

Original Article

## KNOWLEDGE OF HEALTH CARE PROVIDERS OF A TERTIARY HOSPITAL REGARDING POST-OPERATIVE INFECTION

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### ABSTRACT

**Background:** Infection is a very common post-operative complication. Now a day the knowledge about infection among healthcare provider is very essential. The study was aimed to determine the knowledge health care provider regarding the management of infection in postoperative ward.

**Methods:** The cross-sectional study was conducted among 90 respondents (60 doctors, 50 nurses & 40 supporting staff) from January 2015 to December 2015 in Dhaka Medical College and Hospital. A semi structured questionnaire was used to obtain socio-demographic data and infection management related information from the respondents through face to face interview. In-depth interviews were taken from director of DMCH, head of the department of surgery and nurse in-charge in post-operative ward for qualitative data. After collection data were compiled, summarized and analyzed. The study was approved by ethical committee of National institute of Preventive and Social Medicine. Before collection of data, written permission was taken from the director of the selected hospital & take consent from the respondents.

**Results:** Among 150 respondents, 58% were female with 26-30 years age group. Most doctors were post-graduate & nurses were diploma in nursing. Most of doctors had knowledge about infections- 83.3% told bacterial as a type, 80% told devices as a source and 94% told diabetes as a risk factor. Both doctors and nurses had knowledge about the causes and mode of transmission of infection (90% doctors & 93.2% nurses told unsterile instrument), complication due to infection (100% doctors told sepsis & 86.7% nurses told wound become red & swelling), prevention (100% doctors & 92% nurses told proper sterilization of instrument). Doctors (95% and nurse (74%) known about infection control guideline and. Doctors (47.5%) and nurses (68%) received training about infection management Among 40 staff 80% were known about infection and they knew from their colleague. 82.5% staffs known about sterilization.

**Conclusion:** This finding had great impact for management of infection and it will be beneficial for all HCW to receive formal and periodic refresher trainings.

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**Keywords:** Post-operative ward, Infection, Knowledge, Healthcare provider, Tertiary hospital

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### INTRODUCTION

Infection is the invasion of an organism's body tissues by disease causing agents, their multiplication, and the reaction of host tissues to these organisms and the toxins they produce. The invasion and multiplication of microorganisms such as bacteria, viruses, and parasites that is not normally present within the body. An infection may cause no symptoms and be subclinical, or it may cause symptoms and be clinically apparent. An infection may remain

localized, or it may spread through the blood or lymphatic vessels to become systemic. Microorganisms that live naturally in the body are not considered infections. For example, bacteria that normally live within the mouth and intestine are not infections<sup>1</sup>

In Bangladesh, a few studies have been conducted in this field. However, in 1990, the rate of hospital acquired infection was found 30% at Dhaka Medical College and Hospital which is quite high. It was found

that increased frequency was due to overload of the wards by patients, overcrowding by visitors and breach of aseptic measures.<sup>2</sup> In 2003, the rate of infection was found as 11.34% in the DMCH, which reflect a better situation than before. However, the study result revealed that 38.2% patient with HAI had to bear the burden of extra charge because of long hospital stay<sup>3</sup>

The postoperative phase of the patient's journey starts when the patient is transferred from the operation theatre to the post-operative ward. Postoperative care may include pain management and wound care. This begins immediately after surgery, for the duration of hospital stay, and may continue after discharge from the hospital. Part of postoperative care is awareness of the potential side effects and complications of procedure. Knowledge is a familiarity, awareness or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering. All health care providers like doctor, nurse & other supporting staff should have knowledge about post-operative infection. Every day they protect themselves, their patient & the public from infectious disease by washing their hands, using sterile techniques, following detail isolation procedures, re-processing patient care equipment, and overseeing the infection control practices of people they supervise.<sup>4</sup>

Postoperative surgical patients are at risk of developing multiple types of hospital acquired infections. These include surgical site infections which can prolong hospital stay, cause morbidity, increase the cost of health care, and even lead to mortality. Other hospital-acquired infections affecting surgical patients include respiratory & urinary tract infections, methicillin-resistant *Staphylococcus Aureus* bacteremia, antibiotic-related *Clostridium Difficile* enteritis & intravascular cannulae-related infections. All surgical wound are likely to become contaminated, usually by resident bacterial flora from skin or viscera. This may not be of clinical significance & contaminated wounds may go unnoticed, progression from wound contamination to clinical infection is largely determined by the adequacy of host defense, the most important immune mechanism of which is neutrophil phagocytosis which occurs during a crucial few hours intraoperative & after operation.<sup>5</sup>

