



P-ISSN: 2664-3685  
E-ISSN: 2664-3693  
IJPG 2019; 2(1): 58-64  
[www.paediatricjournal.com](http://www.paediatricjournal.com)  
Received: 03-12-2018  
Accepted: 11-01-2019

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## Trends in fever management prescriptions for pediatric patients in India

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**DOI:** <https://doi.org/10.33545/26643685.2019.v2.i1.a.231>

### Abstract

**Background:** Providing appropriate treatment for Fever is very essential in decreasing the morbidity and mortality of patients and preventing the transmission of communicable illness in communities. Hence, the quantification of the prescribing patterns through which fever is effectively managed could be a guide in healthcare system planning and a prerequisite for disease burden estimates in the future.

**Methods:** In this cross-sectional study, a multiple-response questionnaire-based survey focusing on the prevalence, clinical characteristics, management of fever, and the usage of paracetamol will be useful to improve the clinical practice of fever management.

**Results:** About 43% of respondents treated 60-80% of their patients with plain paracetamol. Approximately 79% of the respondents advise Tepid sponging to patients with fever. Only 69% of the respondents felt that urban parents have better awareness about fever. Over 54% of the respondents reported that cough and cold are more commonly associated with fever and 29% of the respondents reported 60-80% of patients with otitis media have fever. Only 32% of the respondents prescribed antibiotics along with paracetamol to 40-60% of their patients. About 57% of respondents preferred 15 mg/kg paracetamol dosage for fever whereas 44% of the respondents preferred the paracetamol + mefenamic acid combination for high-grade fever.

**Conclusion:** Despite the challenges in managing fever, clinicians commonly prescribe antibiotics along with Paracetamol. The results shown here can help determine the common clinical practice patterns among clinicians in the management of fever. Enumerating treatment-providing preferences, trends, and public care preferences identifies pitfalls that need to be improved in fever management guidelines.

**Keywords:** Fever, paracetamol, paediatrics, paracetamol liquid, mefenamic acid

### Introduction

A body temperature that increased above normal is a frequent medical illness known as fever. Typically, it is a symptom that the body is combating an infection or underlying disease. Although it might vary slightly from person to person, the average body temperature for an adult is roughly 98.6 degrees Fahrenheit (37 degrees Celsius) <sup>[1]</sup>. The body's inherent defense systems cause fever to develop. Pyrogens are substances that are released by the immune system when it recognizes the presence of pathogens like bacteria, viruses, or other foreign invaders. These pyrogens affect the hypothalamus, a region of the brain that controls body temperature, leading it to reset the thermostat of the body to a higher temperature <sup>[2]</sup>.

The prevalence and occurrence of fever in India can vary significantly based on several factors, including geographic region, climate, socioeconomic conditions, and the time of year. Fever is a common symptom of various infections and illnesses, so its prevalence can be influenced by the prevalence of these underlying conditions <sup>[3]</sup>. India, like many countries, faces a burden of infectious diseases that can lead to fever. These diseases include malaria, dengue fever, typhoid, chikungunya, and various respiratory infections. The prevalence of these diseases can vary by region and season <sup>[4]</sup>. Malaria is a significant health concern in India, particularly in states with a tropical climate like those in the northeastern and central parts of the country. High fever is a hallmark symptom of malaria, and the incidence of malaria-related fevers can be quite high in endemic areas <sup>[5, 6]</sup>.

Dengue fever outbreaks can occur in different parts of India, especially during the monsoon season when mosquito populations increase. Dengue often presents with a sudden high fever, and its occurrence can vary from year to year <sup>[4]</sup>. Typhoid fever is caused by Salmonella bacteria and can lead to prolonged high fever.

