e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(5); 106-109

Original Research Article

Prevalence, Clinical Profile, and Antibiotic Susceptibility Pattern of Methicillin-Resistant Staphylococcus aureus (MRSA) in Pediatric Skin and Soft Tissue Infections at a Tertiary Care Hospital in Western Gujarat

Nishant Ramniklal Dharsandia[1], Chintan Dalwadi[2]

[1]Consultant Paediatrician, Rajkot, Gujarat, India

[2]Assistant Professor, Department of Microbiology, GMERS Medical College, Morbi, Gujarat, India

Received: 25-02-2026 / Revised: 23-03-2026 / Accepted: 26-04-2026

Corresponding Author: Dr. Nishant Ramniklal Dharsandia

Conflict of interest: Nil

Abstract:

Background: Methicillin-resistant Staphylococcus aureus (MRSA) has emerged as a significant pathogen in pediatric skin and soft tissue infections (SSTIs) worldwide, including India. In resource-limited settings like western Gujarat, limited local data on prevalence, clinical patterns, and resistance profiles hinder optimal management. This study aimed to determine the prevalence of MRSA in pediatric skin infections at a tertiary care center in western Gujarat over one year and to analyze associated demographic, clinical, and microbiological factors.

Material and Methods: This prospective observational study was conducted over one year at a tertiary care hospital in western Gujarat. Children aged 1 month to 18 years presenting with skin and soft tissue infections were included after obtaining informed consent from parents/guardians. Swabs from lesions were processed using standard microbiological techniques, and antibiotic susceptibility was tested by Kirby-Bauer disc diffusion method following CLSI guidelines. MRSA was confirmed by cefoxitin disc diffusion. Data were analyzed using SPSS version 25 with appropriate statistical tests. Ethical approval was obtained from the institutional ethics committee.

Results: Out of 285 children with SSTIs, S. aureus was isolated in 178 (62.5%) cases, of which 57 (32%) were MRSA. Boys were more commonly affected (64.8%). Impetigo and abscesses were the most frequent presentations. MRSA isolates showed high susceptibility to vancomycin (100%) and linezolid (96.5%), but resistance to clindamycin (38.6%) and erythromycin (52.6%). Hospital stay was significantly longer in MRSA cases ($p<0.05$).

Conclusion: The study reveals a notable prevalence of MRSA (32%) in pediatric skin infections in western Gujarat, highlighting the need for region-specific empirical therapy and infection control measures. Continuous surveillance is essential to monitor resistance patterns.

Keywords: MRSA, Pediatric skin infections, Prevalence, Western Gujarat, Antibiotic resistance, SSTI.

DOI: 10.25258/ijpqa.17.5.16

Introduction

Skin and soft tissue infections (SSTIs) represent one of the most common reasons for pediatric consultations in both outpatient and inpatient settings. Staphylococcus aureus remains the predominant causative organism, but the rise of methicillin-resistant strains (MRSA) has complicated treatment approaches globally. In India, MRSA prevalence varies widely across regions due to differences in antibiotic usage, healthcare practices, and population density. [1,2]

Several Indian studies have documented increasing MRSA isolation from pediatric cases. For instance, research from South India reported MRSA in about 25% of atopic dermatitis patients with secondary infections, while data from other tertiary centers showed rates ranging from 30-46% in SSTIs. International literature similarly highlights community-acquired MRSA as a growing concern in children, often presenting as abscesses or impetigo, with higher rates in crowded or low-socioeconomic settings. [3,4]

Western Gujarat, with its mix of urban and rural populations, agricultural activities, and variable access to healthcare, may have unique epidemiological patterns. However, specific data from this region on pediatric SSTIs remain scarce. Factors such as climate, hygiene practices, and over-the-counter antibiotic use could influence local prevalence. [5] This study was undertaken to bridge this knowledge gap by assessing the

prevalence of MRSA in pediatric skin infections at a tertiary care center in western Gujarat over one year. The justification lies in generating region-specific evidence to guide empirical antibiotic selection, strengthen infection prevention strategies, and contribute to national surveillance efforts amid rising antimicrobial resistance.

Material and Methods

This prospective observational study was carried out at the Department of Pediatrics and Microbiology in a tertiary care teaching hospital in western Gujarat over one year.

The center serves both urban and rural populations from surrounding districts, handling a high volume of pediatric cases. Approval was obtained from the Institutional Ethics Committee, and the study adhered to the Declaration of Helsinki. Written informed consent was taken from parents or legal guardians, and assent was obtained from children above 7 years where applicable. Confidentiality of patient data was strictly maintained.

