Prescribing Patterns in Paediatric Outpatients at a Private Tertiary Care Hospital in Hyderabad, India: A Retrospective Observational Study

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***Abstract*—Background: Rational drug prescribing in paediatric patients is a persistent public health challenge globally. Polypharmacy, irrational antibiotic use, and incomplete prescriptions contribute significantly to treatment failures, adverse drug reactions, and escalating healthcare costs. Private tertiary care hospitals in India remain under-studied regarding paediatric prescribing patterns despite serving a substantial share of outpatient load.**

Objectives: To analyse the prescribing pattern of drugs in paediatric outpatients at Tertiary Care Hospital, Hyderabad, using WHO core prescribing indicators, and to compare findings with published literature and WHO benchmarks.

Methods: A retrospective observational study was conducted using 91 prescription records from the Paediatric Outpatient Department of Tertiary Care Hospital, Hyderabad, covering August 2025 to March 2026. Data were extracted and analysed for WHO core prescribing indicators, drug categories, dosage forms, and chief complaints. Descriptive statistics were applied.

Results: A total of 91 paediatric prescriptions were analysed. The mean number of drugs per encounter was 4.24 (range 1–6). Antibiotics were prescribed in 57.1% of encounters. Injectable medications were recorded in 3.3% of prescriptions. Syrup was the predominant dosage form (90.1%). Polypharmacy (≥5 drugs) was observed in 46.2% of encounters. Fever (45.1%), cough (42.9%), and cold/running nose (37.4%) were the most common presenting complaints.

Conclusions: The average number of drugs per encounter, antibiotic prescribing rate, and polypharmacy rate exceed WHO recommended standards. Implementation of standardised paediatric treatment protocols, antibiotic stewardship programmes, and generic prescribing practices are recommended to improve rational drug use at this institution.

***Index Terms*—paediatric prescribing, drug utilisation, WHO core indicators, polypharmacy, outpatient**

I. INTRODUCTION

Paediatric drug prescribing occupies a unique and critically sensitive space in clinical pharmacology. Unlike adults, children present with age-dependent pharmacokinetic and pharmacodynamic variability, necessitating tailored drug selection, dosing, and formulation. Irrational prescribing in paediatric outpatient settings characterised by polypharmacy, unnecessary antibiotic use, and suboptimal dosing represents a significant contributor to antimicrobial resistance, adverse drug events, and increased financial burden on families.

India's healthcare landscape is dichotomous, with private tertiary care hospitals shouldering a substantial and growing share of outpatient consultations. Yet, the majority of published prescribing pattern studies originate from government teaching hospitals, leaving a notable gap in evidence from private sector practice. The World Health Organization (WHO) has established a set of core prescribing indicators designed to assess drug use in primary and secondary care settings globally, enabling meaningful cross-institutional and cross-national comparisons.

Acute respiratory infections, febrile illnesses, and gastrointestinal complaints constitute the predominant disease burden in paediatric outpatient departments across India. These conditions frequently attract multi-drug prescriptions including antibiotics, antipyretics, and antihistaminics a pattern that, when irrational, directly contributes to the growing problem of antimicrobial resistance (AMR) and treatment failure. Tertiary Care Hospital, Bandlaguda Jagir, Hyderabad,

is a private multi-specialty institution providing comprehensive paediatric services under the supervision of Dr. G. Purna Chandra Rao, MBBS, MD-Pediatrics, DM-Neonatology. This study was designed to systematically analyse the prevailing prescribing patterns in its paediatric outpatient department using WHO core prescribing indicators, compare findings with established published literature and WHO benchmarks, and identify areas amenable to targeted intervention.

II. MATERIALS AND METHODS

2.1 Study Design and Setting

A retrospective observational study was conducted at the Paediatric Outpatient Department of Tertiary Care Hospital, Bandlaguda Jagir, Hyderabad, Telangana, India. Tertiary Care Hospital is a private multi-specialty institution catering to a predominantly urban and peri-urban paediatric population.

