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Original Research Article

Paracetamol use in pediatric fever: a cross-sectional survey of clinicians in India

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ABSTRACT

Background: Paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) are widely used in pediatric patients. However, clinicians' preferences and perspectives regarding their safety and efficacy may vary in clinical practice. This survey aimed to assess the clinical practices and perceptions regarding the use of paracetamol in the management of fever in pediatric patients in India.

Methods: This cross-sectional study was conducted among clinicians managing febrile pediatric patients across India. A structured 22-item questionnaire was administered covering antipyretic agent selection, formulation preferences, comparative safety of paracetamol versus NSAIDs, adverse drug reactions, and clinician-rated efficacy on a five-point global improvement scale. Data were analyzed using descriptive statistics, with categorical variables expressed as frequencies and percentages.

Results: The survey included 506 practitioners. Most clinicians reported initiating fever management with paracetamol or NSAIDs (87%), and nearly all (98%) preferred paracetamol as the antipyretic of choice in children. A large proportion (81%) preferred paracetamol as the initial step in 21-30% of patients, while 52% used suppositories in fewer than 10% of febrile cases. Fewer gastrointestinal side effects were identified as the main advantage of paracetamol syrup or drops over ibuprofen by 44% of clinicians, and 57% considered paracetamol to have a better gastrointestinal safety profile. Most clinicians had not encountered adverse drug reactions with paracetamol (86%), and 55% rated its efficacy as showing marked improvement on the global improvement scale.

Conclusions: Paracetamol is the most commonly preferred first-line antipyretic among clinicians for pediatric fever management in India. It is widely regarded as having a favorable gastrointestinal safety profile compared with ibuprofen, a low burden of adverse drug reactions, and good clinician-rated efficacy.
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Keywords: Paracetamol, Paediatric fever, Antipyretic therapy, Treatment preferences, Gastrointestinal safety, Clinical survey

INTRODUCTION

Fever and pain are common manifestations of pediatric infections and represent major reasons for medical consultation, often causing considerable distress to both children and their caregivers.[1,2] Fever is particularly frequent during childhood and accounts for nearly 70% of visits to pediatricians.[3] Despite its high prevalence, managing these symptoms can be challenging for parents. Fever represents a natural physiological response to infection, whereas pain generally arises from inflammation or tissue injury associated with the underlying infectious process. However, parental misconceptions about fever, commonly referred to as "fever phobia," often lead to overtreatment due to exaggerated concerns about potential complications. In contrast, pain in children is frequently under-recognized and inadequately treated, which may result in delayed or

insufficient analgesia and potential long-term consequences such as altered pain perception. Appropriate symptom management is therefore essential to relieve discomfort while minimizing the risks associated with both overtreatments, including unnecessary drug exposure, and undertreatment, which may lead to persistent pain and distress.[1]

Paracetamol is a widely used analgesic and antipyretic for the management of fever and mild-to-moderate pain in pediatric patients. It is recommended as first-line treatment for both fever and pain in children by several national and international guidelines and is included in the WHO Model list of essential medicines for children. Paracetamol is generally regarded as a safe and well-tolerated drug with a favorable efficacy and safety profile. Its pharmacological effects are primarily mediated through central mechanisms.

Paracetamol is believed to inhibit prostaglandin synthesis within the central nervous system by modulating cyclooxygenase (COX) activity, thereby reducing the production of prostaglandin E_2 in the hypothalamus and lowering the thermoregulatory set point responsible for fever. Evidence supporting a central mechanism is provided by the higher concentrations of paracetamol detected in cerebrospinal fluid compared with plasma.

In addition to central prostaglandin inhibition, several other pathways have been proposed to contribute to its pharmacodynamic effects, including activation of descending serotonergic inhibitory pathways, modulation of the endogenous cannabinoid system through its metabolite AM404, and interactions with N-methyl-D-aspartate (NMDA) receptors and nitric oxide pathways.[4]

Despite strong evidence supporting the role of paracetamol in pediatric fever management, limited data are available on clinician perspectives and perceptions in the Indian clinical settings. This survey, therefore, aims to assess the clinical practices and perceptions of clinicians regarding the use of paracetamol for pediatric fever management across India, with a focus on antipyretic agent selection, formulation preferences, safety profile, adverse drug reaction experience, and perceived treatment efficacy.

