

Research Article

Management of Surgical Site Infection

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Abstract: The aim of this cross-sectional study to assess on management of surgical site infection at the Islami Bank Medical College Hospital. A total of 1256 respondents were selected for the study. At last January 2016 to march 2021 their socio-economic condition, demographic characteristics, opinion and level about surgical site infection were mainly investigated. The invasion and multiplication of microorganisms such as bacteria, viruses, and parasites that is not normally present within the body. Infection may cause no symptoms and be subclinical, or it may cause symptoms and be clinically apparent.

Keywords: Surgical Site Infection, Islami Bank Medical College Hospital, bacteria.

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INTRODUCTION

Infections are a major source of morbidity and cause of mortality during the post-operative phase for patients. Wound infections are the second most commonly encountered type of nosocomial, hospital-acquired, infection in the United States [1]. Owing to the fact that wound infection may be induced, such as, by not applying infection control and sterile technique principles in the operating room complex, it is imperative to implement infection control principles and apply sterile technique principles [2]. In 1981, the Study on the Efficacy of Nosocomial Infection Surveillance (SENIC) proposed an infection risk index for surgical patients. Later [4], the SENIC Index was modified, suggesting the inclusion of baseline disease severity, assessed according to patients' clinical condition. This new NNIS Index establishes different surgical patients' infection risk [3, 5].

Background and Significance of the Problem

Surgical Site Infection (SSI) refers to an infection that occurs after operation within 30 days [6]. SSI is one type of nosocomial infection in which a surgical infection occurs after invasive procedures [7]. According to the National Nosocomial Infection Surveillance (NNIS) system and the Centres for Disease Control and Prevention (CDC), SSI accounted for 14% to 16% of all nosocomial infections and was the most

common health care associated infections among surgical patients in the United States (USA) [6]. Incidence of SSIs may vary from hospital to hospital in different countries. Developed countries, such as the USA, the United Kingdom (UK), and Sweden have the lower incidence of SSIs ranging from 2% to 6.4% [8-10]. In developing countries, such as India, Pakistan, Nepal, Turkey and Iran, the incidence of SSIs is higher ranging from 5.5% to 25% [11-15].

In Bangladesh, a study principally conducted with surgical patients showed that the prevalence of postoperative wound infection in medical college hospitals Bangladesh ranged from 6% to 18% [16]. A retrospective study conducted in Shere-E- Bangla Medical College Hospital (SBMCH) showed that the incidence of SSI was 28.49% [17]. In addition, another retrospective study conducted in Comilla Medical College Hospital found that the incidence of SSI was 22.05% [18]. A prospective study conducted in two medical college hospitals found that overall SSI incidence was 11% [19].

SSI is a significant clinical problem leading to morbidity and mortality. SSI caused pain, misery, and possible deformity [20]. SSI also added to functional disability and emotional stress to the patients and in some cases disabling condition led to reduce quality of life [21]. Furthermore, SSI might require that the patient

undergoes additional surgical procedures or it may result in death (Fry and Fry). Patients with SSI had 2 to 11 times higher risk of death compared to patients without SSI [22]. The Institute of Medicine reported that SSIs cause death in 44,000 to 98,000 patients per year in the USA [23]. A study found that mortality rate was 7% in patients diagnosed with SSI [24].

Cause of SSI

There are four main factors which influence the infection rates in surgical wounds, they include, Patient variables, Preoperative preparation, Operative procedure and Postoperative care [25]. From these factors, the following were identified as the main risk factors for SSI's.

SSIs occur when a bacteria is present within a wound. The bacteria may be transferred by contact from surgeons or nurses' hands, the bacteria could be airborne during surgery, and or the patient may come in contact with bacteria after surgery. The most common forms of bacteria that cause surgical site infections include streptococcus pyogenes, and staphylococcus aureus (About Surgical Care Improvement Project Information, 2007).

