

Knowledge, attitude and practices among the doctors on Hospital Acquired Infections of Govt. Hospitals in Dhaka, Bangladesh

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A thesis submitted to Asian University for Women in conformity with the requirements for the degree of Bachelor of Science in Public Health

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Acknowledgement:

I want to express my gratitude for the experiences I have had at Asian University for Women as a Public Health student. I would first like to thank my research/thesis advisor, Dr. Nazmul Alam, for his mentorship for this thesis and for giving me the opportunity to learn and grow with this project and his full support and guidance for data analysis and writing the full paper. I am also thankful for the support I have received from Dr. Mohammed Manir Hossain Mollah over the past one year with various statistical queries and helping me plan my analysis method for this thesis. This analysis would not be possible his constant instructions. I have also received help from my department head and Takeda chair of Public health, Dr. Omur Cinar Elci who provided substantial support to the students of Public health department and allowed me to complete my degree requirements of the thesis within time. I am also thankful to my classmates who supported me and encouraged me during this pandemic to successfully finish my thesis by cheering me through this challenging process. I would also like to thank Dhaka Medical Hospital and Bangabandhu Sheikh Mujib Medical University Hospital for giving me the opportunity and full support to conduct my study. I would like to thank Utrecht University for providing me budget for this study that helped wholeheartedly in data collection and management process. Finally, I would like to thank all my study participants who did participate in the study.

Abstract:

Background: Hospital Acquired Infection (HAI) occurs in a while receiving treatment in a hospital, nursing home, rehabilitation facility, clinical settings or other health care facility that first appear 48 hours or more after the hospital admission. Therefore, addressing this growing public health concern at the earliest is necessary to maintain a healthy nation,

Objective: This study aims to assess the knowledge attitude and practice of HAI in Dhaka, Bangladesh. This study also aims to identify and develop recommendation for prevention of HAI in Dhaka, Bangladesh.

Method:

A cross sectional study among 200 doctors of both male and female in two government hospital was conducted from January to May, 2021. Revised questionnaire was used to assess their knowledge, attitude and practice, socio-demographic information. Data analysis was done in SPSS.

Results: Majority of the participants belonged to ≤ 40 age group and were females (96.1%). The present study showed that, 80% healthcare personnel have some knowledge about Hospital Acquired Infection (HAI). According to study participants, commonly found infection hospital acquired infections was Methicillin-resistant *Staphylococcus* and patient's attendant were the most vulnerable (52%) group to HAI. Most of the study participants washed their hands after handling the patients (74.5%).

Conclusion: The result of the study showed that doctors are well aware of HAIs. It showed that they have good number of knowledge and practice ethics, positive attitude towards HAIs.

Keywords: Hospital Acquired Infection, Cross -Sectional, Hand-wash, Healthcare

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Introduction:

According to WHO, Hospital acquired infection (HAI) is also referred as Nosocomial infection is an infection happens in a patient during the process of healthcare. In addition, that first appears 48 h or more after hospital admission or within 30 days after discharge following in patient care in a hospital. The prevalence of health care-associated infection varies between 5.7% and 19.1% in low- and middle-income countries. 4 million patients are affected by HCAI every year in Europe and 1.7 million in USA (Raka and Mulliqi-Osmani, 2012).

Bacteria, viruses, fungal pathogens; can cause HAIs. Bacteria alone cause about 90 percent of these cases. Maximum people have higher chance of getting hospital acquired infection when they are going to comprise immune system. A lot of research has been conducted in patients to understand the risk factors and all but the health workers are also at risk to get infection.

The most common types are bloodstream infection (BSI), pneumonia (eg, ventilator-associated pneumonia (VAP), urinary tract infection (UTI), and surgical site infection (SSI).

This study proposes to investigate the risk factors associated with hospital acquired infection among patients and health workers in Dhaka city, Bangladesh.

Literature Review:

Many studies have been done on doctors to understand the way of these diseases, while many still ongoing to explore more unknown facts. Though most of the researches have been done in western countries, the number of studies done in south Asian region is not less either. HAI Occurs worldwide and affect both developed and in poor countries.

Studies have been conducted to know the risk factors of hospital acquired infection. And researches are still going as the risk factor for this disease occurs due to not following technical guidelines.