METHODS

Study settings

A cross-sectional study was carried out among clinicians involved in pediatric fever management in the major Indian cities from June 2025 to December 2025. The study was performed in accordance with Bangalore Ethics, an Independent Ethics Committee (ECR/355/Indt/KA/2022), which was recognized by the Indian Regulatory Authority, the Drug Controller General of India.

Study participants

An invitation was sent to leading clinicians in managing pediatric fever in the month of March 2025 for participation in this Indian survey. About 506 clinicians from major cities of all Indian states, representing the geographical distribution, shared their willingness to participate and provide necessary data.

Inclusion criteria

Clinicians involved in the management of pediatric patients with fever, those who were willing to participate and provide written informed consent, and clinicians practicing in India during the study period were included in the study.

Exclusion criteria

Clinicians not involved in the management of pediatric fever, those who declined participation or did not provide informed consent, and those with incomplete questionnaire responses were excluded from the study.

Study procedure

The questionnaire booklet titled PERCEIVE (Perspectives of Experts Regarding Clinical Experience and Views on Paracetamol in children) study was sent to the clinicians who were interested in participating in the survey. The study questionnaire comprised 22 questions that covered key domains, including the etiology and burden of pediatric fever, risk stratification, and identification of high-risk groups such as immunocompromised children, and diagnostic approaches to febrile illness, including investigations such as complete blood count, blood culture, urinalysis, and procalcitonin testing. It also assessed clinical management strategies, including antipyretic pharmacotherapy and non-pharmacological measures such as tepid sponging, treatment preferences for antipyretic agents, particularly paracetamol compared with NSAIDs such as ibuprofen, formulation-specific preferences including suppositories, perceptions of gastrointestinal and renal safety, adverse drug reaction monitoring, and clinician-rated efficacy using a five-point global improvement scale. Reliability, as determined by a split-half test (coefficient alpha), was adequate but should be improved in future versions of the questionnaire. A study of criterion validity was undertaken to test the questionnaire and to develop methods of testing the validity of measures of Physicians' Perspectives. However, the extraneous variables in this include the clinician's experience, usage of the newer drugs, etc. The two criteria used were the doctors' perspectives from the clinical practice and the assessment of an external assessor and statistician. Clinicians had the option to skip questions as desired and were instructed to complete the survey independently, without peer consultation. Before

participating in the survey, all respondents provided written informed consent.

Statistical analysis

The data were analyzed using descriptive statistics, with categorical variables expressed as percentages to illustrate their distribution. Each variable's frequency and corresponding percentage were reported to provide a comprehensive overview. To visually represent the distribution of categorical variables, pie and bar charts were generated using Microsoft Excel, version 2409, build 16.0.18025.20030.

RESULTS

The survey included 506 participants. Approximately 45% of clinicians identified viral infections as the most common cause of fever in children in their clinical practice. Similarly, about 44% of clinicians identified infectious diseases as the primary contributor to the overall burden of fever in clinical practice.

Around 71% of experts reported that infants most commonly present with a higher risk of developing severe complications from infection-related fever in Indian settings. Approximately 51% of clinicians estimated that 11-25% of febrile immunocompromised patients have bacterial infections in their clinical practice, while about 40% reported that viral infections account for 21-30% of fever cases in immunocompromised patients. Nearly 50% of respondents indicated that influenza is a common cause of fever in 11-20% of patients in their clinical practice.

Table 1: Distribution of responses to the initial management step for patients presenting with fever in clinical practice (n=506).

Initial management step	Response rate N (%)
Immediate antibiotic administration	51 (10.08)
Antipyretic treatment with paracetamol or NSAIDs	442 (87.35)
Referral to a specialist	2 (0.4)
Administration of corticosteroids	1 (0.2)
All of the above	10 (1.98)

Table 2: Distribution of responses to the use of paracetamol as the initial step in fever management (n=506).

