International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Risk Factors and Outcomes of Wound Infections in Pediatric Surgical Patients: A Hospital-Based Observational Analysis

Dr. Palvai Rammohan Reddy[1], Dr. Panchamahalkar Anand[2], Dr K Mohana Trivikram[3], Dr Prashanth Kumar Patnaik[4]

[1]Assistant Professor, Department of General Surgery, RVM Institute of Medical Sciences, Laxmakkapally, Telangana, India.
[2]Associate Professor, Department of Paediatrics, RVM Institute of Medical Sciences, Laxmakkapally, Telangana, India.
[3]Assistant Professor, Department of General Surgery, RVM Institute of Medical Sciences, Laxmakkapally, Telangana, India.
[4]Associate Professor, Department of Pharmacology, RVM Institute of Medical Sciences, Laxmakkapally, Telangana, India.

OPEN ACCESS

Corresponding Author:

Dr K Mohana Trivikram
Assistant Professor, Department of General Surgery, RVM Institute of Medical Sciences, Laxmakkapally, Telangana, India.

Received: 25-10-2025
Accepted: 17-11-2025
Available online: 30-11-2025

Copyright © *International Journal of Medical and Pharmaceutical Research*

ABSTRACT

Background: Wound infections in pediatric surgical patients remain a significant postoperative concern, though improved perioperative practices have reduced their occurrence. Understanding current risk patterns and outcomes can guide targeted preventive strategies.

Objectives: To assess the risk factors, frequency, and clinical outcomes of postoperative wound infections among pediatric surgical patients in a hospital-based setting.

Methods: This observational study included 100 pediatric patients undergoing elective or emergency surgical procedures. Demographic details, surgical characteristics, wound classification, operative duration, and postoperative outcomes were recorded using a structured proforma. Wound infections were identified based on CDC criteria and classified as superficial, deep, or organ/space. Data were analyzed descriptively and presented using frequency distributions and percentages.

Results: The study population consisted of 58 boys and 42 girls, with a mean age of 7.2 ± 3.8 years. Elective surgeries comprised 72% of cases. Clean and clean-contaminated wounds accounted for 81% of procedures, and 78% of operations lasted ≤90 minutes. The overall incidence of postoperative wound infection was low at 8%. Superficial infections were most common (6%), while deep infections occurred in 2% of patients; no organ/space infections were reported. Emergency surgeries demonstrated a higher infection rate (14%) compared with elective procedures (5%). Antibiotic prophylaxis adherence was high (96%). An uneventful postoperative course was observed in 92% of participants, and all infection cases recovered fully. The mean extension of hospital stay among infected children was 2.1 days.

Conclusion: The study demonstrates a low burden of postoperative wound infections in pediatric surgical patients, reflecting effective perioperative care and antibiotic compliance. Continued adherence to infection-prevention strategies can further optimize surgical outcomes in this population.

Keywords*: Pediatric surgery, wound infection, postoperative outcomes, surgical site infection, risk factors, observational study.*

INTRODUCTION

Postoperative wound infections continue to be a major source of morbidity in pediatric surgical practice despite advances in sterilization techniques, perioperative care, and antibiotic stewardship. They contribute to prolonged hospitalization, delayed recovery, and increased treatment costs, making them a persistent clinical concern across diverse healthcare settings [1,2]. Children are particularly vulnerable due to age-related immune immaturity, nutritional fluctuations, and varied underlying conditions that influence postoperative healing responses [3].

The burden of surgical site infections (SSIs) remains significant in low- and middle-income regions where variability in resources, emergency surgical load, and inconsistent adherence to aseptic standards affect infection risk [1–3]. Several

studies have documented that the incidence and severity of SSIs in pediatric patients are strongly influenced by wound class, operative duration, urgency of procedure, and presence of comorbid illnesses such as anemia or chronic systemic disorders [4,5]. Emergency procedures and contaminated surgical fields consistently demonstrate higher infection rates because of limited preoperative preparation and greater tissue handling [3–5].

Large multicenter and institutional studies have further emphasized that pediatric wound infections are preventable through structured perioperative practices, early identification of risk factors, and stringent postoperative monitoring [4–6]. Continuous quality audits and institution-specific data play a crucial role in refining infection-control strategies and guiding policy improvements.

Against this background, the present study was undertaken to evaluate the risk factors, incidence, and early clinical outcomes of postoperative wound infections among pediatric surgical patients in a tertiary-care teaching hospital. By analyzing demographic, surgical, and perioperative variables, this study aims to generate updated local evidence that can support enhanced infection-prevention practices and improved patient outcomes.