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It is more common in areas with poor sanitation and access to clean water. The occurrence of fever can also have a seasonal pattern in some regions. For example, flu and other respiratory infections are more common during the winter months in northern India. Access to healthcare facilities and quality medical care can influence the reporting and management of fever cases. In rural and remote areas, people may not have easy access to healthcare, which can affect the diagnosis and treatment of fevers. Immunization campaigns, especially for diseases like measles and rubella, can reduce the incidence of fever caused by vaccine-preventable diseases. Fever is often a symptom of an underlying condition or infection, and the appropriate therapeutic solutions for fever may depend on its cause and severity. Fever can lead to increased fluid loss through sweating and increased respiratory rate. Staying well-hydrated by drinking water, clear fluids or oral rehydration solutions is essential to prevent dehydration. Rest is crucial to help the body recover from illness and conserve energy for the immune system to fight the underlying infection. In some cases, such as bacterial infections, your healthcare provider may prescribe antibiotics to treat the underlying cause of the fever. Antiviral medications may be prescribed for specific viral infections [6]. In cases of high fever, cooling measures like taking a tepid bath, using a cool compress on the forehead and body, or using fans or air conditioning can help lower body temperature. Avoid using very cold water or ice, as it can lead to shivering and may worsen the situation. Since fever is a symptom, it's essential to identify and address the underlying cause.

This may involve diagnostic tests, such as blood tests, imaging, or cultures, to determine the specific infection or condition causing the fever. Treatment should target the root cause. Practicing good hygiene, such as regular handwashing and proper cough and sneeze etiquette, can help prevent the spread of infections that lead to fever. Vaccination is one of the most effective ways to prevent many infectious diseases that can cause fever. Maintaining up-to-date vaccinations, as recommended by healthcare professionals, can reduce the risk of contracting these illnesses [7]. It's critical to get medical help if a fever lasts for a long time, is extremely high (over 104°F or 40 °C), is followed by serious symptoms like breathing problems, continuous vomiting, or confusion, or if it affects newborns, the elderly, or those with underlying health conditions. In such situations, a healthcare professional can identify the source of the fever and suggest the best course of action.

### Methodology

A cross sectional, multiple-response questionnaire based

survey conducted among physicians specialized in managing fever in the major Indian cities.

### Questionnaire

The questionnaire booklet titled "Paracetamol Liquids in the management of Paediatric fever" study was sent to the doctors who were interested to participate. The study questionnaire consisted of 11 questions that focused on the prevalence, symptoms, causes, clinical characteristics, management of fever, and the usage of fever medications in clinical practice. The study was performed after obtaining approval from Bangalore Ethics, an Independent Ethics Committee which was recognized by the Indian Regulatory Authority, Drug Controller General of India.

### Participants

An invitation was sent to professionals across India based on their expertise and experience in treating fever in Indian survey. About 377 clinicians from major cities of all Indian states representing the geographical distribution shared their willingness to participate and provide necessary data. They were explicitly instructed to provide individual responses without consulting their colleagues. Before commencing the study, written informed consent was obtained from all survey participants.

### Statistical analysis

The data were analyzed using descriptive statistics. Categorical variables were presented as percentages to provide a clear insight into their distribution. The frequency of occurrence and the corresponding percentage were used to represent the distribution of each variable. To visualize the distribution of the categorical variables, graphs were created using Microsoft Excel 2013 (version 16.0.13901.20400).

### Results

Among the total of 377 clinicians who participated in the present survey study, 58% were general practitioners, 38% were pediatricians, 2% were neonatologists and paediatricians, and 1% were others/not specified.

In this survey, 43% of clinicians said 60-80% of their patients were treated with plain paracetamol, followed by 27% said that less than 60% of their patients were treated with plain paracetamol, and 22% said that 80-100% of their patients were treated with plain paracetamol (Figure 1). About 79% of the clinicians have agreed for advising tepid sponging to patients with fever, 19% of the clinicians have refused tepid sponging to patients with fever, and 2% did not choose either option (Figure 2).

