

A survey of physicians' opinion and treatment preferences regarding febrile seizures in children

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BACKGROUND: Fever of either low or high-grade is a big concern when present in the pediatric age group; it is much more worrisome if children are younger than 5 years of age. Fever can subside on its own or with the help of simple remedies and or medications. However, some children will develop seizures when they have a fever. Febrile seizures are one of the most common presenting complaints seen in pediatric patients in emergency room visits and physician consult. Two different types of seizures are seen in children, simple and complex seizures. Simple febrile seizures are non harming and self-limiting, while, complex seizures are prone to have long-term side effects on children. Febrile seizures can occur with or without a source of an underlying cause. In this study, we aimed to identify physicians' opinions, knowledge, and suggestions to improve guidelines on current treatment trends for fever and fever's association with febrile seizures in children less than 5 years of age.

OBJECTIVES: To determine physicians' opinion knowledge, and suggestions to improve guidelines on current treatment trends for fever and fever's association with febrile seizures in children less than 5 years of age.

METHODS: A cross-sectional study plan was designed and conducted in June - July 2021 involving general physicians and pediatricians (n = 600). The questionnaire form including 15 closed-end questions was distributed to physicians. Descriptive statistics were used to analyse the data.

RESULTS: 100% of physicians prescribed antipyretics to control fever and or to prevent complications, especially febrile seizures. All participants were aware that axillary temperature of $> 37.2^{\circ} \text{C}$ is defined as fever. All most all, general physicians and most pediatricians used antipyretics to treat other associated symptoms and signs, even when the fever was absent. 76.3% believed that high fever might be an indicator of underlying serious occult bacterial infection. Almost all physicians (91.3%) advised parents to switch to the use of alternate medication when the fevers did not subside after initial treatment with paracetamol; everyone recommended that non-medical supportive treatments like tepid sponging along with antipyretics and ibuprofen to reduce the fever soonest possible. 68% of pediatricians and 90% of general practitioners believe that febrile seizures will cause brain damage. 74% of general practitioners preferred to refer children immediately to specialty centers, for further management of seizures. However, Pediatricians at tertiary care centers, as well as those in private practice used diazepam or lorazepam.

CONCLUSION: Differences are negligible between general physicians and pediatricians while managing fever and fever complications including febrile seizures. Irrespective of

the knowledge, awareness and the availability of fever guidelines by many national and international organizations, physicians are leaning towards child and parents comfort in treatment fever. The gap is wider in general physicians' preparedness than pediatricians. A considerable gap exists to improve physicians' approach, diagnosis, and management of fever in the pediatric population.

INTRODUCTION:

Fever is defined as a rise in body temperature of $> 100.4^{\circ}\text{F}$ in the rectum or $> 99.5^{\circ}\text{F}$ oral or $> 99^{\circ}\text{F}$ in the axilla^{1, 2, 3}. Age is an important factor to decide when to give immediate attention to the child with fever. A child less than 3 months of age need immediate attention if the rectal temperature is 100°F or more, whereas, children between 3 months to 6 years of age, need to consult physician if the rectal temperature is more than 102°F . However, if the child is otherwise symptomatic, irritable, needs immediate attention³. Mayo clinic.

The rise in body temperature is a natural response against a source of either infection or inflammation in the body¹. Fever when present higher-than-normal body temperature, whether, a low or high-grade variety, is a big concern especially when present in the pediatric age group and much more worrisome if it occurs in children less than 5 years of age.

Simple Fever without serious underlying cause can subside on its own or with the help of simple remedies and or medications¹. However, some children will develop convulsions when they have a fever. Febrile seizures are episodes of convulsions occurring either during or immediately after the course of a rise in body temperature; febrile seizures might occur in the absence of a source of infection in the brain, prior history of epilepsy, and or electrolyte abnormalities². A febrile seizure is one of the most common presenting symptoms seen in pediatric patients in an emergency room visits and physician consult². Two different types of seizures are seen in children, simple and complex seizures². Simple febrile seizures are non harming and self-limiting, while, complex seizures are prone to have long-term side effects on children.^{1, 2}

Parents in general, many physicians, and pediatricians believe that the high fever is dangerous that can cause brain damage and or prone to develop febrile convulsions⁴. This concern or fear makes them act fast to reduce even low-grade fever aggressively; this aggressiveness might suppress the body's natural defense mechanisms to react against pyrogens. However, some reports are conflicting in the literature search, regarding fever control and management; such controversies may further complicate the misconceptions in professionals and the public. In this study, we aim to identify the opinions, knowledge, and suggestions to improve guidelines on current treatment trends for fever, and misconceptions of physicians about fever in children and its association with febrile seizures in children less than 5 years of age.