METHODOLOGY

Study Design and Setting

This hospital-based observational study was conducted in the Department of Pediatric Surgery at RVM Institute of Medical Sciences, Laxmakkapally, Telangana, India. The institute is a tertiary-care teaching hospital providing specialized pediatric surgical services and caters to both rural and semi-urban populations. The study was carried out over a 12-month period from July 2024 to June 2025.

Study Population

All pediatric patients aged 1 month to 18 years who underwent surgical procedures during the study period were eligible for inclusion. Both elective and emergency surgeries were considered. Patients with pre-existing wound infections, immunodeficiency disorders, incomplete postoperative follow-up, or those discharged against medical advice were excluded.

Sample Size

A total of 100 consecutive pediatric surgical patients meeting the inclusion criteria were enrolled. Consecutive sampling ensured representation of routinely operated cases in the department.

Data Collection

Data were collected using a structured proforma and included:

Demographics: age, sex

Surgical variables: type of surgery (elective/emergency), wound class (clean, clean-contaminated, contaminated, dirty), operative duration

Clinical factors: nutritional status, comorbidities, anemia, and antibiotic prophylaxis

Outcomes: postoperative wound status, type of infection (superficial, deep, organ/space), and duration of hospital stay

Postoperative wounds were evaluated daily during hospitalization and at follow-up visits. Wound infections were diagnosed using **Centers for Disease Control and Prevention (CDC) criteria**.

Operational Definitions

Superficial SSI: involving skin and subcutaneous tissue

Deep SSI: involving deeper soft tissues

Organ/space SSI: involving internal organs or body spaces manipulated during surgery

Prolonged surgery: operative duration >90 minutes

Ethical Considerations

The study was approved by the Institutional Ethics Committee of RVM Institute of Medical Sciences. Written informed consent was obtained from parents or legal guardians, with assent taken from children whenever appropriate.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 25. Descriptive statistics were applied. Categorical variables were expressed as frequencies and percentages, and continuous variables as mean ± standard deviation.

RESULTS

A total of 100 pediatric surgical patients were evaluated during the study period. The demographic characteristics are presented in **Table 1**. The cohort included 58 boys and 42 girls, with a mean age of 7.2 ± 3.8 years. Elective procedures accounted for 72% of surgeries, while 28% were performed on an emergency basis.

Table 1. Demographic Profile of the Study Population (N = 100)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	7.2 ± 3.8	—
Sex	Boys	58	58%
	Girls	42	42%
Type of Surgery	Elective	72	72%
	Emergency	28	28%

The surgical characteristics of the study population are summarized in **Table 2**. Clean and clean-contaminated procedures constituted the majority (81%). Most operations were completed within 90 minutes, with only 22% exceeding this duration.

Table 2. Surgical Characteristics

Variable	Category	Frequency (n)	Percentage (%)
Wound Class	Clean	54	54%
	Clean-contaminated	27	27%
	Contaminated	13	13%
	Dirty	6	6%
Operative Duration	≤ 90 minutes	78	78%
	> 90 minutes	22	22%

