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Original Research Article

The Level of Knowledge and Practice of Employees on Infection Control in a Tertiary Level Hospital

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Abstract: ***Introduction:*** The one of the main causes of hospital acquired infection (HAI) is the lack of knowledge and improper practice of employees in the hospital. Training programs on the infection control for each employees can reduce the rate of infection acquired from hospital. ***Aim of the study:*** The aim of this study was to assess the knowledge and practice of infection control among the employees in DMCH and ShSMCH. ***Methods:*** This descriptive type of cross-sectional study was conducted in Dhaka Medical college Hospital and Shaheed suhrawardi Medical college Hospital Dhaka for a period of one year starting from January-2019 to December-2019. Total 139 employees (Physician and Nurses) were included in this study. ***Result:*** Among 139 respondents, mean age were 31.97±7.412 (SD). 51.8% (n= 72) were female and 48.2% (n= 67) were male. In this study, 99.3% (n=138) of the respondents were aware of infection control. The current study shows that the 100% (n=139) of respondents know about nosocomial infection. 95.7% (n=114) know infection control technique prevent nosocomial infection and 82% (n=114) of the respondents know infection can occur after discharge from hospital. Maximum 63.3% (n=88) of the respondents know the most effective method to control infection were hand washing properly and the minimum 4.3% (n=6) know prudent use of antibiotics, 38,8% (n=54) know wearing caps, masks and shoe cover and 9.4% (n=13) knows regular vaccination of health care worker. Maximum of the respondents 48.2% (n=67) practice often, 33.8% (n=47) practice always, 17.3% (n=24) practice sometime and minimum .7% (n=1) of the respondent never practice infection control guideline. ***Conclusion*:** Physician and nurses in the current study have average knowledge and practice level regarding infection control.

Keywords: Knowledge, Practice, Employees on Infection Control, and Tertiary Level Hospital.

INTRODUCTION

Infection is a major problem encountered in health care delivery services worldwide. Nosocomial or hospital acquired infection (HAI) is a serious public health issue; about 1.4 million people across the world are infected at any given time. It has been estimated that almost 10% of all hospitalized patients would develop one form of infection or the other during the course of their stay in the hospital [1]. HAI result in substantial morbidity and are estimated to cause about 80,000 deaths annually in the United State. Koch *et al.*, [2] reported a higher risk of death within 30 days in patients with HAI and 1 year when compared to those without HAIs. The most important source of spread of these infections is through the contaminated hands of the health care givers: doctors, nurses and other staffs. Most hospital acquired infections are caused by transmission of pathogens from one patient to another, especially by health care workers who failed to wash their hands after evaluating a patient, or who did not properly comply with simple hospital hygiene measures. HAI vary according to the type of clinical department, with the highest infection rate usually found in the intensive care units, neonatal, burns unit, Operation Theater and medical and surgical ward.

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Therefore the propensity for developing HAIs is higher in critically ill patients admitted to intensive care unit (ICU) [3]. The presence of multiple invasive devices for treating or monitoring the care of such patients makes them vulnerable to common nosocomial infections like urinary tract infection (UTI), respiratory tract infection (RTI) etc. Fadeyi *et al*., [4] showed that 17% of patients under critical care had MRSA bacteremia, and MRSA carrier status of 52.5% among health care workers in the critical care unit with doctors and nurses accounting for 22.7% and 16.7% respectively. Adherence to the guidelines on infection control by ICU health care givers is encouraged in order to minimize the incidence of cross-infection of a patient to another with virulent organism during care [5]. The endemic burden of health care-associated infection is also significantly higher in low- and middle-income than in high-income countries, in particular in patients admitted to intensive care units and in neonates. Despite the availability of low-cost interventions for infection prevention and control, the compliance with standard infection control practices remains very low, particularly in low-income and middle income countries. According to the fact sheet of World Health Organization (WHO) there are several factors which can cause health care-associated infections. Among this Prolonged and inappropriate use of devices and antibiotics, high-risk and sophisticated procedures, immune suppression and other severe underlying patient conditions and insufficient application of standard precautions are some of factors which present regardless of the resources available. To improve the control and prevention of infections in countries with limited resources, a multi-facet approach is needed that is based on improved healthcare structures, increased knowledge, effective guidelines, behavioral changes, attitude, adjustment, better and efficient use of existing resources, as well as international cooperation. Even though, some studies have focused on knowledge of and compliance with standard precautions, hand washing, knowledge and practice of infection control among hospital staff regardless of focusing in attitude. The information has been generated on health care workers in Dhaka Medical College Hospital and Shaheed Sohrawardi Medical College Hospital. Therefore, this study aimed to assess the knowledge and practice of infection control among the employees in DMCH and ShSMCH.

