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Original Research Article

Pattern of Drug Usage in Patients Admitted with Respiratory Problems in Pediatric Wards of C. U. Shah Medical College & Hospital, Surendranagar

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Abstract:

Objective: To observe the pattern of drug use in patients admitted with diagnosis of Respiratory problems in Pediatric department.

Methods: An observational study was conducted on 100 patients admitted with respiratory problems in the pediatric department of a tertiary care teaching hospital. Data were collected using a standardized proforma and analyzed using appropriate statistical methods.

Results: A total of 479 case-sheets were analyzed. Most of the pediatric patients belonged to 1-5 years age group, and 66% were males and 44% were females. A total of 2678 drugs were prescribed. Average number of drugs per patient was 3.3. Among the antibiotics (20.3%) prescribed, cephalosporin group were most commonly prescribed followed by aminoglycosides and penicillin. Nutritional supplements, bronchodilators and antipyretics were other commonly prescribed drugs.

Conclusion: The study revealed that the majority of children were in 1-5 years age group. These patients were admitted mostly with a diagnosis of bronchiolitis, which was treated with cephalosporins. Supportive treatment was given with bronchodilators and antipyretics and nutritional supplements were used for symptomatic management.

Keywords: Drug Usage Pattern, Indoor Paediatric Patients, Respiratory Problems.

Introduction

Drug utilization research is defined as "the study of marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences" [1]. Such studies are crucial in identifying trends in prescribing practices, promoting rational drug use, and optimizing healthcare resources. In the paediatric population, drug utilization patterns hold particular significance because children are not simply small adults. They possess unique physiological, developmental, and pharmacokinetic characteristics, which influence drug absorption, distribution, metabolism, and excretion. Consequently, prescribing in paediatric practice requires careful consideration to ensure both efficacy and safety [2].

Respiratory tract infections (RTIs) are among the most common causes of morbidity and mortality in children worldwide, particularly in developing countries [3]. According to the World Health Organization, acute respiratory infections are a leading cause of paediatric hospital admissions and account for a substantial proportion of under-five mortality globally [4]. In India, the burden of respiratory illnesses remains high due to factors such as malnutrition, poor living conditions, low immunization coverage, and delayed healthcare access [5].

These illnesses significantly contribute to paediatric admissions in hospital settings, with conditions such as bronchiolitis, pneumonia, bronchitis, and upper respiratory tract infections being frequently encountered. Understanding the pattern of drug use in paediatric patients with respiratory illnesses is essential for identifying gaps in treatment practices, minimizing inappropriate prescriptions (e.g., irrational antibiotic use), and developing standardized treatment protocols. Such insights can guide the preparation of hospital formularies, implementation of antimicrobial

stewardship programs, and rational allocation of healthcare resources. The present study was undertaken to analyze the prescribing trends and drug utilization patterns among paediatric patients admitted with respiratory problems in the Paediatric Wards of C.U. Shah Medical College & Hospital, Surendranagar. The findings are expected to provide a baseline for evaluating prescribing practices, improving treatment outcomes, and promoting rational pharmacotherapy in paediatric respiratory care.

Materials and Methods

Study Design and Setting: This was an observational study conducted in the Paediatric Ward of C. U. Shah Medical College & Hospital, Surendranagar, Gujarat, in collaboration with the Departments of Pharmacology and Paediatrics.

Study Duration and Population: The study included 100 paediatric patients admitted with a diagnosis of respiratory tract infections over a period of three months, from July to September 2016.

Inclusion and Exclusion Criteria: The study included all indoor paediatric patients who were admitted with a confirmed diagnosis of respiratory tract infections. Patients who were admitted to the Neonatal Intensive Care Unit (NICU) were excluded from the study.

Ethical Considerations: Prior to initiation, the study protocol was reviewed and approved by the Institutional Ethics Committee in June 2016.

Data Collection: Patient data were collected through active surveillance from hospital case records using a pre-structured proforma. The recorded variables included demographic details, clinical diagnosis, prescribed medications (drug name, dose, route, and frequency), and supportive therapies.

Data Analysis: All collected data were entered into a database and analyzed using descriptive statistical methods. Results were expressed in terms of frequencies, percentages, and averages, as appropriate.

Results

A total of 479 case sheets of paediatric patients admitted with respiratory problems were analyzed during the study period. Across these patients, a total of 2,678 drugs were prescribed, with an average of 3.3 drugs per prescription, indicating a moderate degree of polypharmacy in the management of paediatric respiratory illnesses.