2.2 Study Period and Sample

Prescription records from August 2025 to March 2026 were retrieved and analysed. A total of 91 eligible paediatric prescriptions formed the study sample after application of inclusion and exclusion criteria. Records were sourced from two complementary datasets: 74 records from structured Excel-format registers (October 2025 to January 2026) and 17 records from handwritten prescription PDFs (August 2025 to March 2026).

2.3 Inclusion Criteria

All outpatient prescriptions issued for children aged 0–12 years by the attending consultant paediatrician during the study period were included. Prescriptions from the PDF dataset with patients up to 13 months were also included.

2.4 Exclusion Criteria

Prescriptions with missing or illegible patient information, duplicate records for the same visit, and prescriptions without drug information were excluded. One prescription with unreadable gender was retained for drug analysis but excluded from gender proportion calculations.

2.5 Data Collection

Data were extracted into a structured format capturing: patient demographics (name, age, gender), date of visit, chief complaints, treatment/medicines prescribed (drug name, dosage form, dose, frequency, duration), and clinical notes including examination findings and investigation reports.

2.6 Data Analysis

The following WHO core prescribing indicators were computed: (i) average number of drugs per encounter, (ii) percentage of encounters with an antibiotic prescribed, (iii) percentage of encounters with an injection prescribed, and (iv) most commonly prescribed dosage form. Drug categories were classified into antibiotics, antipyretics/NSAIDs, antihistaminics, bronchodilators, gastrointestinal agents, vitamins/supplements, and nasal/topical preparations. Polypharmacy was defined as the concurrent prescription of five or more drugs in a single encounter. Descriptive statistical analysis was performed using Microsoft Excel and Python (pandas library). Findings were presented as frequencies, proportions, and means with ranges.

2.7 Ethical Considerations

The study used retrospectively collected and de-identified prescription data from routine clinical records. Patient names were used solely for record identification and are not reported in this publication. No patient-identifiable information is disclosed herein. Informed consent waiver is applicable under retrospective audit methodology.

III. RESULTS

3.1 Demographic Profile

A total of 91 paediatric prescriptions were analysed. Of these, 90 had a legible gender entry; one record had an unreadable gender field and was retained for drug analysis but excluded from gender-based calculations. Among the 90 gender-evaluable patients, 45 (50.0%) were male and 45 (50.0%) were female, reflecting a perfectly equal gender distribution (Figure 1). The age of patients ranged from 3 months to 11 years. The school-age group (6–12 years) represented the largest cohort (n=30, 33.0%), followed by the preschool group (3–6 years; n=26, 28.6%), toddlers (1–3 years; n=21, 23.1%), and infants under one year (n=12, 13.2%). Two patients had unrecorded ages (2.2%) (Figure 2).

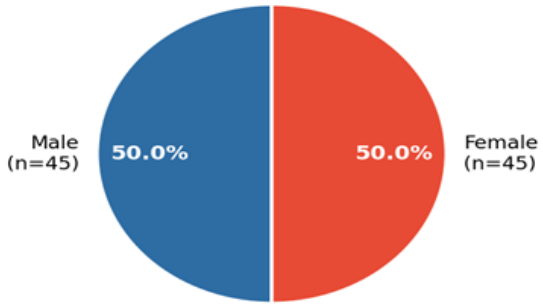

Figure 1: Gender Distribution of Paediatric Patients (n=90 gender-evaluable; 1 record excluded due to unreadable gender entry)

