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Original Research Article

Clinical Profile and Complications of Laboratory-Confirmed Measles in Hospitalized Children at a Tertiary Care Centre in Kashmir

Mohmad Rayees Khanday[1], Peer Shadab Muzaffar[2], Abdus Sami Bhat[3], Sumaiya Farukh Rashid Zehgir[4], Parvez Rafieq[5]

[1]Consultant, Department of Paediatrics, Government Medical College, Srinagar, India
[2]Postgraduate Resident, Department of Paediatrics, Government Medical College, Srinagar, India
[3]Associate Professor, Department of Paediatrics, Government Medical College, Srinagar, India
[4]Junior Resident, Department of Paediatrics, Government Medical College, Srinagar, India
[5]Postgraduate Resident, Department of Paediatrics, Government Medical College, Srinagar, India

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Corresponding Author: Dr. Mohmad Rayees Khanday
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Abstract

Background: Measles remains an important cause of preventable morbidity and mortality, particularly among young children and those with incomplete immunisation. Hospital-based data describing complications can support clinical preparedness and public-health planning.

Objective: To describe the demographic profile, vaccination status, clinical complications, intensive-care requirements and outcomes of children hospitalised with laboratory-confirmed measles.

Methods: This retrospective observational study included children admitted to the Department of Paediatrics, Government Medical College, Srinagar, between 1 February 2023 and 30 November 2023. Children with clinically suspected measles who subsequently tested positive using a measles-specific IgM assay were included. Vaccination status was obtained from vaccination cards. Clinical and outcome data were extracted from the study database.

Results: Eighty-two children were included; 50 (61.0%) were male and 33 (40.2%) were younger than one year. Vaccination was documented in 29 (35.4%) children and vitamin A administration in 79 (96.3%). Respiratory complications were documented in 38 (46.3%), neurological complications in 8 (9.8%), gastrointestinal complications in 11 (13.4%), and haematological complications in 4 (4.9%). Fifteen children (18.3%) required intensive-care admission and six (7.3%) died.

Conclusion: In this hospital-based series, measles was associated with substantial respiratory and multisystem complications, intensive-care utilisation and mortality. Strengthened vaccination coverage, early recognition of complications and standardized clinical documentation are important in the management of hospitalized children with measles.

Keywords: Measles; Children; Complications; Pneumonia; Encephalitis; Vaccination; Kashmir.

Introduction

Measles is a highly contagious viral infection that can cause severe disease in children, including pneumonia, encephalitis, dehydration, nutritional deterioration and death [3,4]. The risk of complications is influenced by age, nutritional status, immune status, vaccination history and access to timely supportive care. Although measles is vaccine-preventable, outbreaks and hospital admissions continue to occur in settings with gaps in immunisation [1,3].

Hospital-based descriptions of measles complications are useful for identifying the clinical burden of disease, anticipating respiratory and neurological deterioration, planning intensive-care resources and informing prevention strategies. Data from Kashmir are particularly relevant for describing the clinical spectrum encountered in a tertiary-care paediatric service. This study aimed to describe the demographic characteristics, vaccination status, clinical complications, intensive-care requirements and outcomes of children admitted with laboratory-confirmed measles at Government Medical College, Srinagar.

Methods

Study Design and Setting: A retrospective observational study was conducted in the Department of Paediatrics, GMC Srinagar. The study period was 1 February 2023 to 30 November 2023.

Participants and laboratory confirmation: Children admitted with clinically suspected measles who subsequently tested positive using a measles-specific IgM assay were included. The clinical suspicion was based on the treating team's assessment and was followed by laboratory confirmation. The available dataset did not contain the assay manufacturer, platform, specimen timing in relation to rash onset, or laboratory quality-assurance details; these limitations are acknowledged in the manuscript.

Data collection: Data were extracted from the study spreadsheet and included age, sex, residence code, vaccination status, vitamin A administration, fever duration, rash duration, cough, intensive-care admission, intensive-care duration, documented complications, diagnosis, and outcome. Vaccination status was based on vaccination cards. Patient identifiers were excluded from the analytical dataset.

