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**TO STUDY THE INCIDENCE AND DETERMINANTS OF SURGICAL SITE  
INFECTION IN OPEN ELECTIVE ANDEMERGENCY SURGERY**

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**ABSTRACT**

**Background:** To Study the Incidence and Determinants of Surgical Site Infection in Open Elective and Emergency Surgery. **Methods:** It is a prospective study, which involves 250 patients who were admitted and operated for all open elective and emergency cases. **Result:** 22 cases diagnosed to have surgical site infection from sample size of 250, which shows the incidence of 8.8%. **Conclusion:** Incidence of wound infection is 8.8% which is less compared to incidence in developing country but more on comparing the incidence in developed country.

**Keywords: Surgical Site Infection, Elective and Emergency Surgery**

**INTRODUCTION**

Surgical site infection is the most common nosocomial infection among surgical patients. Various factors, both endogenous and exogenous risk factors contribute to the occurrence of surgical site infection [1]. It is based on factors like site of infection and type of incision and presence of purulent discharge coming from the wound. Surgical

site infection is defined as occurring within 30 days after the operative procedure for superficial SSI or up to 90 days for deep or organ space SSI, also depending on the surgical procedure [2].

**MATERIALS AND METHODS**

**STUDY DESIGN: PROSPECTIVE  
STUDY**

**STUDY POPULATION:** 250 patients who were admitted and operated for all open elective and emergency cases.

**SAMPLE SIZE:** All the 250 admitted patients were followed from the date of admission with all surgical routine investigations and specific investigation, type of antibiotics patients started on pre-operatively. Patient is followed intra-operatively and post-operatively for any development of surgical site infection, method of detection and type of antibiotics started post- operatively.

**Inclusion criteria**

- Elective surgery.
- Emergency surgery.
- Co morbidity
- DM/HTN/TB/BA/IHD

**Exclusion criteria**

- Previously operated.
- Recurrent surgery.
- Skin infection.

**RESULT**

There were 22 cases diagnosed to have surgical site infection from sample size of 250, which shows the incidence of 8.8%. Main factors contributing to risk of developing surgical site infection include,

- Presence of Diabetes Mellitus
- Smoking
- Alcohol consumption.

- Emergency surgery.
- Longer duration of surgery
- Contaminated wound

Among 22 post operative infections 16.4% individuals had diabetes whereas 5.6 % were non diabetic. The difference between the infection proportion between diabetic and non-diabetic were statistically significant (**Table 1, Figure 1**).

Out of 23 smokers in study participants, 21.7 % had post-op infection whereas remaining 7.5% in post-op infection were non-smokers. This difference between smokers and non-smokers with proportion to post- op infection was statistically significant with p value of 0.022 (**Table 2, Figure 2**).

In this study 25.0 % of alcoholics had post-op infection while only 7.1 % of non-alcoholics had post-op infection. This difference between the proportion of post-op infection between alcoholics and non- alcoholics were statistically significant with p value of 0.03 (**Table 3, Figure 3**).

The proportion of post-op infection in elective surgeries was 6.1 % which is, 12 participants were infected out of 197 elective surgeries. Whereas 18.9 % of emergency surgeries were infected which is, 10 participants out of 53 emergency surgeries. This difference between the

proportion of post-op infection between the emergency and elective surgeries were statistically significant with p value of 0.004 (Table 4, Figure 4).

Among the type of surgery classified based on the wound class 45.0% contaminated surgeries had post-op infection, 10.7 % of clean contaminated surgeries had post-op wound infection and 4 % clean surgeries showed postoperative wound infection. This difference between the proportion of wound infection within wound classes was statistically significant with a p value of <

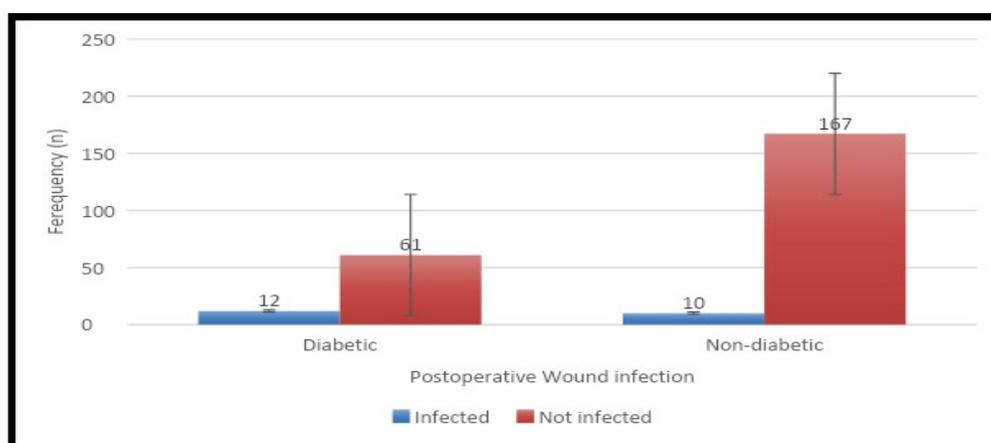
0.001 (Table 5, Figure 5).