A questionnaire was developed to assess the physician's attitude, their working experience in treating fever, current understanding of guidelines, and their management in children between 6 months to 5 years of age⁵. The questionnaire included questions

about the methods utilized for measuring body temperature, drugs are given and their dosages, how often and how they record the temperatures, when do they anticipate the fever complications, conditions that make them choose alternative medicines, and their recommendation for use of any other supporting measures like bathing, tepid sponging to reduce fever threshold. Inclusion and exclusion criteria was preset for all participating physicians and only those who have met our criteria were included or excluded in the study. Our research supervisor assessed the validity of the questionnaire.

MATERIALS AND METHODS:

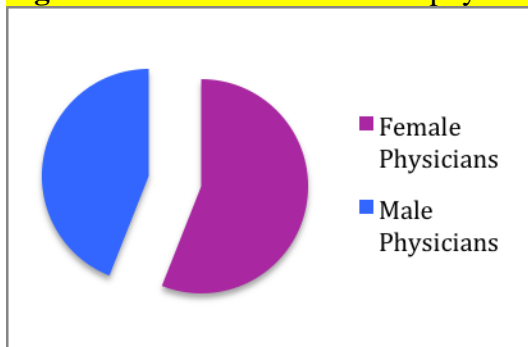
A separate study was conducted between June - August 2021 involving primary care physicians and pediatricians in and around Chennai, Tamil Nadu area, after receiving approval from the Institutional Ethics Committee (SMC / IEC / 2021/03/036). A Questionnaire was set using closed-end questions. Questions included were based on the physician's demographic characteristics, working experience in terms of a number of years and practice set up, general working conditions, routine attitude towards fever, current knowledge, and their first and further steps in the management of fever in children. Permission for an electronic notification was obtained from study participants after explaining the purpose of the study and then the questionnaire form was sent to 400 primary care physicians. Those who were out of practice, for more than 2 years were omitted from the study. We received responses from only 160 physicians; we believe that the ongoing Covid-19 pandemic situation and fears to handle manual work from outside sources might be one of the reasons for less participation. Out of 160 return responses, 30 were incomplete and 40 were unanswered. Incomplete and unanswered forms were not included in the study.

DATA ANALYSIS: General data was collected and analyzed using Microsoft excel; SPSS 16.0 program was used for analyzing descriptive statistics.

RESULTS:

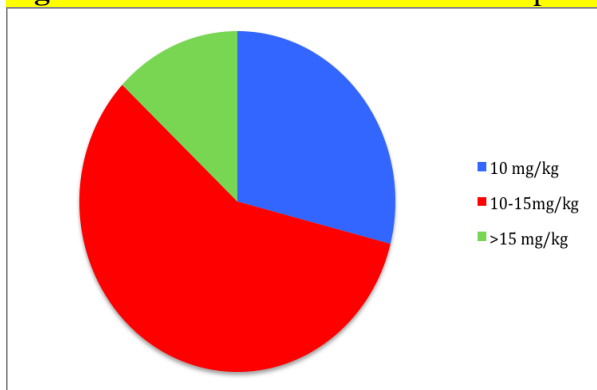
The participation rate of physicians in the study was 25% (n=160). The oldest participant's age was 67 and the youngest was 23 years old. The study has more female participants than their counterparts and the female to male ratio of participants was 1: 0.79. The average number of work experience in treating younger than 5 years children with fever was 8 years. The total number of participants eligible to include in the study and their gender distribution is represented in figure 1.

Figure 1: Gender distribution of physicians participated in the survey



All Primary care physicians, as well as pediatricians, are using an axillary measurement to record body temperature in children up to 1 year of age present with fever complaints. There is an equal split for use of oral temperature and axillary measurement after the age of 1 year to 5 years. 96% of them stated that axillary temperature of $> 37.2^{\circ}\text{C}$ is considered as fever. Almost all physicians (98%) prescribed antipyretic agent paracetamol to all children under the age of 5 with fever. Even when the fever was not present, nearly 35% of physicians prescribed Acetaminophen (generally known as paracetamol) if children under 5 years presented with malaise, irritability, prolonged cry, and or signs of infection. 90% of physicians believed antipyretics were given to control fever as well to prevent further complications of fever, especially febrile seizures; however, 10% of physicians prescribed antipyretics just to comfort the child. While treating febrile seizures, 58% of physicians used paracetamol syrup 10-15mg/kg body weight, while 29% used 10mg/kg, rest used more than 15mg/kg body weight (**Figure 2**). 25% of total participants used intramuscular paracetamol to quickly reduce fever presenting with febrile seizures.

Figure 2: Preferred dose of Paracetamol prescribed by physicians



When physicians have to use alternative drugs to treat fever, ibuprofen and paracetamol combination was their first choice (82%), only 34% used ibuprofen alone. For prevention of recurrent seizures, 69% of physicians used *Clobazam*, while for acute management of febrile seizures intranasal *Midazolam* was prescribed by only 49% of physicians; general physicians have referred the patient to specialty centers rather than starting either Clobazam or midazolam.

