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Knowledge of Hospital Acquired Infections (HAIs) among Medical Students in a Tertiary Hospital in Jos North Local Government Area, Plateau State, Nigeria

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Abstract

Background: Hospital Acquired Infections (HAIs) remain a common cause of death, functional disability, emotional suffering and economic burden among hospitalized patients. Knowledge of HAIs is important in its prevention and control. This study seeks to assess the knowledge of Hospital Acquired Infections (HAIs) among medical students in a Tertiary Hospital in Jos North Local Government Area, Plateau State, Nigeria. **Methods:** This was a descriptive cross-sectional study done in October 2019 among clinical medical students using a Multistage sampling technique. Data was collected using a self-administered structured questionnaire and analyzed using the IBM SPSS 20 (Statistical Package for the Social Sciences). Ethical approval was granted by Bingham University Teaching Hospital, Ethics Committee, Jos, Plateau State. **Results:** A total of 219 students in the clinical arm of the College of Medicine and Health Sciences were selected. A higher proportion (97.7%) of respondents knew about Hospital Acquired Infections and 85.4% knew that Hospital Acquired infections occur in the hospital, and (86.3%) considered patients contagious with half (58.9%) considered patients as the most important source of HAIs, followed by care givers (13.2%), then doctors including medical students and interns (10.0%) and lastly nurses (8.7%). The majority of respondents (70.8%) considered Surgical Wound Infections to be the most commonly occurring HAI, followed by UTIs (69.9%), RTIs (61.2%), BSIs (37.0%) and others (0.9%). The clinical thermometer was the instrument that most commonly transmits HAIs (82.6%), then followed by stethoscope (62.1%), white coats (53.9%), and blood pressure cuff (51.1%). Most respondents knew the infectious substances, like blood (96.3%), nasal discharge

(82.6%), saliva (85.3%), and faeces (79.4%) transmitted HAIs, 72.6% of the respondents said that they were aware of the recommended hand washing techniques by WHO. **Conclusion:** The majority of students 91.3% had good knowledge while 8.7% had poor knowledge of HAIs. Lower classes had more respondents with poor knowledge. This finding was statistically significant (p = 0.002, Chi-square 12.819). Students are encouraged to keep up the level of knowledge they have about HAIs. These students can help improve the knowledge of those whose knowledge level is low. Government and NGOs should support sponsorship for capacity-building events targeted at HAIs for healthcare workers and medical students.

Keywords

Knowledge, Hospital Acquired Infections (HAIs), Nosocomial Infections, Medical Students

1. Introduction

Hospital acquired infections (HAIs) are a huge public health concern and has been found to be associated with an extended hospital stay, and resistance due to prolonged exposure to antibiotics among patients. Furthermore, hospital-acquired infections tend to complicate the course of patient care, while also increasing the burden on the already strained healthcare system. Hospital staff and medical students also serve as hosts and sources of transmission to other staff and patients. Hospital-acquired infections among hospital staff and medical students result in decreased productivity, and increased cost of care [1].

A WHO report on the burden of endemic healthcare-associated infection worldwide on the campaign of "clean care is safe care" reported that; in Europe, HAIs cause 16 million extra days of hospital stay and 37,000 attributable deaths (and contribute to an additional 110,000) [2]. Associated costs approximately 7 billion Euros annually. In the USA, around 99 thousand deaths were attributed to HAIs in 2002. Associated costs were approximately 6.5 billion in 2004. Ventilator-acquired pneumonia (VAP) attributable mortality; between 7% and 30%; VAP attributable costs: 10,000 to 25,000 US dollars per case. Catheter related-blood stream infections (CR-BSI) additional length of stay: 4 - 14 days. Additional associated costs per episode in European countries 4200 - 13,030 Euros. There is an increased length of stay associated with HCAI in developing countries: 5 - 29.5 days. This problem means that there is need to improve the, knowledge of Hospital Acquired Infections (HAIs) among medical students, hospital staff and clients.