Post-op wound infections were seen in 17.1 % of surgeries with surgery timing lasting for more than 2 hours, 4.2% infections were seen in surgeries with 1 – 2 hours duration and 11.1 % post-op infections were seen in surgeries with less than 1 hour of duration. This difference between the post-op infection proportion and surgery duration were statistically significant with p value of 0.006 (Table 6, Figure 6).

**Table 1: Postoperative surgical wound infection between diabetic and non-diabetic**

Diabetes Mellitus	Infected	Not infected	Total	p value
Present	12 (16.4%)	61 (83.6%)	73 (100%)	0.006
Absent	10 (5.6%)	167 (94.4%)	177 (100%)	
Total	22	228	250	

Note: p value based on Pearson chi-square test



**Figure 1: Postoperative surgical wound infection between diabetic and non-diabetic**

**Table 2: Comparison of postoperative surgical wound infection between smokers and non-smokers**

Smoking	Infected	Not Infected	Total	p value
Present	5 (21.7%)	18 (78.3%)	23 (100%)	0.022
Absent	17 (7.5%)	210 (92.5%)	227(100%)	
Total	22	228	250	

Note: p value based on Pearson chi-square test

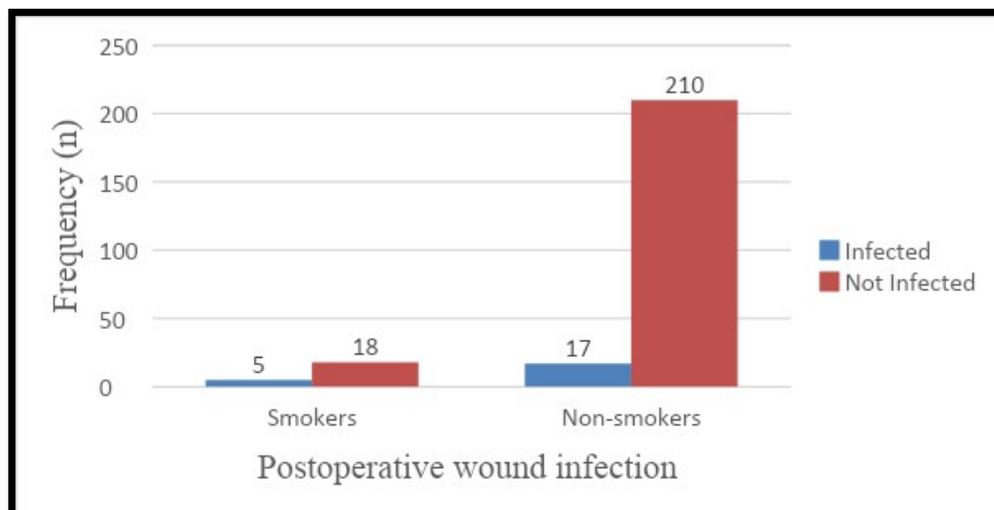


Figure 2: Comparison of postoperative surgical wound infection between smokers and non-smokers

Table 3: Comparison of postoperative surgical wound infection between alcoholics and non-alcoholics

Alcohol Consumption	Infected	Not Infected	Total	p value
Present	6 (25.0%)	18 (75.0%)	24 (100%)	0.03
Absent	16 (7.1%)	210 (92.9%)	226 (100%)	
Total	22	228	250	