METHODOLOGY & MATERIALS

This descriptive type of cross-sectional study was conducted in Dhaka Medical college Hospital and Shaheed suhrawardi Medical college Hospital Dhaka for a period of one year starting from January-2019 to December-2019. Total 139 employees (Physician and Nurses) were included in this study. A questionnaire consisting of a section on knowledge and another on practice was used for data collection. At the beginning of data collection, written permission was taken from the Director of the Hospital. Informed written consent was taken from the respondents. All the data entered and analyzed by using statistical packages for social science (SPSS) software version-21. It was analyzed as from of descriptive statistics includes frequency, percentage, mean, median, mode, standard deviation, statistical significance test (chi square).

RESULT

Table I shows that majority of the respondents 53.2%, (n=74) age were in between 21-30 years and 35.3% (n = 49) of the respondents age were 31-40 years, 8.6% (n= 12) of the respondents age were 41-50 years and 2.9% (n= 4) of the respondents age were on 51-60 years. Mean age was 31.97±7.412 (SD). Among the respondents 89.2% (n=124) were Muslim, Hindus 8.6% (n=12) and Christian 2.2% (n=3). Among the respondents 45.7% (n=63) were medical graduate, 41.0% (n=57) were Diploma-in-Nursing /B.sc-in Nursing and 13.7% (n=19) were post-graduate degree respectively. The majority of the respondents 69.8% (n=97) were married and 30.2% (n=42) were unmarried. Among the respondents 51.1% (n=71) were nurses and 48.9% (n=68) were medical graduate. The majority of the respondents were between 0-12 months working experience 37.4% (n=52), from the respondent working experience between 1-15 years were 29.5% (n=41), 5-10 years 19.4% (n=27), 10-15 years 5.8% (n=8) and above 15 years 7.9% (n=8). Majority of the respondents 36.7% (n=51) having monthly income ‘between, 30,000 -50,000 thousand, 29.5% (n= 41) with a monthly income between 10,000 -20,000 thousand, 25.2% (n=35) between 20,000 -30,000 thousand and more than 50.000 thousand 8.6% (n=12) respondents respectively. Figure 1.1 shows that out of 139 respondents 51.8% (n= 72) were female and 48.2% (n= 67) were male. Table-II shows that 99.3% (n=138) of the respondents were aware of infection control and 0.7% (n=1) respondent do not aware of infection control in hospital respectively. Significantly 97.1% (n=135) follows the infection control guideline of the employee and 2.9% (n=4) don’t follows. 90.6% (n=126) of respondents know the hospital authority arrange Infection control training regularly and 9.4% (n=13) don’t know. The 100% (n=100) of respondents know isolating a communicable disease patient can prevent infection. Majority of the respondents 99.3% (n=138) know infection control technique save himself and patient and 0.7% (n=1) don’t know. Table shows that the 100% (n=139) of respondents know about nosocomial infection. 95.7% (n=114) infection control technique prevent nosocomial infection and 82% (n=114) of the respondents know infection can occur after discharge from hospital. Majority of the respondents 80.6% (n=112) sufferer and 19.4% (n=27) does not suffer from used needle prick injury respectively. Maximum 63.3% (n=88) of the respondents know the most effective method to control infection were hand washing properly and the minimum 4.3% (n=6) know prudent use of antibiotics, 38,8% (n=54) know wearing caps, masks and shoe cover and 9.4% (n=13) knows regular vaccination of health care

