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Original Article

Understanding The Role Of Healthcare-Associated Infections In Morbidity And Readmission Rates Post-Abdominal Surgery

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Abstract

Background: Healthcare-associated infections (HAIs) represent a significant challenge to healthcare systems worldwide and are especially problematic in developing countries like India. This study examines the impact of HAIs, particularly Surgical Site Infections (SSIs) and sepsis, on patient outcomes in a tertiary hospital in Uttar Pradesh, India, focusing on abdominal surgeries.

Methods: A prospective, observational study was conducted at Varun Arjun Medical College & Rohilkhand Hospital over six months, including 90 adult patients aged 30-60 undergoing abdominal surgeries. Patients were monitored for HAIs, length of hospital stay, readmission within 30 days, and morbidity. Statistical analysis was performed using SPSS version 25.

Results: Of the 90 patients, 13 developed at least one HAI, with SSIs being most prevalent in 8 patients, followed by sepsis in 5. Patients with HAIs had a significantly more extended average hospital stay (14±4.1 days) than those without HAIs (7±1.5 days). The readmission rate within 30 days was also higher in the HAI group (23.07%) than those without HAIs (7.79%). Morbidity within 30 days was 30.76% in the HAI group compared to 12.98% in the non-HAI group, although this was not statistically significant (p=0.108).

Conclusion: HAIs significantly impact patient outcomes following abdominal surgeries, underlining the urgent need for robust infection control measures. Further research is warranted to formulate effective interventions and policy recommendations in these settings.

Keywords: *Healthcare-associated infections, Surgical Site Infections, Abdominal surgeries Patient outcomes, Length of hospital stay*

INTRODUCTION

Healthcare-associated infections (HAIs) are a critical concern in the medical field, often posing significant challenges to patient outcomes and healthcare systems globally. These infections occur in a healthcare setting, neither present nor incubating at admission, and have grave implications, including prolonged hospital stay, increased healthcare costs, and elevated morbidity and mortality rates.[1] While the global burden of HAIs is considerable, developing countries, including India, face unique challenges concerning infection control and prevention due to resource limitations and the high patient load.[2]

Abdominal surgeries, in particular, entail a high risk of postoperative complications, including surgical site infections (SSIs), sepsis, and other types of HAIs.[3] The situation is further exacerbated in tertiary hospitals, which serve as primary referral centres and manage a more complicated patient demographic, often involving comorbidities and heightened susceptibility to infections.[4]

In Uttar Pradesh, one of India's most populous states, the impact of HAIs on patient outcomes undergoing abdominal surgeries in tertiary hospitals is a subject that has not been extensively studied. While there are general statistics and insights into the prevalence of HAIs in India, region-specific data is sparse. Such localized research is vital for creating targeted infection control measures, improving patient outcomes, and utilizing limited healthcare resources.[5]

This study aims to fill the existing research gap by investigating the impact of hospital infections on patient outcomes, explicitly undergoing abdominal surgeries in a tertiary hospital in Uttar Pradesh, India. We hypothesize that a high incidence of HAIs significantly correlates with adverse patient outcomes, such as prolonged hospital stays, increased readmission rates, and higher mortality rates. The results of this study intend to guide policy formulation and intervention strategies in Uttar Pradesh and serve as a model for similar settings in other developing countries.

MATERIALS AND METHODS

Study Design and Setting

This prospective observational study was conducted over 6 months from July 2022 to December 2022 at Varun Arjun Medical College & Rohilkhand Hospital, Uttar Pradesh, India. The hospital is a tertiary care facility, providing multi-disciplinary healthcare services, including a specialized unit for abdominal surgeries.

Study Population

The study included adult patients aged between 30 and 60 who underwent abdominal surgery during the study period. Patients were included irrespective of their gender, socio-economic status, and comorbidities. Patients below 30 and above 60 years of age, those who refused to participate, and those transferred from other healthcare facilities post-surgery were excluded from the study.