Percentage of patients (%)	Response rate N (%)
<10	13 (2.57)
11-20	85 (16.8)
21-30	408 (80.63)

Among hospitalized patients, about 39% of clinicians reported hospital-acquired infections as the most common cause of fever. Approximately 68% of clinicians indicated that fever of unknown origin is characterized by prolonged high-grade fever, absence of an identifiable source, and association with systemic symptoms. Around 51% of clinicians reported complete blood count as the first-line diagnostic test for evaluating febrile patients in routine clinical practice. Nearly 49% stated that fewer than 10% of febrile patients present with red-flag signs of sepsis or organ failure in their clinical practice, while about 42% reported using procalcitonin testing in fewer than 10% of febrile patients to diagnose ongoing bacterial infection in routine clinical practice.

Table 3: Distribution of responses to the use of paracetamol suppositories in patients with fever (n= 506).

Percentage of patients (%)	Response rate N (%)
<10	261 (51.58)
11-20	129 (25.49)
21-30	116 (22.92)

Table 4: Distribution of responses to the main advantage of paracetamol syrup/drops over ibuprofen syrup in children (n=506).

Advantages	Response rate N (%)
Faster onset of action	139 (27.47)
Fewer gastrointestinal side effects	221 (43.68)
Lower risk of kidney damage	45 (8.89)
All of the above	101 (19.96)

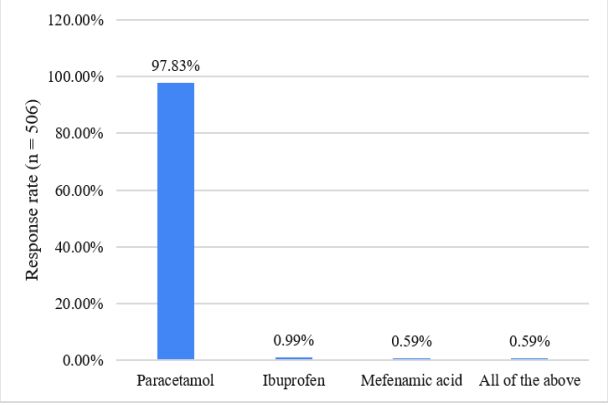

Figure 1: Distribution of responses to preferred antipyretics for treating fever in children in clinical practice.

About 70% of clinicians indicated that they advise tepid sponging for the management of fever in children in their clinical practice. A majority of clinicians (87%) reported that initiating antipyretic therapy with paracetamol or

NSAIDs is the first step in managing patients presenting with fever (Table 1). Nearly 98% of respondents preferred paracetamol as the antipyretic of choice for managing fever in children in routine clinical practice (Figure 1). Around 81% of practitioners reported prescribing paracetamol as the initial step in fever management for 21-30% of patients in their clinical practice (Table 2). Approximately 52% reported prescribing paracetamol suppositories in fewer than 10% of patients with fever in routine clinical practice (Table 3).

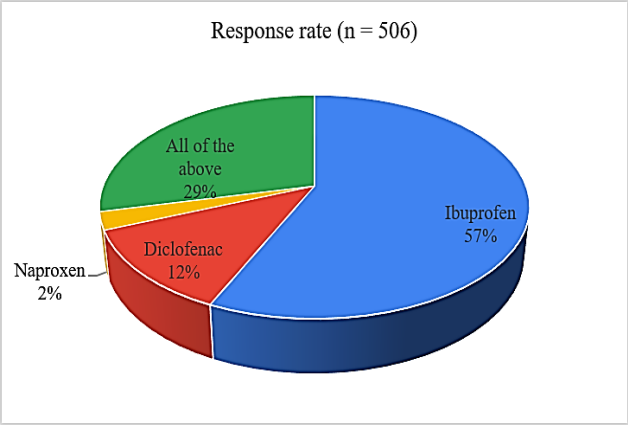

Figure 2: Distribution of responses to drugs compared with paracetamol for gastrointestinal safety profile.