Patients in the (ICUs) are more likely to be infected by multi drug resistance microorganisms and most of these infections are spread by carriage of microorganisms on the healthcare workers' (HCWs) hands; so outbreaks of this infections resulting from cross-transmission are most likely to happen (Karaaslan et al.,2014). The dominant infections include Pneumonia (21.8%), surgical site infections (21.8%), gastrointestinal infections (17.1%), urinary tract infections or UTIs (12.9%), and primary bloodstream infection (9.9%,) (Magill, 2014) .

Again, Hospital acquired infection control wants self isolation of patients in a healthcare system. Otherwise, patients have the chance of transmission or infected with organism within hospitals. Therefore, the patients who demonstrate microbial resistance, difficult to treat or whose has association with high morbidity and mortality to others need to be seperated.In a journal made by John Hopkins University found that that patient ratings of provider and nursing communication were largely not affected by isolation status (Siddiqui et al., 2018). To prevent the infection, to control the spread of epidemic and endemic multidrug-resistant microorganisms patient self isolation is one of the important yet expensive measure to treat. It is essential for some patients to be isolated due to transmission-based precautions, and contact precaution are highly restrictive and often requires physical isolation too.(Landelle, Pagani

and Harbarth, 2020). 26% of the 963 patients admitted for COVID-19 to the Johns Hopkins Health System between March and May of 2020 had either a possible, probable, or confirmed HAI (*Smith* 2021). A report from 41 studies from Southeast Asia found a pooled prevalence of HAIs was 9.0% (95% CI 7.2%–10.8%) (Ling 2015).

There are several study conducted on the factors associated with infectious disease control in developing world recommended by the doctors or health care administration. A review journal conducted research on studies about “Infectious Disease Control in developing world.” This journal shows that infection control and prevention activities are focused mainly at the hospital level. The rates of HCAs within a hospital represent the best indicator for the quality of services offered, where a high frequency of HCAs is evidence of a poor quality of health service. Again, risk of patients of HCAs could be significantly reduced if governments make infection control a priority. So, Administrative initiatives are the most effective to control HAI infections. (Raka and Mulliqi-Osmani, 2012).

Another study was conducted in Bangladesh shows that detection of source of infection is an important prerequisite factor for designing a control program of nosocomial infection. Again, this study is not consistent where they found that 38.0% of the patients above 60 years and 35.0% of less than 14 years developed infection (Hussain et al.18). The present study result revealed that there was no association between age and development of HAI, but with extreme of age the difference was found statistically significant (Afroz, Fakruddin, Masud, & Islam, 2017).

A main factor of preventing Hospital acquired infection is the role of health professionals in hospitals. Study shows that the role of doctors, nurses were initiator of practices where infection control is imperative and their infection control more effective(Iedema et al., 2015). Health

professionals sometimes act as vectors of disease, creating new infections among their unsuspecting clients. To prevent it frequent hand washing, Gloves, gowns, and masks, white coat are important medium to fight against hospital acquired infection among patients and doctors (Saloojee, 2020)

Some of the statistical studies gave indication that developing countries are in the highest risk of having nosocomial infection among nurses and health workers because of their poor knowledge.

A study conducted in Dhaka, Bangladesh reported that about 33% nurses had poor knowledge and about 40% had average knowledge on nosocomial infection. In another study, approximately two thirds of participants hadn't had previous courses on infection control (Fashafsheh et al., 2015) and only 8% had previously undergone infection control training such as in-service education, short-term courses, or a training program (Taneja et al., 2009). Again, study in Palestine hospital reported about half of the respondents had fair knowledge and one quarter had poor knowledge on infection control (Fashafsheh et al., 2015). Another study in Maldives revealed that nurses had high knowledge score, but low practice score (Najeeb and Taneepanichsakul, 2008) (Rahman, Khan, Nahar, & Ahasan, 2017).

As generation now a days are most exposed to western culture and they are more into western lifestyle so they are not very alert about hospital hygiene management. Different traditions exist in European countries about hospital hygiene and European Centre for Disease Prevention and Control (ECDC) adopted the term of "infection control and hospital hygiene" which includes all the engaged European healthcare professional (Brusaferros et al., 2018). Again, Surgical hand washing has an important place in preventing the development and transfer of nosocomial infections, and also in the development of surgical site infections (Gök, 2016.)