The CDC recommends that sterile techniques & supplies be used for any type of surgical incision. Care of the post-operative incision depending whether incision is closed by primary or secondary intention. Bacteria also are introduced into the wound with poor dressing change technique. Attempts to control infections in the wound bed present challenges to

wound healing. Healthcare providers must be cognizant chemicals and techniques used to prevent infection. One of the most effective preventive measures is debridement of devitalized tissue, and necrotic debris must also be removed before topical antibiotics can be used. Another preventive measure is cleaning with nontoxic solutions & adequate force. Normal saline is effective when used with adequate force to wash away the bacteria. Study has shown that a 35 ml syringe and a 19 gauge needle deliver the solution at 8 psi, adequate to remove bacteria<sup>6</sup>.

Post-operative infection can cause pain; poor wound healing, need for further treatment including antibiotics, longer hospital stay, increase healthcare cost &. Sometime may cause death. It also can result in litigation for the healthcare providers. Ways to try to prevent these types of infection include giving antibiotics before a procedure, when appropriate, using an antiseptic solution to "prep" the area around a surgical incision; maintaining sterility of the surgical area & operating tools; and having operating room staff wear clean cloths, hats, masks.

## **METHODS**

This study was a cross sectional study, carried out on a group of health care providers within a time frame of 12 months from 1<sup>st</sup> January to 31<sup>st</sup> December 2015 in Dhaka Medical College and Hospital.

The study population comprised of Doctor, Nurse, Ward boy, MLSS. Non-probability purposive sampling technique is used for data collection. Due to time constraints, the sample size purposively fixed at 150. The number of doctors, nurses and supporting staff were selected by simple sampling. 60 doctors, 50 nurses and 40 supporting staff such as ward boy, aya, MLSS, Sweeper were selected as study population.

Face to face interview will be performed using a standard questionnaire; in-depth interview & check list fill up by observation. A Semi structured interview questionnaire was developed in both English and Bengali. But the Bengali questionnaire was used. The questionnaire was developed using the selected variables according to the specific objectives. Mixed method approach was applied for collection of data. Three in-depth interviews were taken from the service providers at management level for qualitative data. A checklist was used to verify some of the components related to the thesis. There were 80 questions most close ended that made it easier to analyze the data, responses to each of which were coded. A coding box, where the coding number for each of the responses would be entered, was inserted for each question. Collected data were checked and verified at the end of work. In depth interview was conducted among

director, head of the department of surgery and nurse in-charge regarding infection management and the duration of the interview ranged from 15-20 minutes.

The questionnaire was pre-coded for entry into the software SPSS Statistics software (version 20) and data was analyzed. An analysis plan was developed keeping in view with the objective of the study. Every data were presented by MS word, Excel, table, graph, chart and then interpretation done using SPSS version 20.

The study was approved by ethical committee of National institute of Preventive and Social Medicine. Before collection of data, written permission was taken from the director of the selected hospital. Before initiation of the data collection a brief introduction on the aims of the objectives of the study was given to the

respondents. They were informed about their full right to participate or refuse to participate in the study. The researcher also assured the respondents that there was no invasive procedure included in the study and all the findings of the study would be for the research purposes only. Complete assurance was given to them that all information by them would be kept confidential. After completion of these procedures data collection was with their consent.

**RESULTS**

Among 150 respondents the female respondents were 58% & 22.7% respondents were aged between 26-30 years. Mean = 34.71; (SD = ± 9.448) (Table-1)

**Table: 1 Distribution of Respondents by Sex & age (n=150)**

Characteristics	Frequency	Percent
<b>Sex</b>		
Male	63	42.0
Female	87	58.0
<b>Age (years)</b>		
26-30	34	22.7
31-35	24	16.0
36-40	20	13.3
41-45	21	14.0
46-50	14	9.3
>50 yea	10	6.7
Total	150	100.0

Mean = 34.71; (SD = ± 9.448).