Definitions and outcomes: The primary outcome was the frequency and pattern of documented measles-associated complications. Secondary outcomes were intensive-care admission, intensive-care duration and in-hospital death. Complication categories were derived from the recorded diagnosis and complication fields and were not mutually exclusive. Respiratory complications included documented respiratory distress, pneumonia, bronchopneumonia, bronchiolitis, pleural effusion and related respiratory diagnoses. Neurological complications included encephalitis, acute disseminated encephalomyelitis, seizures, hemiparesis and weakness. Gastrointestinal and haematological categories were based on the recorded clinical entries.

Statistical analysis: Categorical variables were summarized using frequencies and percentages. Continuous variables were summarized descriptively. Because the dataset contained free-text clinical diagnoses and derived, potentially overlapping complication categories, the reported complication frequencies should be interpreted as documentation-based estimates rather than mutually exclusive diagnoses. No causal associations are inferred from this descriptive analysis.

Ethics: This analysis used de-identified retrospective clinical data. Institutional ethics approval was obtained from the relevant institutional ethics committee of Government Medical College, Srinagar. The study used retrospective records and did not require additional patient intervention.

Results

The study database contained 82 hospitalized children with laboratory-confirmed measles during the study period. Fifty patients (61.0%) were male and 32 (39.0%) were female.

The largest age group was children younger than one year (33; 40.2%), followed by children aged 1 to less than 5 years (27; 32.9%), 5 to less than 10 years (20; 24.4%), and 10 years or older (2; 2.4%).

Vaccination status and supportive treatment: Vaccination status was documented as positive in 29 children (35.4%) and negative in 53 (64.6%). Vitamin A administration was recorded in 79 children (96.3%). The dataset used a binary vaccination variable; the number and timing of measles-containing vaccine doses were not available for analysis.

Documented complications: Respiratory complications were recorded in 38 children (46.3%). Neurological complications were recorded in 8 (9.8%), gastrointestinal complications in 11 (13.4%), and haematological complications in 4 (4.9%).

One child had a recorded shock/critical-illness flag, while three had other documented complications. Categories could overlap, and their classification was based on the wording available in the source dataset.

Intensive-care admission and outcomes: Fifteen children (18.3%) required intensive-care admission. Six children (7.3%) died, while 76 (92.7%) were discharged. Respiratory failure, sepsis, shock and multiorgan dysfunction were reported in the overall description of fatal clinical illness; however, individual attribution and frequencies were not available in the analytical dataset and are therefore not presented as separate causes of death.

Table 1:

Characteristic	n (%)
Male	50 (61.0%)
Female	32 (39.0%)
Age <1 year	33 (40.2%)
Age 1–<5 years	27 (32.9%)
Age 5–<10 years	20 (24.4%)
Age ≥10 years	2 (2.4%)
Vaccinated (card documented)	29 (35.4%)
Unvaccinated	53 (64.6%)
Vitamin A recorded as given	79 (96.3%)
ICU admission	15 (18.3%)

Death		6 (7.3%)
Discharged		76 (92.7%)
Documented complication category	**N**	**% of cohort**
Respiratory	38	46.3%
Neurological	8	9.8%
Gastrointestinal	11	13.4%
Haematological	4	4.9%
Shock/critical illness	1	1.2%
Other documented complications	3	3.7%

Discussion

This retrospective hospital-based series describes a clinically important burden of measles among admitted children. Respiratory complications were the most frequently documented complication category, followed by gastrointestinal and neurological manifestations. The requirement for intensive care in 18.3% of children and the recorded in-hospital mortality of 7.3% indicate that measles was associated with substantial morbidity in this tertiary-care population.

Children younger than one year represented 40.2% of the cohort. Infants may be vulnerable to severe measles because of incomplete age-based immunisation, waning maternal antibody protection and limited physiological reserve. However, the age distribution in this study should not be interpreted as a population-level risk estimate because the study included hospitalized patients and did not include a denominator of all measles infections in the community.