Data Collection

Infection Monitoring

A team of trained healthcare professionals continuously monitored the patients for signs and symptoms of healthcare-associated infections (HAIs) from preoperative until discharge or 30 days post-surgery, whichever was earlier. Standard infection control guidelines were followed during this process.

Variables

Data were collected on several variables to assess patient outcomes, including:

1. Length of hospital stay
2. Readmission rates within 30 days of discharge

3. Morbidity outcomes, including surgical site infection (SSI), sepsis, and other types of HAIs

Data Analysis
Statistical analyses were performed using SPSS version 25. Descriptive statistics were used to summarize demographic information and incidence rates of HAIs. A p-value less than 0.05 was considered statistically significant.

Ethical Considerations
Ethical approval for this study was obtained from the Institutional Review Board of Varun Arjun Medical College Rohilkhand Hospital. Written informed consent was taken from all participants. The study adhered to the Declaration of Helsinki, and all collected data were anonymized to maintain patient confidentiality.

Quality Control
Regular audits were conducted to ensure data accuracy and completeness. Any discrepancy in data was resolved by referring to the original medical records and discussing it with the research team.

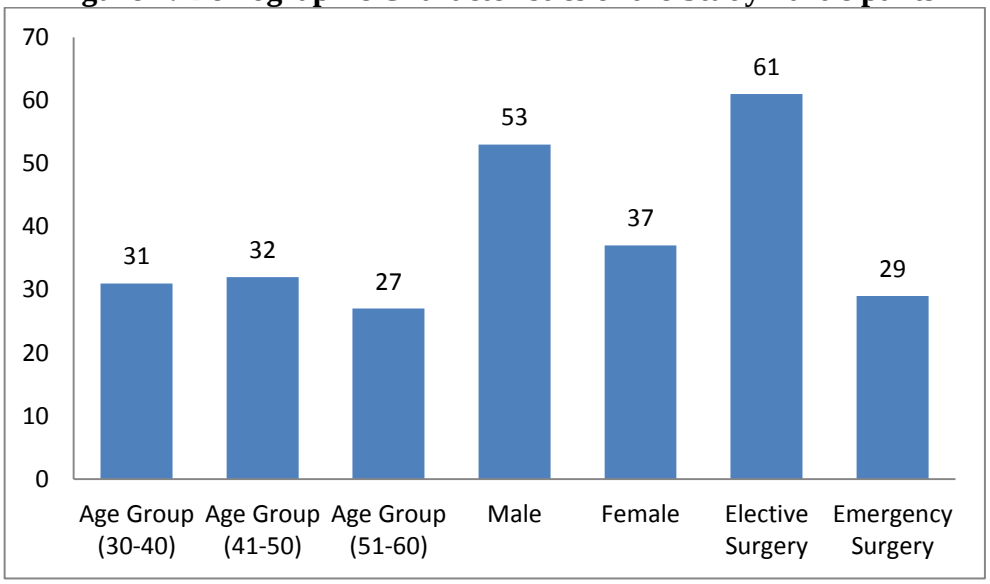
RESULTS

Demographic Characteristics
A total of 90 patients undergoing abdominal surgeries were enrolled in the study. The average age was 47±6.3 years, with 57% of the participants being male. The 61 surgeries were elective, while the remaining 29 were emergency procedures (Statistically significant, p=0.00002).

Table 1: Demographic Characteristics of the Study Participants

Variables	Categories	Frequency (%)	P-Value
Age Group (years)	30-40	31(34.44%)	0.791
	41-50	32(35.55%)	
	51-60	27(30%)	
Gender	Male	53(57.60%)	0.09
	Female	37(41.11%)	
Type of Surgery	Elective	61(67.77%)	**0.0007**
	Emergency	29(32.22%)	