Note : p value based on Pearson chi-square test

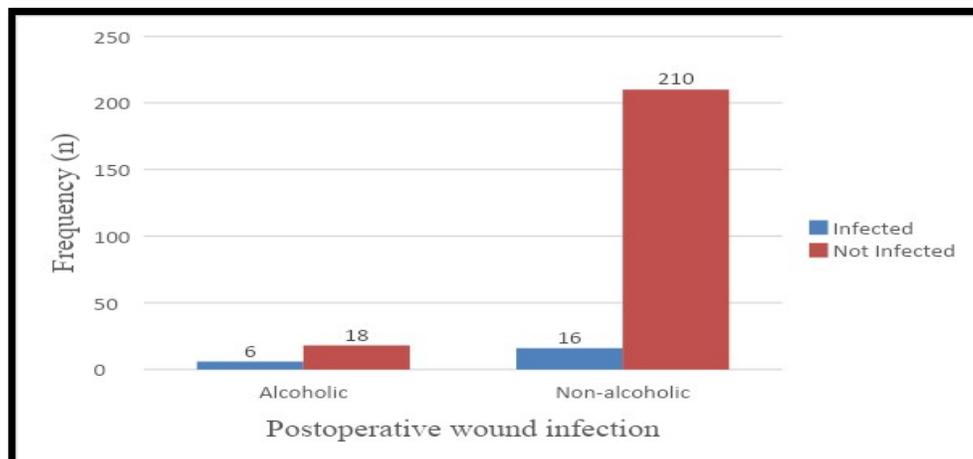


Figure 3: Comparison of postoperative surgical wound infection between alcoholics and non-alcoholics

Table 4: Comparison of postoperative surgical wound infection between nature of surgery

Nature of surgery	Infected	Not Infected	Total	p value
Elective	12 (6.1%)	185 (93.3%)	197 (100%)	0.004
Emergency	10 (18.9%)	43 (81.1%)	53 (100%)	
Total	22	228	250	

Note: p value based on Pearson chi-square test

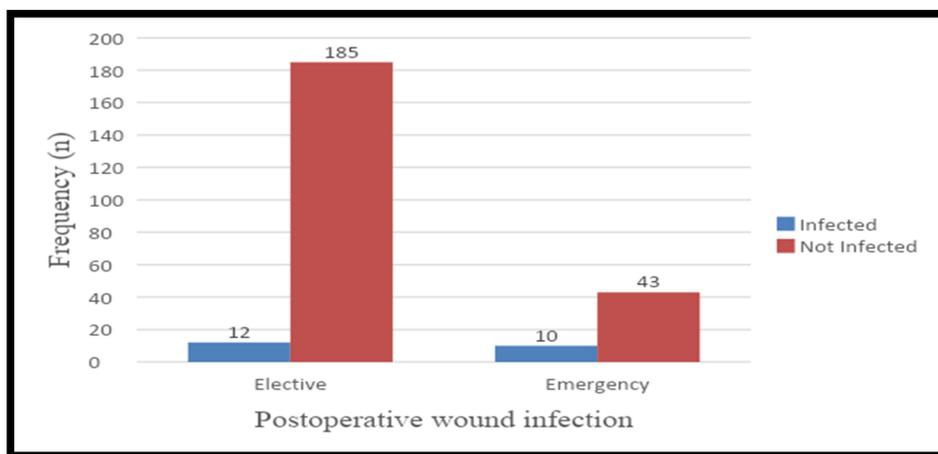


Figure 4: Comparison of postoperative surgical wound infection between nature of surgery

Table 5: Comparison of postoperative surgical wound infection between wound class

Wound Class	Infected	Not Infected	Total	p value
Clean	7 (4%)	167 (96.0%)	174 (100 %)	< 0.001
Clean Contaminated	6 (10.7%)	50 (89.3%)	56 (100%)	
Contaminated	9 (45%)	11 (55%)	20 (100%)	
Total	22	228	250	

Note: p value based on Pearson chi-square test

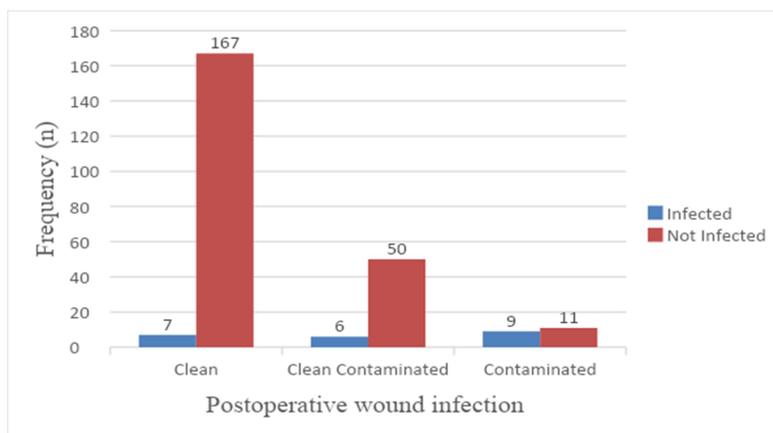


Figure 5: Comparison of postoperative surgical wound infection between wound class