Although food safety has dramatically improved in the last decades, outbreaks of nosocomial

Gastroenteritis continue to occur worldwide. To prevent this hospital hygiene management should be strict enough and food safety measures should be taken properly (March, 2018)

To make it zero hospital acquired infection John Hopkins Medicine Department had made a study on “How do we reach zero?” They created a program that combated CLABSI in intensive care units through a multi-pronged approach—implementing a simple checklist of evidence- based measures while changing culture and caregivers' attitudes through an approach called the Comprehensive Unit-based Safety Program (CUSP). The success was replicated on a larger scale across 103 Michigan ICUs and then later across most U.S. states, with positive results (Provost, 2020).

Research Objectives:

1. To measure the level of knowledge in elected hospitals in Dhaka, Bangladesh.
2. To assess the type of attitude about HAI among doctors in elected hospitals in Dhaka, Bangladesh.
3. To understand management practices to prevent HAI in selected hospitals in Dhaka, Bangladesh.
4. To develop recommendations for prevention of HAI in Bangladesh.

Methodology:

Study Design: The study was hospital based Cross Sectional Exploratory Study design.

Study population: The study was conducted among the men and women aged 25 to 60 years who are admitted to the selected wards.

Study site: The study was conducted in Government Hospitals in Dhaka. A number of wards in the selected hospital selected to conduct the study.

Sampling method: I used consecutive sampling method for the studies in two hospitals of Dhaka were contacted for permissions with the information form to conduct the study. The director of these two hospitals allowed the study. Then after the approval, consent forms for the guardians were provided in both of the hospitals targeting doctors. Then they were given a brief about the study and the importance of it. They were requested to volunteer as participants in the study. After getting the consent 200 participants participated in the study.

Sample size: The expected prevalence HAI among people in Bangladesh is 15.4%. To, calculate the sample size we took 5% absolute precision and 95% confidence level. By calculating this form we get a readymade table.

The required sample size is calculated by using formal.

$$N = \frac{Z^2 - \alpha/2 \cdot p(1-p)}{d^2}$$

Where,

N= required sample size

Z= the standard normal distribution usually set at 1.96 which corresponds to the 95% C.I.

P= prevalence of nosocomial infection is 9.4%

D= precision, (in proportion of one; if 5% d= 0.05)

$$\text{Now, sample size } n = (1.96)^2 * 0.154 (1 - 0.154) / (0.05)^2$$
$$= 200$$

Data collection: A questionnaire was developed into four parts for the study purpose. First part of the questionnaire contained socio demographic questions like age etc. second part of questionnaire contained information like knowledge. Third part of the questionnaire focused on their, management and practices of the infection. Fourth part of the questionnaire focused on the assessment of attitude of HAI in the hospital wards. All data was collected through face to face interviews.

Data management and analysis:

SPSS and Stata software was used for data analysis. We used descriptive analysis to understand health status, and infection risk factors. Chi-square, t-test and two tailed test were done to address the specific objectives set forward for this study.

Ethical considerations:

The study maintained maximum ethical standard with approval from Ethical Review Committee (ERB) of AUW. The study maintained privacy and confidentiality of the participants. Informed written consent was given to every participant. If the participants cannot read it by themselves was read out to them. Before taking the consent the aim of the study was explained to the participants. They were able to ask any questions regarding to the research. The participants were also able to withdraw from the research any time they wanted.

Results:

Table 1: Gender specific distribution of study participants according to socio-demographic characteristics (n=200)

A hospital based cross sectional study was carried out among 200 doctors in 7 different medical wards of DMC and BSMMU.

The survey showed majority of the study participants were from ≤ 40 years age group (81.5%), females (96.1 %), majority of study participants were male doctors from DMC (72.6 %) and female were (69.7%) (Table 1)

Characteristics	Male, n=124 (%)	Female, n=76 (%)	Total, n=200(%)
Age			
≤ 40 Yrs	101 (81.5)	73(96.1)	174 (87)
>40 Yrs	23(18.5)	3(3.9)	26(13)
Hospital			
DMC	90(72.6)	53(69.7)	143(71.5)
BSMMU	34(27.4)	23(30.3)	57(28.5)
Years of Practice			
≤ 5 Yrs	82(66.1)	53(69.7)	153(67.5)
>5 Yrs	42 (33.9)	23(30.3)	65(32.5)
Ward			
Obs gynco	10(8.1)	13(17.1)	23(11.5)
Physiology Medicine	31(25)	17(22.4)	48(24)
Medicine	34(27.4)	9(11.8)	43(21.5)
Intensive Care (General)	16(12.9)	9(11.8)	25(12.5)
Infectious Disease	16(12.9)	10(13.2)	26(13.0)
Surgery	7 (5.6)	11(14.5)	18(9)
Haematology	10(8.1)	7(9.2)	17(8.5)