According to 44% of experts, fewer gastrointestinal side effects are the main advantage of using paracetamol syrup or drops over ibuprofen syrup in children (Table 4). Approximately 57% of clinicians indicated that paracetamol has a better gastrointestinal safety profile than ibuprofen in clinical practice (Figure 2). Around 86% reported that they have not encountered any adverse drug reactions in patients treated with paracetamol in their clinical practice. About 55% of participants rated the efficacy of paracetamol as showing marked improvement on the global improvement scale in their clinical experience (Figure 3).

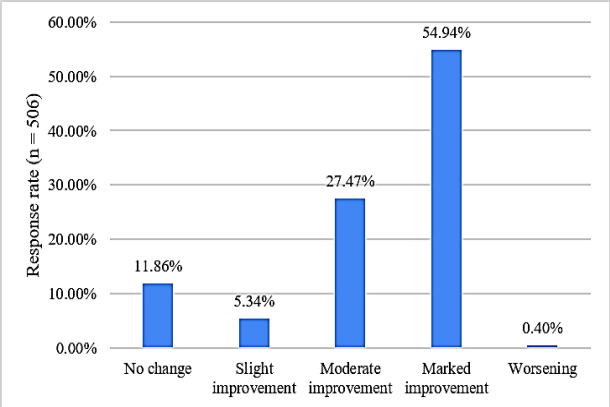

Figure 3: Distribution of responses to clinician-rated efficacy of paracetamol on the global improvement scale.

Approximately 63% of clinicians reported that they regularly monitor patients for potential side effects or complications related to medications in their clinical practice. About 63% stated that they have not used N-acetylcysteine for the management of paracetamol overdose in their clinical practice.

DISCUSSION

The survey findings indicate favorable clinical outcomes associated with paracetamol therapy, with more than half of clinicians reporting marked clinical improvement on the global improvement scale. In addition, a substantial majority of surveyed clinicians indicated that they initiate fever management with antipyretic therapy, most commonly using paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs), as the first step in routine clinical practice. In pediatric patients, the primary antipyretic agents recommended for fever management are paracetamol and ibuprofen, both of which have been approved as safe for use in children when administered at appropriate doses by regulatory authorities such as the U.S. Food and Drug Administration. NSAIDs play an important role in fever and pain management in children, with paracetamol, ibuprofen, and, in some clinical settings, mefenamic acid commonly used as first-line therapeutic options.[5,6] The prioritization of antipyretics as a first-line intervention reflects clinicians' recognition of the need to reduce discomfort, prevent febrile complications, and improve patient well-being, particularly in the pediatric population.

The major observation in this survey is the near-unanimous preference for paracetamol over other antipyretics in routine pediatric clinical practice, with 98% of respondents identifying it as their antipyretic choice for managing fever in children. This strong preference is consistent with evidence from clinical studies demonstrating the efficacy and safety of paracetamol in pediatric fever management. In a double-blind, randomized, placebo-controlled trial involving 210 febrile children, paracetamol significantly reduced body temperature and produced a greater percentage decrease in temperature within the first four hours compared with placebo. A significantly higher proportion of children became afebrile at four hours (46.6% vs. 12.1%; $p<0.001$), with greater symptomatic improvement observed at six hours ($p<0.001$). No serious clinical or biochemical adverse effects were reported, indicating that paracetamol provides effective and well-tolerated antipyretic therapy in children with febrile illness.[7] Similarly, Kamel et al, reported that paracetamol was the most commonly used antipyretic by caregivers for the management of fever, further supporting its widespread acceptance in pediatric fever treatment.[8]

With respect to prescribing frequency, a significant proportion of clinicians reported prescribing paracetamol as the initial step in fever management for 21-30% of their patients. This may reflect clinicians' adherence to

watchful waiting strategies for mild or self-limiting febrile episodes, in which pharmacological intervention is deferred unless the fever persists or causes significant patient distress. In this context, Jensen et al, reported that approximately three out of four parents administered paracetamol to febrile children, primarily to reduce body temperature, relieve pain, and help the child fall asleep, highlighting that caregiver-driven use at home complements clinician-directed prescribing in the broader management of pediatric fever.[2]