Among 150 respondents, majority 26% respondents were post-graduation doctors & followed by 20.7% were diploma in nursing, 14% were MBBS, 12.7% were BSc in nursing, 6% can sign only, 5.3% SSC passed, 5.3% were 1-5 class, 5.3% were 6-10 class,

2.7% were HSC passed and 2% only graduate (Table-2). Among those respondents 30% were doing the job in this hospital about 1-2 years (Chart-1) & 52.7% respondents working time were 7-8hrs.

**Table: 2 Distribution of Respondents by educational level (n=150)**

Position	Education	Frequency	Percent
Supporting staff	Can sign only	9	6.0
	1-5 class	8	5.3
	6-10 class	8	5.3
	SSC passed	8	5.3
	HSC passed	4	2.7
	Graduate	3	2.0
Nurses	Diploma in nursing	31	20.7
	BSc in nursing	19	12.7
Doctors	MBBS	21	14.0
	Post graduate doctor	39	26.0
Total		150	100.0

*Knowledge regarding postoperative infection*

Among 60 doctors and 50 nurses most 90% known about the post-operative complication. Among 54 doctors 92.6% respondents & among 45 nurses 77.8%

respondents told infection as a post-operative complication.

(Table-3).

**Table: 3 Distribution of doctors & nurses by knowledge to the post-operative complication**

Post- operative Complication	Doctors ( n=54)		Nurses (n=45)	
	(f)	%	(f)	%
Fever	49	90.7	31	68.9
Pain	40	74.1	31	68.9
Infection	50	92.6	35	77.8
Blood clots	44	81.5	22	48.9
Fatigue & weakness	50	92.6	26	57.8
Delirium	25	46.3	26	57.8
Operational injury	31	57.4	27	60.0
UTI	46	85.2	23	51.1
Irregular wound healing	42	77.8	27	60.0

(Multiple Responses) n = 54+45

The table-4 shows all doctors were know about the type & source of infection. Among them 83.3% told bacterial as a type & 80% told devices as the source of

infection. Among 60 doctors 83.3% were known about the risk factors of infection &94.3% told diabetes as a risk factor.

**Table: 4 Distribution of Doctors by the knowledge about type & source of infection**

Characteristics	Yes		No	
	(f)	%	(f)	%
<b>Type</b>				
Bacterial	50	83.3	10	16.7
Viral	45	75	15	25
Fungal	29	48.3	31	51.7
Parasitic	31	51.7	29	48.3
<b>Source</b>				
Environmental	41	68.3	19	31.7
Devices	48	80.0	12	20.0
Personnel	37	61.7	23	38.3

(Multiple Responses) n=60

The table-5 shows among 60 doctors them all & among 50 nurses majority 86% had knowledge about the causes of infection. Majority 85% (doctor) & 62.8% (nurse) told if instrument is not sterile properly

as a cause of infections. Among all doctor 90% told by infectious patient & 88% nurse 93.2% told by unsterile instrument as a mode of transmission of infections.

**Table: 5 Distribution of Doctors and Nurse by the knowledge about Causes & mode of transmission of infection**

Characteristics	Frequency	Percent	Frequency	Percent
<b>Causes</b>	<b>Doctors(n=60)</b>		<b>Nurses (n=43)</b>	
By cross-infection	51	85.0	25	58.1
If instrument is not sterile properly	51	85.0	27	62.8
The hospital environment is unclean	38	63.3	21	48.8
If waste do not manage properly	25	41.7	15	34.9
Any error due to operation	23	38.3	13	30.2
Do not take proper care after operation	36	60.0	18	41.9
More visitors	43	71.7	18	41.9
<b>Mode of transmission</b>	<b>Doctors(n=60)</b>		<b>Nurses (n=44)</b>	
By infectious patients	50	83.3	39	88.6
By unsterile instrument	54	90.0	41	93.2
By air with sneeze & cough	47	78.3	17	38.6
By needle	48	80.0	16	36.4
By waste	32	53.3	26	69.1
By blood	50	83.3	27	61.4

(Multiple Responses)

The table 6 shows among 60 doctors 83.3% were know about the risk factors of infection. Among 53

respondents 94.3% told diabetes as risk factors of infections.

