

Article

Infection control practices in a district hospital

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Abstract: Infection control practice is one of the major task performed by health care worker to reduce health care-associated infections (HACIs) in hospital. Health care-associated infections (HACIs) are common causes of illness and mortality among hospitalized patients including healthcare workers. The study aimed to identify the infection control practices in a district hospital. A cross sectional study was conducted from January to December, 2019 in a district hospital, Jashore, Bangladesh. Two hundred and twelve (212) Healthcare workers were selected purposively from this hospital and interviewed with a pre-tested semi-structured questionnaire. An observational check list was also used to observe the practices of that hospital. Among the healthcare workers 21 (9.9%) were doctor, 143 (67.5%) were nurse, 8 (3.8%) were technologist, 7 (3.3%) were aya, 13 (6.1%), were ward boy and 20 (9.4%) were cleaner. Collected data were checked, coded and transferred in to SPSS version 25 for analysis. Frequency, Percentage, Mean, SD, chi-square and other statistics were calculated. P-value less than 0.05 were set as statistically significant. The practices scores were categorized into good ($\geq 80\%$), fair (59-79%), and poor ($\leq 59\%$). The study found that overall of the respondents had fair practices regarding infection control. Among the doctors, nurse 7.3% had good practice, 51.8% had fair practice and 40.9% had poor practice. Among the supporting staffs 54.20% had Fair practice and 45.80% had Poor practice regarding infection control practices. Association between use of PPE with gender (p-.000) and with designation (p-.000) was evaluated and found highly significant relationship. Study findings suggest that in the existing infection control practices are often neglected and failed to protect healthcare workers and patients from hospital acquired infection.

Keywords: infection; infection control; practice regarding infection control; level of practice; waste segregation; waste management

1. Introduction

Infection control practices can be grouped in two categories, standard precautions and additional (transmission-based) precautions. Transmission of infections in health care facilities can be prevented and controlled through the application of basic infection control precautions which can be grouped into standard precautions, which must be applied to all patients at all times, regardless of diagnosis or infectious status, and additional (transmission-based) precautions which are specific to modes of transmission (airborne, droplet and contact). Standard precautions treating all patients in the health care facility with the same basic level of “standard” precautions involves work practices that are essential to provide a high level of protection to patients, health care workers and visitors (WHO, 2004).

British Medical Council established Hospital Infection Control Program in 1941 and a part time post of “Control of Infection Officer” was created, which was renamed as “Infection Control Doctor” in 1988. The first full time “Infection Control Nurse” was appointed in 1959 (Selwy, 1991). National Nosocomial Infections Surveillance (NNIS) system of the Centre for Disease Control and Preventions (CDC) was developed in early 1970s to

monitor the incidence of Hospital Acquired Infection, the risk factors and causative organisms (Emori *et al.*, 1991).

According to World Health Organization (WHO), of every 100 hospitalized patients, 10 in developing countries and 7 in developed countries will acquire at least one HAI (WHO, 2016). In US and Europe the point prevalence of patients with at least one HAI in acute care hospitals has reached 6%, prevalence (19.5%) was highest among patients admitted to intensive care units (ICU) (Suetens *et al.*, 2013). By contrast in developing countries, the problem is three times higher when compared to the incidence observed in adult intensive care units in the US (Allegranzi *et al.*, 2011).

In Bangladesh there are a few studies of infection control in hospital settings. One of the few, a study by (Faruquzzaman, 2011) of the surgical ward at Dhaka Medical College, revealed that 30% of the study patients had suffered a nosocomial infection. Among them, 38.7% were wound infections, 26.6% were urinary tract infections, 19.2% were acute respiratory tract infections, and 12.5% were acute gastrointestinal infections. Another significant finding of this study was that there was a strong positive association between the frequency of nosocomial infections and the number of visitors per patient per day. Shamsuzzaman (2015) suggested that hand hygiene as a strategic action for infection control in hospitals must be part of the organizational culture of hospitals.

Medical records of 8,769 in patients of a private hospital in Dhaka, Bangladesh, in 2014 indicated a nosocomial infection rate of 2.29%, with respiratory tract infection accounting for the highest proportion of infections (63%) and skin & soft tissue infections the lowest (2% of infections) (Begum *et al.*, 2017).

