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The study of prescription patterns in pediatric outpatients for the management of fever

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ABSTRACT

Introduction: The therapeutic efficacy of certain antibiotics might be significantly impacted by incorrect usage. The study's goals were to ascertain the trend of antibiotic prescriptions and examine the justification for their usage in pediatrics diagnosed with fever in outpatient department. *Method:* The goal of the current observational study was to assess the prescription pattern for fever in children. A total of 117 prescriptions were gathered from the outpatient department of various private and public hospitals. The information extracted from the prescriptions included information on the patient's gender, weight, age, diagnosis and prescribed medications. *Results:* Of the 117 pediatric patients with fever, 60.7% were male and 39.3% were female. Majority of the study subjects (25.6%) belonged to the 2-5 years of age. The presenting complain of majority of the patients was cough with fever i.e., 30.8% patients. While mostly patients (57.3%) were prescribed antibiotics along with NSAIDs (Non-steroidal anti-inflammatory drugs). Cephalosporins accounted for the largest percentage of antibiotic prescriptions (34.2%). *Conclusion:* The majority of the pediatrics are getting cephalosporin antibiotics for management of fever. Comparatively fewer medications were prescribed in generic form, with the majority coming from the Essential Drug List. Our research recommends that methods to curb the excessive use of antibiotics be put into place and that the protocols for treating pediatric patients be updated on a regular basis.

Keywords: Pediatric; Fever; Antibiotics; Prescription patterns; Cephalosporins; NSAIDs, Essential drug list.

1. INTRODUCTION

The World Health Organization (WHO) defines pediatrics as a branch of medicine that deals with the health and medical care of infants, children, and adolescents. It encompasses a range of health issues, including physical, emotional, and social well-being, and addresses both preventive and curative aspects of health care (Groenewald, 2019). The focus is on the unique

developmental needs of children and the importance of family and community in promoting healthy growth and development. Pediatric care extends from birth through adolescence, typically up to the age of 18 (Groenewald, 2019). The usual definition of *fever* in pediatrics is a body temperature of *100.4°F (38°C)* or above, which may be measured with a rectal thermometer, which is the most accurate for young children.

Older children can use oral or ear thermometers, although the readings they give can be a bit low (Atwood et al., 2010). The most common causes of fever in children are gastrointestinal, respiratory, and urinary tract infections (such as the common cold or flu) (Hamilton et al., 2020). Seasonal variations can also affect the prevalence of fever, with winter months seeing greater rates of fever due to viral infections such as the respiratory syncytial virus (RSV) and influenza (Bermúdez et al., 2022). Approximately 443 832 children die from diarrheal illness each year, making it the third most common cause of mortality for children under the age of five. The body may get dehydrated and lose essential minerals during a prolonged bout of diarrhea, which can last for many days (Cairo et al., 2020).

In the past, the majority of cases of mortality linked to diarrhea were caused by acute dehydration and fluid loss. These days, a growing percentage of deaths linked to diarrhea are probably the result of other causes, such as septic bacterial infections. The most vulnerable groups to potentially fatal diarrhea include those living with HIV, malnourished children, and those with weakened immune systems (Cairo et al., 2020). One common and often temporary symptom is diarrhea. An attack of diarrhea is said to strike the typical American every other year (Antony et al., 2021). The majority of these instances include diarrhea that clears up on its own in a day or two and then goes away (Cairo et al., 2020). Some people get persistent diarrhea that can last for several months or even years.

These people are more prone to seek medical assistance for their issues. Up to 5% of people may experience chronic diarrhea (liquid stools for more than four weeks) in any given year, which can be a significant contributor to impairment (Sol et al., 2019). Antibiotics are routinely recommended in the pediatrics department as they cure infections (Atwood et al., 2010). Approximately 28% of children and babies worldwide are at high risk for illnesses caused by an underdeveloped immune system (Sol et al., 2019). Several studies revealed that 50-85% of children get antibiotics in both wealthy and underdeveloped nations prescribed by doctors (Atwood et al., 2010). Based on their chemical makeup, mode of action, and range of activity, antibiotics are categorized (Yackey et al., 2019).

Every class is used to treat particular kinds of bacterial infections and has special characteristics of its own (Shahid et al., 2024a; Shahid et al., 2024b). The type of infection, the bacteria causing it, and patient-specific variables are generally taken into consideration while selecting an antibiotic (Bassetti et al., 2017). It's critical to choose the right antibiotic for pediatric patients when considering antibiotic treatment, taking into account the patient's age, weight, known allergies, and underlying medical issues (Principi and Esposito, 2019). Compared to adult patients, pediatric kids may react differently or more severely to antibiotics as reactions can be minor, severe, or, in very rare circumstances, potentially fatal. In children who may be taking antibiotics, interactions with other drugs may be more complicated (Bassetti et al., 2017).