Demographic Profile: As shown in Table 1, children aged 1–5 years constituted the largest proportion of admissions (50%, n=50), underscoring the high vulnerability of preschool-aged children to respiratory tract infections requiring hospitalization. Infants less than 1 year of age also accounted for a substantial proportion of admissions (41%, n=41), while older children aged 5–12 years represented a smaller fraction (9%, n=9). With respect to gender distribution, males were more frequently admitted (66%, n=66) compared to females (34%, n=34), yielding a male-to-female ratio of approximately 1.9:1.

Table 1: Age and Gender Distribution of Patients

Age group (years)	Male	Female	Total (%)
Less than 1	25	16	41 (41%)
1–5	39	11	50 (50%)
5–12	2	7	9 (9%)
Total	**66**	**34**	**100 (100%)**

Common Respiratory Conditions: As shown in Figure 1, the most common respiratory conditions leading to paediatric admissions were upper respiratory tract infections, pneumonia, bronchitis, bronchiolitis, and asthma exacerbations. Among lower respiratory tract infections, pneumonia and bronchiolitis accounted for the largest proportion of cases.

Viral upper respiratory tract infections were particularly prevalent in infants and younger age groups, highlighting their greater susceptibility to viral respiratory illnesses.

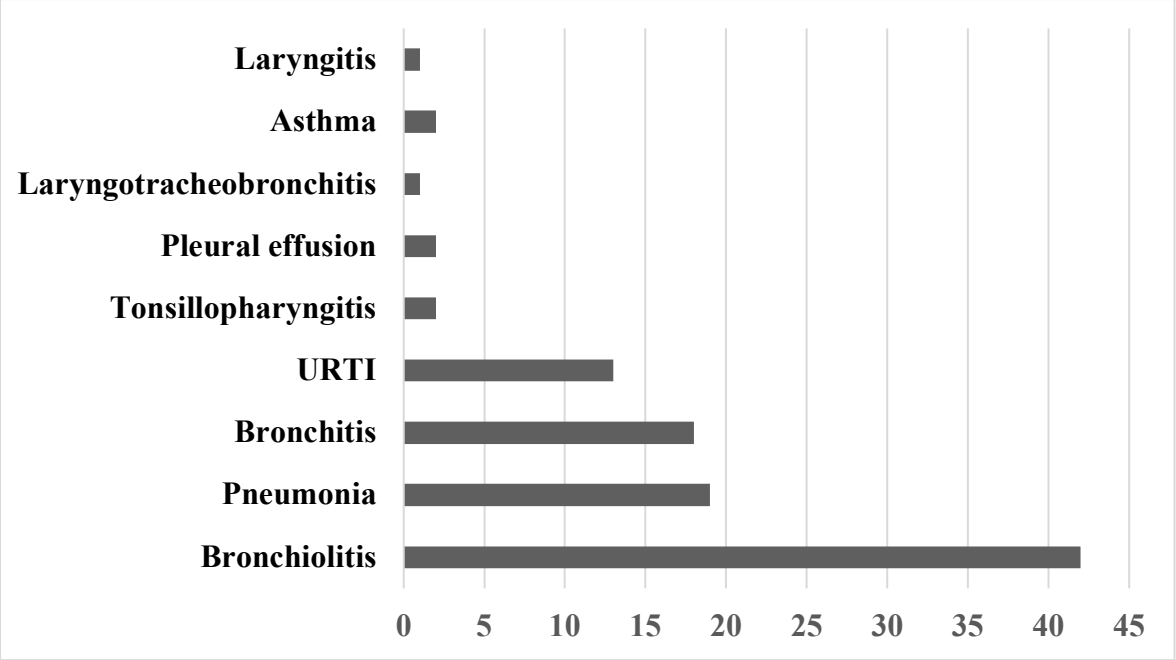

Figure 1: Common Respiratory Conditions with Which Pediatric Patients Were Admitted

Routes of Drug Administration: As shown in Figure 2, the oral route constituted the most frequently used method of drug administration (~55–60% of prescriptions) among children admitted with respiratory tract infections. Parenteral routes, including both intravenous and intramuscular administration, accounted for ~35–40% of prescriptions, underscoring their importance in severe cases where immediate therapeutic action was required. A smaller proportion of drugs were administered via inhalation or nebulization, primarily for bronchodilator and symptomatic therapy.