Hasan (2010) describes in an editorial that, within the health system of Bangladesh, infection control is not a well-recognized discipline. Some private hospitals in Dhaka have initiated basic infection control measures, but the overwhelming majority of both government and private hospitals are not even aware of the existence of such measures.

Infection prevention plays a key role in preventing and reducing the rate of healthcare associated infection (HAIs). HAIs, are the most frequent adverse event in healthcare worldwide can occur as a part of an endemic or epidemic situation and affect the quality of care of hundreds of millions of patients every year in both developed and developing countries (Allegranzi *et al.* 2011; Allegranzi *et al.*, 2007). According to the Centers for Disease Control and Prevention (CDC), HAIs defined as infections localized or systemic condition resulting from adverse reaction to the presence of infectious agent or its toxins acquired from health care settings that was not incubating or symptomatic at the time of admission to the healthcare facility [Horan *et al.*, 2008]. These infections are a major public health concern and a threat to patient safety, contributing to increased morbidity, mortality, and cost (Allegranzi *et al.*, 2007). Based on the available evidence, the overall impact of HAIs implies prolonged hospital stay, long-term disability, increased resistance of microorganisms to antimicrobials, high costs for patients and their family, and unnecessary deaths (Kennedy *et al.*, 2013; Green *et al.*, 2015). In addition, it places a significant massive additional economic burden on the health care system (Plowman *et al.*, 2001).

Therefore, it was important to explore and identify the Infection Control Practices in a District Hospital at 250 bed General Hospital, Jashore in Bangladesh.

2. Materials and Methods

2.1. Ethical consideration

A permission letter was taken from superintendent of District Hospital, Jashore. The researcher communicated with the deputy-superintendent to select the eligible subjects to participate and informed the subjects about the objectives and the procedure of this study. Participation was voluntary and anonymity was guaranteed. Based on returning and completing the questionnaire by 212 doctor's nurses' and supporting staffs was considered as eligible subjects who signed written informed consent form and completed questionnaire in this study. Subjects could be withdrawn at any time without any reason.

2.2. Research design

A cross-sectional study was carried out for this investigation.

2.3. Study setting

The study was conducted in 250 Bedded General Hospital, Jashore and it's a Governmental District Hospital.

2.4. Study period

Total study period was 1 (one) year from 1st January to 31st December 2019.

2.5. Study sample

Healthcare workers of the selected hospital was the study population including Doctors, Nurses and supporting staffs who give direct care to the patient.

2.6. Sampling technique

Purposive sampling technique was used.

2.7. Inclusion criteria

Working as a full time doctors, nurses' and supporting staffs in (250 bedded General Hospital, Jashore) and having roles and responsibilities connected with direct patient care.

2.8. Tool of the study

Semi-structured interviewer administration questionnaire and an observational check list was developed by using selected variables according to objectives. The questionnaire was divided into 5 sections including 1) Doctors and Nurses' Demographic Questionnaire, 2) Doctors and Nurses' Practices Regarding Infection Control Practices Questionnaire, 3) supporting staffs Demographic Questionnaire, 4. Supporting staffs Practices Regarding Infection Control Practices Questionnaire, 5) Observational check list. The subjects were asked to choose correct answer. 1(One) point was given to a correct answer while 0 was given to an incorrect answer. Question 7 to 34 was developed for Doctor's and Nurse's practices so we give point for 1 to 34 serial number of question and no point was given for organizational question. The total score ranged from 0-34 and it was then converted into percentage. The practice scores were categorized into good ($\geq 80\%$), fair (59-79%), and poor ($\leq 59\%$).

3. Results and Discussion

A descriptive cross-sectional study was carried out among 212 health care workers including Doctors, Nurses and supportive staffs who are directly related to patient care working in 250 bedded General Hospital, Jashore. The demographic characteristics of the respondents are shown in Table 1.

Table 1. Demographic characteristics of respondents by Frequency and percentage (n=212).