World Health Organization (WHO) estimates these infections to occur among 7% - 12% of the hospitalized patients globally, with more than 1.4 million people suffering from infectious complications acquired in the hospital at any time. In 2007, the International Nosocomial Infection Control Consortium

(INICC) conducted a prospective surveillance in 7 Indian cities to determine the rate of HAI. An overall HAI incidence rate of 4.4% corresponding to 9.06 infections per 1000 ICU-days was reported. Lately, there are increasing reports from different parts of the world revealing varying HAI incidence rates across various healthcare setups [3].

HAIs remain a common cause of death, functional disability, emotional suffering and economic burden among the hospitalized patients. The increased length of stay for infected patients is the greatest contributor to cost [3]. Hospital acquired infections, also known as Healthcare associated infections or Nosocomial infections are acquired infections that are typically not present or incubating at the time of admission [4]. The time frame definition of infection as an HAI is at least 48 - 72 hours after hospitalization, 3 days after leaving the hospital, 30 days after surgery or 1 year after implant [5]. Examples of Nosocomial infections includes ventilator-associated pneumonia, tuberculosis, urinary tract infection, hospital-acquired pneumonia, skin infections, surgical site infection, gastroenteritis, puerperal fever and central line-associated blood stream infections [6]. The most common types are bloodstream infection (BSI), Pneumonia (e.g. Ventilator-Associated Pneumonia [VAP]), Urinary Tract Infection (UTI) and Surgical Site Infection (SSI) [6].

Hospital Acquired Infections are caused by viral, fungal and bacterial pathogens. Examples include; *Staphylococcus aureus,* Methicillin resistant *Staphylococcus aureus, Candida albicans, Pseudomonas aeruginosa, Acinetobacterbaumannii, Stenotrophomonasmaltophilia, Clostridium difficile, Escherichia coli*, *Klebsiella pneumonia, Klebsiellaoxytoca,* Influenza, Tuberculosis, Vancomycin-resistant Enterococcus,Enterococcus species *(e.g., faecalis, faecium)* Legionnaires' disease, Respiratory syncytial virus, etc. [5].

Studies [7] [8] have shown that, the most commonly encountered HAIs in the government hospitals were Urinary Tract Infections (UTI) (61.4%) followed by hospital-acquired pneumonia (55.6%) while the least were Ventilator-associated pneumonia (1.9%). In the private health facilities, hospital-acquired pneumonia was the most prevalent (66.1%) and closely followed by UTI (62.4%) while the least was Tuberculosis (1.8%). There was a significant difference in the prevalence rate of HAIs between government and private health facilities with the infection occurring more in the government hospitals, which may be due to overcrowding [7].

Hospital acquired infections (HAIs) are a common problem faced by hospitals in all countries around the world. In order to reduce HAIs in any hospital, knowledge on HAIs and compliance to preventive practices of aseptic and antiseptic precautions are very essential [8].

Standard precautions provide protection from a range of blood-borne pathogens, but their effectiveness relies upon the knowledge of Health care workers (HCWs) and the level of compliance in their use [9]. Medical students are a part of the healthcare team that play a role in the incidence and prevention of Hos-

pital Acquired Infections, therefore, adequate knowledge about Hospital Acquired Infections and Infection Prevention and Control (IPC) practices should be incorporated into the professional training of medical students [10]. This study seeks to assess the knowledge of Hospital Acquired Infections (HAIs) among medical students in a Tertiary Hospital in Jos North Local Government Area, Plateau State, Nigeria.

2. Methodology

Jos North Local Government Area (LGA) is one of the seventeen local government areas in Plateau State, and it is mainly metropolitan [11] [12] [13]. It was created in 1987 and extends over an area of over 291 km^2 with a population of 429,300 projected from the 2006 National Population and Housing census, with 266,666 (62%) being urban dwellers and 163,134 (38%) being rural dwellers [11] [12] [13].