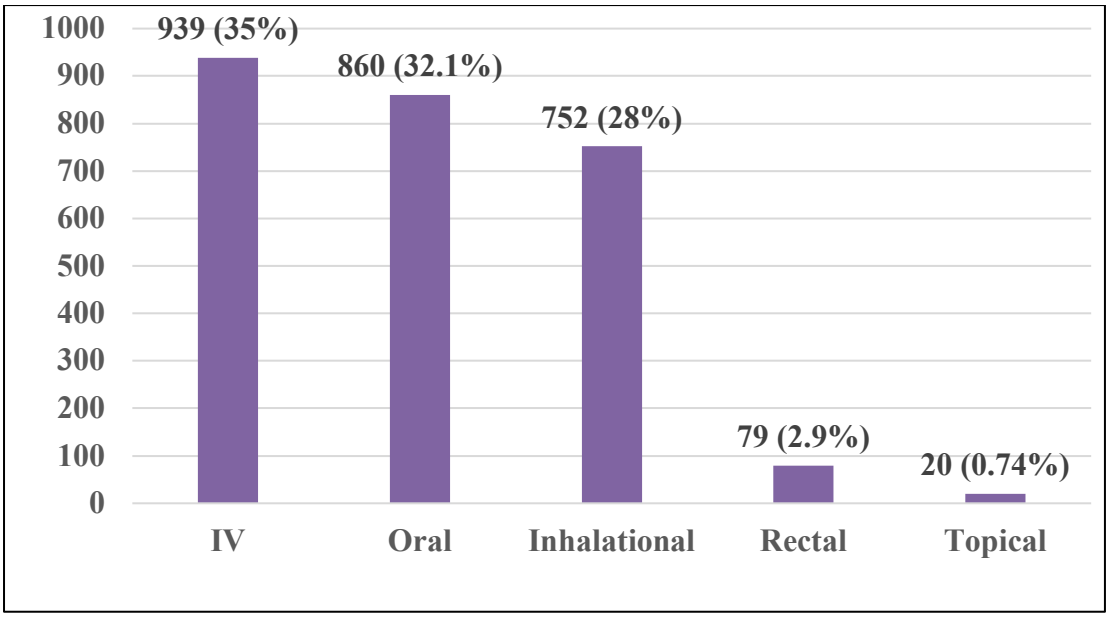

Figure 2: Routes of Drug Administrations

Antibiotic Utilization: As shown in Figure 3, antibiotics were prescribed in nearly three-quarters of paediatric respiratory tract infection cases (70–75%), underscoring their central role in treatment. Broad-spectrum antibiotics such as cephalosporins, macrolides, and penicillin derivatives constituted the majority of prescriptions.

The elevated level of empirical antibiotic use suggests that clinicians often relied on clinical judgment rather than routine microbiological testing, which was not consistently available.