worker. Table-III shows that maximum of the respondents 48.2% (n=67) practice often, 33.8% (n=47) practice always, 17.3% (n=24) practice sometime and minimum .7% (n=1) of the respondent never practice infection control guideline. 85(61.2%) of the respondents always wash hand before and after, 28(20.1%) of the respondents mostly practice, 24(17.3%) practice sometime and few respondents never practice wash hands before wearing and after removing gloves respectively. Maximum 83(59.7%) of respondents practice wash hands with running water and soap and 41(29.5%) practice with hexisol / sprit, 26(18.7%) practice with water and disinfectant and 11(7.9%) practices with running water. 61 (43.9%) of the respondent practice wash hands before and after examination patients and 60 (43.2%) practice before and after touching wounds, 53 (38.1%) practice procedure between two different patient and19 (13.7%) practices before performing invasive bedside procedure. Majority 57.6% (n=80) of the respondents practices wear personal protective equipment during nasogastric suctioning and minimum 7.2% (n=10) of the respondents practice during transporting coughing patient, 30.2% (n=42) following during drawing blood and 26.6% (n=37) of the respondents practice wear personal protective equipment during performing physical examination respectively. Maximum of the respondents 87.8% (n=122) practices surgical instrument were sterilized the central sterilized area and minimum 5.0 (n=7) practices were others area, 9.4% (n=13) of the respondents practices in the surgical area sterilized been done. Majority 58.3% (n=81) of the respondents practices isolate the patient an isolation room, 25.9% (n=36) using mosquito net and 13.7% (n=19) of the respondents by using curtain respectively. Maximum 52.5% (n=73) of the respondents practices cleaned operation theater by using fumigation procedure, 29.5% (n=41) with disinfectant, 23.0% (n=32) using formalin, minimum 1.4% (n=2) cleaned operation theater by using ultraviolet-ray. Table-IV shows the relations between knowledge on infection control of employees with socio-demographic variables. No significant statistical differences were found between knowledge of infection control with age, sex, religion, educational level, marital status, profession, working experiences and monthly income. Table-V shows that the relation between practices on infection control of employees with socio-demographic variables. Statistical significant association was found with sex (p=0.002), educational level (p= 0.044), profession (p=0.029) and monthly income (p=0.043). No significances were found with age, religion, marital status and working experiences.

Table-I: Demographic characteristics of the study people (n=139)

Characteristics		Frequency (f)	Percentage (%)
Group (years)Age	21-30	74	53.2
	31-40	49	35.3
	41-50	12	8.6
	51-60	4	2.9
	Mean ± SD	31.97±7.412	
Religion	Islam	124	89.2
	Hindus	12	8.6
	Chistian	3	2.2
Level of education	Diploma-in-Nursing /B.sc-in Nursing	57	41.0
	M.B.B.S/B.D.S	63	45.3
	Post graduate Degree	19	13.7
Marital status	Married	97	69.8
	Unmarried	42	30.2
Profession	Physician	68	48.9
	Nurse	71	51.1
Working experience	0-12 Months	52	37.4
	1-5 Years	41	29.5
	5-10 Years	27	19.4
	10-15 Years	8	5.8
	< 15 Years	11	7.9
Monthly income	10,000-20,000/-	41	29.5
	20,000-30,000/-	35	25.2
	30,000-50,000/-	51	36.7
	< 50,000/-	12	8.6

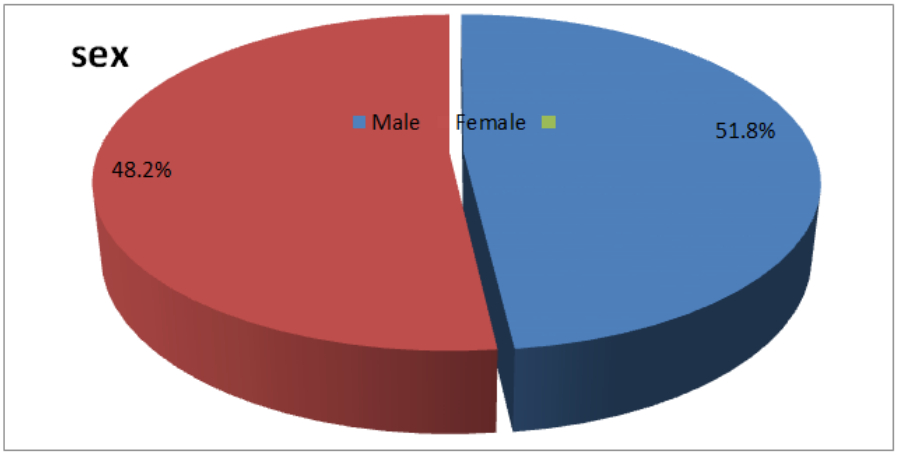

Figure 1.1: Distribution of the respondents by Sex (n=139)

Table-II: Knowledge of Employees on Infection Control (n=139)