The present study showed that, 80% doctors have knowledge about Hospital Acquired Infection (HAI). The doctors of both hospitals mentioned about, most common hospital acquired infections and it was Methicillin-resistant *Staphylococcus aureus* (57%) followed by *Streptococcus pneumoniae* (24%). The research also found that according to the doctors commonly seen pathogens of HAIs was *Escherichia coli* (51%) followed by *Clostridium difficile* (40.6%). Among the study participants, Patient's attendant held 52% chances of being responsible for hospital acquired infection followed by 45% responsibility of spreading HAIs to patients themselves. Water and soap was the highest percentage 74.5 in suitable hand washing method to prevent the hospital acquired infection. The minimum bed spacing was 1.5 meters (or 5 feet) which was recognized by 50.5% and among 200 participants 80% doctors had the sources of hospital acquired infection knowledge. The knowledge they shared to wear PPE is Keeping hygiene management (71.8%) followed by prevent the spread of germs (26.7%). (Table 2)

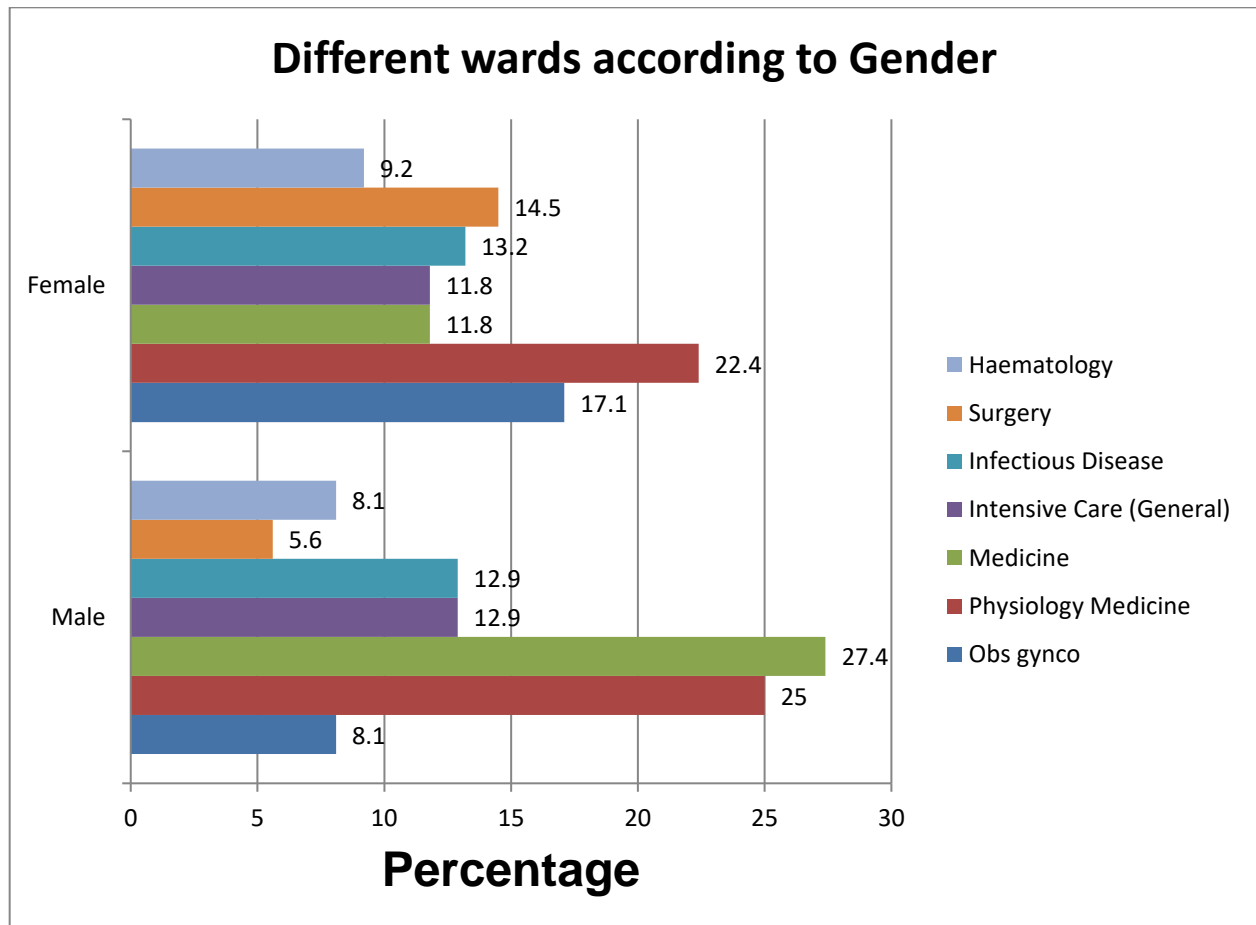