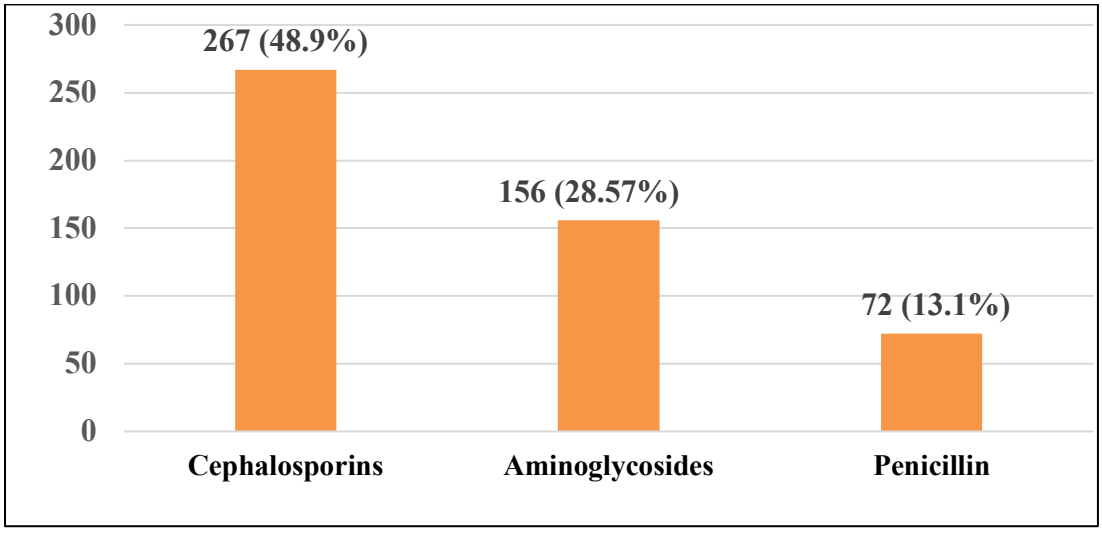

Figure 3: Antibiotic Utilization in Respiratory Tract Infections

Bronchodilator Usage: As shown in Figure 4, bronchodilators were prescribed in nearly half of the patients (45–50%), particularly in those with wheeze, asthma exacerbations, or bronchospasm secondary to lower respiratory tract infections. Inhalation therapy, administered via nebulizers or metered-dose inhalers, was the preferred mode owing to its rapid symptomatic relief and targeted action. Oral bronchodilator preparations were used less often, reflecting a clinical preference for inhaled routes in the management of acute respiratory symptoms.

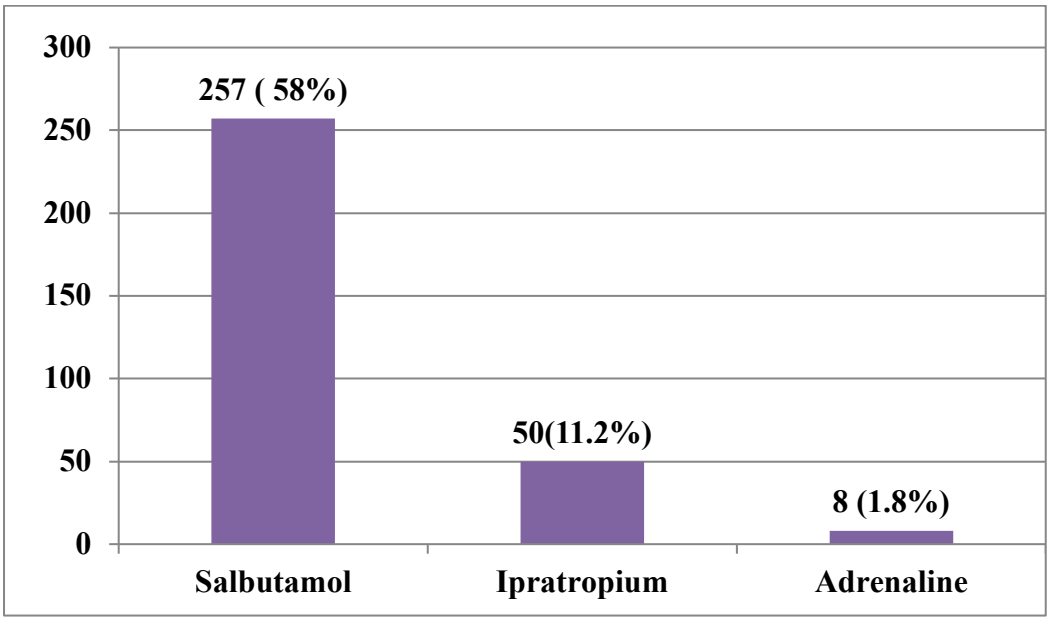

Figure 4: Bronchodilators Usage in Respiratory Tract Infections

Antipyretic Use: As shown in Figure 5, antipyretics were prescribed in the majority of children presenting with fever, with an overall utilization rate of approximately 90–95%. Paracetamol was the predominant choice due to its established safety and efficacy profile, whereas ibuprofen was infrequently used as an alternative, mainly in older paediatric patients.