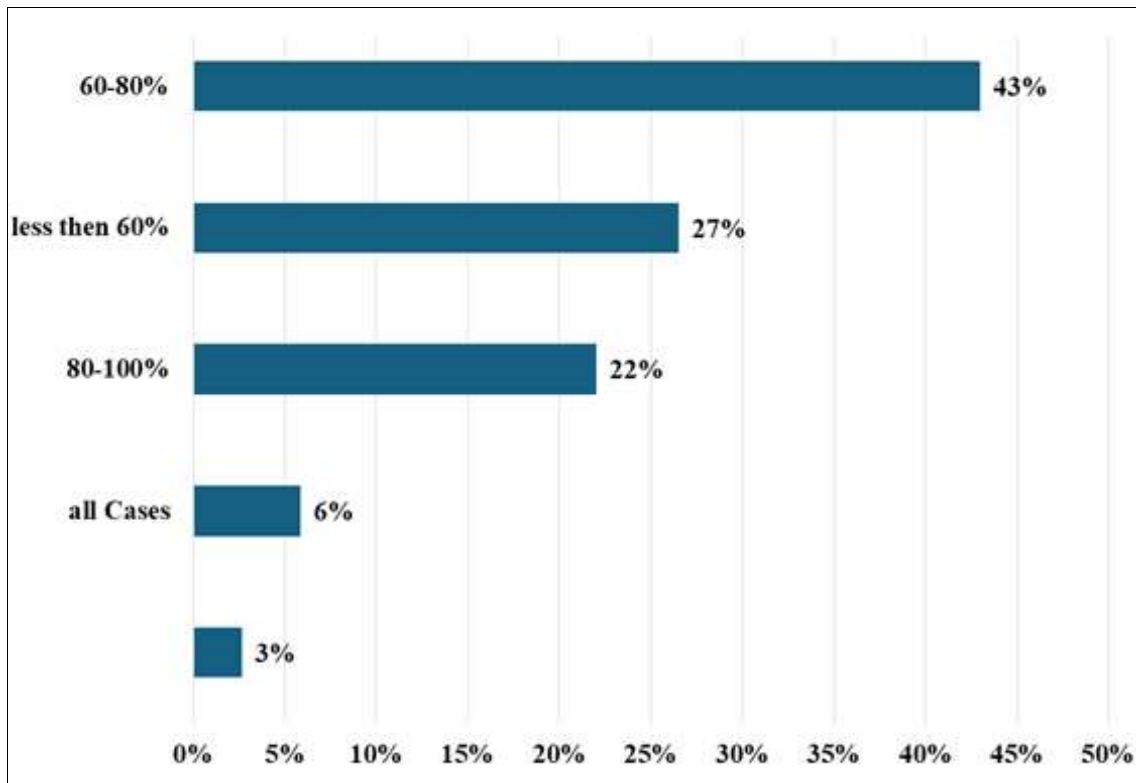


Fig 1: Distribution of the proportion of patients treated with plain paracetamol

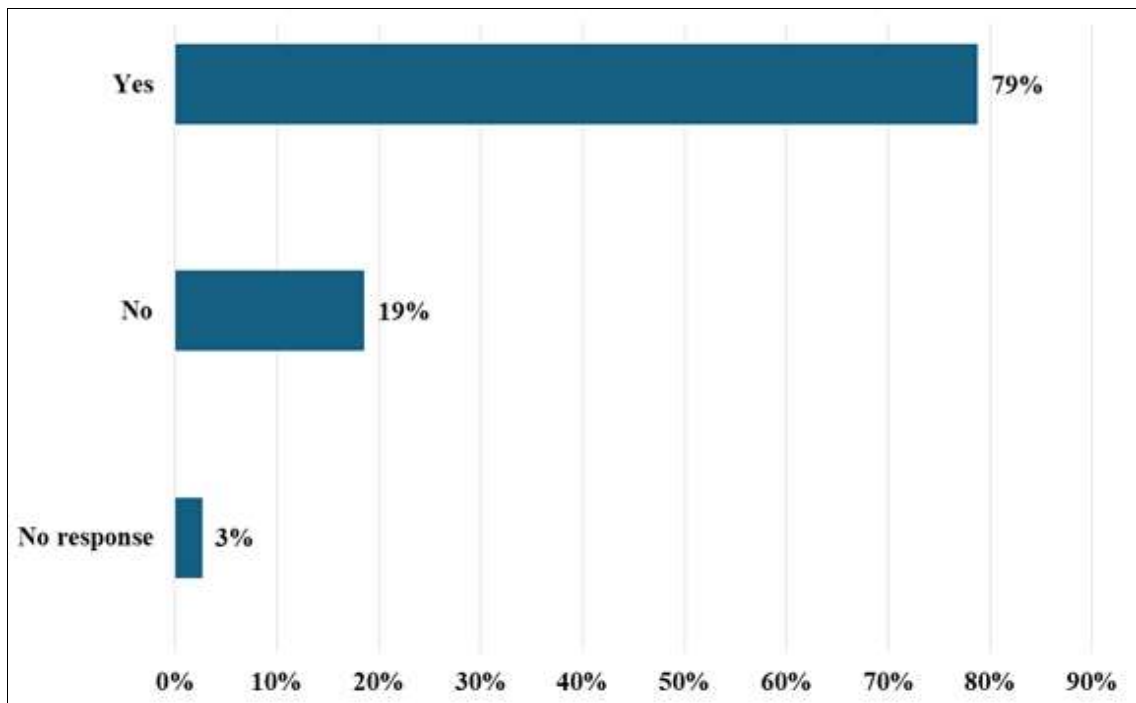
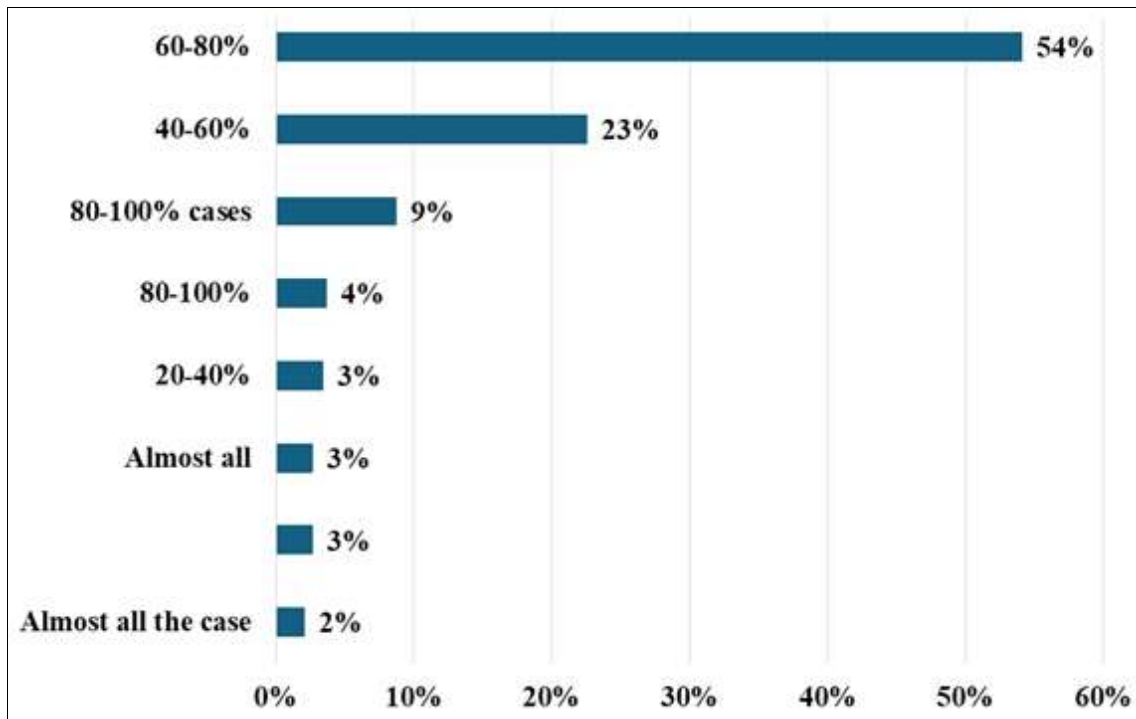


Fig 2: Physicians recommendation on tepid sponging to patients with fever

The data obtained in this survey show that 69% of the clinicians felt that urban parents have better awareness about fever, while 11% sided with rural parents, 7% sided with sub-urban parents, 5% agreed with both rural & urban, 3% did not respond, 2% sided with urban and semi-urban parents, and 1% sided with rural and semi-urban.