Figure 1: Different wards according to gender

Table 2: Knowledge of study participants about hospital acquired infections (n=200).

Knowledge about hospital acquired infections	Frequency	%
Knowledge about commonly found infection		
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)	114	57
Vancomycin-resistant enterococcus (VRE)	14	7
<i>Clostridium difficile</i> -associated infections	24	12
Streptococcus pneumonia	48	24

Commonly seen pathogens of hospital acquired infection		
Escherichia coli.	103	51
Clostridium difficile	82	40.6
Staphylococcus aureus	6	3
Pseudomonas aeruginosa	2	1
Stenotrophomonas maltophilia	2	1
Vulnerable for HAI		
Attendant	104	52
Patients	90	45
Nurses	4	2
Doctors	2	1
Methods of hand washing		
Water and soap	149	74.5
Alcohol and hand rub	51	25.5
Distance between beds		
1.5 meters (or 5 feet)	101	50.5
1 meter	99	49.5
Source of infection knowledge		
Yes	160	80
No	40	20
Reasons to wear PPE		
Keeping hygiene management	154	71.8
prevent the spread of germs	45	26.7

Figure2: Knowledge on commonly HAIs

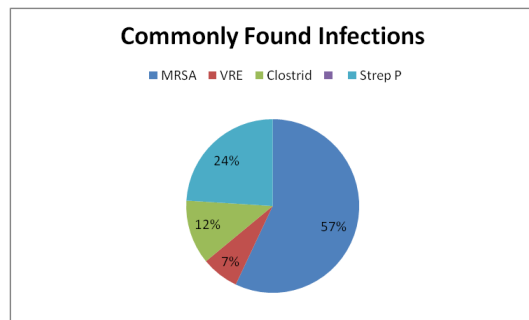
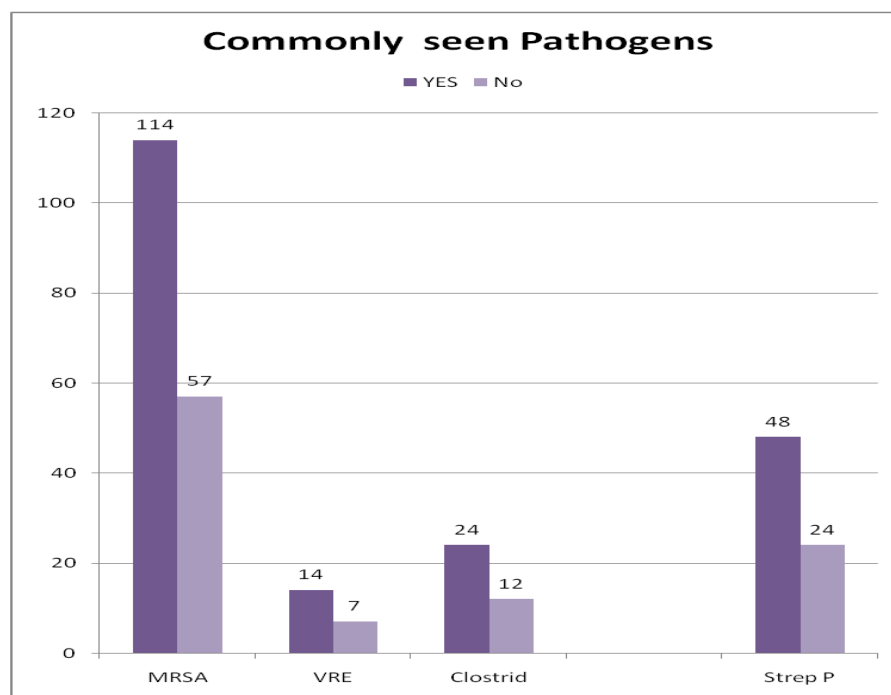