Jos North LGA shares boundaries to the north with Toro LGA of Bauchi state, to the east with Jos East LGA, to the west with Bassa LGA and to the south with Jos South LGA. Civil service, farming and small scale businesses are the predominant occupations. Christianity and Islam are the two most commonly practiced religions in the area [11].

Jos North LGA has a number of health care facilities which include 29 primary healthcare centers, one federal and one state hospital and over 40 private and faith based institutions including Bingham University Teaching Hospital, Our Lady of Apostles Hospital and Faith Alive Foundation.

This study used a descriptive cross-sectional study done using structured self-administered questionnaires among undergraduate medical students in the clinical arm (400 - 600 level) of the College of Medicine and Health Sciences of Bingham University.

The Kish formula for calculating sample size was used to determine the sample size for this study. The P value for the sample size determination was obtained after reviewing data from similar previous studies [14]. These values were used as the prevalence, at 95% confidence interval and margin of error set at 5%.

$$\text{Kish formula } n = Z^2pq/d^2.$$

where n—Minimum sample size, Z—Standard normal deviant at 95% confident interval = 1.96; d—Level of precision = 0.05; $q = 1 - p$.

p = Proportion of the population having the characteristic of interest = 15% [14]; $n = (1.96)^2 \times 0.15 \times 0.85/(0.05)^2$; n = 0.4898/0.0025; N = 195.92; N = 196.

Approximately 10% of the minimum sample size was added to 196 to make room for non-response and rounded up, which resulted in a sample size of 216. A total of 219 students in the clinical arm of the College of Medicine and Health Sciences were selected.

A multistage sampling technique was employed in the selection of study participants. Stage one (1) Selection of institution—there are 3 tertiary institutions

in Plateau state. Simple random sampling (balloting) was used to select one Teaching hospital from three (University Teaching Hospital-JUTH, Plateau State specialist Hospital-PSSH, Bingham University Teaching Hospital-BHUTH).

Stage two (2) Selection of classes—Stratified random sampling method was used. Each class was regarded as a stratum, we determined and presented the number of students in each class and did proportional allocation to size. And selected using simple random sampling (balloting) the class list served as sampling frame. Then, 4th year—89 students selected, 5th year—85 students selected, 6th year—45 students selected, a total of 219 students were selected. Only students who were present and gave consent were selected. The questionnaire contained 17 set of questions assessing knowledge of respondents concerning HAIs. Questions were on awareness of Hospital Acquired Infections (HAIs), types of HAIs, modes of transmission of HAIs, knowledge of HAI monitoring program in health facility, methods of prevention of HAIs. Scoring was categorized as good knowledge score is >50% and a poor knowledge score if <50%.

Data collected was analyzed using Statistical Package for Social Sciences (SPSS) version 20. After entry, data was analyzed and results were illustrated with frequency tables, bivariate tables and apposite diagrams.

Ethical approval was granted by the Bingham University Teaching Hospital Health Research and Ethics Committee (NHREC/21/05/2005/00659), while permission was granted by College of Medicine and Health Sciences to seek for permission to conduct the study. Informed consent was appropriately obtained from each participant in the study, by means of the consent form attached to the questionnaire which also explained the purpose of the study to them. Each study participant was duly informed that their participation in the study was voluntary and that they could decide to withdraw from the study at any point in time. Participants were also assured of confidentiality of information given.

3. Findings

1) Awareness of Hospital Acquired Infections (HAIs)

Table 1 shows that 97.7% of respondents knew about Hospital Acquired Infections, while 2.3% had no knowledge. Majority of respondents (85.4%) know that Hospital Acquired infections occur in the hospital, while 10.5% do not.

Majority (86.3%) consider patients contagious. Furthermore, while 96.3% of respondents consider all unsterile needles and sharps to be contaminated, 2.3% do not consider these items to be contaminated. 1.4% do not know.