**Table: 6 Distribution of Respondents according to the risk factor of infection**

Risk factor	Doctors (n=53)	
	Frequency	Percent
Obesity	33	62.3
Diabetes	50	94.3
Older age	35	66.0
Emergency operations	46	86.8
Need more time for complex operation	41	77.4
Using lifesaving drug before operation	21	39.6

(Multiple Responses) n=53

The table 7 shows among 60 doctors & 50 nurses 90% known about the complication of infection. 100%

doctors told sepsis & 86.7% nurses told wound become red & swelling.

**Table: 7 Distribution of Respondents among Doctors and Nurse by the knowledge about complication due to infection**

Complication of infection	Doctors (n=54)		Nurses (n=45)	
	Frequency	Percent	Frequency	Percent
Rapid heartbeat	45	83.3	24	53.3
Sepsis	54	100.0	37	82.2
Hypotension	41	75.9	33	73.3
Hypertension	41	75.9	33	73.3
Wound become red & swelling	47	87.0	39	86.7
Delayed wound healing	47	87.0	38	84.4
The wound Stitch opening	27	50.0	22	48.9
Secondary infection	38	70.4	38	84.4

(Multiple Responses) n=54+45

The table 8 shows among 60 doctors 95% known about the infection control guideline and among 50

nurse 74% were know about the infection control guideline.

**Table: 8 Distribution of Respondents among Doctors and Nurse by the knowledge about infection control guideline**

Knowledge	Doctors (n=60)		Nurse(n=50)	
	Frequency	Percent	Frequency	Percent
Yes	57	95.0	37	74.0
No	3	5.0	13	26.0
Total	60	100.0	50	100.0

The table 9 shows that among 60 doctors 100% respondents had knowledge about prevention of the infection. Among them all respondents 100% told proper sterilization of instrument& everybody use PPI as a prevention of infection. Among 50 nurses 100%

respondents were know about prevention of the infection. Among them most respondents 92% told proper sterilization of instrument as a prevention of infection.

**Table: 9 Distribution of Doctors and Nurse by the knowledge about prevention of infection**

Prevention	Doctors (n=60)		Nurses (n=50)	
	Frequency	Percent	Frequency	Percent
Proper sterilization of instrument	60	100	46	92.0
keep infectious patient separately	55	91.7	41	82.0
Keep hospital clean	53	88.3	36	72.0
Everybody use PPI	60	100.0	39	78.0
Proper management of waste	25	41.7	31	62.0
Take proper pre-operative & post-operative care	36	60.0	34	68.0

(Multiple Responses)

The table 10 shows 46.7% doctors & 68% nurses got training about infection control. Among 60 respondents 80% & among 50 nurses 66% told there

had no training facility in this hospital. Among 28 doctors & 34 nurses who got training 47.1% doctors & 46.4% nurses received <1 week training. Maximum 28.6% doctors & 38.2% nurses received training 1 month ago.

**Table: 10 Distribution of doctors & nurses according to got training about infection control & by the knowledge about training facility present in the hospital**

Training	Doctors (n=60)		Nurses (n=50)	
	Frequency	Percent	Frequency	Percent
<b>Got training about infection</b>				
Yes	28	46.70	34	68.0
No	32	53.30	16	32.0
<b>training facility present in the hospital</b>				
Yes	12	20.0	17	34.0
No	48	80.0	33	66.0
Total	60	100.0	50	100.0

The table 11 shows among 40 supporting staff 80% had knowledge about infection occurred in post-operative ward. Among 32 respondents who knew

about infection 46.9% known by listen from other staff. Among 40 respondents 82.5% knew about the sterilization process.

**Table: 11 Distribution of Supporting staff of knowledge regarding post-operative infection**

Media of knowledge	Frequency	Percent
By training	11	34.4
By watching television	4	12.5
By listen from others staff	15	46.9
By reading book	2	6.3
Total	32	100.0

**DISCUSSION**

This study revealed that among 150 respondents 40% respondents were doctors, 33.3% were nurse and others were supporting. The female were 58%, more than male. These finding were lower in the contrast of the study conducted by Dr. Garballiyasu.7 From the present study it is evident that maximum respondents were in the 26-30 years age group and the percentage was 22.7%. Their mean was 34.71; (SD = ± 9.448). The mean age of this study is almost same as the contrast of the study conducted by Dr. Garballiyasu.7