For some families, the expense of antibiotics and the requirement for a full course of treatment might be difficult (Ball et al., 2002). Failure to adhere to recommended regimens may result in insufficient treatment and exacerbate resistance (Shahid et al., 2022). It takes careful thought and observation to lessen these drawbacks. Usually, pediatricians carefully consider the advantages and disadvantages before prescribing antibiotics, and they only do so when absolutely required (Spicer et al., 2020). The present study was conducted with the aim to access the prescription trends in pediatric patients visiting outpatient department (OPD) for the management of fever.

2. METHODOLOGY

Study design & Study Subjects

An examination of the prescription pattern for fever, diarrhea, colds, and flu in Pakistani pediatric patients was done using a descriptive, cross-sectional observational research. Prescriptions from various hospitals in several Pakistani cities were gathered in order to collect statistics. A completed consent form was given, and participant consent was obtained before any data was collected. Unfinished responses were not included in the final analysis. The present study has been granted ethical approval by the Institutional Ethical Review Board and the Bio-Ethical Committee (BEC) of Lahore University of Biological & Applied Sciences.

Inclusion & Exclusion criteria

The inclusion criteria included prescriptions for fever, cold, flu, vomiting, diarrhea, and cough. Pediatric outpatient prescriptions were included in the study. However, those participants were excluded from the study for which consent was not obtained.

Study Setting and Duration

The research was conducted at several hospitals across Pakistan. The current study aims to assess Pakistani healthcare systems' prescription patterns for fever in pediatric outpatients. Data was collected from outpatient departments of various hospital settings from Lahore, Pakistan. The research period was of 6 months i.e., from March 2024 to August 2024. Based on convenient sampling technique, a total of 117 pediatric prescriptions from patients-both male and female were recruited for the present study.

Statistical analysis

Using IBM SPSS v21.0, the study subjects' obtained data was examined and evaluated. Descriptive statistics were applied in order to summarize the variables. Categorical variables were represented by percentages and frequencies.

3. RESULTS

The demographic variables of the study subjects including gender, age and weight are summarized in (Table 1). Majority of the patients at outpatient department were diagnosed with cough and fever as presented in (Table 2). Whereas, the presenting complain ratio of pediatric outpatients are graphically presented in (Figure 1).

Table 1 Demographic characteristics of study subjects

No:	Variables	Categories	N	%
1.	Gender	Male	71	60.7
		Female	46	39.3
2.	Age	0-6 months	19	16.2
		7 months- 1 year	24	20.5
		1-2 year	28	23.9
		2-5 year	30	25.6
		Greater than 5 year	16	13.7
3.	Weight	Under weight	44	37.6
		Normal weight	72	61.5
		Over weight	1	0.9

Table 2 Diagnosis and medications prescribing trends for fever

No.	Variable	Categories	N (%)
1.	Diagnosis	Fever only	25 (21.4)
		Fever + Diarrhea	22 (18.8)
		Fever + Cough	36 (30.8)
		Fever + Diarrhea + Vomiting	21 (17.9)
		Fever +Flu	6 (5.1)
		Fever +Allergy	7 (6.0)
2.	Medications prescribed for fever	NSAIDs only	39 (33.3)
		NSAIDS + Antibiotics	67 (57.3)
		NSAIDs + Antihistamines	11 (9.4)
3.	Medication for Diarrhea	Oral fluids only (ORS)	35 (29.9)
		No Medication for Diarrhea	82 (70.1)
4.	Nebulizer	Yes	24 (20.5)
		No	93 (79.5)