Management of SSI

Although there are various ways of preventing SSIs, the most appropriate way is administering antibiotic prophylaxis at the appropriate time, (20 min before surgery). Example is Zinacef 1,5g or 3g according to the surgeons' instructions. The administering of antimicrobial prophylaxis before surgery has been proved to decrease greatly the incidence of postoperative infection particularly where the inoculum of bacteria is high, such as vaginal surgery or where there is insertion of an artificial device, for example hip prosthesis. Appropriate timing of administering antibiotics to prevent surgical infections is critical but ignored. Surgical site infections may be prevented by controlling the risk factors in cases of scheduled surgery (Michael Andrea, Jose, Weldon & Ginsburg, 48).

According to Beaver [26] antibiotic cycling can prevent hospital-acquired MRSA; it also decreases development of antibiotic resistance strains of gram-negative organisms. The benefits of antibiotic cycling appear to reduce the "monotonous exposure" to one agent over time and reduce the selection pressures for any single agent.

OBJECTIVES OF THE STUDY

General objectives

To assess the level of the surgical site infection patient and management.

Specific objective

1. To assess socio-demographic information of respondents.
2. To assess about different type of surgical site infection.
3. To assess about cause of surgical site infection.
4. To assess the knowledge about preventive measure of surgical site infection.
5. To assess the socio-demographic information of patients.

REVIEW OF LITERATURE

Surgical Site Infection

Intact skin is the patient's first line of defence against bacterial invasion. A surgical incision is unintentional breach of this defence mechanism, after which the surgical wound can be contaminated by bacteria from multiple sources [20]. Surgical site infection (SSI) refers to an infection that occurs within 30 days of the operation, if no implant is left in place or within one year of operation, if an implant is left in place and the infection appears to be related to the operation. SSIs are divided into three types, depending on the depth of infection penetrating into the surgical wound: superficial incisional infection, deep incision infection, and organ/space infection [27, 28, 6, 29]. SSIs are the most common type of nosocomial infection among surgical patients and are commonly caused by the patients' own flora and by health care providers [27]. According to the National Nosocomial Infection Surveillance (NNIS) system of the Centre for Disease Control and Prevention (CDC), SSI accounted for 14% to 16% of all nosocomial infections and was the most common nosocomial infections among surgical patients, and accounted for 38% of such infection [6].

MATERIALS AND METHODOLOGY

Data collection procedure

A written permission must take from the concerned hospital authority before collecting data. It is also discuss the study purpose with respected respondents by using questionnaires. Finally collected data is tabulated accordingly. Data were analyzed using computer software. The subjects' demographic information, Management of Surgical site infection, was analyzed using frequencies and percentages. This analysis is done according to the objectives of the research study. This data is collected randomly from the specific patient 1256 respondents.

DISCUSSION

Surgical site infection has become a worldwide problem increasing length of hospital stay and economic lost. Therefore, while patients are taken into the surgical ward is the researchers view that the responsibility for taking care of them by providing a secure environment, which prevents the patient from Surgical site infection. It must be observed that strict

aseptic technique should be maintained by the entire surgical team.

An outcome of this study is to make recommendations from the research findings to surgical site infection at Islami Bank Medical college Hospital. The outcomes are also providing a possible direction for the education needs to combine both academic teaching and clinical practice. The prevalence postoperative surgical wound infection in all Medical College Hospital of Bangladesh was found to be eight to eighteen percent and the mean postoperative stay in case of patient with postoperative infection is twenty five days, which is about three times more than without wound infection. The Surgical site infection overstay period ranges from seven to forty one days [16]. There is no systematic data about prevalence of surgical site infections in Bangladesh, but anecdotal evidence suggest that it may have increased recently. However, surgical site infections can affect the patient’s life, which may lead to impaired quality of life, employment and can cause anxiety, depression and death [30].

The literature review presented the roles regarding prevention of infection in the surgical ward & post-operative ward. However, there was little information relating to this specific issue. Therefore this review prevented literature on how to prevent infection in the surgical ward in various countries with the prevalence rate of surgical site infection was highlighted. There is a little documented evidence about education and research on prevention of infection in the postoperative ward. Therefore, it appears that there is a gap in the available information that nurses have about infection, which leads to providing the best possible environment for patient undergoing surgery. A review of research in best practice in nursing relating to the application of knowledge, revealed that problem based learning has been very effective, which could be pursued to educate clinical nurses in the hospital setting.