The proportion of children recorded as unvaccinated was 64.6%. Vaccination status was obtained from vaccination cards, which provides a stronger basis than parental recall alone. Nevertheless, the available binary variable did not permit analysis of the number of doses, timing of vaccination, eligibility at the time of illness, or reasons for non-vaccination. These limitations restrict interpretation of vaccination-related associations.

Respiratory disease was prominent in the dataset, including pneumonia, bronchopneumonia, respiratory distress, pleural effusion and respiratory failure. These findings are clinically relevant because respiratory deterioration is a major pathway to intensive-care admission in severe measles. Neurological manifestations, including encephalitis, ADEM, seizures and focal neurological deficits, were less frequent but clinically significant and warrant careful documentation and follow-up.

The reported fatal clinical course suggests severe respiratory and systemic illness; the overlapping nature of these conditions limits attribution to a single immediate cause.

Published hospital-based studies provide useful context, although direct comparison is limited by differences in case definitions, patient selection and healthcare settings. In a prospective study of 150 hospital-based children, respiratory complications occurred in 50%, while gastrointestinal and neurological complications each occurred in 14.6%; children younger than one year had more complications and multisystem involvement [5]. In a study of 136 children hospitalized with complicated measles at Ayub Teaching Hospital, Abbottabad, Pakistan, pneumonia (39.7%) and diarrhoea (38.2%) were the most common complications; seven children died, and encephalitis was reported as the commonest cause of death [6]. In a retrospective study from Kolkata involving 584 hospitalized measles patients, pneumonia was the most common complication. Very severe pneumonia occurred in 34 patients requiring intensive care, of whom 13 died [7]. These findings support the prominence of respiratory complications in hospitalized measles, while differences in admission thresholds, nutritional status, vaccination history, diagnostic definitions and referral patterns limit numerical comparisons with the present cohort. The pattern observed in this cohort is consistent with the established clinical spectrum of measles described in international guidance and hospital-based literature, in which pneumonia and other respiratory complications are prominent, while neurological and gastrointestinal complications occur less frequently but may be clinically serious [1–4]. Direct numerical comparison is limited by differences in admission thresholds, outbreak context, age distribution, nutritional status, case definitions and documentation practices.

Strengths and limitations

The study included laboratory-confirmed cases and used vaccination cards rather than relying solely on recall. It also captures a broad range of clinical complications encountered in a tertiary-care paediatric department. Limitations include the retrospective single-centre design, the modest sample size, the absence of a community denominator, incomplete detail regarding laboratory assay procedures, and reliance on free-text clinical documentation. The complication categories were derived from recorded entries and may be affected by under-documentation, inconsistent terminology and overlap between diagnoses. Detailed nutritional status, comorbidities, oxygen requirements, mechanical ventilation, timing of complications and

case-level cause-of-death data were not available in the analytical dataset.

Conclusion

Among children hospitalized with laboratory-confirmed measles at Government Medical College, Srinagar, respiratory and multisystem complications were common, with substantial intensive-care utilization and in-hospital mortality. The findings reinforce the importance of measles prevention, early recognition of respiratory and neurological complications, timely supportive care and standardized documentation of severity and outcomes. Future multicentre studies with prospective definitions and complete vaccination, nutritional and treatment data are needed.

Declarations: Ethics approval and consent to participate: Institutional ethics approval was obtained from the relevant institutional ethics committee of Government Medical College, Srinagar. As this was a retrospective analysis of de-identified clinical records, the requirement for individual informed consent was determined in accordance with institutional ethics committee policy.

Consent for publication: Not applicable to this aggregate analysis, provided that the dataset contains no identifiable patient information and institutional policy permits use of the de-identified data.

Availability of data and materials: The de-identified dataset is available from the corresponding author on reasonable request, subject to institutional permissions and applicable data-protection requirements.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: All authors contributed to the study conception, interpretation of the findings and critical revision of the manuscript, and approved the final version.

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