In this survey, 54% of the clinicians reported 60-80% of their patients having cough and cold associated with fever, 23% reported 40-60% cases, and 9% reported 80-100%

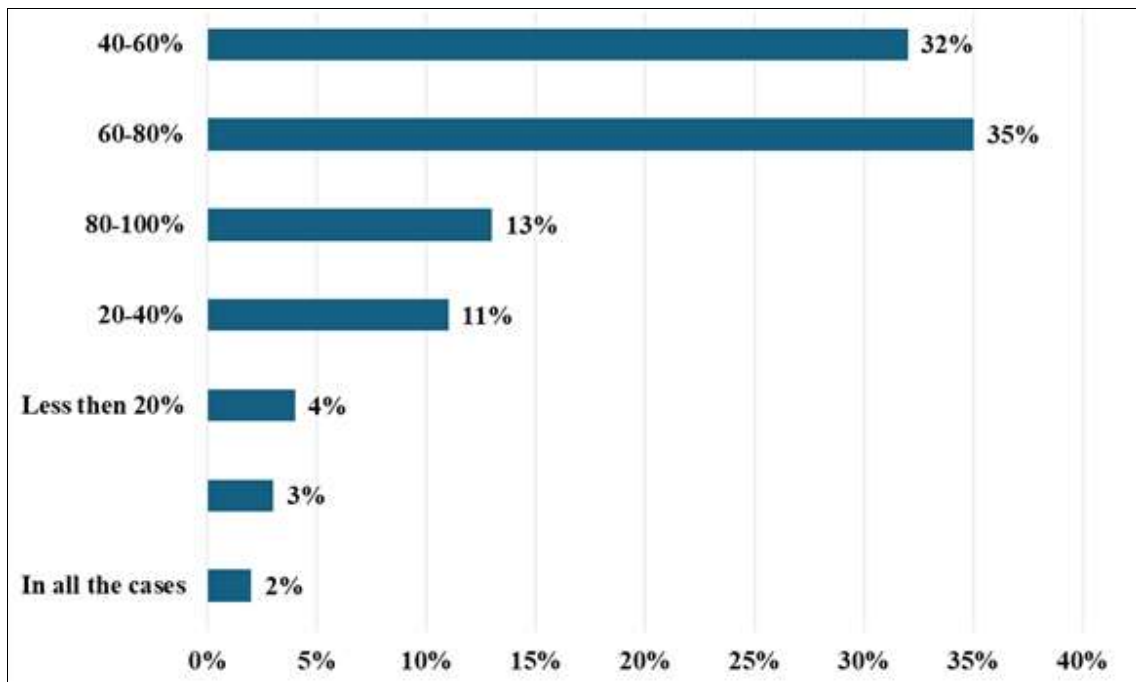
cases just like 4% more respondents, 5% of respondents reported almost all cases and 3% didn't respond (Figure 3). On the other side, 29% of clinicians who participated in the survey reported 60-80% of patients with otitis media having fever, 27% reported 40-60% of patients, 17% reported 20-40% of patients, 15% reported 80-100% of patients, 5% reported less than 20% of patients, 2% reported almost all, another 2% reported all, and 2% never responded.



**Fig 3:** Association of cough and cold with fever

In addition, 32% of the clinicians reported prescribing antibiotics along with paracetamol to 40-60% of their patients, 35% reported 60-80% cases, 13% reported 80-100% cases, 4% reported less than 20% cases, 3% didn't respond, and 2% reported in all of their cases (Figure 4). Over 39% of the clinicians who participated in the survey sided with "3,4,2,1" as their essential attribute to be

considered while selecting the paracetamol liquid, 21% responded as "7", 15% responded as "3" and 9% responded as "2". About 33% of the clinicians chose flavor "4" as their preferred flavor, 21% chose flavor "1", 10% chose flavor "3", and 6% chose flavor "1 and 4". Also, 57% of clinicians preferred 15mg/kg paracetamol dosage for fever, 37% preferred 10mg/kg, and 2% didn't respond (Figure 5).



