teaching hospital –Sudan. 100% of nurses had good knowledge about NIs, 98% had knowledge about the cause of NIs, 100% had knowledge about the mode of transmission of NIs, and more than 2/3 had seminar or workshop about infection control. (21)

**Justification:** Our country has a low resources of health settings for those have a high burden of infectious diseases including tuberculosis and HIV. So there is a need for improving our infection control precautions and guidelines to manage the use of the scarce resources and decrease health- care associated infections.

Doctors and Nurses with inadequate knowledge and practice may increase risk of transmission of these infections between patient to patient, visitors and members of Health care workers (HCWS).

### **Objectives:**

#### **General Objectives:**

To assess knowledge, attitude and practice of medical doctors and nurses regarding infection control measures.

**Specific Objectives:** To identify the current infection control measures used, to assess knowledge, attitude and practice of medical doctors and nurses and compare between them regarding infection control.

#### **Material and methods:**

A descriptive cross-sectional based study. The data was collected from three teaching hospitals, Omdurman teaching hospital, Al-Khartoum-Bahrry teaching

hospital and Al-Khartoum teaching hospital between March - August 2018 for 254 nurses and 283 medical doctors working in that hospitals using non-probability Convenience sampling method.

Data was collected using a validated and pre- tested self-administered questionnaire that guided by the research objectives and the information obtained from WHO and centers for diseases control and prevention (CDC).

Questionnaire was developed in English for doctors and translated to Arabic for nurses, using simple basic questions and statement to enhance the clarity. The questionnaire had five sections: (1) Demographics and requirement. (2) The knowledge about the standard precautions and transmission based precautions. (3) The attitude of doctors and nurses regarding infection control. (4) The practice of doctors and nurses in hand hygiene and using of personnel protective equipment. (5) The reasons for non-compliance with infection control standards.

Data was analyzed by statistical package of social science (SPSS) version 23. Chi-square test was used to identify the different among categorical groups p-value, less than 0.05 was considered for statistical significance.

## Results:

### Demographic Data:

A total of 537 Health Care Workers (HCWs) (doctors and nurses) were included, 429 completely responded with response rate of 79.9%, concerning the professional categories of respondents 47.2% were nurses with response rate of (79.5%) and 52.9% were doctors with response rate of 80.2%. From nurses 24.8% were male while 75.2% were female, doctors 37.4% were male and 62.6% were female. The mean age of doctors was 26.6 (SD 5.2) while 38.2 (SD 10.4) for nurses, mean of work experience was 2.8 years (SD 3.9) while 14.62 (9.17) years for nurses. The remaining socio-demographic results presented in the table 1.

Characteristics	Doctors		Nurses	
<b>Work position for doctors</b>				
House officer	87	38.3%	-	-
Medical officer	74	32.6%	-	-
Registrar	57	25.1%	-	-
Consultant	9	4%	-	-
<b>Qualification for nurses</b>				
Diploma	-	-	97	48%
Bachelor's degree	-	-	89	44.1%
Other	-	-	16	7.9%

**Table (1): Represent the socio-demographic characteristics of respondents HCWs**

### **Relationship between participants and infection control department:**

Nurses had better communication (49.5%) with infection control department in area of health status compared to 33% form doctors, in area of provision of preventive services and investigation for exposure by mean of 50.5% for all compared to 33.5% for doctors and in area of investigation of exposure 56.9% compared to 22.5% for doctors.

Nurses underwent more investigations before placed in their position in area of immunization status (61.9% compared to 41.4%), history of condition (54.5% compared to 38.8% of doctors), physical examination (56.4% compared to 41.4% for doctors) and received education program in infection control by mean of 42.1% compared to 39.6% for doctors as shown in table 2.