Table 1 shows that majority of the respondents (58.9%) considered patients as the most important source of HAIs, followed by care givers (13.2%), then doctors including medical students and interns (10.0%) and lastly nurses (8.7%).

2) Types of HAIs, modes of transmission of HAIs

The majority of respondents (71.1%) considered Surgical Wound Infections to be the most commonly occurring HAI, followed by UTIs (70.1%), RTIs (61.5%), BSIs (37.2%) and others (1.4%).

Table 1. Awareness of hospital acquired infections (HAIs).

	Frequency	Percent (%)
Ever heard of Hospital Acquired Infections (HAIs)		
Yes	214	97.7
No	5	2.3
TOTAL	**219**	**100**
Do you know if it occurs in your hospital?		
Yes	187	85.4
No	23	10.5
TOTAL	**219**	**100**
Do you consider patients contagious?		
Yes	**189**	86.3
No	**27**	12.3
TOTAL	**219**	**100**
Do you consider all unsterile needles and sharps are contaminated?		
Yes	211	96.3
No	5	2.3
TOTAL	**219**	**100**
Which is the most important source of HAIs?		
Patients	129	58.9
Doctors(including medical students)	22	10.0
Nurses	19	8.7
Care-givers/Attendants	29	13.2
TOTAL	**219**	**100**

Majority 97.2% of respondents considered coughing to be the most common means of spreading infectious organisms. This was closely followed by sneezing (89.0%), handshaking (81.2%) and spitting 61.5%. The lowest was talking (22.9%).

Majority of respondents knew that you report to the health facility on you have contracted hepatitis (73.4%), HIV (63.4%), Influenza (73.4%), and Malaria (17.9%)

3) Methods of prevention of HAIs

In Table 3, the knowledge of methods of prevention of HAIs, 78.0% considered proper hand washing to be the most effective. This was followed by regular vaccination of healthcare workers (19.3%), isolation of infected patients (17.4%), wearing caps, masks and shoe covers (17.0%). Cohorting staff had the least percentage (4.6%).

Table 2. Types of HAIs, modes of transmission, of HAIs.

	Yes	No
Which of the following HAIs are commonly seen in your hospital? *Multiple response*		
Urinary Tract Infection (UTI)	153 (70.1)	65 (29.9)
Surgical Wound Infection (SWI)	155 (71.1)	63 (28.9)
Respiratory Tract Infection (RTI)	134 (61.5)	84 (38.5)
Bloodstream Infection (BSI)	81 (37.2)	137 (62.8)
Others	3 (1.4)	215 (98.6)
Which of the following behaviours can spread infectious organisms? *Multiple responses*		
Coughing	212 (97.2))	6 (3.8)
Spitting	134 (61.5)	84 (38.5)
Talking	50 (22.9)	168 (77.1)
Sneezing	194 (89.0)	24 (11.0)
Handshaking	177 (81.2)	41 (18.8)
To prevent HAIs, you should report to your health department when you have contracted: *Multiple responses*		
Hepatitis B (HBsAg+)	160 (73.4)	58 (26.6)
HIV	139 (63.4)	78 (36.6)
Influenza	160 (73.4)	58 (26.6)
Malaria	39 (17.9)	179 (82.1)

Table 3. Knowledge of methods of prevention of HAIs.