Figure 1: Demographic Characteristics of the Study Participants



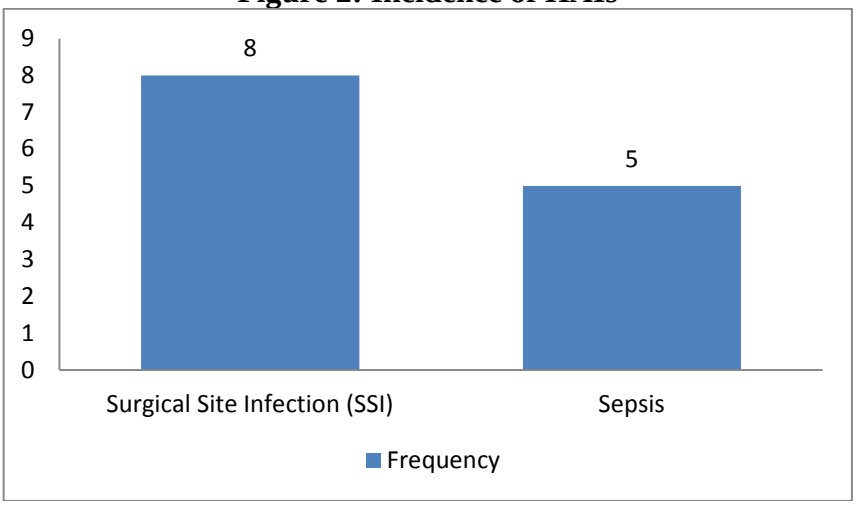
Incidence of Healthcare-Associated Infections (HAIs)

Of the participants, 13 developed at least one form of HAI. Surgical Site Infections (SSIs) were the most common, occurring in 8 patients, followed by sepsis in 5 patients.

Table 2: Incidence of HAIs

Type of HAI	Frequency (%)	P-Value
Surgical Site Infection (SSI)	8(8.88%)	0.405
Sepsis	5(5.55%)	

Figure 2: Incidence of HAIs



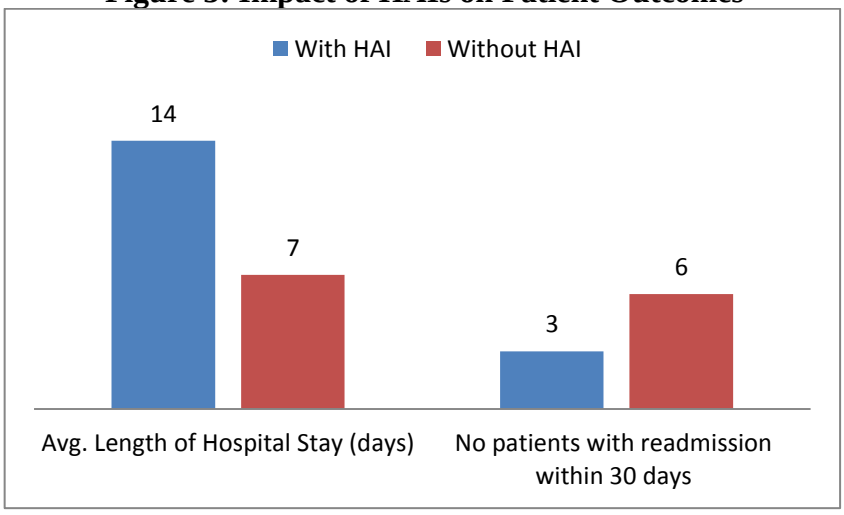
Patient Outcomes

Patients with HAIs had a significantly more extended average hospital stay (14±4.1 days) compared to those without HAIs (7±1.5 days) ($p < 0.00001$). The readmission rate within 30 days of discharge was also higher in patients with HAIs (23.07%) compared to those without (6%) ($p < 0.05$).