Knowledge of Employees on Infection Control		Frequency (*f*)	Percent (%)
Aware of infection control	No	1	0.7
	Yes	138	99.3
Follow infection control guideline	No	4	2.9
	Yes	135	97.1
Regular arrange training on infection control	No	13	9.4
	Yes	126	90.6
Infection control technique	No	1	0.7
	Yes	138	99.3
Knowledge on nosocomial infection	Know about nosocomial infection	139	100
	Nosocomial infection occur after discharge from hospital	114	82
	Infection control technique prevent nosocomial infection	133	95.7
The most effective method of control infection	Hand washing properly	88	63.3
	Wearing caps, masks and shoe cover	54	38.8
	Regular vaccination of health care workers	13	9.4
	Prudent use of antibiotics	6	4.3

Table-III: Practice of Employees on Infection Control

Practice of Employees on Infection Control		Frequency (*f*)	Percent (%)
Practice infection control guideline	Never	1	0.7
	Sometime	24	17.3
	Often	67	48.2
	Always	47	33.8
Wash hands before wearing and after removing gloves	Never	2	1.4
	Sometime	24	17.3
	Often	28	20.1
	Always	85	61.2
How do you usually wash your hands while on duty	Wash with running water	11	7.9
	Wash with running water and soap	83	59.7
	Wash with running water and disinfectant	26	18.7
	Wash with hexisol / sprit	41	29.5
when do you wash your hands	Before performing invasive bedside procedure	19	13.7
	Before and after examination patients	61	43.9
	Before and after touching wounds	60	43.2
	Between two different procedures on different patients	53	38.1
when wear personal protective equipment (mask and gloves)	Transporting coughing patients in / out of ward	10	7.2
	Drawing blood from a patient	42	30.2
	Nasogastric suctioning	80	57.6
	Performing physical examination	37	26.6

Practice of Employees on Infection Control		**Frequency (*f*)**	**Percent (%)**
where surgical instrument sterilization been done	The surgical area	13	9.4
	The central sterilization area	122	87.8
	Others area	7	5
0How do you isolate the patient	An isolation room	81	58.3
	By using mosquito net	36	25.9
	By using curtain	19	13.7
How cleaned operation theater	Clean with disinfectant	41	29.5
	Formalin	32	23
	Fumigation	73	52.5
	Ultraviolet-ray	2	1.4

Table IV: Relation of knowledge on infection control with socio-demographic variables (n=139)

		Total knowledge score			χ^2
		Poor knowledge %	**Average knowledge %**	**Good knowledge %**	
Age	21-30	2.2	46.8	4.3	χ^2 =8.453 D f = 6 P =0.207
	31-40	0.0	35.3	0.0	
	41-50	0.0	8.6	0.0	
	51-60	0.0	2.9	4.3	
Sex	Male	0.7(1)	44.6(62)	2.9(4}	χ^2=1.098 D f = 2 P = 0.577
	Female	1.4(2)	48.9(68)	1.4(2)	
Religion	Islam	2.2(3)	83.5(116)	3.6(5)	χ^2=0.982 D f = 4 P = 0.913
	Hindus	0.0	8.5(11)	0.7(1)	
	Christian	0.0	2.3(3)	0.0	
Educational level	Diploma / B.sc in nursing	0.7(1)	38.1(53)	2.2(3)	χ^2 = 1.823 D f = 4 P =0.768
	MBBS/BDS	1.4(2)	41.7(58)	2.2(3)	
	Post-graduate	0.0	13.7(19)	0.0	
Marital status	Unmarried	1.4(2)	26.6(37)	2.2(3)	χ^2= 3.194 D f = 2 P =0.203
	Married	0.7(1)	66.9(93)	2.2(3)	
Profession	Physician	1.4(2)	45.3(63)	2.2(3)	χ^2= 0.392 D f = 2 P =0.822
	Nurse	0.7(1)	48.2(67)	2.2(3)	
Working experience	0-12 months	1.4(2)	33.1(46)	2.9(4)	χ^2= 5.434 D f = 8 P =0.710
	1-5 years	0.7(1)	27.3(38)	1.4(4)	
	5-10 years	0.0	19.4(27)	0.0	
	10-15 years	0.0	5.8(8)	0.0	
	>15 years	0.0	7.9(11)	0.0	
Monthly income	10,000-20,000	1.4(2)	26.6(37)	1.4(2)	χ^2 = 5.253 D f = 6 P =0.512
	20,000-30,000	0.0	23.0(32)	2.2(3)	
	30,000-50,000	0.7(1)	35.3(49)	0.7(1)	
	>50,000	0.0	8.6(12)	0.0	

Table V: Relation of practices on infection control with socio-demographic variables (n=139)