The data from the learning requirement question revealed that all of the nurses felt that they had

an important role in preventing infection in surgical ward. At least most of the respondents were given emphasis on this training and they realized that they must know about infection control. The risk factor of post-operative wound infection are there are multiple reasons for post-operative wound infection, which have been validated and documented as risk factor. A risk factor is any recognized contribution to an increase in post-operative wound infection. The risk factor related to patients age, the nature of the presenting clinical condition, concurrent disease (e.g. diabetes), malnutrition, skin disease, particularly infection.

It was revealed that the average practicing scores of the nurses were at a high level. The present study also revealed that pre-operative practice was identified at a high level and post-operative practice was identified at a very high level. This finding indicates that nurses had provided good nursing practices for prevention of SSI. There are several individual and organizational factors that influence high level of practice. The first factor is sufficient supplies of water, gloves, disposal boxes, antiseptic solutions, and surgical instruments. These supplies can help nurses to perform good practice. A study had found that surgical infection control was related to sufficient resources of caring for surgical patients [31].

RESULTS

Age distribution describes among respondents were 46% in the age group of 36-45, 36% in the age group of 25-35 and 18% in the age group of 46-59. Most of the respondents are married about 80%, single were 16% and widow 4%. According to length of service among 1256 from the length of 0-10 years are 18%, 11- 20 years 46%, 21-30 years 8%.

A total of 1256 patient of IBMCH were interviewed to assess their surgical site infarction of the patient admitted in Surgery ward. The findings of the study derived from data analyses are presented below (Tables 1-2 and Figs. 1-7).

Table-1: Distribution of the respondent by their socio-demographic information

Variable	Parameters	Number	Percentage
Age	25- 35 years	453	36%
	36-45 years	577	46%
	46-59 years	226	18%
Marital status	Single	201	16%
	Married	1005	80%
	Widow	50	4%
Length of service	0-10 years	226	18%
	11 – 20years	577	46%
	21– above 30 years	453	36%

Table-1: showed that majority of the respondents were (46%) in the age group of 36-45,

(36%) in the age group of 25-35 and (18%) in the age group of 46-59. The mean age of the respondents.

Between them most of they are married about (80%), single were (16%) and widow (4%). The length of 0-10 years are (18%), 11- 20 years (46%), 21-30 years (8%).

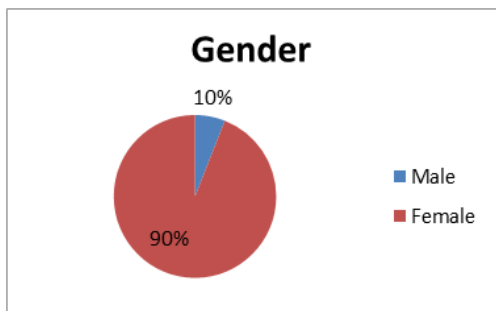


Fig-1: Distribution of the respondent by their gender

Fig-1: showed that most of the respondents (90%) were female and (10%) were male of them.

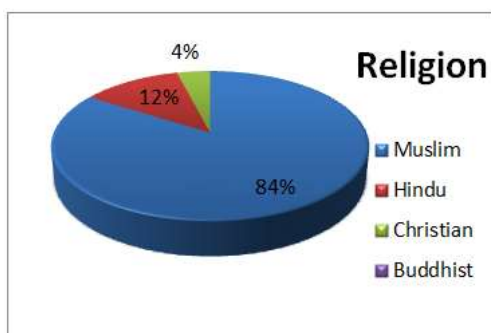


Fig-2: Distribution of the respondent by their religion

Fig-2: Showed that majority of the respondents were Muslim (84%), Hindu (12%) and Christian 4%.