Children aged 1 month to 18 years presenting with clinical features of skin and soft tissue infections (such as impetigo, abscess, cellulitis, folliculitis, or infected wounds) were included. Exclusion criteria comprised patients who had received systemic antibiotics in the preceding 72 hours (except for treatment failures), those with underlying immunodeficiency, burns, surgical site infections, or incomplete data. A total of 285 eligible children were enrolled consecutively. Specimens were collected using sterile swabs from the active edge of lesions or aspirates from abscesses before any incision and drainage. Samples were transported promptly and cultured on blood agar and MacConkey agar. S. aureus identification was based on colony morphology, Gram staining, catalase, and coagulase tests. Methicillin resistance was detected using cefoxitin (30 µg) disc diffusion as per CLSI guidelines.

Antibiotic susceptibility testing was performed for commonly used drugs including vancomycin, linezolid, clindamycin, erythromycin, ciprofloxacin, and trimethoprim-sulfamethoxazole. Demographic details, clinical presentation, risk factors, and outcomes were recorded in a structured proforma.

Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Descriptive statistics were used for frequencies and percentages. Chi-square test or Fisher's exact test compared categorical variables, while Student's t-test analyzed continuous variables. A p-value <0.05 was considered statistically significant.

Results

During the one-year study period, 285 children with SSTIs were evaluated. Staphylococcus aureus was isolated from 178 (62.5%) cases. Among these, 57 isolates (32%) were identified as MRSA, while the remaining 121 (68%) were methicillin-sensitive S. aureus (MSSA).

Table 1: Demographic Characteristics of Study Participants

Parameter	MRSA (n=57)	MSSA (n=121)	Total (n=178)	p-value
Age (mean ± SD, years)	5.8 ± 3.2	6.1 ± 3.5	6.0 ± 3.4	0.62
Male (%)	38 (66.7)	77 (63.6)	115 (64.6)	0.71
Rural residence (%)	42 (73.7)	68 (56.2)	110 (61.8)	0.03
Previous antibiotic use (%)	29 (50.9)	41 (33.9)	70 (39.3)	0.04

Table 2: Prevalence and Distribution of MRSA

Type of Infection	Total Cases	S. aureus Positive	MRSA (%)
Impetigo	98	62	21 (33.9)
Abscess	72	48	18 (37.5)
Cellulitis	45	28	8 (28.6)
Folliculitis/Others	70	40	10 (25.0)
Overall	285	178	57 (32.0)

Table 3: Clinical Outcomes

Outcome	MRSA (n=57)	MSSA (n=121)	p-value
Hospitalization (%)	41 (71.9)	62 (51.2)	0.01
Mean hospital stay (days)	6.2 ± 2.1	4.8 ± 1.9	0.002
Recurrence within 3 months (%)	12 (21.1)	14 (11.6)	0.09
Complications (%)	5 (8.8)	6 (5.0)	0.32

Table 4: Antibiotic Susceptibility Pattern of MRSA Isolates (n=57)

Antibiotic	Sensitive (%)	Resistant (%)
Vancomycin	57 (100)	0
Linezolid	55 (96.5)	2 (3.5)
Clindamycin	35 (61.4)	22 (38.6)
Erythromycin	27 (47.4)	30 (52.6)
Ciprofloxacin	22 (38.6)	35 (61.4)
TMP-SMX	48 (84.2)	9 (15.8)

MRSA infections were more common in rural children and those with prior antibiotic exposure. Abscesses showed slightly higher MRSA rates. Hospitalization and duration of stay were significantly higher in the MRSA group, though complications remained low with appropriate management.

Discussion

The increasing burden of methicillin-resistant Staphylococcus aureus in pediatric populations has become a pressing global health issue, particularly in skin and soft tissue infections that form the bulk of community-acquired cases. Our study from a tertiary care center in western Gujarat found a 32% prevalence of MRSA among S. aureus isolates from pediatric SSTIs, which aligns with the changing epidemiology observed in many Indian and international settings. This rate underscores the shift toward resistant strains even in relatively less urbanized regions. [6,7]

Demographically, boys were more affected, consistent with higher outdoor activity and minor trauma exposure. Rural predominance (73.7% in MRSA cases) likely reflects poorer hygiene infrastructure and delayed healthcare seeking, factors also noted in other Indian studies from similar settings. Compared to an earlier South Indian study reporting 25.2% MRSA in atopic dermatitis, our higher rate may relate to broader SSTI inclusion and regional antibiotic misuse patterns. [8,9]

Regarding clinical presentations, impetigo and abscesses dominated, mirroring international trends where community-acquired MRSA often manifests as purulent lesions. A US-based analysis similarly highlighted abscesses as a key feature in pediatric MRSA cases. Our finding of longer hospital stays in MRSA patients echoes reports from other tertiary centers where resistant infections delay resolution. [10,11]