Table 6: Comparison of postoperative surgical wound infection between time durations during surgeries

Duration of surgery	Infected	Not Infected	Total	p value
Less than 1 hour	4 (11.1%)	32 (88.9%)	36 (100%)	0.006
1 – 2 hours	6 (4.2%)	138 (95.8%)	144 (100%)	
More than 2 hors	12 (17.1%)	58 (82.9%)	70 (100%)	
Total	22	228	250	

Note: p value based on Pearson chi-square test

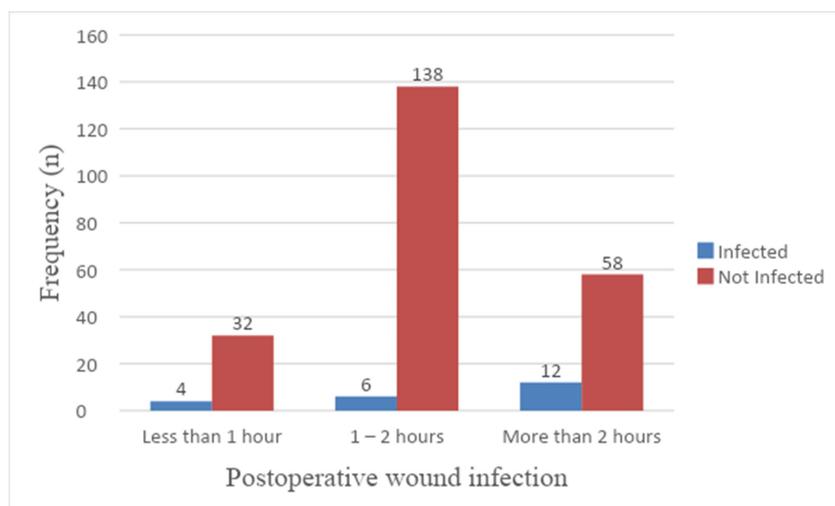


Figure 6: Comparison of postoperative surgical wound infection between time durations during surgeries

## DISCUSSION

Surgical site infection is the most common nosocomial infection among surgical patients. Various factors, both endogenous and exogenous risk factors contribute to the occurrence of surgical site infection [3, 4]. It is based on factors like site of infection and type of incision and presence of purulent discharge coming from the wound. Surgical site infection is defined as occurring within 30 days after the operative procedure for superficial SSI or up to 90 days for deep or organ space SSI, also depending on the surgical procedure. Incidence of surgical site infection in our study is 8.8%. Postoperative surgical site infection is mainly responsible for morbidity and mortality of treated patients. It is helpful for both surgeon as well as patient. From surgeon's point of view it will delay the

time for treating patients and from patients point of view it will prolong hospital stay, cost and also affects mental and physical health of the patient. Incidence of wound infection from our study is high on comparing to incidence of wound infection from developed country but low on comparing the incidence of wound infection from developing country [5-7]. On concluding, there is no significant limiting factor in our study, as all the data entry was made by the same person by themselves and also pre-operatively routine antibiotic chemoprophylaxis was administered to all patients irrespective of elective or emergency surgery.

## CONCLUSION

In our present study, incidence of wound infection is 8.8% which is less compared to incidence in developing country but

more on comparing the incidence in developed country. We also studied the various factor contributing to its occurrence and various steps in controlling the wound infection.

Among the infected cases

- 90.9% cases were resolved completely and remaining went onto complication.
- 2nd post-operative day was the commonest day of detecting wound infection.
- Majority of wound infection was identified by both clinical and microbiological method.
- *Staphylococcus* and *E.coli* is the main organism isolated from culture. Hence, steps which can be taken in preventing wound infection include,
  - 1) Control of co-morbid conditions like Diabetes Mellitus.
  - 2) Abstinence from addiction like smoking, alcohol.
  - 3) Proper choice of antibiotics.
  - 4) Decreasing the duration of surgery, meticulous tissue handling, to achieve adequate vascularity.

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