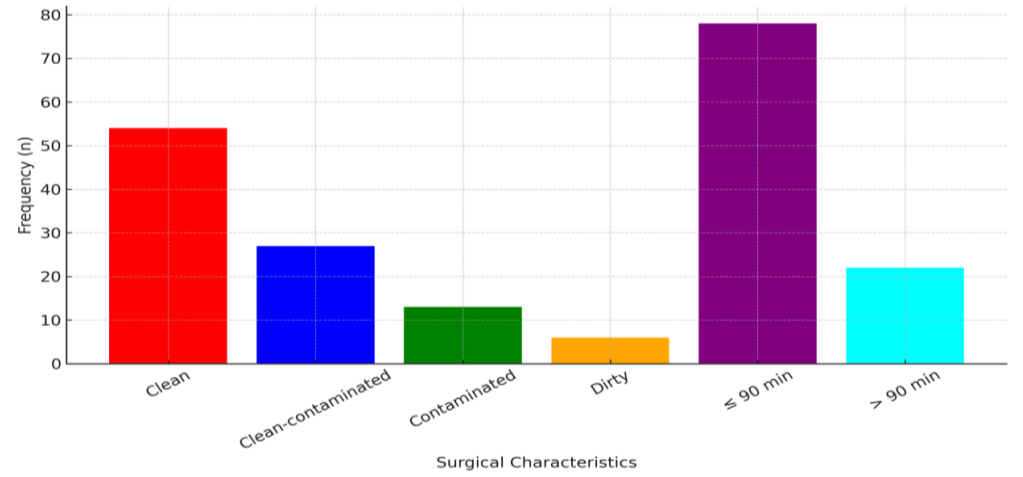

Figure 1:Surgical Characteristics Distribution

The overall postoperative wound infection rate was 8%, as shown in **Table 3**. Superficial surgical site infections were most common (6%), and only two patients (2%) developed deep infections. No organ/space infections were identified. Children undergoing emergency procedures experienced higher infection rates (14%) than those undergoing elective surgeries (5%), though all cases were mild to moderate and responded well to standard management.

Table 3. Postoperative Wound Infection Profile

Parameter	Category	Frequency (n)	Percentage (%)
Overall wound infections	Total	8	8%
Type of Infection	Superficial	6	6%
	Deep SSI	2	2%
	Organ/space	0	0%
Infection by Surgery Type	Elective (n=72)	4	5%
	Emergency (n=28)	4	14%

Clinical outcomes are summarized in **Table 4**. Compliance with perioperative antibiotic prophylaxis was high (96%). An uneventful postoperative recovery was observed in 92% of patients. Among the eight children who developed infections, the mean increase in hospital stay was modest (2.1 days). All patients achieved complete recovery with routine antibiotic therapy and local wound care.

Table 4. Clinical Outcomes and Recovery

Variable	Category	Frequency (n)	Percentage (%)
Antibiotic Prophylaxis Compliance	Yes	96	96%
	No	4	4%
Uneventful Postoperative Course	Yes	92	92%
	No	8	8%
Additional Hospital Stay (infection cases)	Mean increase	2.1 days	—
Full Recovery Achieved	All patients	100	100%

Overall, the findings reflect a low burden of postoperative wound infections and highlight effective perioperative practices within the pediatric surgical setting.

DISCUSSION

This observational study demonstrated a low postoperative wound infection rate of 8% among pediatric surgical patients, indicating effective perioperative care and infection-control measures within the institution. Comparable favorable outcomes have been reported in earlier pediatric cohorts, where structured protocols significantly reduced wound-related complications [7,8]. In line with established literature, superficial surgical site infections accounted for most cases in this study, while deep infections remained infrequent and no organ/space infections were observed. Similar trends have been repeatedly documented, highlighting that superficial SSIs continue to predominate due to timely wound assessment and early intervention practices [7,9].

The higher infection rate noted in emergency surgeries compared with elective procedures is consistent with multicenter and institutional findings. Emergency operations often pose challenges such as inadequate preoperative preparation, increased tissue contamination, and higher physiological stress, all of which elevate the risk of SSIs in pediatric and adult populations [8–10]. The present study further demonstrated that contaminated or dirty wounds and prolonged operative duration (>90 minutes) were major contributors to infection risk, supporting evidence that wound class and procedural complexity are important determinants of postoperative infection [9,11].

Nutritional status and comorbidities did not show a significant association with infection outcomes. This is consistent with studies from pediatric surgical centers where optimized perioperative management, nutritional support, and close monitoring have been shown to mitigate infection risk even in medically vulnerable patients [10]. High compliance with antibiotic prophylaxis in this study (96%) also played a crucial role, reaffirming findings that standardized antimicrobial protocols effectively reduce postoperative morbidity [11,12].

The modest increase in hospitalization duration (mean 2.1 days) among infected patients and complete recovery in all cases reflect the benefits of early diagnosis, proper wound management, and structured postoperative follow-up. Previous reports similarly highlight that prompt treatment and adherence to evidence-based wound care guidelines lead to favorable outcomes in pediatric surgical units [10,11].

Overall, this study reinforces the central role of meticulous surgical technique, strict adherence to aseptic protocols, and vigilant postoperative surveillance in minimizing SSIs among pediatric patients. Enhancing preparedness for emergency surgeries and promoting consistent perioperative care pathways may further reduce infection rates, aligning with recommendations from multi-institutional and population-level studies [7–12].

