

MEDICAL SCIENCES

SCARLET FEVER IN INDIA

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Abstract

Scarlet fever (ScF), a toxin-mediated result of Group A Streptococcus (GAS) infection, it considerable risk to public health because of its frequent of outbreaks and Associated with severe sequelae. In this study, the WHO clinical criteria were used and a structured Questionnaire was administered in investigating 218 suspected cases of ScF across Indian states over 12 months. Rapid Antigen Detection Test (RADT) and clinical assessment Confirmed cases. The experimental result was that there was a confirmation rate of 64.2% (140/218) with a prevalence of incidence in children aged 5-12 years (72.1%). Severity Stratification (Mild, Moderate, Severe) by composite symptom score showed 45.7% Moderate and 18.6% severe cases. Severe cases were highly correlat with delay. Initiation of antibiotics . The result demonstrates that ScF is A neglected disease in India , high morbidity is associated with access delays to Healthcare. The results support the WHO criteria for inclusion in national surveillance and also. Identify key touch points for early intervention and for the prevention of Acute Rheumatic Fever.

Keywords: Scarlet Fever, Group A Streptococcus, WHO Criteria, India, Epidemiology, Severity Index, Outbreak Surveillance

Introduction

Scarlet fever, which is caused by strains of Streptococcus pyogenes as Group A Streptococcus producing Exotoxin, is manifested by pharyngitis, fever and rash. Further considered a historical disease, a worldwide resurgence has been reported with rising Incidence and severity in East Asia and Europe. Non-specific surveillance, clinical overlap with viral exanthems, and inconsistent diagnostic practices also obscure the disease burden In India. To improve global comparability, streptococcal pharyngitis and ScF have Standardized case definitions from the World Health Organization. Nevertheless, their Application in the Indian healthcare setting is inconsistent. This study help to applying WHO criteria in a systematic survey to: 1) Estimate the percentage of Clinically suspected cases who meet confirmed criteria, 2) Stratify disease severity By means of a standardized scoring system, 3) Identify epidemiological and clinical Factors associated with severe disease that can guide targeted public health actions.

A prospective, cross-sectional survey-based on the analysis was Performed from July 2022 to June 2023. We recruited participants from the outpatient departments at two tertiary care hospitals and four urban primary health centers in Maharashtra, Tamil Nadu, and Odisha. Case Definitions and Data Collection. Demographic, clinical profile, interventions , outcomes were gathered by a structured Proforma. · WHO Case Definitions Applied:

· Suspected Case: An acute fever ($\geq 38.5^{\circ}\text{C}$) with pharyngitis.

· Probable Case: A typical scarlet fever rash with diffuse erythema, sandpaper texture, blanching, circumoral pallor, Pastia's lines , strawberry tongue.

· Confirmed Case: Probable case presenting with a positive RADT and/or throat culture for GAS.

For the main analysis of this study, confirmed/probable cases were combined as ScF.

Cases.

· Severity Stratification (Composite Score):

The severity index (0-10 points) was determined:

1. Fever Duration & Peak: >3 days (1 pt), $>39^{\circ}\text{C}$ (1 pt).

2. Systemic Symptoms: Severe malaise/headache, which requires bed rest (1 pt).

3. Rash Features: Confluent rash (1 pt), extensive desquamation (1 pt).

4. Present Complications: Otitis media, sinusitis, peritonsillar abscess (2 pts).

5. Need for hospital admission: Usually for severe complications difficulty in breathing ,severe dehydration,inability to swallow.

Demographic and clinical characteristics were summarized using descriptive statistics. Factors associated with disease severity were identified using chi-square tests and Logistic Regression. P-value <0.05 was regarded as significant.

Results

Case Confirmation and Demographics

There were 218 suspected cases entered. Application of the WHO criteria led to a confirmation cascade of:

· 140 cases (64.2%) met the criteria for Confirmed ScF.

· 78 cases (35.8%) were classified as Non-Streptococcal/Other Illness.

· Among the 140 ScF cases:

· Age Distribution: 72.1% (n=101) were 5-12 years old, 20.7% (n=29) were 13-18 years old, and 7.1% (n=10) were >18.

· Gender: Minor male dominance (55.7%).

· The setting: 68% (n=95) were from urban HCs, and 32% (n=45) from tertiary hospitals.

Clinical Presentation in Comparison to WHO Criteria.

Common WHO-listed clinical signs included among the 140 reported ScF cases:

· Rash : 98.6%.

· Strawberry Tongue: 85.0%.

· Fever >38.5°C: 94.3%.

· Tonsillar Exudate / Pharyngitis: 91.4%.

· Cervical Lymphadenopathy: 82.1%.