	Yes	No
Which is the single most effective method to prevent HAIs? *Multiple responses*		
Hand washing properly	170 (78.0)	48 (22.0)
Wearing caps, masks and shoe covers	37 (17.0)	181 (83.0)
Regular vaccination of healthcare workers	42 (19.3)	176)80.7)
Isolation (Cohorting) of infected/colonized patients	38 (17.4)	180 (82.6)
Cohorting staff (assignment of staff to a cohort of patients)	10 (4.6)	208 (95.4)
Which of the followings are the recognized sources of HAIs? *Multiple responses*		
White coat	118 (54.1)	100 (5.9)
Stethoscope	136 (62.4)	82 (37.6)
Thermometer	181 (83.0)	37 (17.0)
Wristwatch (used for patients)	23 (10.6)	195 (89.4)
Blood pressure cuff (sphygmomanometer)	112 (51.4)	106 (48.6)
With regards to visitor management in hospital settings, which of the following is/are correct? *Multiple responses*		
Visitors should be allowed to stay with patients at any time except during clinical rounds	41 (18.8)	177 (81.2)
Children visitors should not be allowed to visit patients at all	77 (35.3)	141 (64.7)
Visitor screening (for potential infectious diseases) should be observed all time	148 (68.9)	69 (32.1)
Visitor screening should be observed only during community outbreaks	69 (31.7)	149 (68.3)

According to the respondents, the clinical thermometer was the instrument that most commonly transmits HAIs (83.0%). This was followed by stethoscope (62.4%), white coats (54.1%), blood pressure cuff (51.4%). The least was wrist-watch (10.6%).

Majority (86.6%) of respondents considered all patients to be contagious, 12.3% do not consider all patients to be contagious, while 1.4% do not know.

4) Knowledge of HAI monitoring program in health facility

In Table 4(a) most respondents knew the infectious substances, like blood (96.3), nasal discharge (82.6%), saliva (85.3%), faeces (79.4%) and vomitus (76.7%).

Almost (96.3%) all respondents were aware about the Nosocomial infection monitoring program in the hospital.

Less than a quarter of the participants were able to tell the environmental sources required for microbial analysis as only 26.1% stated water, 19.3% disinfectants, 24.3% stated inanimate healthcare objects, 21.1% said environmental surfaces.

A high proportion (80.0%) stated that they would place a face mask when

Table 4. (a) Knowledge of HAI monitoring program in health facility; (b) Knowledge of HAI monitoring program in health facility.

(a)

Which of the followings from patients do you assume to be infectious? *Multiple responses*	**Yes**	**No**
Blood	210 (96.3)	8 (3.7)
Nasal discharge	180 (82.6)	38 (17.4)
Saliva	186 (85.3)	32 (14.7)
Vomitus	165 (76.7)	53 (24.3)
Faeces	173 (79.4)	45 (20.6)
Aware about a Nosocomial infection monitoring program in the hospital	**Freq**	**Percent**
Yes	211	96.3
No	5	2.3
TOTAL	**219**	**100**
If yes, which personnel or environmental sources of infection should be included for microbial cultural analysis? *Multiple responses*	**Yes**	**No**
Air	-	-
Water	57 (26.1)	161 (73.9)
Disinfectants and antiseptics	42 (19.3)	176 (80.7)
Inanimate healthcare objects	53 (24.3)	165 (75.7)
Environmental surfaces	45 (21.1)	172 (78.9)

(b)

With regards to white coats *Multiple responses*	**Yes**	**No**
White coat can prevent hospital associated infections	138 (63.3)	80 (36.7)
Long-sleeve white coats are more preventative than short sleeve white coats	178 (81.7)	40 (18.3)
Disposable gown should be donned over the white coat when performing invasive bedside procedures	178 (81.7)	40 (18.3)
It is not required to take off the white coat when going to the canteen inside the hospital	14 (6.4)	204 (93.6)
Types of patients for face mask during transfer/transport out of room for investigations n = 205	**Yes (%)**	**No (%)**
Patients suffering from influenza	164 (80.0)	39 (20.0)
Coughing patients with suspected pulmonary tuberculosis	193 (94.1)	12 (5.9)
Patients receiving radiation therapy for colon cancer	29 (14.1)	175 (85.9)
All patients regardless of their illness	21 (10.2)	184 (89.8)
Awareness about the recommended hand washing techniques by WHO	**Frequency**	**Percent (%)**
Yes	159	72.6
No	53	24.2
TOTAL	**219**	**100**

transporting a patient who has influenza, 94.1% stated that they would place a face mask when transporting a patient who is coughing. 85.9% stated that they would not place a face mask when transporting a Patients receiving radiation therapy for colon cancer. 10.2% stated that they would place a face mask when transporting all patients regardless of their illness

As shown in Table 4(b), 72.6% of the respondents said that they are aware of the recommended hand washing techniques by WHO while 24.2% said they are not aware.