5.	Antiemetics	Yes	15 (12.8)
		No	102 (87.2)
6.	Cough syrups	Yes	23 (19.7)
		No	94 (80.3)

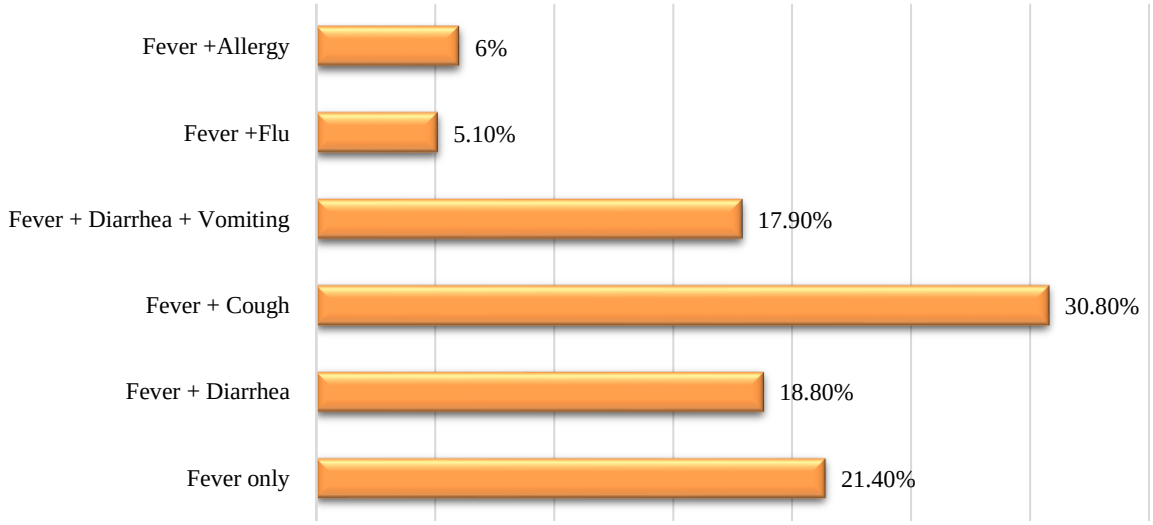

Figure 1 Presenting complain ratio of pediatric outpatients

The antibiotic prescription trends of the study subjects are mentioned in (Table 3). Majority of the patients were not prescribed any antibiotic, whereas, among the antibiotic prescribed prescriptions, Cephalosporins were the most commonly prescribed antibiotics-graphically represented in (Figure 2).

Table 3 Antibiotic Prescription trends

No.	Variable	Categories	N (%)
1.	Antibiotic prescription trends	No Antibiotic	50 (42.7)
		Cephalosporin	40 (34.2)
		Metronidazole	10 (8.5)
		Penicillin	8 (6.8)
		Macrolides	9 (7.7)

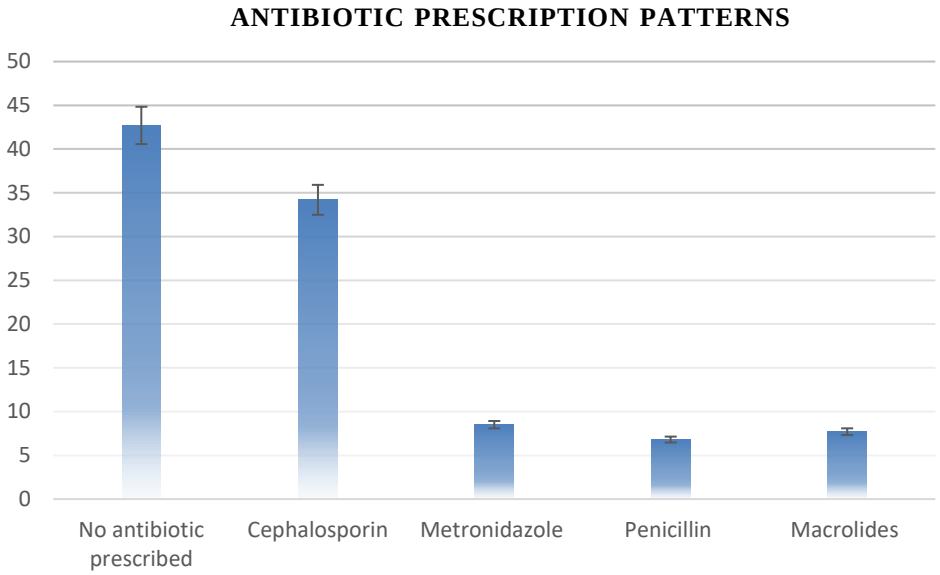

Figure 2 Antibiotic prescription patterns in pediatric outpatients

4. DISCUSSION

The present study is an observational study that was conducted to observe the pediatric prescription trends in outpatient department, for the management of fever across Lahore, Punjab, Pakistan. In the present study male population make up a larger number of participants (60.7%) than females (39.3%)- presenting that majority of the pediatric patients visiting OPD for the management of fever were male patients. These results are contrary to an observational study conducted in India, according to which among 1038 patients, most of the pediatric patients were female patients, followed by male patients (Antony et al., 2021). Sex has a significant influence on the course of many infectious illnesses, beginning at birth.