In the study it was very much encouraging that among doctors, the majority (26%) completed the post-graduation but the majority (20.7%) of nurses possessed only diplomas. These finding are low in contrast with the findings of a study conducted in Bangladesh by Sickder HK where 93.3% were completed diploma in nursing. Among the supporting staff only 6% can sign only and others are literate. For nursing education in Bangladesh, curriculum in both diploma and bachelor degree in nursing and for supporting staff should educated and trained include general principle of infection control that increase the level of knowledge. Among 150 respondents 30% doing job in the hospital from 1-2 years and 52.7% respondents working time were 7-8hrs. Maximum 67.3% respondents had no personal habit and who have personal habit among them 46.9% are smoker and eating betel leaf.

Among 60 doctors they all were know about the type of infection. Among those respondents 83.3% told bacterial type is the most common type of infection occurred in post-operative ward and few were say others types like viral, fungal & parasitic. Majority respondents 80% told devices as the common source of infection, infection can also have occurred from environmental (68.3%) and personnel (61.7%) source.

In this study 100% doctors known about the causes and mode of transmission of infection but majority (86%) of nurses were known about the causes and 88% are known about the mode of transmission of infection. Majority doctors 85% told by cross-infection & if instrument is not sterile properly as a cause and 90% told by unsterile instrument as a mode

of transmission of infections. On other hand maximum nurses 62.8% told if instrument is not sterile properly as a cause and 93.2% told by unsterile instrument as a mode of transmission of infections. According their knowledge nurses has some lacking. So if maintain sterility then we can reduce the chance of infection.

From this study it clearly finds that most 90% doctors and nurses known about the post-operative complication. Among them 92.6% doctors, 77.8% nurses mention infection as the most common post-operative complication and it mainly starts from postoperative ward after operation if not properly manage. Due to infection many complication are arise from those 100% doctors told sepsis and 86.7% told wound become red & swelling as a complication of infection.

For occurring infection some risk factors were responsible and 83.3% doctors had knowledge about those risk factors, the most 94.3% told diabetes as most vulnerable risk factors of infections. So for diabetes patients we should take extra care both preoperative & postoperative. For identify infection some test done, 93.3% doctors done those tests and 100% done blood test primarily for detect infection.

From the present study it is evident that 95% doctors and 74% nurses are known about the infection control guideline. A study was conducted by Zafar et al where two third of the respondents were familiar with the guideline or protocol. On other hand 85% doctors told that there had no written protocol about infection in this hospital.

Prevention is better than treatment and Infection can manage if prevention is taken. The present study shows 100% respondents were known about the prevention of infection. Among them all respondents 100% told infection can prevent by proper sterilization of instrument & if everybody properly uses personal protective equipment like hand gloves, mask, apron, cap etc.

From the present study it is evident that among 60 respondents 46.7% and among 50 respondents 68% got training about infection control. Training course duration is <1 week among 46.4% and 47.1% respondents. Only 28.6% doctors and 38.2% nurses

do training 1 month ago. 80% doctors and 66% nurses told there had no training facility in this hospital. Finding related to received infection control training of nurses slightly higher than the findings of a study conducted by Sickder HK. From this study we find that the health care providers have lacking's of training and they must receive more training. The hospital authority should give the training facility by arraigned effective training program in the hospital and establish a training institute.

From this study it was found that among 40 staff most of them are not so educated and well trained but 80% of them had knowledge about infection occurred in post-operative ward and 46.9% of them known by listen from other staff in the hospital.

### CONCLUSION

Comparing the findings of the present study at Dhaka Medical College and Hospital with that of the previous studies it is evident that the occurrence of the Infections is lower than that of the previous study. In spite of this attention should be given to operation theater and post-operative wards, because surgical wound infection was still found on the top of the list among all Hospital. Therefore, regular study like this will help to guide hospital for quality control policy. Recent improvements in antibiotic prophylaxis, including the timing of initial administration, appropriate choice of antibiotic agents, and shortening the duration of administration, have established the value of this technique in many clinical surgical settings. Future study designs should strongly consider risk factors for individual patients when new antibiotic agents are tested. The study gave rise to the recommendation on the basis of the study finding to improve the knowledge of infection that is Education and training program should be conducted to improve to improve knowledge and practice of health care providers specially for supporting staff & establish a written protocol about infection control in every hospital.

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