Two third (63.3%) stated that white coat can prevent hospital associated infections, 178 (81.7) stated that long-sleeve white coats are more preventative than short sleeve white coats, 178 (81.7) mentioned that disposable gown should be donned over the white coat when performing invasive bedside procedures, only 14 (6.4) stated that it is not required to take off the white coat when going to the canteen inside the hospital

Table 5 shows good knowledge score of 91.3% and a poor knowledge score of 8.7% among students.

Test of association between class of students and level of knowledge shows that, a higher proportion of students in 4th year had poor knowledge (16.9%) of Knowledge of HAI prevention than those in fifth year (2.4%) and 6th year (2.4%). This finding was statistically significant (p = 0.002, Chi square 12.819).

Table 5. Total knowledge score.

Knowledge	Frequency	Percent (%)
Good knowledge	200	91.3
Poor knowledge	19	8.7
Total	219	100

Table 6. Bivariate analysis comparing knowledge of HAI prevention and the different classes of students.

Class of students	Knowledge of HAI prevention			Chi square	P value
	Good knowledge n (%)	Poor knowledge n (%)	Total n (%)		
4th year	74 (83.1)	15 (16.9)	89 (100.0)	12.819	0.002
5th year	83 (97.6)	2 (2.4)	85 (100.0)		
6th year	43 (95.6)	2 (4.4)	45 (100.0)		
Total	**200 (100)**	**19 (100)**	**219 (100)**		

4. Discussion

The result from our study showed that 97.7% of the respondents had heard of Hospital Acquired Infections and also had good knowledge (91.3%) towards prevention practices of HAIs. This is consistent with the findings reported by Adjugah *et al.* at University of Port Harcourt Teaching Hospital which had a good knowledge score of 93.5% and that of Ogoina *et al.* in two tertiary hospitals in Amasoma and Jos with a score of 90% [15]. The good knowledge level observed, might be due to the fact that HAIs and its prevention has been incorporated in the medical student curriculum during the first year of clinical (400 L). This is a good finding for advocates of HAI prevention and Infection prevention and control (IPC) and it is a needed ingredient for practical application of these actions.

It was observed that 8.7% of the students had poor knowledge. The reason could be due to challenges in understanding the theories and application of prevention of HAIs. Thus, it will be important to have training sessions with the medical students to serve as a revision session. This is against the backdrop that majority of the students are aware that HAIs occur in the hospital as revealed in this study.

Surgical site infections (SSIs) (71.1%), urinary tract infections (70.1%), respiratory tract (61.2%), and bloodstream infections (37.0%) were mentioned by participants as the common HAIs based on their current knowledge. This finding differed from a study at the University College Hospital Ibadan, where it was found that urinary tract infection (43.96%) was listed as the commonest HAIs, followed by surgical site infection (30.7%) [16]. In another study among final-year medical students at Government Medical College, India, venous stream

infections, urinary tract infections, respiratory tract infections and surgical site infections were considered to be the most frequently encountered HAIs [4]. Our findings may be explained by the infrequent use of central intravenous catheters and mechanical ventilators, making surgical site infections the most common. This finding will help practitioners to focus on the areas of need in reducing the morbidity and mortality due to HAIs, especially as 96% of participants stated that they consider sharps, and needles as contaminated.