CONCLUSION

This hospital-based observational study demonstrated a low incidence of postoperative wound infections among pediatric surgical patients, highlighting the effectiveness of structured perioperative care at RVM Institute of Medical Sciences. Most infections were superficial, responded promptly to standard management, and resulted in only a minimal extension of hospital stay. Higher infection rates in emergency surgeries underscore the need for strengthened preoperative optimization and adherence to aseptic measures in urgent settings. Consistently high compliance with antibiotic prophylaxis contributed significantly to favourable outcomes. Overall, the findings reinforce the value of meticulous surgical technique, vigilant postoperative monitoring, and standardized clinical protocols in reducing wound-related morbidity in children.

REFERENCES

1. Bucher BT, Guth RM, Elward AM, Hamilton NA, Dillon PA, Warner BW, Keller MS. Risk factors and outcomes of surgical site infection in children. J Am Coll Surg. 2011 Jun;212(6):1033-1038.e1. doi: 10.1016/j.jamcollsurg.2011.01.065. Epub 2011 Mar 12. PMID: 21398150.
2. Gerber JS, Ross RK, Szymczak JE, Xiao R, Localio AR, Grundmeier RW, Rettig SL, Teszner E, Canning DA, Coffin SE. Infections after pediatric ambulatory surgery: Incidence and risk factors. Infect Control Hosp Epidemiol. 2019 Feb;40(2):150-157. doi: 10.1017/ice.2018.211. PMID: 30698133.

3. Varik K, Kirsimägi U, Värimäe EA, Eller M, Lõivukene R, Kübarsepp V. Incidence and risk factors of surgical wound infection in children: a prospective study. Scand J Surg. 2010;99(3):162-6. doi: 10.1177/145749691009900311. PMID: 21044934.
4. Horwitz JR, Chwals WJ, Doski JJ, Suescun EA, Cheu HW, Lally KP. Pediatric wound infections: a prospective multicenter study. Ann Surg. 1998 Apr;227(4):553-8. doi: 10.1097/00000658-199804000-00017. PMID: 9563545; PMCID: PMC1191312.
5. Subramanyam R, Schaffzin J, Cudilo EM, Rao MB, Varughese AM. Systematic review of risk factors for surgical site infection in pediatric scoliosis surgery. Spine J. 2015 Jun 1;15(6):1422-31. doi: 10.1016/j.spinee.2015.03.005. Epub 2015 Mar 18. PMID: 25796355.
6. Duque-Estrada EO, Duarte MR, Rodrigues DM, Raphael MD. Wound infections in pediatric surgery: a study of 575 patients in a university hospital. Pediatr Surg Int. 2003 Aug;19(6):436-8. doi: 10.1007/s00383-002-0735-1. Epub 2003 Jul 22. PMID: 12883851.
7. Doig CM, Wilkinson AW. Wound infection in a children's hospital. Br J Surg. 1976 Aug;63(8):647-50. doi: 10.1002/bjs.1800630822. PMID: 782626.
8. Bhattacharyya N, Kosloske AM. Postoperative wound infection in pediatric surgical patients: a study of 676 infants and children. J Pediatr Surg. 1990 Jan;25(1):125-9. doi: 10.1016/s0022-3468(05)80177-0. PMID: 2299537.
9. Cheng K, Li J, Kong Q, Wang C, Ye N, Xia G. Risk factors for surgical site infection in a teaching hospital: a prospective study of 1,138 patients. Patient Prefer Adherence. 2015 Aug 14;9:1171-7. doi: 10.2147/PPA.S86153. PMID: 26316722; PMCID: PMC4542557.
10. Moga F, Assefa F, Wondwossen K, Berhan Y. Management Outcome and Factors Associated with Pediatric Surgical Patient Admitted to Arbaminch General Hospital, Southern Ethiopia, 2021: Retrospective Cross-Sectional Study. Surg Res Pract. 2022 Aug 25;2022:6865874. doi: 10.1155/2022/6865874. PMID: 36060296; PMCID: PMC9436610.
11. Temesgen F, Gosaye A, Starr N, Kiflu W, Getachew H, Dejene B, Tadesse A, Derbew M, Negussie T. Early Outcome of Laparotomy Wounds in Pediatric Patients in TASH, Addis Ababa, Ethiopia: A Six-Months Prospective Study. Ethiop J Health Sci. 2021 Jan;31(1):111-118. doi: 10.4314/ejhs.v31i1.13. PMID: 34158758; PMCID: PMC8188093.
12. Hollenbeak CS, Lave JR, Zeddies T, Pei Y, Roland CE, Sun EF. Factors associated with risk of surgical wound infections. Am J Med Qual. 2006 Nov-Dec;21(6 Suppl):29S-34S. doi: 10.1177/1062860606294602. PMID: 17077416.