Figure3: Commonly HAI pathogens



Regarding practice of HAI among the study participants, 85% doctors of these two hospitals mentioned that while they practiced they tried to use clean and safe instruments regularly. The present study showed that 62% doctors used anti-biotic in Hospital acquired infections. Again, 52.5% doctors used PPE while visiting ICU and followed by 35% used before physical examinations. Regardless of any diseases, 68% doctors used masks to treat patients. Moreover, 95% doctors responded that they practiced washing hands before and after touching wounds and 3% used before and after examining patients. Among 200 participants, 47.5% responded that washing hands properly was the prime way to prevent the diseases followed by 19.8%

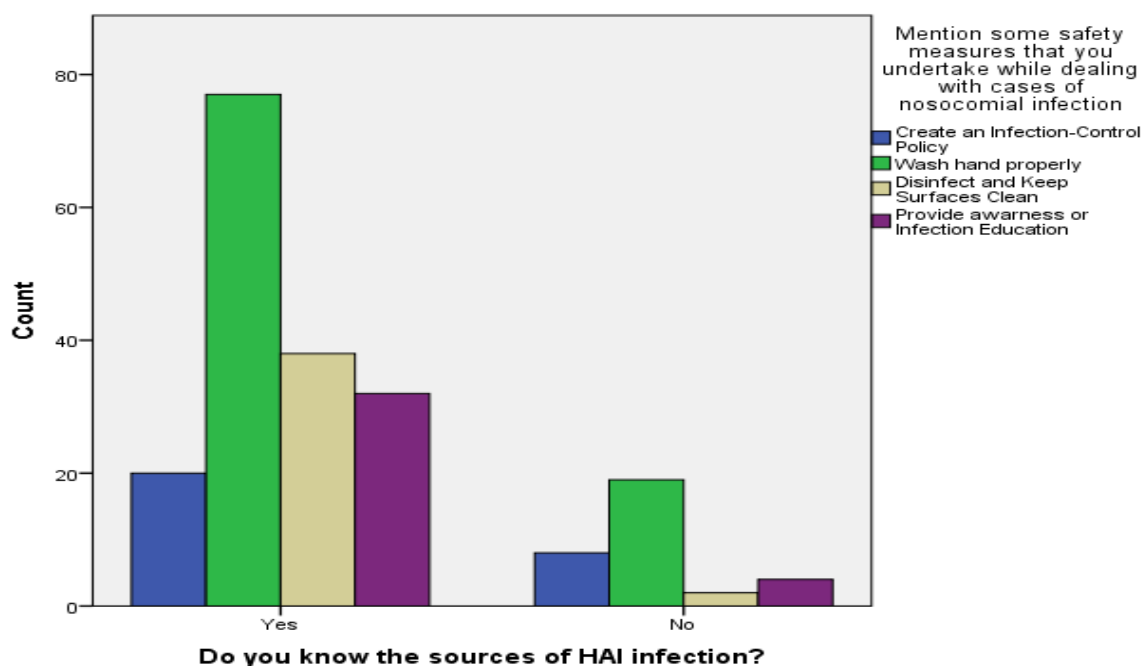
practiced disinfect and Keep Surfaces Clean as a safety measures. . Practice of cleaning of white coat or uniform regularly was seen among 51% of study participants. The present study showed, 62.5% of the study participants previously had exposure to patient's blood, vomit or other body. (Figure 3) (Table3).

Table 3: Practice of study participants about hospital acquired infections (n=200).