Males generally have greater rates of illness and death than females throughout their lives. This unequal distribution is mostly explained by men's heightened vulnerability to and severity of infectious illnesses throughout infancy and childhood. According to reports, human females respond more powerfully than men do to infection or antigenic stimulation in terms of humoral and cellular immunity (Muenchhoff and Goulder, 2014). This study also discovered that children between the ages of two and five have a higher risk of fever than other age groups. This might indicate an increased vulnerability to illnesses between ages 2 and 5. Research shows that newborn health should be prioritized in healthcare.

The similar outcome as our analysis is also shown by a recent prospective observational study that was held in Amravati, Maharashtra-India, presenting that the age group 2-12 years old comprised the majority of prescriptions for fever and infection (Shende et al., 2019). The possible reason could be the fact that children below the age of five have less developed immune system and are easy target to acquire infections through daycare settings or frequent encounter with infection prone surfaces. In the present study, among 117 pediatric prescriptions, 57.3% of the prescriptions i.e., 67 pediatric patients were prescribed antibiotics. The most commonly prescribed antibiotic groups were cephalosporins i.e., 40 (34.2%) prescriptions.

However, the prescriptions for penicillin were 6.8% i.e., only 8 pediatric patients were prescribed the Penicillin class of antibiotics. While 7.7% patients i.e., only 9 patients were prescribed Macrolides class of antibiotics. The possible reason could be the fact that as compared to penicillin class of antibiotics, cephalosporin antibiotics, a subtype of β-lactam antibiotics, offer a broader spectrum of antibacterial action. Their pharmacokinetic characteristics are enhanced, and they exhibit greater stability against β-lactamase enzymes. However, in contrast to our findings, a prior study carried out in Barabanki, Uttar Pradesh, North India in 2014 produced different findings.

The majority of the patients i.e., 48% were prescribed Amoxicillin (Penicillin class of antibiotic), while only 16% of the patients were prescribed Cefixime- belonging to third generation of Cephalosporin class of antibiotic. Majority of the pediatric patients, recruited for this study visited outpatient department (OPD) because of the upper respiratory tract infections (Mishra et al., 2014). In the present

study, only 12.8% of the pediatric patients were prescribed anti-emetics due to absence of presenting complain of vomiting. While, only 19.7% of the patients were prescribed cough syrups.

Similar findings are observed in another prospective observational study conducted in New Delhi, India in 2012 in which only 9.6% pediatric prescriptions contain Anti-emetic prescribing, while 12.9% patients were prescribed anti-diarrheal in accordance with the presenting complaints (Akhtar et al., 2012). Another prospective observational study conducted across Karnataka, India in 2016 presented the results that 24.84% pediatric patients were prescribed cough syrups. While 75% of the patients were prescribed Amoxicillin- Penicillin class of antibiotics, while among Cephalosporins, the drug Cefotaxime- belonging to third generation of Cephalosporin class of antibiotic was the most prescribed drug (Malpani et al., 2016).

The current study presents the findings that NSAIDs (nonsteroidal anti-inflammatory drugs) are the most commonly prescribed drugs i.e., all the prescriptions contained NSAIDs prescription. A study conducted across Lahore, Punjab, Pakistan presented the results that NSAIDs are the most commonly used drugs in terms of self-medication as well (Shahid et al., 2022). Our study presented an insight to the prescription trends of pediatric population across different areas of Lahore, Pakistan for the management of fever. According to the results of out study, nonsteroidal anti-inflammatory drugs are the most commonly prescribed drugs for the management of fever.

5. CONCLUSION

Our study indicated that 57.3% of pediatric kids obtained antibiotic prescriptions, with the highest number of prescriptions occurring in the 2–5-year age group. According to our findings, numerous antibiotics were administered; however, the most commonly prescribed medicine was cephalosporin. Drugs were mostly prescribed from the Essential Drug List, with fewer prescriptions being generic. Our study recommends implementing techniques to prevent illogical antibiotic usage and updating pediatric patient treatment recommendations on a frequent basis.

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Author Contributions

Author AS, AA and MS collected data from study subjects and performed initial statistical analysis. Author HA, SS and H wrote the initial draft of the manuscript. Author MZA performed refined statistical analysis for the final manuscript. All authors contributed in the preparation of the final manuscript.

Ethical approval

The present study has been granted ethical approval by the Institutional Ethical Review Board and the Bio-Ethical Committee (BEC) of Lahore University of Biological & Applied Sciences and allotted a protocol approval number: ERB-PHRMD-DPP/4469-A.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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