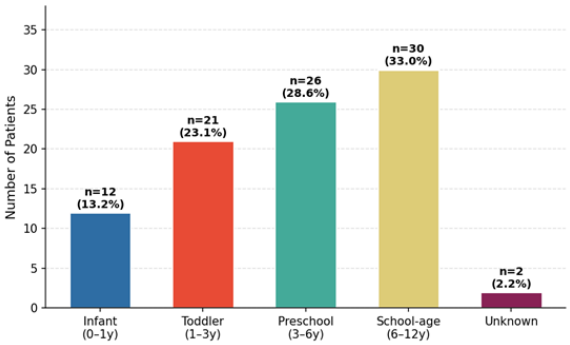

Figure 2: Age Group Distribution of Paediatric Patients (n=91)

3.2 Chief Complaints

Fever was the most common presenting symptom, reported in 41 patients (45.1%), followed by cough in 39 patients (42.9%) and cold/running nose in 34 patients (37.4%). Vomiting was recorded in 10 patients (11.0%). Skin rash and throat pain were each reported by 7 patients (7.7%). Other complaints included loose motions/diarrhea, headache, constipation, ear pain, eye redness, breathing difficulty, and abdominal pain. Table 1 and Figure 3 present the complete distribution of chief complaints. Notably, many patients presented with multiple concurrent complaints, reflecting the multi-symptomatic nature of acute respiratory and febrile illnesses in the paediatric age group.

Table 1: Distribution of Chief Complaints (n=91)

Chief Complaint	No. of Patients (n=91)	Percentage (%)
Fever	41	45.1
Cough	39	42.9
Cold/Running Nose	34	37.4
Vomiting	10	11.0
Throat Pain	7	7.7
Skin Rash	7	7.7
Loose Motions/Diarrhea	5	5.5
Headache	4	4.4
Constipation	4	4.4
Ear Pain	4	4.4
Eye Redness	4	4.4
Breathing Difficulty	3	3.3
Stomach/Abdominal Pain	3	3.3

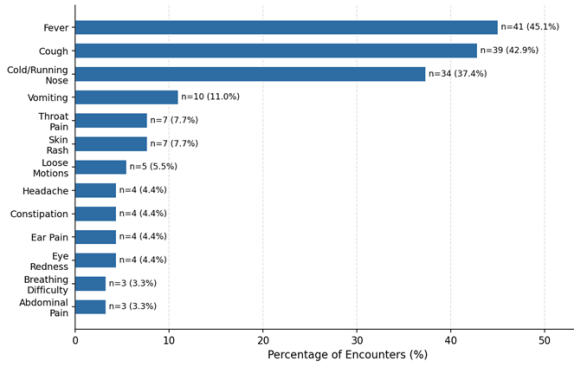

Figure 3: Distribution of Chief Complaints Among Paediatric Patients (n=91)

3.3 WHO Core Prescribing Indicators

The average number of drugs per encounter was 4.24 (range: 1–6). Antibiotics were prescribed in 52 (57.1%) of encounters. Injectable medications were recorded in 3 (3.3%) prescriptions (intramuscular paracetamol in 2 cases and intramuscular ondansetron in 1 case). Polypharmacy, defined as five or more drugs per encounter, was observed in 42 patients (46.2%). Table 2 summarises the WHO prescribing indicators for the present study.

Table 2: WHO Core Prescribing Indicators Tertiary Care Hospital Paediatric OPD (n=91)

WHO Core Prescribing Indicator	Value Tertiary Care Hospital (n=91)
Average number of drugs per encounter	4.24 (Range: 1–6)
Percentage of encounters with an antibiotic prescribed	57.1%
Percentage of encounters with an injection prescribed	3.3%
Polypharmacy (≥5 drugs per encounter)	46.2% (n=42)
Most common dosage form	Syrup (90.1% of prescriptions)

3.4 Drug Categories Prescribed

Antipyretics/NSAIDs were the most frequently prescribed drug category by number of encounters (68.1%), reflecting the high burden of febrile illness. Antibiotics were prescribed in 57.1% of encounters, followed by vitamins/nutritional supplements (60.4%), nasal/topical preparations (41.8%), bronchodilators (33.0%), antihistaminics (30.8%), and gastrointestinal agents (13.2%). The commonly prescribed antibiotics included amoxicillin-clavulanate (Promoxiclav), azithromycin (Azee), and cefpodoxime-based combinations (Propodcef, Propobcef, Nestclar XC). Table 3 and Figure 4 detail the drug category distribution.