The relatively limited use of paracetamol suppositories is noteworthy, as more than half of respondents (51.58%) reported prescribing this formulation in fewer than 10% of their patients with fever. This limited utilization may be attributed to the greater convenience, acceptability, and flexibility of oral formulations such as syrups or drops, which are generally preferred in routine pediatric practice. Suppository formulations are typically reserved for specific clinical situations, such as vomiting, inability to tolerate oral medications, or impaired swallowing. Similar findings have been reported in the literature; a study by Botzenhardt et al, evaluating analgesic prescription patterns found that the rectal route of administration was rarely used in clinical practice. Except in cases of gastroesophageal reflux, where 17.5% of prescriptions (61/348) were administered rectally, the overall use of the rectal route remained low, with paracetamol suppositories accounting for the majority of these prescriptions. These observations suggest that while rectal formulations remain an important alternative in select clinical circumstances, oral antipyretic formulations continue to dominate routine fever management in pediatric settings.[9]

Regarding the comparative advantages of paracetamol over ibuprofen, the majority of clinicians identified fewer gastrointestinal side effects as the primary advantage of paracetamol syrup or drops over ibuprofen syrup in the pediatric population. This is complemented by the finding that the majority of respondents considered paracetamol to have a superior gastrointestinal safety profile compared with ibuprofen. These perceptions are well-supported by the pharmacological and clinical literature. A systematic review and meta-analysis by Pranata et al, comparing oral paracetamol with oral ibuprofen in preterm neonates with patent ductus arteriosus reported that the rates of renal dysfunction (OR 0.27; 95% CI 0.10-0.77; I^2=0%) and gastrointestinal bleeding (OR 0.31; 95% CI 0.11-0.88; I^2=0%) were lower in the paracetamol group.10 Bianciotto et al, evaluated the risk of upper gastrointestinal complications (UGIC) associated with drug use in the pediatric population. The findings indicated that paracetamol was associated with a lower risk of UGIC (adjusted OR 2.0, 95% CI 1.5-2.6) compared with ibuprofen (adjusted OR 3.7, 95% CI 2.3-5.9).[11]

The safety profile of paracetamol was further reinforced by the observation that 86% of clinicians reported no adverse drug reactions in patients treated with paracetamol in their clinical practice. A review by Moniotte et al, on the use of paracetamol in pediatrics concluded that paracetamol administered at a dose of 15 mg/kg every 6 hours demonstrated effective analgesia in conditions such as headache or migraine, traumatic pain, and ear, nose, and throat disorders, including pharyngotonsillitis, acute otitis media, sore throat, post-tonsillectomy pain, and postoperative pain following dental extraction. Owing to its central COX-independent antinociceptive mechanism, paracetamol was considered a preferable option to NSAIDs for the management of mild-to-moderate acute pain. Overall, paracetamol was reported to be safe in children, with adverse effects being rare at therapeutic doses. Its efficacy and safety profile were well established, and the drug could be used in children from birth; consequently, it was recommended by major scientific bodies as a first-line treatment for fever and pain in pediatric patients.[12]

This survey contributes to the growing body of literature supporting the safe and effective use of paracetamol in the pediatric population. The use of a structured questionnaire enabled the systematic assessment of multiple clinically relevant domains. However, several limitations should be considered when interpreting the findings. The study relied on self-reported data from clinicians, which is subject to recall bias and social desirability bias and may influence the accuracy of the reported treatment preferences. In addition, the survey did not capture information on patient demographics, disease severity, or institutional protocols, all of which may significantly affect antipyretic prescribing patterns. The generalizability of the findings may also be limited by the geographic distribution and clinical specialties of the respondents.

CONCLUSION

The survey findings indicate that paracetamol is the most preferred antipyretic for managing fever in pediatric patients, reflecting its well-established efficacy and favorable safety profile. Clinicians highlight its superior gastrointestinal tolerability compared with ibuprofen, with most reporting no adverse drug reactions in their practice. The limited use of rectal suppositories shows a clear preference for oral formulations in routine clinical care. These observations support the continued recommendation of paracetamol as a first-line antipyretic for pediatric fever management.

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Ethical approval: This study was approved by the Independent Ethics Committee

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