		Total practice score			χ^2
		Poor practice %	**Average practice %**	**Good practice %**	
Age	21-30	10.1(14)	39.6(55)	3.6(5)	χ^2=8.463 D f = 6 P =0.206
	31-40	6.5(9)	23.7(33)	5.0(7)	
	41-50	1.4(2)	5.8(8)	1.4(2)	
	51-60	0.0	1.4(2)	1.4(2)	
Sex	Male	12.2(17)	27.3(38)	8.6(12)	χ^2=12.014 D f = 2 P = 0.002
	Female	5.8(8)	43.2(60)	2.9(4)	

		Total practice score			χ^2
		Poor practice %	**Average practice %**	**Good practice %**	
Religion	Islam	17.3(24)	62.6(87)	9.4(13)	χ^2 =2.965 D f = 4 P = 0.564
	Hindus	0.7(1)	6.5(9)	1.4(2)	
	Christian	0.0	1.4(2)	0.7(1)	
Educational level	Diploma / B.sc in nursing	9.4(13)	28.1(39)	3.6(5)	χ^2 = 9.796 D f = 4 P =0.044
	MBBS/BDS	4.3(6)	33.1(46)	7.9(11)	
	Post-graduate	4.3(6)	9.4(13)	0.0	
Marital status	Unmarried	4.3(6)	23.0(32)	2.9(4)	χ^2= 0.941 D f = 2 P =0.625
	Married	13.7(19)	47.5(66)	8.6(12)	
Profession	Physician	5.0(7)	36.0(50)	7.9(11)	χ^2 = 7.069 D f = 2 P =0.029
	Nurse	12.9(18)	34.5(48)	36.0(5)	
Working experience	0-12 months	6.5(9)	28.1(39)	2.9(4)	χ^2= 8.610 D f = 8 P =0.376
	1-5 years	7.9(11)	18.0(25)	3.6(5)	
	5-10 years	2.2(3)	15.1(21)	2.2(3)	
	10-15 years	0.0	5.0(7)	0.7(1)	
	>15 years	1.4(2)	4.3(6)	2.2(3)	
Monthly income	10,000-20,000	5.0(7)	23.0(32)	1.4(2)	χ^2= 12.997 D f = 6 P =0.043
	20,000-30,000	8.6(12)	13.7(18)	2.9(4)	
	30,000-50,000	3.6(5)	26.6(37)	6.5(9)	
	>50,000	0.7(1)	7.2(10)	11.5(16)	

DISCUSSION

This descriptive type of cross sectional study was conducted from January 2019- December 2019 on a total of 139 respondents to find out infection control practice in a selected tertiary level hospital in Dhaka city. The study was conducted in Emergency department, Medical, surgical, pediatric, orthopedic and urology wards in Dhaka medical college hospital and Shaheed suhrawardi medical college hospital. Semi-structure questionnaire was used to assess the knowledge and practice of employees on infection control. This study found the highest number 53.2% respondents belonged to age group of 21-30 years and they were junior most groups.51-60 years and older, most senior group only 2.9%. The respondents mean age was 31.97±7.412 years. This finding is in concordance with that of Jemal *et al*., [6] Similar study in Thailand and Tobago found that majority of the respondents 39.3% were between the ages of 21-25years, 13.7% were 36-40 years old and 16% of the health care workers were more than 40 years old [7]. In this study, majority 51.8% were found female. According to official statistics of Bangladesh, female students make up 60% of the enrolled medical students [8]. Again 90% seats were reserved for female students in nursing profession in Bangladesh. For that, the proportion of female service provider was found highest in my study. The present study found, majority of the respondents 89.2% were Muslim. The prime religion in Bangladesh is Islam (90%) but a significant percentage of the population adheres to Hindus (9%) (Bangladesh country profile-2017). This study found out of 139 respondents majorities 51.1% were nurses and 48.9% were physician. In another cross-sectional study of seven hospitals in the Dhaka division of Bangladesh were found 30% doctors, Nurses and 60% technologies [9]. In this study showed that maximum number of respondents 37.4% were working experience within 12 months. 29.5% of the respondents had working experience between 1-5 years. 19.4% experience was 5-10 years. 10-15 years of working experience had 5.8% of the respondents. Working experience more than 15 years were 7.9% of the respondents. In another study was done in Gazipur, Bangladesh by Bhattacharjee *et al*., [10], knowledge of biochemical waste management was found that majority of respondents 45% had 5-10 years' experience whereas 27.4% respondents had less than 5 years of service experience. Emphasizing the need to protect this group of worker's in the prime of their life hospital infection. The result of this study showed that all of respondents aware of infection control but hadn't had previous course of infection control. Education is a critical issue in the training of all health care workers (HCW's), particularly in countries where theirs is a lack of formal and well organized infection control programs. Despite limited resources developing countries still have to deal with complex issues related to occupational exposure to blood borne pathogens and enforcement of standard precautions in this context occupational risk is increased because of the inadequate supply of personal protective equipment (PPE), improper disposal of medical waste and lack of effective needle disposal systems. More than half of the respondents were to have average knowledge of employees on infection control. Knowledge was found to be higher than what was reported in Palestinian