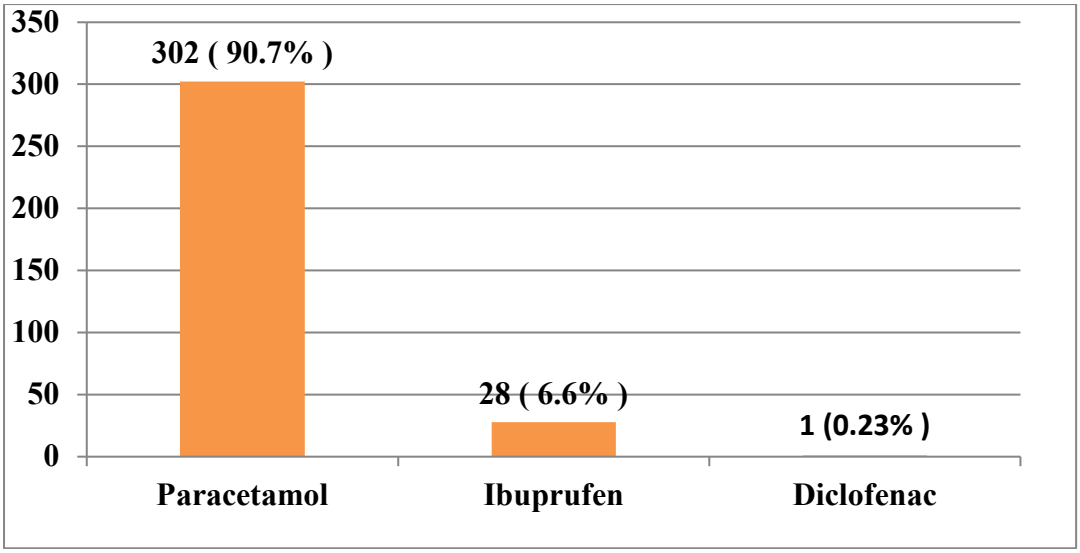

Figure 5: Antipyretics Use in Respiratory Tract Infections

Nutritional Supplements: As shown in Figure 6, nutritional supplements such as multivitamins, minerals, and iron preparations were included in nearly one-third (30–35%) of prescriptions for children with respiratory tract infections. These supplements were commonly prescribed with the intent to support recovery, improve immune competence, and address nutritional deficiencies that are prevalent in the paediatric age group.

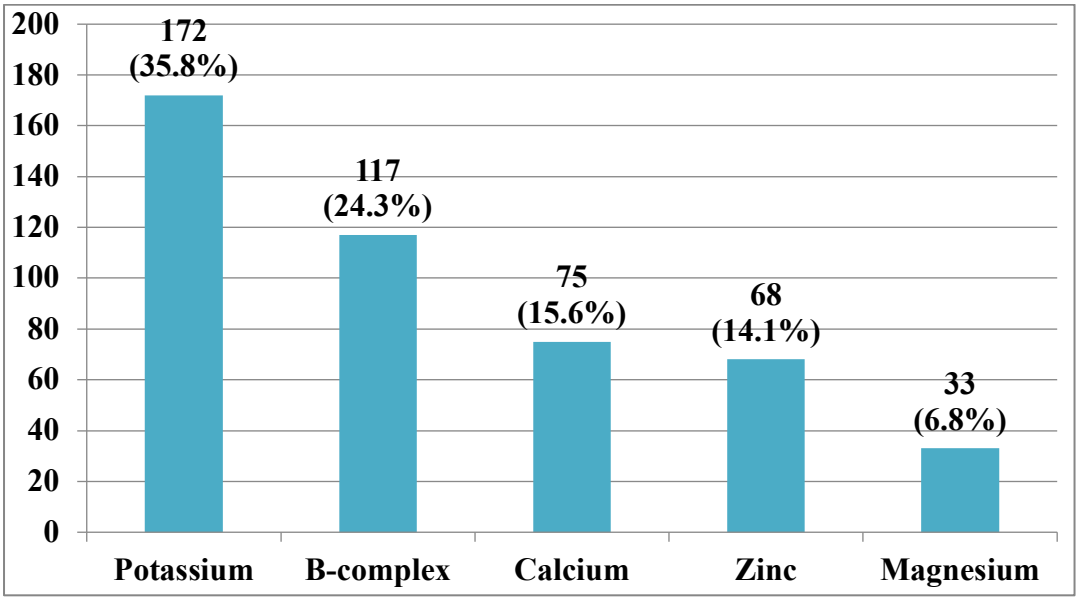

Figure 6: Nutritional Supplements Use in Respiratory Tract Infections

The present study highlights a high antibiotic prescribing rate and moderate polypharmacy in paediatric respiratory care. While the predominance of oral drug use aligns with paediatric dosing convenience, the substantial proportion of parenteral therapy suggests that many patients presented with moderate-to-severe disease.

Empirical antibiotic selection underscores the need for local antibiogram-guided protocols to optimize antimicrobial stewardship.