Table 3: Distribution of Drug Categories Prescribed (n=91)

Drug Category	No. of Encounters	Percentage (%)
Antibiotics	52	57.1
Antipyretics/NSAIDs	62	68.1
Vitamins/Nutritional Supplements	55	60.4
Nasal/Topical Preparations	38	41.8
Bronchodilators	30	33.0
Antihistaminics	28	30.8
Gastrointestinal Agents	12	13.2

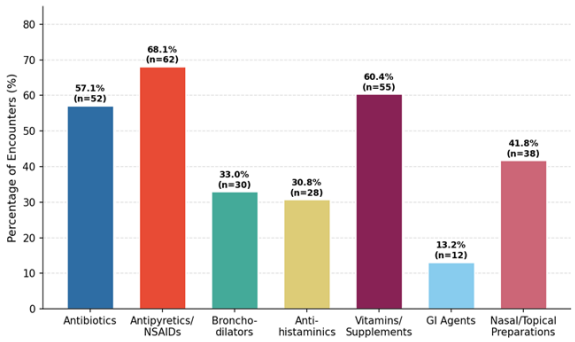

Figure 4: Drug Categories Prescribed (Percentage of Encounters, n=91)

3.5 Dosage Forms

Syrup was overwhelmingly the dominant dosage form, present in 90.1% of prescriptions. Drops were included in 27.5% of prescriptions, predominantly in infants and toddlers under 18 months. Nebulization therapy was prescribed in 26.4% of encounters, primarily for patients with respiratory complaints including bronchospasm and wheezing. Tablet/capsule formulations were used in 8.8% of prescriptions, consistent with the predominantly younger age distribution of the study population. Table 4 and Figure 5 depict the dosage form distribution.

Table 4: Dosage Forms Prescribed (n=91)

Dosage Form	No. of Prescriptions	Percentage (%)
Syrup	82	90.1
Drops	25	27.5
Nebulization	24	26.4
Tablet/Capsule	8	8.8

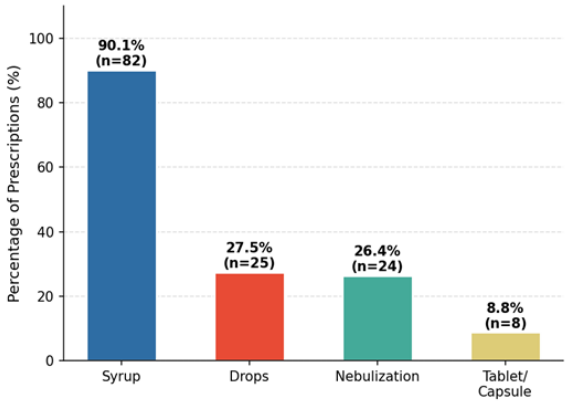

Figure 5: Dosage Forms Prescribed (Percentage of Prescriptions, n=91)

IV. DISCUSSION

This study provides the first systematic analysis of paediatric prescribing patterns from Tertiary Care Hospital, a private tertiary care institution in Hyderabad, Telangana. The findings offer valuable insights into drug utilisation trends and highlight important deviations from WHO core prescribing benchmarks in private sector paediatric practice.

4.1 Average Number of Drugs Per Encounter

The mean number of drugs per encounter in the present study was 4.24, considerably higher than the WHO recommended range of 1.6–1.8 for primary care settings, and higher than values reported by Hans N. et al. (2.52) and Gedam D.S. et al. (1.69) from government tertiary care hospitals. This elevated average likely reflects the private sector tendency toward comprehensive symptomatic management and patient expectation for multi-drug prescriptions during acute illness episodes. High drug counts per encounter

increase the risk of drug interactions, adverse effects, and non-compliance.