**Fig 4:** Frequency of prescribing antibiotics with paracetamol

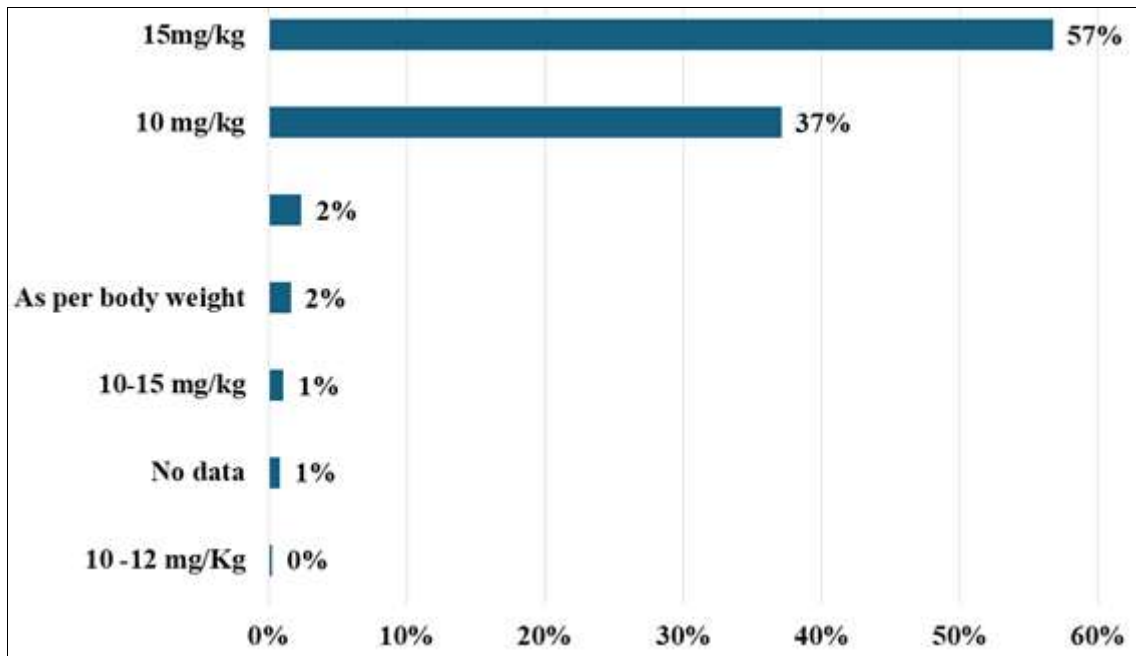


Fig 5: Preferred paracetamol dose in fever

Moreover, 40% of the clinicians admitted 20-40% instances of encountering high-grade fever in children, 31% encountered 40-60% cases, 18% encountered 10-20% cases, and 7% encountered more than 60% cases (Figure 6). Furthermore, 44% of the clinicians preferred taking

Paracetamol + mefenamic acid combination, 21% preferred Paracetamol + separate mefenamic acid on an SOS basis, 16% preferred Paracetamol high dose: 15 mg/kg, and 7% preferred Paracetamol high dose: 15 mg/Kg (Figure 7).