KNOWLEDGE RELATED QUESTION

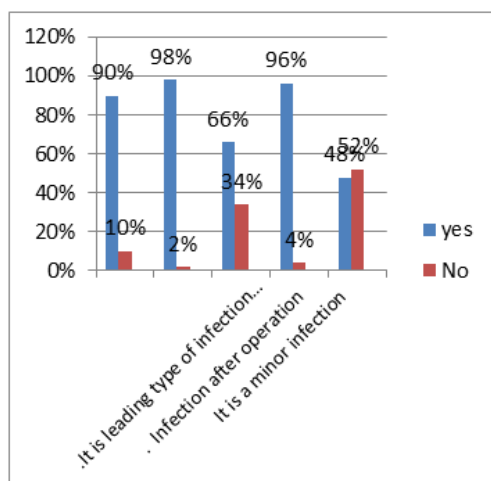


Fig-3: Distribution of the respondent by their Knowledge on what is surgical site infection?

Fig-3: Showed that his knowledge about what is surgical site infection of the respondent, about a). A major source of illness in surgical patient Yes 90% No 10%, b). It is leading type of infection among hospitalized patient. Yes 98% No 2% c). Infection after operation Yes 66% No 34% d) It is a minor infection Yes 96% No 4%, e) post-operative infection control by proper sterilization Yes 48% No 52%.

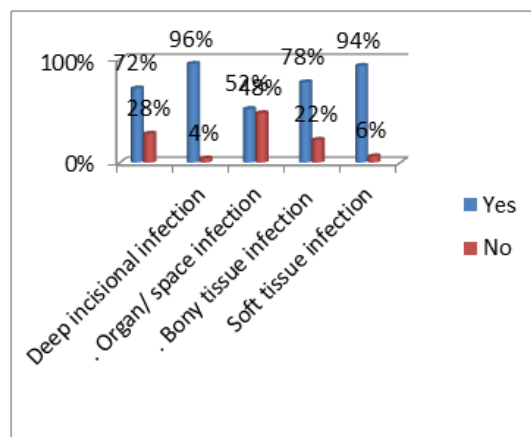


Fig-4: Distribution of the respondent by their knowledge about classification of surgical site infection

Fig-4: showed that the knowledge of the respondents about what are the types of surgical site infection. Majority of the respondents were 96% answer (Deep incisional infection). 94% answer. (Soft tissue infection). 78% answer. (Bony tissue infection). 72% answer. (Superficial incisional infection). 52% answer (Organ/ space infection).

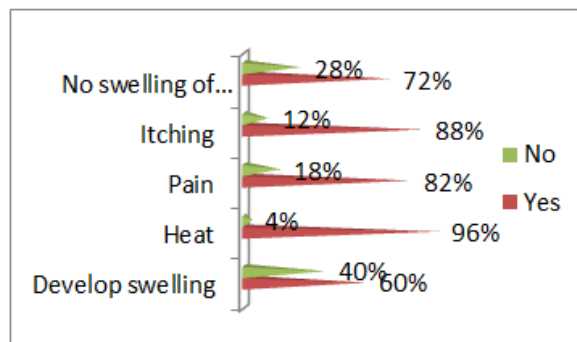


Fig-5: Distribution of the respondent by their knowledge about the symptoms of surgical site infection

Fig-5: Showed that the knowledge of the respondents about the symptoms of surgical site infection. Majority of the respondents were 96% (Heat). 88% (Itching), 82% (Pain), 72% (No swelling of the wound), 60% (Develop swelling).

Table-2: Distribution of the respondent by their knowledge about the following factors leads to develop surgical site infection

Parameters	Answer			
	Yes		No	
	Yes %	No %	Yes %	No %
a) Poor nutritional status of patient	1256	100%	0	-
b) Negligence of the post-operative care.	1130	90%	126	10%
c) Excessive visitors in the ward.	1230	98%	26	2%
d) Excessive visitors in the ward.	0	-	1256	100%
e) Cleanliness of the word.	0	-	1256	100%

Table-2: showed that the knowledge of the respondents about the following factors lead to develop surgical site infection. Majority of the respondents were 100% (Poor nutritional status of patient), 98%

(Negligence of the post-operative care), 90% (Negligence of the post-operative care), 0% (Excessive visitors in the ward), 0% (Cleanliness of the word).