Practice about hospital acquired infections	Frequency	Percent
Practices of using of the clean and safe instruments		
Yes	170	85
No	30	15
Use of anti biotic in HAI		
Yes	126	62
No	76	38
PPE wear during practice		
While visiting ICU	105	52.5
Performing physical examination	70	35
Attending patients with fecal incontinence	25	12.5
Use of mask for patients regardless of any disease		
Yes	165	80.9
No	35	17.2
Washing of hands after handling every patient		
Before and after touching wounds	190	95
Before and after examining patients	6	3
Before performing invasive bedside procedures	4	2
some safety measures for HAI		
Wash hands properly	96	47.5
Disinfect and Keep Surfaces Clean	40	19.8
Provide awareness or Infection Education	36	17.8
Create an Infection-Control Policy	28	13.9

Practice of cleaning of white coat or nursing uniform after hospital duty		
Yes	178	87.3
No	22	10.8
Exposure of study participants to patients blood, vomit or other bodily fluids		
Yes	125	62.5
No	75	37.5

Figure4: Multiple bar charts on knowledge over sources of infection and safety measures



Regarding attitude about HAIs, 81% doctors did not believe that working in hospital exposed them to HAI diseases. Among the study participants, 73% believed that well developed guidelines needed to prevent such diseases. The present study showed that, 87% doctors agreed that hospital's waste management plays role in HAIs. 90% participants said that safe guidelines should be developed for patient's visitors. It also presented data that 85.6% doctors believed that proper hand washing technique should be practiced by all practitioners. Among the 200 participants, 66.5% doctors believed that raising awareness was the possible intervene to reduce HAIs. (Table 4).

Table4: Attitude of study participants about hospital acquired infections (n=200).

Attitude about hospital acquired infections	Frequency	Percent
Exposure to HAI diseases while working in the hospital		
Agree	29	14.2
Disagree	171	83.8
well developed guidelines needed to prevent HAI		
Agree	169	82.8
Disagree	31	15.2
Hospital's waste management plays role in HAI		
Agree	192	94.1
Disagree	8	3.9
Safe guidelines should be developed for patient's visitors (i.e the regulation on no of visitors, limited, visiting hours).		
Agree	157	77
disagree	15	7.4
Netural	27	13.2
Proper hand washing techniques should be used by all the health practitioners		
Agree	181	88.7
Netural	19	9.3
Raising awareness can be an intervention to reduce HAI		
Agree	187	91.7
Disagree	13	6.4

Table 5: Association of Socio-Demographic Variables with Attitude and Practice of doctors on HAI

Characteristics	Favourable attitude (%)	Unfavourable Attitude (%)	p-value
Age			0.567
<=40 Yrs	117(70.9)	48(29.1)	
>40 Yrs	17(65.4)	9(34.6)	
Sex			0.867
Male	84(70.6)	35(29.4)	
Female	50(69.4)	22(30.6)	
Years of Practice			0.413
<=5 Yrs	95(72)	20(28)	
>5 Yrs	39(66.1)	39(33.9)	
	Good Practice (%)	Poor Practice (%)	p-value
Age			0.065
<=40 Yrs	156(89.7)	18(10.3)	
>40Yrs	30(100)	0(0)	
Sex			0.349
Male	111(89.5)	13(10.5)	
Female	71(93.4)	5(6.6)	
Years of Practice			0.002
<=5 Yrs	117(87.7)	18(13.3)	
>5 Yrs	67(100)	0(0)	

Regarding the table 5 it showed that maximum doctors had favorable attitude towards Hospital acquired Infection despite of their socio-demographic conditions. It showed that male doctors had more favorable attitude (70.6) than female doctors (69.4). Again, for good practice, male doctors had good practice than female doctors.

Discussion:

HAIs are one of the most significant and complex health problems in the healthcare system linked with high morbidity and mortality. This research findings highlighted valuable information about knowledge, attitude and practices regarding HAIs among a sample of 200 doctors of two reputed government hospitals of Bangladesh- Dhaka Medical College, Bangabandhu Sheikh Mujib Medical University Hospital.