Demographic characteristics	Frequency	Percentage
Designation		
Doctor	21	9.9%
Nurse	143	67.5%
Technologist	8	3.8%
Aya	7	3.3%
Ward boy	13	6.1%
Cleaner	20	9.4%
Total	212	100%
Age		
25 – 35 years	53	25.0%
36 – 45 years	105	49.5%
46 – 55 years	54	25.5%
Mean \pm SD	41.04 \pm 7.006	
Gender		
Male	45	21.20%
Female	167	78.80%
Religion		
Muslim	169	79.7%
Hindu	40	18.9%
Christian	3	1.4%
Educational qualification		
MBBS	21	9.9%
Post-Graduation	19	9.0%
BSc nursing	9	4.2%
Nursing diploma	115	54.2%
Graduation	3	1.4%
HSC	10	4.7%
SSC	4	1.9%

Primary education	31	14.6%
Length of service		
1 -10 years	104	49.50%
11 -20 years	58	26.90%
Above 20 years	50	23.26%

Table 1 has shown the demographic characteristics of the respondents (n = 212). 9.9% were Doctor, 67.5% Nurse, 3.8% Technologist, 3.3% Aya, 6.1% word boy and 9.4% were cleaner. From the respondents 49.5% were from 36 – 45 years age group. Rest of them 25.0% from 25 – 35 years and 25.5% from 46 - 55 years. The mean age of the respondents were 41.04 (± 7.006) years. Majority of the respondents 78.80% were female and rest of them 21.20% were male. Among the respondents 79.7% were Muslim, 18.9% Hinduism, 1.4% Christian. Educational qualification of the respondents were 54.2% diploma in nursing. Among them 9.9% had educational level up to MBBS and rest of them educational level up to 9.0% had post-Graduation, 4.2% BSc in nursing, 1.4% Graduation, 4.7% HSC, 1.9% SSC, 14.6% Primary education and almost half of respondents 49.50% had length of service within 1 - 10 years, 26.90% had from 11-20 years and rest of them 23.60 & respondents had 20 years above.

Doctors and nurses practices regarding infection control in district hospital, Jashore (out of 212 respondents, doctor and nurse were 164) are shown in Tables 2, 3, 4 and Figure 1.

Table 2. Distribution of the respondents by practices of hand hygiene (n=164).

Practices of hand washing	Correct practices		Incorrect practices	
	N	%	N	%
Maintain hand hygiene	157	95.7%	7	4.3%
Wash hands in the six-step hand washing technique	92	56.1%	72	43.9%
Mandatory moment of hand washing	103	62.8%	61	37.2%
How usually wash hands while on duty	94	57.3%	70	42.7%

Table 2 shows 95.7% respondents maintain hand hygiene, 56.1% respondents wash hands in the six-step hand washing technique, 62.8% respondents wash hands on the mandatory moment and 57.3% usually wash hands with soap and water while on duty.

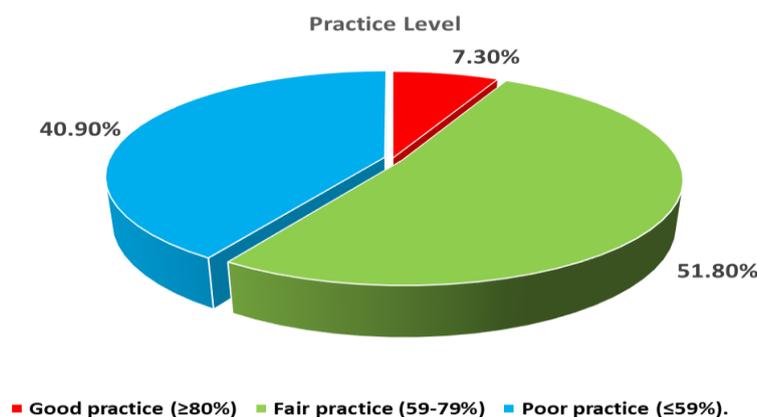


Figure 1. Distribution of the respondents (Doctors and Nurses) according to practice level regarding infection control (N= 164).

Figure 1 shows that 51.8% doctors and nurses scored fair practice, 40.9% doctors and nurses scored poor practice and 7.3% doctors and nurses scored good practice regarding infection control. Overall Doctors and Nurses practices regarding infection control were at the fair level. Where, Mean 21.90 (SD \pm 4.29) with minimum score 11 and maximum score 30 respectively.

Table 3. Association between gender and PPE use (n=164).