More than half, 58.9% of the respondents considered patients to be the most important source of infections and stated that body fluids like blood (95.9%), nasal discharge (82.2%), saliva (84.9%), vomitus (75.3%) and feces (79%) be considered as infectious. This is in keeping with their statement that patients are infectious as stated by 86.3% of the students. This is comparable to a study at a Saudi University among medical students which revealed that only 41.8% recognized that all patients are sources of infection and only 31.9% acknowledged that all body fluids except sweat should be viewed as sources of infection [17]. Despite this statement, participants should be aware that medical students, doctors, nurses and other healthcare workers are a major source of HAIs.

Our study also revealed that the recognized sources of HAIs according to respondents were thermometer (31.7%), stethoscope (23.9%), white coat (20.7%), and sphygmomanometer (19.6%). Meanwhile result from a study among healthcare personnel in a tertiary hospital in India showed that mattresses and pillows accounted for 39.5%, followed by white coat at 24.6%, nurse uniform at 22.2%, thermometer at 16.2% and mobile phones at 13.2% as the most commonly recognized sources of HAIs [18]. It is important to identify the probable sources of HAIs to direct our public health actions to curb its spread.

The majority of the respondents (77.6%) considered hand washing as the single most effective method to prevent HAIs. This is comparable with a similar study conducted in North-Western Nigeria in which most of the respondents (87.9%) correctly identified hand washing as the most effective method to prevent HAIs [19]. Majority (72.6%) admitted knowing the WHO recommended hand washing techniques but only 14.2% knew the steps involved. This was to findings in a report on Awareness and Practice of Infection Control by Healthcare Workers in the Intensive Care Units of a Tertiary Hospital in Nigeria in the intensive care units in Nigeria, where it was found that 52.5% of respondents had knowledge regarding the six steps of hand washing [20]. Hand washing remains a vital step in the prevention of Hospital Acquired infection and maintenance of standard precautions in the health care setting. Hand washing should be monitored by the HAI prevention team or the healthcare workers responsible for Infection Prevention and Control (IPC) [21] [22] [23].

It's worthy of note that, a higher proportion of students in 4th year had poor knowledge (16.9%) of Knowledge of HAI prevention than those in the fifth year (2.4%) and 6th year (2.4%). This finding was statistically significant. This is a plausible finding as 4th year clinical classes may still be having introductory sessions in clinical practice in the ward. They are the youngest class in clinical

medical school. Their level of knowledge is expected to grow and develop as they encounter more teaching and practical clinical experience during their training.

5. Conclusions

Most (97.7%) of respondents knew about Hospital Acquired Infections and 85.4% knew that Hospital Acquired infections occur in the hospital, and (86.3%) considered patients contagious with half (58.9%) considered patients as the most important source of HAIs. The majority of respondents (70.8%) considered Surgical Wound Infections to be the most commonly occurring HAI, followed by UTIs (69.9%), RTIs (61.2%), BSIs (37.0%) and others (0.9%).

The clinical thermometer was the instrument that most commonly transmits HAIs (82.6%), followed by stethoscope (62.1%), white coats (53.9%), blood pressure cuff (51.1%), 72.6% of the respondents said that they are aware of the recommended hand washing techniques by WHO. The majority of students 91.3% had good knowledge while there was poor knowledge of HAIs among 8.7% of students. Lower classes had more respondents with poor knowledge. This finding was statistically significant ($p = 0.002$, Chi-square 12.819).

6. Recommendation

To Government/NGOs (Or Teaching Hospitals), whichever is intended:

1) Provide training and re-training sessions on the prevention and control of HAIs to increase awareness of healthcare workers and medical students.

2) Provide sponsorship for capacity building events targeted at HAIs for healthcare workers and medical students.

For Medical students and Teachers:

1) Students should be encouraged to keep up the level of knowledge they have about HAIs. They should continue to train and get everyone to have the same level of knowledge.

2) A number of students do not know the WHO Hand washing techniques, this should be taught by the teachers and practiced by the students.

3) Medical Teachers should ensure participation of medical students in training programs organized by the institution aimed at improving knowledge regarding HAIs.

4) Promptly report incidences and observations that may affect HAI control and prevention.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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