Table 3: Impact of HAIs on Patient Outcomes

Outcome Variables	With HAI (n=13)	Without HAI (n=77)	p-value
Avg. Length of Hospital Stay (days)	14±4.1	7±1.5	<**0.00001**
No patients with readmission within 30 days (%)	3(23.07)	6(7.79)	0.317

Figure 3: Impact of HAIs on Patient Outcomes



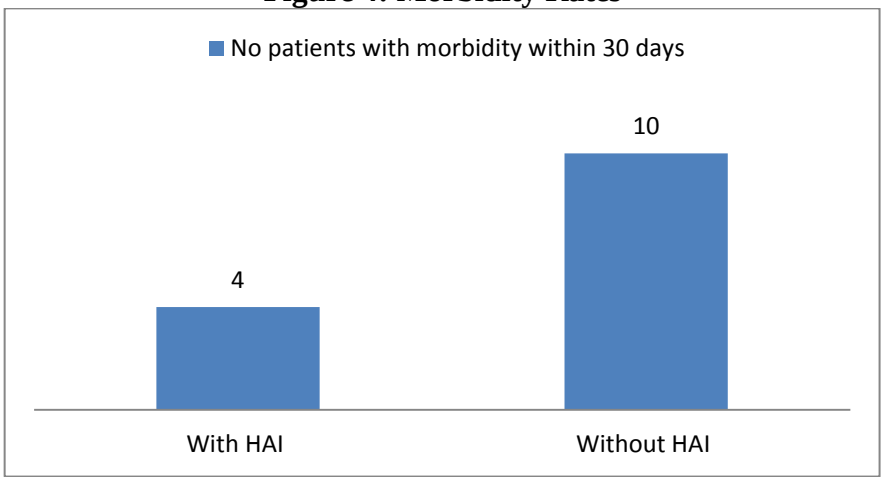
Morbidity

The 30-day morbidity was higher among patients who developed HAIs (28.6%) compared to those who did not (10.5%), and this difference was statistically not significant (p >0.05).

Table 4: Morbidity Rates

Outcome Variable	No patients with morbidity within 30 days (%)	p-value
With HAI (n=13)	4 (30.76%)	0.108
Without HAI (n=77)	10 (12.98%)	

Figure 4: Morbidity Rates



The study revealed a significant impact of HAIs on patient outcomes, including prolonged hospital stays, increased readmission rates, and higher morbidity, underscoring the importance of rigorous infection control measures in abdominal surgeries, especially in tertiary healthcare settings.

DISCUSSION

This study investigated the impact of healthcare-associated infections (HAIs) on patient outcomes after abdominal surgeries in a tertiary hospital in Uttar Pradesh, India. The study revealed several crucial insights that could influence public health policies and clinical practices.

The incidence of HAIs in our study was 14.44%, with the majority of infections being surgical site infections (8.88%), followed by sepsis (5.5%). These findings align with global trends, where SSIs often represent the most common HAIs following abdominal surgeries.[6] However, the incidence rate is noticeably higher than in some developed countries, reflecting the unique challenges healthcare systems face in developing countries.[7]

Our results showed that HAIs, particularly SSIs and sepsis, significantly affected patient outcomes, including length of hospital stay and readmission rates. These results corroborate existing literature, highlighting increased healthcare costs associated with HAIs.[8] Interestingly, although the morbidity rates were higher among patients who developed HAIs, the result was not statistically significant, possibly due to the limited sample size.

The study had limitations, including a relatively small sample size and a short follow-up period. It also focused exclusively on a single tertiary hospital, which may not entirely capture the diverse healthcare settings in Uttar Pradesh or other parts of India.

The findings from this study have several implications. First, it underscores the need for robust infection control measures to reduce the rate of HAIs, particularly SSIs and sepsis. Second, it highlights the importance of localized research for developing effective interventions and policy recommendations.[9]

CONCLUSION

Healthcare-associated infections significantly impact patient outcomes following abdominal surgeries in tertiary hospitals in Uttar Pradesh, India. There is an urgent need to address these issues through evidence-based interventions and policies, especially in resource-limited settings.

ABBREVIATIONS

HAI- Healthcare-Associated Infections
SSI - Surgical Site Infections
SPSS - Statistical Package for the Social Sciences
Avg. - Average
IRB - Institutional Review Board

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CONFLICT OF INTERESTS

The authors declare no conflict of interest concerning this article's research, authorship, and publication.

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