Characteristics	Doctors		Nurses	
	Yes	No	Yes	No
<b>Communication with infection control department regarding</b>				
<b>Health status</b>	33%	67%	49.5%	50.5%
<b>Provision of preventive services</b>	33.5%	66.5%	50.5%	49.5%
<b>Investigation for exposure</b>	22.5%	77.5%	56.9%	43.1 %
<b>Investigation done before placed in this position:</b>				
<b>Immunization status</b>	41.4%	58.6%	61.9%	38.1%
<b>History of condition</b>	38.8%	61.2%	54.5%	45.5%
<b>Physical examination</b>	41.4%	58.6 %	56.4%	43.6%
<b>Periodic laboratory test</b>	-	-	43.6%	56.4%
<b>Education program in infection control</b>	36.6%	63.4%	57.45%	42.6%

**Table (2): Represent the baseline characteristics of participants**

### **Knowledge of HCWs about infection control:**

Large number of nurses (70.3%) agreed that they know the presence of written protocol for infection control in their hospitals comparing to a small number of doctors (22%).

The mean knowledge of doctors (71.4%) and nurses (67.6%) regarding hand washing materials was approximately similar as stated in table 3, but the knowledge about the minimum time of hand washing which is 1 minute was found superior in doctors (40.5%) compared to nurses 25.7%.

While nurses had more knowledge regarding the recap of needle. The knowledge of both nurses and doctors in keeping doors closed in situation of airborne disease was inadequate.

### **Overall level of knowledge of infection control protocol:**

The overall result showed that 39.6% doctors and 53.5% nurses had good level of knowledge while 59.5% doctors and 46.5% nurses had fair knowledge as shown in table 3.

Staff	Level of knowledge			
	Poor <50%	Fair (50- 79 %)	Good > 80%	Mean + SD
Doctors	0.9%	59.5%	39.6%	2.39 ± 0.5
Nurses	0 %	46.5%	53.5%	2.53 ± 0.5

**Table 3: Represent the level of knowledge of nurses and doctors about infection control**

**Association of knowledge score with different variant:**

There is only a statistical significant relationship between the score percent of knowledge and the education program of infection control of nurses (P=0.045).

**Practice of HCWs about infection control:**

In area of practice for hand washing for 1 minute only 24.3% of nurses and 37 % of doctors wash their hands for at least one minute and (16.3%) doctors, (20.8%) nurses in time **more than 1 minute**.

Practice regarding hand washing (table 4) and frequency of changing PPE (table 5) was approximately similar in both nurses and doctors. However, (39.6%) of doctors agreed with that they don't remember or care to frequently wash their hands also 16.3% of nurses stated it as shown in table 4.

Characteristics	Doctors		Nurses	
	Yes	No	Yes	No
<b>Frequency of washing hands</b>				
<b>After handling any body fluids</b>	96%	4 %	97 %	3 %
Between contact with different patients	83.3%	16.7%	91.9%	8.9%
Between task and procedure in the same patient	49.3 %	50.7 %	69.3%	30.7%
Immediately after removing gloves	81.5 %	18.5 %	91.6 %	7.6 %
Don't remember or care to frequently wash my hands	39.6%	60.4%	16.3%	83.7%

**Table 4: Represent the practice of HCWs about infection control**

Characteristics	Gloves		Masks		Protective clothing		Eye protection	
	Doctor	Nurse	Doctor	Nurse	Doctor	Nurse	Doctor	Nurse
After each patient	83 %	93.6%	12.8 %	31.2 %	30%	18.3%	7.9%	12.4%
After few patient	6.6 %	2 %	18.1%	23.3%	15.4%	13.9%	4.4 %	7.9 %
Daily	2.2 %	2 %	14.1%	7.4 %	8.7%	17.3%	4.8 %	9.9 %
More than once daily	4.4 %	1.5 %	10.1 %	8.4 %	7.5%	5.4%	3.1 %	3.5 %
If it is become soiled	1.8%	1%	7 %	7.4 %	7.4%	11.4%	4 %	4%
I don't use	1.8%	0%	37.9%	12.4%	32.6%	15.8%	75.8 %	62.4 %

**Table 5: Represent the frequency of change personnel protective equipment (PPE)**

Large number of nurses (57.9%) and doctors (70%) wash their hands with tap water as shown in table 6.