hospitals [11]. However the study revealed approximately 2.2% of the respondents were poor knowledge. This was found lower than what was reported in wolaitta sodo otania teaching and referral hospital, Ethiopia [12]. Concerning assessment of employees practice regarding infection control and age, years of experience and profession of the studied group. According to this study 95.7% of the respondents knew technique of infection control can prevent nosocomial infection ,80.6% of the respondents suffer from used needle prick injury due to lack of less training.100% of the study population knew isolating communicable disease can prevent infection respectively. This study showed that 97.1% of study participants follow infection control guideline to protect infection. Positive attitude about infection control is pillar to prevent cross infections. More than half of the respondents 75.5%have average practice about control infection because this study included only physicians and professional nurses of 139 employees. 61.2% respondents always wash hands before and after wearing gloves during patients care. This was less much lower than the previous studies done In Mizan-Aman general hospital and North Wollo that showed 68.7% and 74.1% of health care workers wash their hands before examine patients respectively. 100% of the respondents always sterilize Operation Theater. 63.3% of the respondents have knowledge about the five moments of hand washing and 47.5% always practice five moments of hand hygiene. Hand hygiene is the initial steps towards successful infection control in any health care set up. we also found that newly appoint nurses and interns physician had moderate knowledge about hand hygiene and this is similar to the reported outcome of similar work conducted by (Colossi *et al*.,) The poor compliance of resident with hand hygiene in my study compared with other health care workers, is comparable with findings from similar studies done in Iran, Kuwait and India. This poor compliance, in addition to inadequate knowledge, may also be due to lack of proper facilities such as uninterrupted running tap, soap, gowns and masks, among others necessary for control of transmission of infections in the tertiary level hospital [13]. In this study 46.8% respondents sometime use head caps and shoe cover and only 20.9% use head caps and shoe cover. 51.8% of the respondents wear gown for personal protection during working hour sometimes. Another study in Nigeria, found that less than two thirds of respondents 63.8% always used personal protective equipment's [14]. Statistically no significant relationship was found between gender (male-21.6% and Female-30.9%) and use of gown, where p=0.078. Between designation of the respondents and use of head caps and shoe cover (physician 25.9% and nurses 27.3%), p=0.945. This finding was not similar with study conducted in Bangladesh by Uddin *et al.,* (2014) [15] concerning the relationship between knowledge, practice and physician, nursing qualification. The present study revealed that no significant statistical difference in knowledge scores p=.768 and significant statistical difference in practice scores p=0.44.

Limitations of the study

In our study, there was small sample size and absence of control for comparison. Study population was selected from two center in Dhaka city, so may not represent wider population. The study was conducted at a short period of time.

CONCLUSION & RECOMMENDATIONS

The present cross-sectional study was conducted among one 139 employees (Physicians and nurses) regarding knowledge and practice of infection control in a tertiary level hospital. This study revealed that the hospital maintain different aspect of infection control activities through they have some disparities. They are made separate row in the ward to keep patients infected and fresh case. Among the clinical service provider maintained sterility during procedure (major and minor operation, dressing, suctioning). Maximum respondents knew about nosocomial infection. Cleanliness status of the hospital was satisfactory, well ventilation, bed to bed distance well maintained. Infection control and prevention in Bangladesh (ICPPB) is one of them WHO have imitated conducting seminars and discussion at hospitals. DGHS also arranged training for employees in a government hospital for control infection. Based on the findings of this study, it can be concluded that physician and nurses in the current study have average knowledge and practice level regarding infection control. It is recommended to updating knowledge and practice of physician and nurses through continuing with educational programs and providing training program for newly appointed employees about infection control at regular intervals. The administrators should promote feedback of practice, individual's reinforcement and appropriate rewards for the good practice to control infections.

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