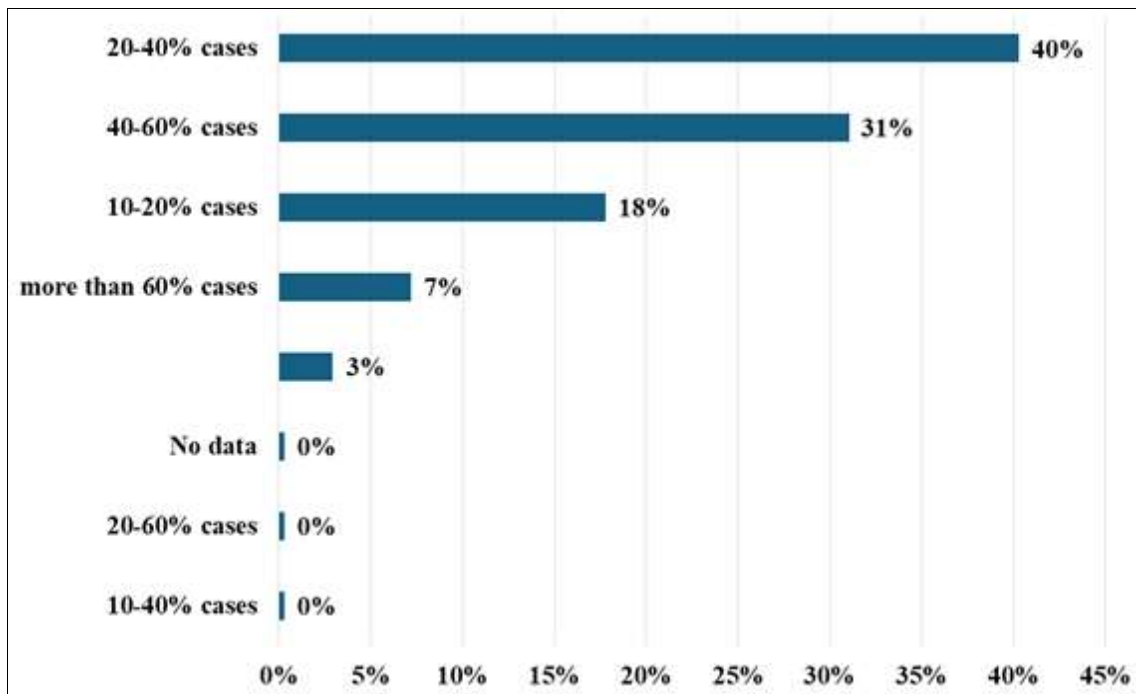
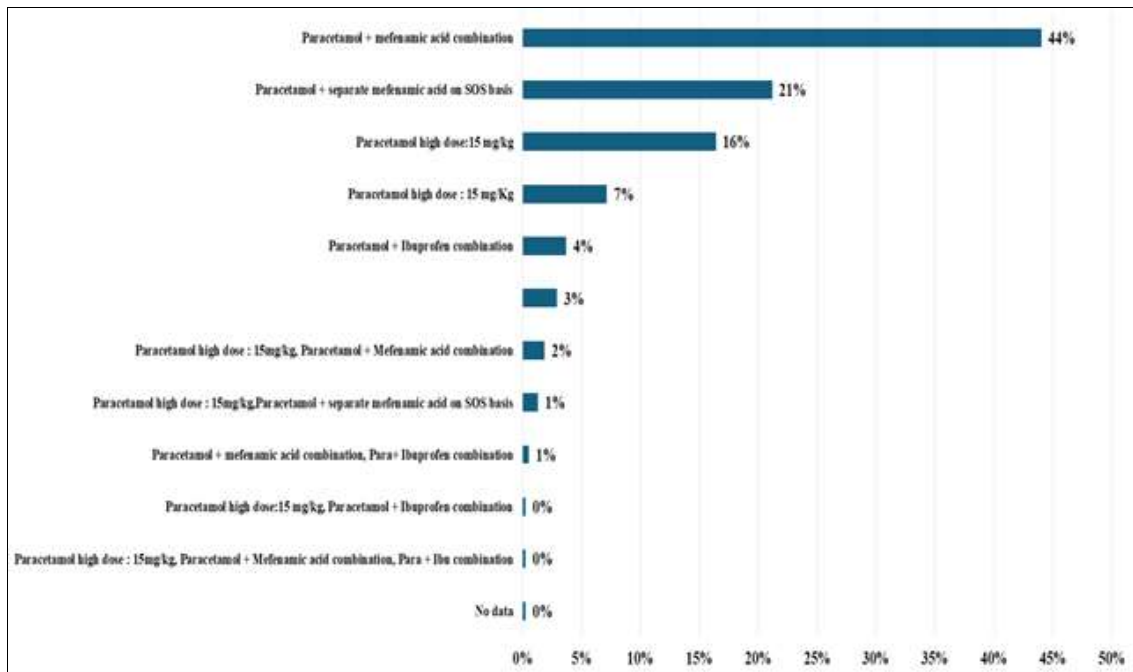


Fig 6: Prevalence of high-grade fever among children



**Fig 7:** Preferred treatment for high-grade fever

**Discussion**

The present study examining the prevalence, symptoms, causes, clinical characteristics, and the usage of medications to manage fever in clinical practice shows that the majority of clinicians (56%) treat around 60-80% of patients with fever per week. Similar findings were in previous studies that highlighted fever was the most common reason for patients to visit a primary healthcare practitioner in India [7]. These findings could help to establish disease patterns, which in turn influence healthcare services, medical research, and medical education, as well as fuel innovation in health epidemiology [8]. In this survey, 43% of clinicians who participated said that 60-80% of their patients were treated with plain paracetamol, followed by 27% said that less than 60% of their patients were treated with plain paracetamol, and 22% said that 80-100% of their patients were treated with plain paracetamol. In a prospective, observational study enrolling adult patients who accessed the emergency department for fever found that paracetamol 1,000 mg was the first choice for the treatment of fever [9]. Hence, Paracetamol could be one of the most commonly used over-the-counter (OTC) drugs for fever because of its good availability, low cost, and tolerability [10]. About 79% of the clinicians have accepted to advise tepid sponging to patients with fever. Previous studies have statistically proved that tepid sponging was effective on fever among children (6-12 years) [11]. There was evidence that a decrease in body temperature was observed after the application of a warm water tepid sponge compress. Hence, tepid sponge compresses are advised as a non- pharmacological therapy to reduce fever for children mainly [12]. Most of the clinicians (69%) participated in the survey agreed that urban parents have better awareness about fever, while 11% sided with rural parents, 7% sided with sub- urban parents, 5% agreed with both rural and urban, 3% did not respond, 2% sided with urban and semi-urban parents, and 1% sided with rural and semi-urban. Previous studies have shown that level of literacy, socioeconomic status, and area of residence were the main factors affecting Indian parent’s knowledge regarding fever management in children [13].