Characteristics	Doctors		Nurses	
	Yes	No	Yes	No
Washing hands using plain soap	83.7%	16.3%	61.9%	38.1%
Washing hands using alcoholic hands rub	79.7%	20.3%	65.8%	34.2%
Washing hands using water less antiseptic agent	52 %	48 %	84.6%	10.4 %
Washing hands using tap water	70 %	30 %	57.9 %	42.1 %

**Table 6: Represent the knowledge of HCWs about hand washing material**

**Attitude of HCWs towards infection control:**

HCWs had a positive attitude toward infection control. However, large number of them (74.8% from doctors 65.4% from nurses) think that the work load affects their ability to apply infection control guidelines. A few of them agreed with the lack of infection control policies in hospitals.

The attitudes towards HAIs (Healthcare Associated Infections) were encouraging since a high percentage of respondents reported positive global and specific believes, (75.8%) doctors and (54.9%) nurses disagree with the statement "I feel that infection control policies and guidelines are enough in the hospital ", 74.5% from doctors and 68.8% from nurses disagree with statement " It is not my responsibility to comply with HAIs guidelines", 74.9% from doctors and 74.7 % from nurses disagree with statement " I don't have to wash hands when I use gloves" these documents are important because they help to reduce the rate of nosocomial infection if HCWs comply with these documents. About believes, 89.8% doctors and 92.6% nurses believes that following the prevention guidelines will protect themselves, patients and visitors, 91.1% from doctors and 85.6% from nurses believes that they can be source of transmission.

**Reasons for non-compliance of HCWs with infection control standards:**

The majority of doctors and nurses revealed that their reasons for non-compliance with using PPE and washing their hands is due to non-availability and lack of hand washing material respectively as shown in table 7.



<b>CARACTARESTICS</b>				
	YES	NO	YES	NO
<b>Why wouldn't you wear personnel protective equipment?</b>				
Time consuming	23.8%	66.2%	12.9%	87.1%
Not comfortable	23.3%	76.7%	10.4%	89.6%
Not available	81.5%	18.5%	69.8%	30.2%
Not important (no risk for HAIs )	11%	89%	16.8%	83.2%
<b>Why wouldn't you wash your hands?</b>				
Lack of hand washing Materials	68.3%	31.7%	56.4%	43.6%
Causes irritation and Dryness	19.8%	80.2%	17.8%	82.2%
Low risk of acquiring Infections	10.6%	89.4%	20.8%	78.2%
No time, busy practice	25.6%	74.4%	23.8%	76.2%
I forget to do	27.8%	72.2%	18.3%	81.7%

**Table 7: Represent the reasons for non-compliance of HCWs with infection control**

### **Discussion:**

The mean of age 26.6 for doctors and 38.2 for nurses, this result is similar to the result reported in previous studies conducted in Sana'a city in Yemen that shows the majority of participant nurses were 25-year-old and above (6), also compared to a study in Nigeria with mean of 35 for nurses and mean of 34 for doctors (23). In the present study most of participants are female with (62.2%) of doctors and (75.2%) of nurse.

Relationship between participants and infection control department:

The current study revealed that (58.6%) doctors and (38.1%) nurses did not received investigations regarding immunization status before they were placed in this positions. Therefore, both patients and HCWs were exposed to hospital acquired infections, in line to study in Zambia (76.4%) of nurses did not receive appropriate vaccination regarding infection control (12). In our study, we found that a (63.4%) of doctors and (42.6%) of nurses didn't received an education program in infection control.

### **Knowledge of HCWs about infection control:**

Large number of nurses (70.3%) agreed that they know the presence of written protocol for infection control in their hospitals comparing to a small number of doctors (22%).

The mean knowledge of doctors (71.4%) and nurses (67.6%) regarding hand washing materials was approximately similar, but the knowledge about the

minimum time of hand washing which is 1 minute was found superior in doctors (40.5%) compared to nurses 25.7%.