Most physicians (90%) agreed on the fact that febrile convulsions can cause brain damage. $> 3/4$ th (75%) said that fever is harmful to the child and 92% reported that regardless of the underlying pathology, a body temperature of $> 38^{\circ}\text{C}$ must be treated. For 90% of physicians, the main reason for antipyretic usage is to prevent febrile convulsion, while physical methods like bathing and or tepid sponging was recommended to reduce fever by 87%. The majority acknowledged that Acetyl Salicylic Acid (ASA) should not be used to control fever in children.

DISCUSSION:

Fever is defined as a rise in body temperature $> 98.96^{\circ}\text{F}$. According to the guidelines of the Italian pediatric community, for all children at home, axillary measurement of temperature using a digital thermometer is preferable; axillary measurement was recommended because it is easy to perform by parents and comfortable to child⁶. Some consider non-invasive tympanic temperature measurement as an alternative method for measurement of temperature⁷. As per our study all most all physicians agreed with a general definition of fever and agreed to prefer take temperature under axilla for recording core body temperature in children.

Antipyretic agents must be given to all children under the age of 5 with fever, irrespective of the presence or absence of other associated signs and symptoms, and are also should be used in children presenting with irritability, reduced activity, poor feeding, prolonged cry, and sleep-deprived⁸.

Mostly, Physicians prescribe antipyretics to reduce fever, prevent febrile seizures, reduce irritability, and ensure comfort to children and parents. International literature confirms that fever phobia is common among parents and health care workers. Misconceptions about complications of fever especially febrile convulsions often push parents to give over-attention to reduce the body temperatures and this further reinforces the phobia among health care workers⁹. Our findings also agree to the fact that 'Fever phobia' seems to continue to exist in physician's generations, irrespective of specialty.

Body temperature reducing methods such as tepid sponging is universally practiced method for ages and our participants also expressed similar views that rapid cooling of body temperatures will reduce the chances of febrile seizures as well as brain damage in children.

Febrile seizures are likely to occur with rapid rise in temperature, either at the onset of febrile illnesses, during high body temperature, and or after a rapid decrease in temperature with alcohol sponging. Parents, as well as general physicians think that chance of suffering from febrile seizures would be high if the body temperatures last longer and are higher than normal. Although supporting evidence is lacking, misconception among physicians is so common that fever $\geq 41^{\circ}\text{C}$ causes brain damage¹⁰. As per other studies, such misconceptions are not uncommon among general physicians working in primary health care, hospitals, and emergency rooms¹¹. Despite having no evidence to suggest that brain damage can occur after prolonged fever or after febrile convulsions, physicians in our study also believed that brain damage might occur if febrile convulsions are not treated aggressively; our analysis correlated with reports of other studies with regards to usage of aggressive usage of antipyretics to prevent febrile seizures¹².

Currently, guidelines are conflicting to define or conclude the association between the risk of febrile convulsion and the rise of fever. High body temperatures have a significant role in causing febrile seizures than the rapidity of the temperature rise; however, some disagree^{12, 13}. Most studies reported that irrespective of treating children with antipyretics in an attempt to prevent the further rise of fever, one-third of participated children

developed a second episode of febrile seizures¹³⁻¹⁷. However, studies did not specify the duration of the gap between the episodes. In a randomized controlled trial, 157 children were followed up for two years after their first febrile convulsion. However, they concluded that there was no evidence to report that antipyretic treatment reduced the risk of febrile convulsions¹⁴⁻¹⁷. These two observations support us to state that the height of fever may or may not play a key role in causing febrile seizures.

We believe that in children of less than 5 years of age, (i) a high index of suspicion for severe bacterial infection, and fear of febrile seizures and brain damage will stay forever in the minds of parents and physicians, which in turn, will make them adhere to aggressive as well routine treatments, irrespective of guidelines by international organizations. (ii) Acetaminophen/Paracetamol with or without Ibuprofen is an acceptable alternative drug of choice to treat fever in children. (iii) Use of Acetyl Salicylic Acid (ASA) is not recommended many due to the risk of developing Reye's syndrome.

LIMITATION & RECOMMENDATION:

Our study has certain limitations due to the ongoing SARSCoV-19 pandemic and Covid19 protocols. We had to restrict ourselves to using smaller groups only to obtain information. We recommend extending future analysis to include more rural group participation.

CONCLUSION:

Although the fevers show a good immune response, negative perceptions of fever, such as fear of febrile seizures and fever phobia, remain unchanged in most general physicians when compared to pediatricians. Such fears and phobia dominate them to prescribe routine paracetamol use and alternative medicines to rapidly reduce the body temperature rather than adhering to current guidelines and implementing novel ideas.

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