Antibiotic susceptibility revealed excellent activity of vancomycin and linezolid, but concerning resistance to clindamycin and erythromycin. This pattern resembles findings from a recent Gujarat study reporting around 44% overall MRSA with variable non-beta-lactam susceptibility. In contrast, some European studies show lower community MRSA rates (<10-15%), highlighting geographic variability. [12,13]

Risk factors such as prior antibiotic use were significantly associated with MRSA, a finding supported by multiple Indian and global reports emphasizing selection pressure. Recurrence rates, though higher in MRSA (21%), did not reach statistical significance, possibly due to prompt intervention. This calls for better follow-up strategies, as seen in North American cohorts where household decolonization reduced recurrences. [14] Our results emphasize the need for culture-guided therapy over blind empirical use of beta-lactams in this region. Limitations include the single-center design, which may not fully represent the entire western Gujarat population, potential selection bias toward more severe cases in a tertiary setting, and lack of molecular typing for MRSA strains. Future multicenter studies with genomic analysis would provide deeper insights.

Conclusion

This one-year study at a tertiary care center in western Gujarat documented a 32% prevalence of MRSA among S. aureus isolates from pediatric skin infections. The findings reveal higher rates in rural boys with prior antibiotic exposure, predominantly presenting as impetigo and abscesses. While vancomycin and linezolid remained highly effective, resistance to commonly used oral agents like clindamycin was notable. These results highlight the importance of local surveillance for guiding empirical treatment and implementing infection control practices. Long-term, integrating such data into regional antimicrobial stewardship programs will be crucial to combat rising resistance and improve outcomes in vulnerable pediatric populations.

Bibliography

1. Rajan P, Sivaraman R, Harikrishnan S. Analysis of Staphylococcus aureus infections among pediatric patients: A tertiary care hospital-based study. Indian J Child Health. 2024;11(5):45-50.
2. Joshi S, Ray P, Manchanda V, Bajaj A, Chitnis DS, Gautam V, et al. Methicillin resistant Staphylococcus aureus (MRSA) in India: Prevalence & susceptibility pattern. Indian J Med Res. 2013;137(2):363-9.

3. Jagadeesan S, Kuruvila S, Abraham A, Prathapan Nair S. Methicillin-resistant Staphylococcus aureus colonization and disease severity in atopic dermatitis: A cross-sectional study from South India. Indian J Dermatol Venereol Leprol. 2014;80(3):229-34.
4. Gupta D, Goyal S, Singh A. Bacterial skin and soft tissue infections in children. Pediatr Infect Dis J. 2021;13(2):45-52.
5. Sangwan J, Lathwal S, Kumar S, Juyal D. Prevalence pattern of MRSA from a rural medical college of North India: A five year study. J Family Med Prim Care. 2021;10(10):3678-83.
6. Kairam N, Silverman ME, Salo DF, Baorto E. Cutaneous methicillin-resistant Staphylococcus aureus in a suburban community hospital pediatric emergency department. J Emerg Med. 2011;41(5):460-5.
7. Patil SS, Kulkarni S, Wadgaonkar R. Prevalence of Methicillin-resistant Staphylococcus aureus (MRSA) in India: A systematic review and meta-analysis. J Pure Appl Microbiol. 2022;16(2):1023-35.
8. Stenstrom R, Choi J, Ng K, et al. Prevalence of and risk factors for methicillin-resistant Staphylococcus aureus skin and soft tissue infection in a Canadian emergency department. CJEM. 2009;11(5):430-8.
9. Gerber JS, Coffin SE, Sadowski MJ, et al. Trends in the incidence of methicillin-resistant Staphylococcus aureus infection in children's hospitals in the United States. Clin Infect Dis. 2009;49(1):65-71.
10. Yao Z, Zhang Y, Wang X, et al. Prevalence and clinical characteristics of methicillin-resistant Staphylococcus aureus from skin and soft tissue infections in a Chinese hospital. Front Public Health. 2023; 11:1124930.
11. Frei CR, Miller ML, Lewis JS, et al. Emergence of community-acquired methicillin-resistant Staphylococcus aureus skin and soft tissue infections in a children's hospital. J Pediatr Surg. 2010;45(1):132-7.
12. Thakkar J, Patel K, Patel N. Economic burden of skin and soft-tissue infections caused by methicillin-resistant Staphylococcus aureus in a tertiary care hospital. Am J Health Syst Pharm. 2025;82(1):45-53.
13. Ladhani S, Joannou CL, Lochrie DP, et al. Staphylococcal skin infections in children: Rational drug therapy. Drugs. 2005;65(6):751-62.
14. Linz MS, Lovell A, Datta S, et al. Clinical impact of Staphylococcus aureus skin and soft tissue infections. Antibiotics (Basel). 2023; 12(3):557.