Gender	PPE use		χ^2,df	P-value
	Correct practice	Incorrect practice		
Male	11 61.1%	7 38.9%	16.349,1	.000
Female	27 18.5%	119 81.5%		
Total	38	126		

Table 4. Association between designation and PPE use (n=164).

Designation	PPE use		χ^2,df	P-value
	Correct practice	Incorrect practice		
Doctor	14 36.8%	7 5.6%	25.595,1	.000
Nurse	24 63.2%	119 94.4%		
Total	38	126		

Table 3 shows that there was an association between the gender and PPE (Personal Protective Equipment) use of the respondents were statistically highly significant ($\chi^2=16.349$, $df=1$, $p .000$). Here, male were more likely to be correctly use of PPE than female and table 4 shows that there was an association between designation and PPE (Personal Protective Equipment) use of the respondents were statistically highly significant ($\chi^2=25.595$, $df=1$, $p .000$). So nurse were more likely to be correctly use of PPE than doctor.

Supporting staffs practices regarding infection control in district hospital, Jashore (out of 212 respondents, supporting staffs were 48) are shown in Tables 5, 6 and Figure 2.

Table 5. Distribution of the respondents (supporting staff) by answering Yes/NO question based on waste management (N=48).

Variable	Yes		NO	
	N	%	N	%
Making presence of waste with separate color coded bin	28	58.3%	20	41.7%
Dispose off waste in separately from separate bin	22	45.8%	26	54.2%
Know the method of storage hazardous waste	23	47.9%	25	52.1%
Know color containers are need for waste segregation	43	89.6%	5	10.4%
Have available supply of separate color coded bag or container for waste collection	4	8.3%	44	91.7%
Specific time for waste transportation	43	89.6%	5	10.4%
Specific trolley for waste transportation	00	00%	48	100%
Specific door for waste transportation	00	00%	48	100%
Aware of Hospital waste management rules	48	100%	00	00%

In Table 5, more than half of the respondents 58.3% making presence of waste with separate color coded bin, 45.8% respondents dispose of waste in separately from separate bin, 47.9% respondents know the method of storage hazardous waste, 89.6% respondents know that color containers are need for waste segregation, 8.3% respondents mentioned that have available supply of separate color coded bag or container for waste collection, 89.6% respondents mentioned that had specific time for waste transportation and 100% mentioned that there had no specific trolley and door for waste transportation and 100% respondents aware of hospital waste management rules.

Table 6. Distribution of the respondents (supporting staff) by answering Yes/NO question based on sharp injury regarding infection control practices (N=48).

Variable	Yes		NO	
	N	%	N	%
Injured with sharp object	46	95.8%	2	4.2%
Reported to Supervisor after injury	2	4.2%	46	95.8%
Cover broken skin before work	46	95.8%	2	4.2%
Taking post exposure prophylaxis after injury	2	4.2%	46	95.8%
Vaccination against infectious diseases (hepatitis-B)	6	12.5%	42	87.5%

In Table 6, among respondent 95.8% injured with sharp object, 4.2% reported to supervisor after injury, 95.8% cover broken skin before work, 4.2% taking post exposure prophylaxis after injury and 12.5% vaccinated against infectious diseases (hepatitis-B).

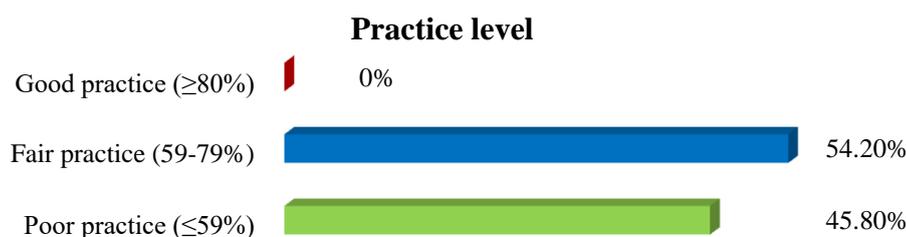
**Figure 2. Distribution of the respondents (supporting staffs) according to practice level on infection control (N= 48).**

Figure 2 shows, 54.20% supporting staffs practices level were fair, 45.80% supporting staffs practices level were poor and 0.0% supporting staffs had good levels of practices regarding infection control. Overall Supporting Staffs practice regarding Infection Control were at the fair level (Mean= 17.46, SD±2.44) with minimum scores and maximum scores 13 (48.14%) and 21 (77.77%), respectively.