Polypharmacy (≥5 drugs) was documented in 46.2% of encounters a substantially higher rate than reported in most government hospital-based studies. The predominant paediatric illnesses in the study sample (fever, upper respiratory tract infections) frequently attracted concurrent prescriptions of an antibiotic, antipyretic, antihistaminic, bronchodilator, and a vitamin supplement, contributing to this pattern.

4.2 Antibiotic Prescribing

Antibiotics were prescribed in 57.1% of encounters. This is higher than the 48.3% reported by Hans N. et al. (2021) and considerably exceeds the WHO recommended benchmark of 20–26.8% for primary and secondary care settings. The most commonly prescribed antibiotics were amoxicillin-clavulanate combinations and azithromycin, reflecting the predominance of respiratory tract infections in the study population. The high antibiotic prescribing rate in this private institution may reflect patient and parental expectations, shorter consultation time pressures, and the predominantly respiratory disease burden during the study period.

Antimicrobial resistance (AMR) remains a critical global concern, and unnecessary antibiotic prescribing in paediatric outpatient settings has been identified as a major driver of AMR in low- and middle-income countries. Regular prescription audits and adoption of antibiotic stewardship principles are urgently recommended to reduce antibiotic prescribing rates.

4.3 Injectable Prescriptions

Injections were prescribed in 3.3% of encounters, which is within the WHO acceptable threshold of less than 10% and lower than the 6% reported by Hans N. et al. In paediatric outpatient settings, the oral route is preferred wherever clinically appropriate, and the low injection rate in this study reflects adherence to this principle. Nebulization was used in 26.4% of encounters, appropriate given the burden of acute respiratory conditions including bronchospasm and wheezing in young children.

4.4 Dosage Forms

Syrup was the predominant dosage form (90.1%), consistent with the younger age profile of the study population and the well-established palatability and ease of administration of liquid formulations in children. This finding is higher than that reported by Hans N. et al. (65%) and Gedam D.S. et al. (62.2%), both of whom also identified syrup as the most prescribed dosage form. Drops were common in infants and toddlers. Tablet prescription (8.8%) was limited to older school-age children, consistent with clinical practice norms.

4.5 Disease Profile

Upper respiratory tract infections, febrile illnesses, and associated complaints dominated the clinical profile, mirroring the seasonal burden of respiratory infections. This is consistent with published paediatric OPD data from Indian tertiary care institutions, which consistently report acute respiratory and febrile illnesses as the leading causes of paediatric outpatient visits.

4.6 Comparison with Literature

Table 5 and Figure 6 present a structured comparison of key prescribing indicators from the present study against published Indian studies and WHO recommended standards. The present study demonstrates a higher drugs-per-encounter ratio, antibiotic prescribing percentage, and polypharmacy rate compared to all referenced studies, while maintaining a lower injection rate. These findings underscore the unique prescription dynamics of private tertiary care paediatric practice and the need for targeted interventions.

Table 5: Comparison of WHO Core Prescribing Indicators with Published Studies and WHO Standards

Parameter	Present Study (Tertiary Care Hospital)	Hans N. et al. (2021)	Gedam D.S. et al.	WHO Standard
Avg. drugs/encounter	4.24	2.52	1.69	1.6–1.8
Antibiotic encounters (%)	57.1	48.3	37.3	20–26.8
Injection encounters (%)	3.3	6.0	0.0	<10
Polypharmacy (%)	46.2	N/R	28.5	N/A
Most common dosage form	Syrup (90.1%)	Syrup (65%)	Syrup (62.2%)	—