Fever awareness was fair among urban parents. Increased awareness for correct fever management of under-five children is desirable among urban parents to reduce the misuse of antibiotics and antipyretics. It is recommended that health education regarding common pediatric ailments should be provided to the parents at every contact with health care providers [14]. Important educational points should include the role of fever in childhood illnesses, what to assess during febrile episodes, and when a healthcare visit is required. 54% of the clinicians who participated reported that around 60-80% of fever patients had a cough and cold also. Various studies have reported that cold and cough are common among fever patients having upper respiratory tract infection [15]. In this survey, 29% of the clinicians reported 60-80% of patients with otitis media have fever, followed by 27% reporting in 40-60% of patients, and 15% reporting in 80-100% of patients. This data suggested that fever was more commonly prevalent among otitis media patients [16]. Over 32% of the clinicians participated in this survey reported prescribing antibiotics along with paracetamol to 40-60% of their patients, 35% reported in 60-80% cases, 13% reported in 80-100% cases, 4% reported less than 20% cases, 3% didn’t respond, and 2% reported in all of their cases. These diverse distribution suggests that prescribing antibiotics along with paracetamol is a common practice. Paracetamol also known as acetaminophen is a promptly acting antipyretic and analgesic drug compared to other non-steroidal anti-inflammatory drugs (NSAIDs) to manage fever because of its safety profile. In case of infections, paracetamol is prescribed along with antibiotics [17]. Notably, 57% of clinicians who participated in the survey preferred 15mg/kg paracetamol dosage for fever, 37% preferred 10mg/kg, and 2% didn’t respond. The maximum daily dose beyond the neonatal period varies from 10-15 mg/kg. The body temperature-reducing effect of acetaminophen is similar at physician-directed doses [18]. Over 40% of the clinicians admitted 20-40% instances of encountering high-grade fever in children, 31% encountered 40-60% cases, 18% encountered 10-20% cases, and 7% encountered more than 60% cases. In a previous study

among the 298,327 children aged 0 to 59 months included in the analysis, the weighted prevalence of high-grade fever was 22.65%. Respiratory illness was the strongest factor associated with fever in children. In this survey, 44% of the clinicians preferred taking paracetamol + mefenamic acid combination for high-grade fever, 21% preferred paracetamol + separate mefenamic acid on if needed basis, 16% preferred paracetamol high dose:15 mg/kg, and 7% preferred paracetamol high dose: 15 mg/Kg. Previous studies show that standard-dose paracetamol (15 mg/kg/dose) had a slower and shorter antipyretic effect than high-dose paracetamol (20 mg/kg/dose) and mefenamic acid (6 mg/kg/dose). A single dose of high-dose paracetamol was safe and had a similar antipyretic effect as mefenamic acid [20]. Clinical trials with larger sample sizes and comparisons of other NSAIDs will be required to confirm these findings.

### Conclusion

This study sheds light on the prevalence and management of fever in clinical practice. It revealed that plain paracetamol is a common choice for treating fever among patients and most clinicians advised tepid sponging and awareness about fever was perceived to be better among urban parents, and cough and cold are frequently associated with fever cases. Also, prescribing antibiotics along with paracetamol is common in their clinical practice and the preferred attributes for paracetamol selection vary among respondents. Ultimately, this survey provides valuable insights into the clinical approach to fever management in India and highlights the diversity of opinions and practices among healthcare professionals. Further research and collaboration are needed to continually improve the management and prevention of fever in the country.

**Conflict of Interest:** Not available.

**Financial Support:** Not available.

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