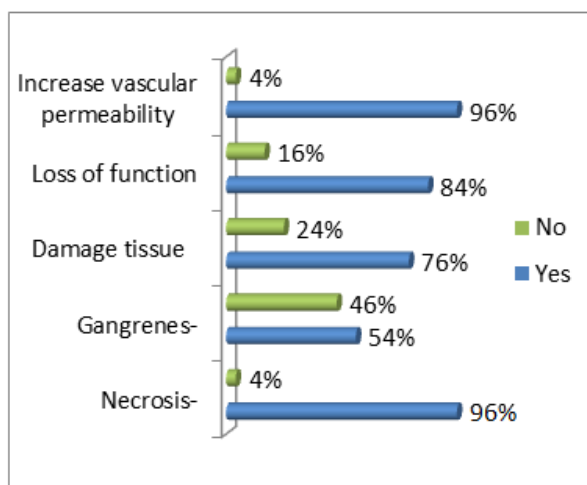


Fig-6: Distribution of the respondent by their knowledge about the complication of surgical site infection

Fig-6: showed that the knowledge of the respondents about the complication of surgical side infection. Majority of the respondents were 96%

(Necrosis), (Increase vascular permeability), 84% (Loss of function), 76% (Damage tissue), 54% (Gangrenes).

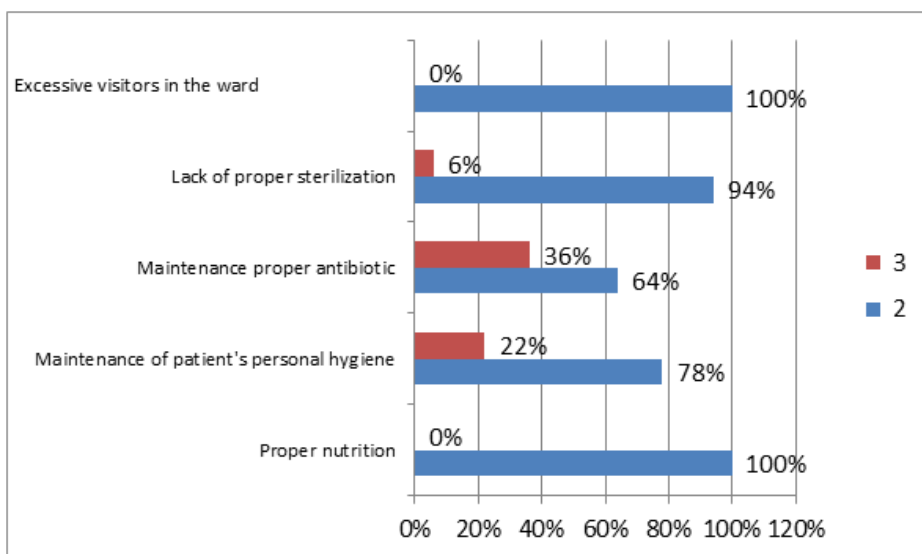


Fig-7: Distribution of the respondent by their knowledge about which factor are helpful in preventing surgical side infection

Fig-7: showed that the knowledge of the respondents about which factor is helpful in preventing surgical site infection. Majority of the respondents were 100% (Proper nutrition), (Excessive visitors in the ward). 94% (Lack of proper sterilization). 78% (Maintenance of patient's personal hygiene). 64% (Maintenance proper antibiotic) 6.

CONCLUSION

On the above circumstances, this study indicates that most about surgical site infection it is evident from this study that the multiple factors are associated with the occurrence of surgical site infection in Islami Bank Medical College Hospital. This is related with overload of patients, overcrowding of visitors, shortage of stuffs, workload, break of aseptic technique, with consideration of limited recourses and socio-economic condition of the patients appropriate measures need to be taken urgently through arranging the training to provide proper knowledge and experience for nurses to prevent of surgical site infection.

RECOMMENDATION

- i. Basic instruction of surgical site infection should be provided To Hospital.
- ii. Health education should be focused on personal hygiene and nutrition which are very essential to prevent surgical site infection.
- iii. More supportive devices should be provided in hospital to prevent surgical site infection.
- iv. The study can be done on a large scale taking sample from different wards of different hospitals to see the differences.
- v. For effective study, the authority should be provided sufficient time and financial support.

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