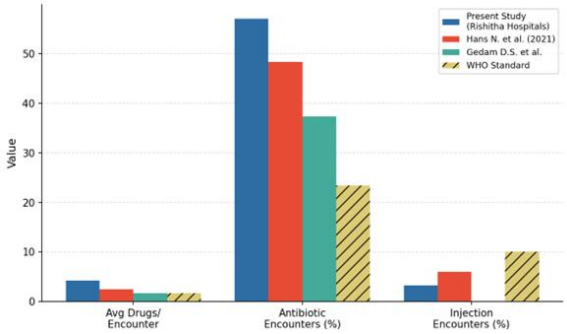

Figure 6: Comparative WHO Prescribing Indicators Tertiary Care Hospital vs. Published Studies

V. CONCLUSIONS

This retrospective observational study of paediatric prescribing at Tertiary Care Hospital, Hyderabad, reveals significant deviation from WHO core prescribing benchmarks, particularly regarding the average number of drugs per encounter, antibiotic prescribing rate, and polypharmacy rates. The antibiotic prescribing percentage substantially exceeds WHO recommendations, underscoring the urgent need for antibiotic stewardship initiatives.

The following recommendations are proposed to rationalise paediatric drug prescribing:

(i) development and institutionalisation of evidence-based paediatric treatment protocols; (ii) routine prescription audits at quarterly intervals; (iii) continuing medical education programmes on rational prescribing and antibiotic stewardship for clinical staff; (iv) promotion of generic drug prescribing to reduce economic burden on families; and (v) integration of WHO prescribing indicator monitoring into hospital quality improvement initiatives.

Future research should involve prospective data collection over larger sample sizes across multiple seasons to characterise the full spectrum of paediatric prescribing at this institution, enabling more robust conclusions and longitudinal trend analysis.

VI. LIMITATIONS

This study is limited by its retrospective design and relatively small sample size of 91 prescriptions. Data were collected from a single private institution over a seven-month period, restricting generalisability to other settings. Missing or unreadable entries in some prescription records may have introduced minor inaccuracies. Generic drug prescribing rates could not be computed due to the predominant use of branded trade names in the prescriptions. The drug count for record 27 (trauma referral with no systemic drugs) was coded as zero and excluded from the drug category analysis but retained in the total sample. Future prospective, multi-centre studies with larger samples and standardised data collection are warranted.

REFERENCES

[1] N. Hans, “Prescribing pattern of drugs used in paediatric patients in outpatient department of a tertiary care institution,” International Journal of Medical Science and Diagnostic Research, vol. 5, no. 7, pp. 33–37, 2021.

[2] D. S. Gedam, “Drug utilisation study in paediatric outpatient department,” Indian Journal of Pediatrics, vol. 77, no. 2, pp. 165–168, 2010.

[3] World Health Organization, How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators. Geneva, Switzerland: WHO, 1993.

[4] N. Venkateswaramurthy et al., “Assessment of drug prescription pattern in paediatric patients,” Journal of Pharmaceutical Sciences and Research, vol. 9, no. 2, pp. 81–84, 2017.

[5] P. R. Shankar et al., “Prescribing patterns among paediatric inpatients in a teaching hospital in western Nepal,” Singapore Medical Journal, vol. 47, no. 4, pp. 265–268, 2006.

[6] J. Torvi, D. Suman et al., “Drug prescription pattern in paediatric outpatient clinic in a tertiary hospital,” International Journal of Medical Research, vol. 15, pp. 12–20, 2011.

[7] Indian Academy of Pediatrics (IAP), Standard Treatment Guidelines for Common Paediatric Conditions, 2021.

[8] Ministry of Health and Family Welfare, Government of India, National List of Essential Medicines 2022. New Delhi, India: MoHFW, 2022.

[9] R. Laxminarayan et al., “Antibiotic resistance: The need for global solutions,” The Lancet, vol. 382, no. 9893, pp. 1057–1098, 2013.

[10] S. Dimri, P. Tiwari, S. Basu, and V. R. Parmar, “Drug use pattern in children at a teaching hospital,” Indian Pediatrics, vol. 46, no. 2, pp. 165–167, 2009.