In overall level of knowledge (53.5%) of nurses were with good knowledge comparing with (39.6%) of doctors, and (46.5%) of nurses with fair knowledge comparing with the large number of doctor (59.5%) with fair knowledge, only (0.9%) of doctors with poor knowledge and the result show no poor knowledge for nurses, which is low compared to study conducted in hospital of Kerman city showed 74.5% of nurses had good knowledge about hand hygiene. (4) A finding of similar study in Palestine show that two-third of the study group didn't have previous course in infection control and half of them with fair knowledge, the author suggested that this finding was due to inadequate training in infection control program (15), also a study conducted in Zambia revealed that (86.7%) of their participants didn't attend service training regarding infection control and (68.9%) of them had poor knowledge (12). In addition, study in Yemen showed that (71%) of nurses with fair knowledge and (3%) with poor knowledge (6), whereas in Zabol (43%) of nurses with poor knowledge and (51%) with average knowledge, Comparing with study in Pakistan (73%) of HCWs with sufficient knowledge (5) and Compared to Kanwalpreet Sodhi study stated that in their study the overall knowledge and awareness regarding different infection control practices were excellent. (16)

Association of knowledge score with different variant:

In the present study we found that there is a significant relationship between score percent of knowledge of nurses and education programs ( $P=0.045$ ) but doctors didn't have this significant relationship.

There's no significant relationship with age, work experience, qualification and experience for both doctors and nurses. Unlike a study conducted in Palestine there's no significant relationship between score percent of knowledge and education programs for nurses, in contrast there is a significant relationship between score percent of knowledge for doctors and their work position( $p=0.03$ ) and education programs ( $p=0.043$ ) but there is no relationship with gender( $p=0.094$ ) and work experience ( $p=0.053$ )(15). Similar result in Juba reported that there's no significant relationship between score of knowledge and gender (20).

### **Practice of HCWs about infection control:**

Failure to perform appropriate hand hygiene is considered to be the leading cause of health care associated infections (HCAIs), because that hand hygiene is a major component of standard precautions and one of the most effective methods to prevent the transmission of pathogens associated with health care (26). The current study shows that(96% ) doctors and (97%) nurses wash their hands after handling any body fluids, (83.3%) doctors (91.1%) nurses between contacts with different patients, (69.3%) of nurses wash between task and procedure in the same patient but less than half of doctors do that, and usually

most of them work in the surgery unit, (81.5%) doctors (91.6%) nurses immediately after removing gloves, (39.6%) doctors (16.3%) nurses don't remember to wash their hands. This malpractice may lead to transmission of HAIs.

This result is similar to the result reported in study in dental clinics in Khartoum state, Sudan, which revealed that (89.6%) of dentists wash their hands before and after each patient and (93.6%) of them after removing gloves(10), compared to a study conducted in Ethiopia which showed that (68.7%) of HCWs wash their hands before examining patients (18), and a study in Zambia, (75.4%) of nurses wash their hands before and after direct contact with patient (12), another study in Namibia (72.8%) of health science students wash their hands before and after contact with patients and (87.7%) after the removal of gloves (25). In line of a study conducted in Iran which concluded that (85.5%) of nurses wash their hands after touching body fluids (27), compared also to study in Bolan medical complex hospital (BMCH) in Pakistan stated that about >70% respondents had insufficient knowledge of hand hygiene, 97% from respondents always wear gloves when touch body fluid, 75% of participants always changes gloves between patients and 25% not always used, 70% respondents never re-use disposable gloves and 30% had opposite practice. (13)

Regarding the materials used by nurses and doctors to wash their hands in the current study we found that (79.7%) doctors, (65.8%) nurses use alcoholic hands rub and (52%) doctors, (84.6%) nurses use water less antiseptic agent and also large number use the plain soap 83.7% from doctors and 61.9% from nurses. All these materials are recommended by CDC and WHO. The CDC recommend that when hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash with either a non-antimicrobial soap and water or an antimicrobial soap and water and if it is not visibly soiled, use an alcoholic-based hands rub for routinely decontaminating hands ,WHO recommended that if exposed to a potential spore-forming pathogens is strongly suspected or proven, including outbreaks of *Clostridium difficile*, hand washing with soap and water is the preferred means(26)(28). (70 %) doctors, (57.9%) nurses use tap water to wash their hands. Definitely use of tap water alone is not enough to decontaminate hands and the quality of water is important in hand washing when performing an operation.