We found good knowledge among doctors on HAIs and measures to prevent it. The survey showed that , 80% doctors have good knowledge about Hospital Acquired Infection (HAI) which is similar to a research done by Ocran Irene in Ghana, where they found 88.7% Health Care Workers (HCWs) had some knowledge of HAIs and also similar to research done in Tripura where 87.4% Health workers had knowledge on HAI. Methicillin-resistant *Staphylococcus aureus*(MRSA) and Streptococcus pneumonia (Strep P) were the two most common hospital acquired infections according to study participants which contrast from a study conducted by Kaushik Nag in Tripura and there Urinary tract infection where seen the highest kind of infection (60.5%) and in Gujarat where 98.8% selected respiratory tract infection to the common infection in hospital acquired infection. Among the doctors, 74.5 % had knowledge about hand washing methods to prevent of hospital acquired infection which is slightly lower than the study made in Tripura. In terms of protective barriers, Ojulong J, in Namibia showed, 42% participants gave correct answer regarding use of gloves and in the study of Tripura 22.4% showed good knowledge on personal protective equipments which is less than this study. In this study, 71.8% respondents said that keeping hygiene management is the reason to wear PPE to prevent the HAIs. In this study, participants hold hospital workers (3%) responsible for spreading HAIs and studies said that healthcare workers hands are the main source of HAI transmission, and therefore hand washing methods are the vital point to prevent HAI among patients and healthcare workers. In the study among Nepalese health workers at Nepal found that with wearing dirty protective aprons (33%) or masks (47%) in emergency conditions and this is the main medium of getting HAIs. Moreover, a study conducted by Marranzano M et al, in Sicily where only 54% of people believe that working in hospital cause them HAIs.

Regarding practice of HAI among doctors 85% mentioned that they often do the treatment practice and in the study mentioned that 62% use antibiotics in HAI which is completely different from the study in Tripura where 61.7% of doctors use pre-sterilized instruments in the HAI treatment. In the present study, 52.5% respondents wear PPE before entering the ICU room as a precaution and a study conducted by Yassi A, where 27% of respondents felt that precautionary measures can change the scenario of HAI in any places of the world.¹³ The present study showed contrast than Kamulegeya A, in Uganada found, lack of gloves (53.2%) and masks on the ward (28.7%) were the most commonly cited reasons for not wearing them as precautionary measures. In the present study, 68% doctors use mask in their wards to deal with patients properly. Similarly, 95% doctors washed their hands before and after touching wound of patients and a study showed that, 90.2% of the study participants washed their hands after handling the patients which is almost close to this study. Again, a study done by Ogoina D et al, in Nigeria (58.5%) and in Iran found, the highest correct answer (87.5%) was about washing hands after exposed to blood, liquids, vomit etc.

Regarding attitude of the doctors on HAI, well developed guidelines needed to prevent HAI and respondents highlighted as 73% which is higher than the study in Tripura where 45% health professionals replied as precautionary measures should be taken. In the present study, 90% doctors believe that they safety measures should be taken for patients and attendants where in the study kasushik Nag et. al mentioned in their study that 73.8% respondents believe that patients are equally contagious in spreading HAI.

This study showed that the two reputed hospital's doctors have enough knowledge on hospital acquired infection based on their experiences. Though, there is lack of practice measures taken to control the hospital acquired infection. They claimed attendants as the main carrier for the infectious disease but there are studies done showed hospital management were not up to the mark. The study also showed use of different preventive methods such as hand-washing, PPE wear and masks before handling patients and respondents mentioned in a good percentage regarding their practices with those. Also, most of the participants believe (66.5%) that raising awareness can be an intervention to reduce HAI. The weakness of the study is the participants tried to favor their hospital.

Strength and Limitations:

There are few limitations in the study. At first, it didn't achieve the targeted sample size and sample sites were also adjusted. Doctors from these renowned two hospitals were reluctant to give data and they consulted the answer among each other. This might affect the answering in interviews. Also, the maximum age groups of the participants were under 30 with less duration of work experience. On the other hand, the study has some strength as well. There are only few studies done on hospital-acquired infection among health professionals in Bangladesh. In Dhaka, these studies are very rare and this study can lead to many more study. To recommend for future study like this limitations and strengths must be in knowledge to get the proper outcome.

Conclusion:

The result findings showed that doctors are well aware of HAIs. It showed that they have good number of knowledge and practice ethics, positive attitude towards HAIs.. There might be some underlying effects such as poor infrastructure, bad quality instruments and supply etc which triggered HAIs. Further studies are needed to know better in larger scale. More research is needed in this public health sector to reduce the infected rate. Therefore, policy makers of hospital management should take HAI strictly and health education and promotion can change the fear of getting affected by HAI from the patients. Frequent hand-washing practices and better clean and safe instruments and avoid crowding in hospital can allow and patient to get treatment without any diseases and this will lead to ultimate development.

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