4. Conclusions and Recommendations

Study findings suggest that in the existing infection control practices are often neglected and failed to protect healthcare workers and patients from hospital acquired infection. Hospital acquired infection is commonest complication seen in any hospitalized patient and healthcare professionals are constantly exposed to microorganisms.

There should be implementation of infection control policy in all hospitals at Bangladesh.

- i. There should be an effective infection control team in the hospital.
- ii. All healthcare workers should be protected from vaccine preventable infectious diseases.
- iii. The PPEs should be made available by the authorities of the health facilities.
- iv. Above all, healthcare workers should receive periodic training on infection control, with a view to improving overall safety of patients and healthcare providers.

Conflict of interest

None to declare.

References

- Allegranzi B, S Bagheri, C Combescure, W Graafmans, H Attar, L Donaldson and D Pittet, 2011. Burden of endemic health care-associated infection in developing countries: systematic review and meta-analysis. *Lancet*, 377: 228–241.
- Allegranzi B, J Storr, G Dziekan, A Leotsakos, L Donaldson and D Pittet, 2007. The first global patient safety challenge “clean care is safer care”: from launch to current progress and achievements. *J. Hosp. Infect.*, 65: 115–123.

- Begum A, S Bari, AK Azad, I Hossain and PR Saha, 2017. Prevention of nosocomial infection and role of hand hygiene compliance in a private hospital of Bangladesh. *Bangladesh Critical Care Journal*, 5: 83–87.
- Horan TC, M Andrus and MA Dudeck, 2008. CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting. *Am. J. Infect. Control*, 36: 309–332.
- Emori TG, DH Culver, TC Horan, WR Jarvis, JW White, DR Olson, S Banerjee, JR Edwards, WJ Martone, RP Gaynes and JM Hughes, 1991. National nosocomial infections surveillance system (NNIS): description of surveillance methods. *Am. J. Infect. Control*, 19: 19–35.
- Faruquzzaman, 2011. Positive associations of nosocomial infections in surgical ward with etiological clinical factors. *Bratisl Lek Listy.*, 112: 273–277.
- Green N, A Johnson, K Henderson, B Muller-Pebody, S Thelwall, J Robotham, M Sharland, M Wolkewitz and SR Deeny, 2015. Quantifying the burden of hospital-acquired bloodstream infection in children in England by estimating excess length of hospital stay and mortality using a multistate analysis of linked, routinely collected data. *J. Pediatric. Infect. Dis. Soc.*, 4: 305–312.
- Hasan Z. 2010. How big a challenge to initiate three basic infection control practices in hospitals of Bangladesh? *Bangladesh J. Med. Microbiol.*, 4: 1–2.
- Kennedy E, M Greene and S Saint, 2013. Estimating hospital costs of catheter-associated urinary tract infection. *J. Hosp. Med.*, 8: 519–522.
- Plowman R, N Graves, M Griffin, J Roberts, A Swan, B Cookson and L Taylor, 2001. The rate and cost of hospital acquired infections occurring in patient admitted to selected specialists of a district general hospital in England and the various burden imposed. *J. Hosp. Infect.*, 4: 198–209.
- Suetens C, S Hopkins, J Kolman and L Diaz Högberg, 2013. European Centre for Disease Prevention and Control. Point prevalence survey of healthcare associated infections and antimicrobial use in European acute care hospitals. Sweden: ECDC; 2013.
- Selwy S, 1991. Hospital infection: the first 2500 years. *J. Hosp. Infect.*, 18: 5–64.
- Shamsuzzaman AKM, 2015. Development of strategies for infection prevention and control in hospital setting: Bangladesh perspectives. *Bangladesh J. Infect. Dis.*, 2: 1–2.
- WHO, 2016. Health care-associated infections FACT SHEET. 2016. http://www.who.int/gpsc/country_work/gpsc_ccisc_fact_sheet_en.pdf. Accessed 20 May 2018.
- World Health Organization (WHO), 2004. Practical Guidelines for Infection Control in Health Care Facilities. India: WHO.