Bronchodilator use reflects a significant burden of obstructive airway pathology among admitted children, while frequent nutritional supplementation suggests an integrated approach toward recovery and long-term health.

Discussion

Our finding that bronchiolitis was the leading cause of admission mirrors many hospital-based paediatric cohorts from low- and middle-income countries, where bronchiolitis and pneumonia together account for the bulk of under-five respiratory admissions [3,6]. Several Indian tertiary-care studies likewise describe bronchiolitis predominance in infants and young children, with

pneumonia occupying the second position, suggesting a similar etiologic profile across regions with comparable climates, viral seasonality, and immunization coverage [7,8]. Where studies have reported pneumonia as the top diagnosis, this has often been in settings with a higher burden of bacterial disease, reduced RSV seasonality, or differing admission thresholds, factors that may explain inter-study variability [9].

The high use of cephalosporins in our cohort is consistent with prescribing patterns described in paediatric wards across South Asia and Africa, where broad-spectrum agents are frequently used for empirical coverage in moderate-to-severe respiratory infections [10,11]. Antimicrobial stewardship literature, however, highlights a gap between current practice and guideline-recommended first-line agents such as ampicillin or amoxicillin for uncomplicated community-acquired pneumonia [12,13]. Compared with stewardship-led interventions from other tertiary centres, where targeted measures shifted practice toward narrower-spectrum regimens, our findings suggest an opportunity to recalibrate empirical choices and ensure de-escalation when bacterial infection is unconfirmed [14].

Salbutamol emerged as the most prescribed bronchodilator in our study, aligning with observations from other paediatric RTI cohorts, particularly in cases with wheezing or bronchospasm [15,16]. Nonetheless, evidence for bronchodilator efficacy in classic bronchiolitis remains limited, with several randomized trials reporting minimal sustained benefit [17]. The similarity of our findings to other real-world settings underscores existing practice patterns, while the divergence from more conservative evidence-based protocols suggests scope for revising bronchodilator use criteria.

The predominance of intravenous (IV) drug administration parallels findings from other inpatient paediatric series, where acute illness severity, poor oral tolerance, and the need for rapid bioavailability favour parenteral therapy at admission [18]. Conversely, early IV-to-oral switch protocols implemented elsewhere have demonstrated reductions in length of hospital stay, cost of care, and line-related complications [19]. Compared with such switch-focused strategies, our data indicate potential benefits from adopting standardized reassessment within 24–48 hours to transition eligible patients to oral therapy.

Supportive measures such as antipyretics and nutritional supplementation were also common in our cohort, consistent with recommendations from paediatric care guidelines and similar observational studies [20, 21]. Proactive nutrition screening and supplementation, as practiced in some centers, have been linked to improved recovery, particularly in undernourished children [22].

Limitations: The study was conducted in a single tertiary care teaching hospital, which may limit the generalizability of findings to other settings. The relatively short study period (three months) may not fully account for seasonal variations in respiratory illnesses. Microbiological confirmation of bacterial infections was not routinely available, potentially influencing antibiotic prescribing patterns. Additionally, as a retrospective chart-based analysis, the study depended on the accuracy and completeness of recorded clinical and prescribing data.

Future Directions: Future research should involve multi-center, year-round surveillance to capture seasonal trends and regional differences in pediatric respiratory illness patterns. Incorporating microbiological and virological diagnostics would allow more targeted antimicrobial use and better stewardship outcomes. Interventional studies assessing the impact of antimicrobial stewardship programs, early IV-to-oral switch protocols, and evidence-based bronchodilator use guidelines in bronchiolitis could provide actionable insights for optimizing paediatric respiratory care in similar settings.

Conclusion

Bronchiolitis was the leading cause of paediatric respiratory admissions, with cephalosporins as the most prescribed antibiotics and salbutamol as the primary bronchodilator. Intravenous administration was the predominant route, reflecting the severity of illness. Supportive care with antipyretics and nutritional supplements was common. These patterns highlight the need for antimicrobial stewardship, rational bronchodilator use, and timely IV-to-oral therapy transitions to optimize paediatric respiratory care outcomes.

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Use of Generative AI: The authors used a generative artificial intelligence tool (ChatGPT) to assist in the drafting and language refinement of this manuscript. All content was subsequently reviewed, validated, and edited by the authors to ensure accuracy, originality, and compliance with the study data. The AI tool did not contribute to the study design, data analysis, interpretation, or final decision-making.

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