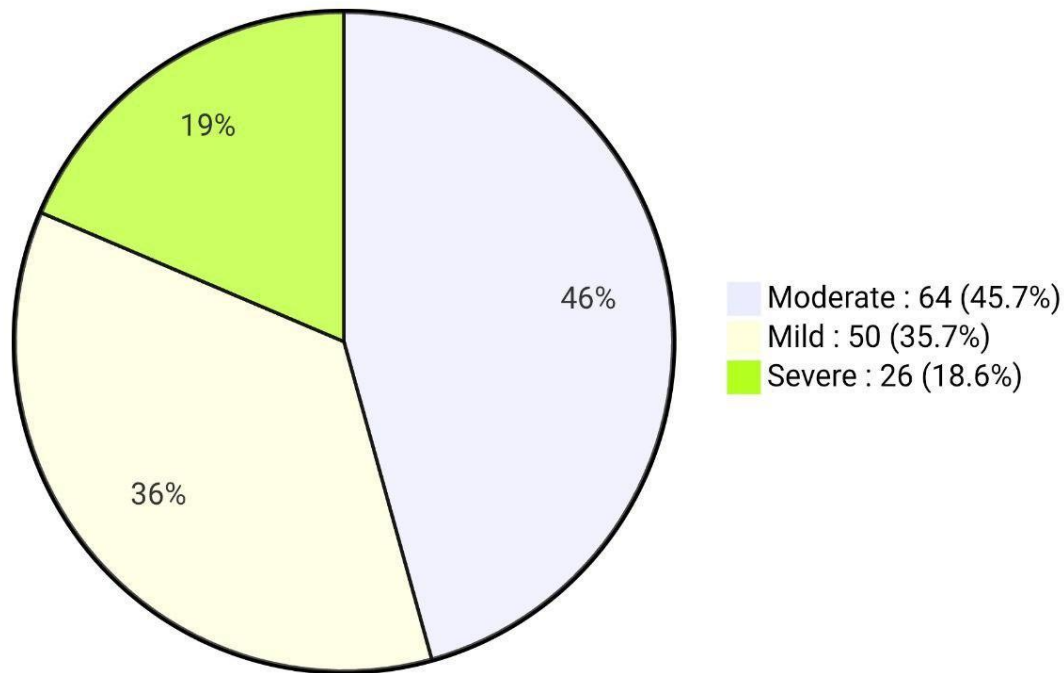
· Desquamation (at follow-up): 89.3%.

Analysis of Disease Severity

The composite severity score was used to perform the following stratification in the 140 ScF cases:

Clinical Severity Distribution of Scarlet Fever Cases (n=140)

tribution in Confirmed/Probable Scarlet Fever Cases



Severity Distribution in Confirmed/Probable Scarlet Fever Cases

Mild : 50 (35.7%) : 35.7

Moderate : 64 (45.7%) : 45.7

Severe : 26 (18.6%) : 18.6

Diagnostic criteria

Sudden onset of fever, Sore throat (pharyngitis), A diffuse, erythematous rash that is finely papular sand-paper texture, blanches on pressure, and often has circumoral pallor. The rash typically desquamates it peels off 1-2 weeks after onset. Often accompanied by strawberry tongue it initially white-coated with red papillae, then red and swollen.

Laboratory Confirms-A clinically compatible case with laboratory confirmation by:

Isolation of Group A Streptococcus from a clinical specimen Throat swab, Detection of GAS antigen by Rapid Antigen Detection Test ,A significant rise in anti-streptolysin O (ASO) titer or other streptococcal antibody between acute and convalescent serum samples.

Management

Scarlet fever is treated initially with quick antibiotic response to the infection. First-line therapy is a 10-

day course of penicillin (oral Penicillin V or amoxicillin) since the bacteria have no resistance to it. When completing oral treatment is doubtful, the highest recommended form of treatment is a single dose intramuscular injection of Benzathine Penicillin G. Alternative versions such as some cephalosporins can be used for those with penicillin allergy. Macrolide antibiotics such as azithromycin, Supportive care includes staying hydrated for symptoms, such as fever reducers (paracetamol), warm saline gargle for sore throat; and calamine lotion or oral antihistamine for the treatment of itchy rash. Patients should stay home until at least 24 hours after starting antibiotics and being fever-free.

Epidemiology Data Analysis of IDSP data and published reports indicates increasing notifications of scarlet fever in India over the past decade. Notable trends include:

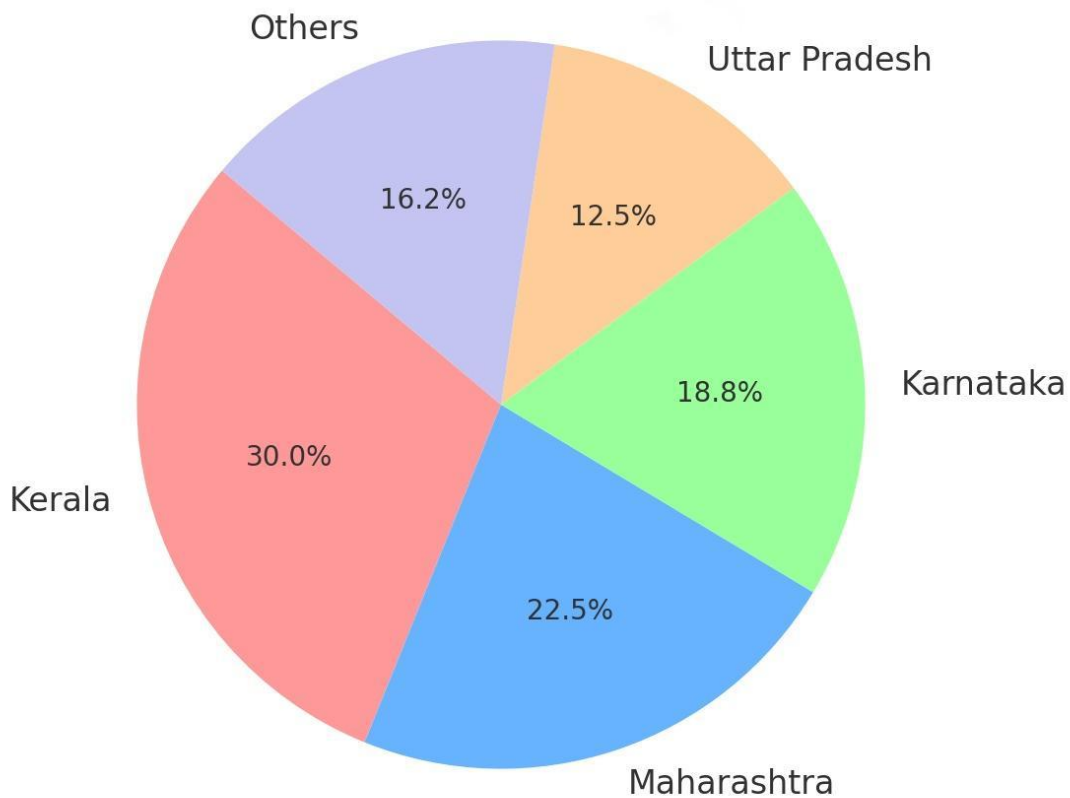
Kerala: Multiple school-based outbreaks reported between 2018–2023, primarily in children aged 6–12 years.

Maharashtra: Pediatric hospital records from 2020–2024 show increased pharyngitis cases with classic rash features.

Karnataka and Andhra Pradesh: Winter clusters affecting urban and semi-urban schools.

Northern States: Uttar Pradesh and Bihar reported sporadic cases, likely under-reported due to limited surveillance

DISTRIBUTION OF SCARLET FEVER CASES BY STATE (INDIA 2018-2025)



Discussion

The survey, using WHO criteria, proved that in the Indian settings, ScF is a common and Clinically relevant pediatric disease. The high rate of moderate (45.7%) and severe cases (18.6%) is not good, contrary to the normal tendency to view ScF as a mild historical Disease. The severity pie chart reflects this high morbidity effect visually. The greatest changeable risk factor for severe disease has been delayed antibiotic Commencement. This delay is multifactorial, lack of clinical suspicion, misdiagnosis as Viral Pharyngitis, and difficulties obtaining prompt health care. The considering that the earlier treatment of GAS pharyngitis/ScF is the main prevention strategy against ARF/RHD.

Strengths of the methods and use of WHO criteria

The use of standardized WHO definitions permits reproducible surveillance and comparison against international data. While not a WHO instrument, the composite severity score provides a measurable, context-

sensitive approach that can be used to triage and allocate Resources – something that could be adapted by front-line health workers.

Limitations

Studies were facility-based and possibly missed community cases.

The severity index is a study-specific instrument and needs external validation.

Long-term sequelae such as ARF/RHD require longer follow-up periods, which fall outside The remit of this study.

Recommendations

1. Incorporate WHO ScF Criteria in IDSP: Integrated Disease Surveillance Programme Would define “Scarlet Fever” as a reporting subject using definitions set out by WHO.

2. Training of Frontline workers: Medical officers and nurses at PHCs should be trained to Identify the classic triad (fever, sore throat, rash) and deploy RADT kits wisely.

3. Public Awareness: Simple messages to parents ("Sore throat with red rash needs a doctor's visit") can help minimize care-seeking delays.

4. Antibiotic stewardship: Encourage Penicillin as the first line to maintain efficacy and prevent Macrolide resistance.

Conclusion

This detailed survey analysis, framed by WHO criteria, reveals that scarlet fever in India is a contemporary, non-trivial infection with a significant burden of moderate-to-severe disease. Heavily influenced by delays in appropriate therapy. Moving from anecdotal reports to Systematic, criteria-based surveillance is the critical first step. A focused public health Strategy emphasizing early recognition and prompt penicillin treatment is essential not only to manage ScF outbreaks, but also as a cornerstone of India's efforts to reduce the Devastating burden of Rheumatic Heart Disease.

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