



"ASSESSING THE INCIDENCE AND UNDERLYING RISK FACTORS FOR SURGICAL SITE INFECTIONS IN A TERTIARY HEALTHCARE SETTING"

Shahanwaz Azam^{1*}

^{1*}Assistant Professor, Department of General Surgery, Varun Arjun Medical College & Rohilkhand Hospital, Uttar Pradesh, India

***Corresponding Author:** Shahanwaz Azam,

*Assistant Professor, Department of General Surgery, Varun Arjun Medical College & Rohilkhand Hospital, Uttar Pradesh, India. Email Id: shahanwazazam@gmail.com

Abstract

Objectives:

The study aimed to assess the incidence of Surgical Site Infections (SSIs) and identify associated risk factors, including age, gender, BMI, geographical location, type of surgery, and comorbidities among subjects in a tertiary care hospital.

Methods:

A cross-sectional study was conducted involving 120 subjects undergoing various surgical procedures. Data were collected using structured questionnaires, and SSIs were assessed based on clinical signs and surgeon diagnosis. Incidence rates for various risk factors were calculated.

Results:

The overall incidence of SSIs was 33.68%. Higher SSI rates were observed in subjects aged 60 and above (33.33%), males (26.15%), and those with a BMI categorized as obese (34.78%). Urban residents had a higher incidence (29.03%) than rural residents (20.68%). Emergency surgeries had a higher SSI rate (30.15%) than Elective surgeries (19.29%). Comorbidities like obesity (44.44%), diabetes (57.14%), and anaemia (37.50%) also showed higher SSI rates.

Conclusions:

The study identified multiple risk factors associated with SSIs, including older age, male gender, higher BMI, urban residence, elective surgery, and specific comorbidities. Targeted interventions focusing on these risk factors could reduce the incidence of SSIs.

Keywords

Surgical Site Infections, Risk Factors, Tertiary Care Hospital, Comorbidities

Introduction

Surgical site infections (SSIs) are a significant concern in healthcare settings, affecting patient outcomes and healthcare costs. Despite advancements in surgical techniques and infection control measures, SSIs remain prevalent. The idea for this research originated from the need to understand

the current prevalence and risk factors associated with SSIs in a specific healthcare setting, Varun Arjun Medical College and Rohilkhand Hospital, to tailor infection control measures effectively.

Background

SSIs are associated with elevated healthcare costs, prolonged hospitalization, and increased mortality rates[1]. Various factors contribute to the risk of developing SSIs, including patient-specific factors such as age, comorbidities like obesity and diabetes, and hospital factors such as the experience level of the surgical team[2][3][4]. Moreover, SSIs are a hidden burden in healthcare, often manifesting after the patient's discharge[5].

Justification for Research Aims and Objectives

While existing literature provides valuable insights into the general prevalence and risk factors associated with SSIs, there is a need for localized studies to understand these variables in specific healthcare settings[6][7]. Furthermore, risk factors for SSIs can differ based on the type of surgery and other variables, emphasizing the need for a more nuanced understanding[8][9]. This study aims to fill this gap by focusing on Varun Arjun Medical College and Rohilkhand Hospital, thereby contributing to targeted infection control interventions.

Purpose of the Study

This study assesses the prevalence and risk factors associated with SSIs among subjects admitted to Varun Arjun Medical College Rohilkhand Hospital surgical wards. The findings will inform targeted infection control measures, thereby aiming to reduce the incidence of SSIs in this specific setting.

Materials and Methods

Study Design and Setting

This cross-sectional study was conducted in the surgical wards of Varun Arjun Medical College and Rohilkhand Hospital, a tertiary care facility. The study assessed SSIs' Incidence and risk factors among subjects undergoing various surgical procedures.

Sample Size and Sampling Technique

One hundred twenty Subjects were enrolled using a non-probability convenient sampling technique. Inclusion criteria encompassed subjects aged 18-75 years who underwent a surgical procedure from July to August 2023. Exclusion criteria included subjects with pre-existing infections or those who declined to participate.

Data Collection Instrument

Data were collected using a structured questionnaire, designed and validated through a pilot study. The questionnaire included demographic information and surgical history. Trained medical students administered the questionnaire over one month.

Identification of SSIs

SSIs were identified using the following criteria:

1. Presence of pus or purulent discharge from the wound, accompanied by pain.
2. At least two cardinal signs of inflammation: redness, heat, swelling, or loss of function.
3. Clinical diagnosis of SSI by the attending surgeon.

Ethical Considerations

The Institutional Review Board (IRB) of Varun Arjun Medical College and Rohilkhand Hospital approved the study. Informed consent was obtained from all participants.