Comparing with the study conducted in dental clinics by Idris which had a results lower than our study that stated (19.2%) of dentist's wash their hand with ordinary soap and water, this difference may be because the dentist's apply all their work orally so there is high risk for transmission of infection if they don't wash their hands by antiseptic soap (10).

In the present study (37%) of doctors and (24.3%) of nurse wash their hands in time not less than 1 minute and (16.3%) doctors, (20.8%) nurses in time more than 1 minute. The CDC recommended that the minimum time for hand washing is not less than 20 seconds and WHO recommended that the time from 40 to 60 seconds for hand washing and from 3 to 5 minutes for surgeons(26) (28).

With regard to the finding of PPE compliance in the present study, there's significance variation between the practice and the PPE recommendations. The use of PPE generally, except gloves is below the current recommendations. There is high adherence (83% doctors ,93.6% nurses) to the use of gloves after each patient in contrast to lower adherence to wear the other equipment's ,and this is supported by the fact that the most reported reason for not wearing the mask and eye protection was "Not available ". The reason reported by study in dental unit is " no need for them " this study similar to our study in that the highest adherence was to gloves wearing (99.2%) and the lowest to eye protection(10).

#### **Attitude of HCWs towards infection control:**

The attitudes towards HAIs (Healthcare Associated Infections) were encouraging since a high percentage of respondents reported positive global and specific believes, (75.8%) doctors and (54.9%) nurses disagree with the statement "I feel that infection control policies and guidelines are enough in the hospital ", these documents are important because they help to reduce the rate of nosocomial infection if HCWs comply with these documents. Like a Study conducted in Zambia revealed that 52.8% of nurses don't think that infection control policies and guidelines are enough in the hospital (12).

About believes, 89.8% doctors and 92.6% nurses believes that following the prevention guidelines will protect themselves, patients and visitors. Similar result found in Italy show that 89.2% of HCWs think that hand hygiene measure reduces the risk of HAI among patients. 91% doctors, 85.6% nurses think that they can be source for transmission of hospital acquired infection (14).

Regarding the compliance to the guideline, 74.8% doctors and 65.4% nurses are unable to apply the infection control guidelines due to work load.

The HCWs have a positive attitude about hand washing when using gloves where 74.9% doctors and 74.7% nurses disagree with the statement "I don't have to wash hands when I use gloves ". This result is in contrast with the result reported in Zambia which showed that 96.9% of nurses think that it's not necessary to wash their hand when using gloves (12).

Only 18.1% of doctor and 28.7% of nurses believe that it not their responsibility to comply with IC protocol, and this small percent may affect in the transmission in HAI. Unlike a Study in Zambia showed that about 6.7% of nurse agree with this statement (12).

Reasons for non-compliance of HCWs with infection control standards:

In the present study (68.3%) of doctors and (56.4%) of nurses revealed that their reason for non-compliance with hand washing guidelines was lack of hand washing material” also the reason for non-compliance to wearing PPE, (81.5%) doctors and (69.8%) nurses stated that "not available”.

### **Conclusion:**

Based on the finding of our study the majority of nurses had good knowledge in compare to doctors who had fair knowledge, with positive attitude and practice of both doctors and nurses toward infection control program. However, we conclude that the patient is exposed to infection related diseases due to lack of resources, insufficient training program and work load.

### **Recommendation:**

It's recommended to update knowledge and practice of nurses and doctors through continuing in service educational programs and providing training program for new HCWs about infection control at regular intervals and it's advised to increase their communication with infection control department for optimal outcome. Investigation must be done for HCWs before employing. Also it's important provide HCWs with the needed materials to minimize risk of HAIs and health hazards.

### **ETHICAL STATEMENT:**

a) Funding: (if any): No funding

b) Conflict of Interest No conflict of interes:

c) Ethical approval: Approval from hospital mangers obtained before reaching doctors and nurses

d) Informed consent: I have read and understand the provided informations:

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