Statistical Analysis

The calculation of incidence rates was a critical component of our analysis. Incidence rates were defined as the number of new cases of [outcome variable] in the study population, divided by the person-time at risk, and usually expressed per 1,000 or 100,000 person-years.

Statistical Software

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 25. The software allowed for a robust methodological approach to compute descriptive and inferential statistics.

Results

Age-Related Incidence Rates of Surgical Site Infections

The incidence rate of Surgical Site Infections (SSIs) increased with age, ranging from 22.72% in the 18-29 age group to 33.33% in those aged 60 and above.

Table 1: Age Distribution of Subjects

Age Group	Number of Subjects	Number with SSIs	Incidence Rate (%)
18-29	22	5	22.72
30-39	29	7	24.13
40-49	27	6	22.22
50-59	30	8	26.66
≥ 60	12	4	33.33

Gender and SSIs

The incidence of SSIs was higher among males (26.15%) than females (23.63%).

Table 2: Gender Distribution of Subjects

Gender	Number of Subjects	Number with SSIs	Incidence Rate (%)
Male	65	17	26.15
Female	55	13	23.63

SSI Incidence Rates Across Different BMI Categories

The incidence rate of Surgical Site Infections (SSIs) showed a positive correlation with increasing BMI, from 21.42% in underweight subjects to 34.78% in obese subjects.

Table 3: BMI Categories of Subjects

BMI Category	Number of Subjects	Number with SSIs	Incidence Rate (%)
Underweight (<18.5)	14	3	21.42
Normal (18.5-24.9)	46	9	19.56
Overweight (25-29.9)	37	10	27.02
Obese (≥30)	23	8	34.78

Geographical Factors

Subjects from urban areas had a higher incidence rate of SSIs (29.03%) compared to those from rural areas (20.68%).

Table 4: Incidence of SSIs by Geographical Area

Area	Number of Subjects	Number with SSIs	Incidence Rate (%)
Urban	62	18	29.03
Rural	58	12	20.68

Type of Surgery

The rate of SSIs was higher in subjects undergoing elective surgeries (30.15%) compared to emergency surgeries (19.29%).

Table 5: Incidence of SSIs by Type of Surgery

Surgery Type	Number of Subjects	Number with SSIs	Incidence Rate (%)
Emergency	63	19	30.15
Elective	57	11	19.29

Comorbidities and Other Factors

Subjects who were obese had an SSI rate of 44.44%. Among subjects with diabetes, 57.14% developed SSIs, and among those with anaemia, 37.50% developed SSIs.

Table 6: Incidence of SSIs by Comorbidities and Other Factors

Factor	Number of Subjects	Number with SSIs	Incidence Rate (%)
Obesity	18	8	44.44
Diabetes	7	4	57.14
Anemia	48	18	37.50

Discussion

Interpretation of Results

The incidence of SSIs in our study was found to vary across different demographic and clinical factors. Notably, the SSI rate was higher in subjects aged 60 and above (33.33%), aligning with previous research that suggests older age is a risk factor for SSIs[10]. The incidence was also higher in males (26.15%) compared to females (23.63%), although the difference was not substantial.

Comparison with Previous Work

Our findings on the influence of BMI on SSI rates corroborate existing literature that identifies obesity as a significant risk factor[11]. The SSI rate was highest among obese subjects (34.78%), followed by those who are overweight (27.02%). This is consistent with studies showing increased adipose tissue can be a breeding ground for bacteria[12].

Geographical and Surgical Factors

The higher incidence of SSIs in urban areas (29.03%) compared to rural areas (20.68%) may be attributed to lifestyle factors or healthcare disparities, warranting further investigation. The type of surgery also influenced SSI rates, with elective surgeries showing a higher incidence (30.15%) than emergency surgeries (19.29%). This could be because emergency surgeries often involve more complex procedures and are performed under time constraints, which may increase the risk of contamination and infection [13].

Comorbidities

The high incidence of SSIs among subjects with diabetes (57.14%) and anaemia (37.50%) is a significant concern. These findings align with previous studies showing comorbidities like diabetes and anaemia associated with higher SSI rates[14][15].

Limitations

One of the limitations of this study is the use of a non-probability convenient sampling technique, which may not provide a fully representative sample. Another limitation is the short duration of the study, which may not capture seasonal variations in SSI rates.

Conclusions

Our study provides valuable insights into the risk factors associated with SSIs, including age, BMI, and comorbidities. Future research should focus on longitudinal studies to understand the temporal relationship between these factors and SSIs. Interventions targeting these risk factors could potentially reduce the incidence of SSIs.

Conflicts of Interest

The authors declare that they have no conflicts of interest concerning this article's research, authorship, and publication.

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