

# Parental beliefs and practices regarding childhood fever in Turkish primary care

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## Abstract

**Background:** Fever is a very common problem in pediatric age and is one of the most common reasons parents seek medical attention. We aimed to investigate beliefs, habits, and concerns of Turkish parents regarding their children's fever.

**Materials and Methods:** We performed a cross-sectional survey which was conducted as face-to-face interviews by family physicians from April to June 2014 in family healthcare centers in nine different cities in Turkey. Parents with a child with fever aged between 0 and 14 years were interviewed. The participants were asked questions about sociodemographic data, the definition and measurement of fever, antipyretics, and other interventions used to reduce fever before presenting to the primary care center.

**Results:** A total of 205 parents participated in this study. Ninety-four parents (45.8%) measured fever with a thermometer prior to presentation. Only 36 parents (38%) used the thermometer correctly. Thirty-eight parents (18.5%) knew the correct temperature definition of fever for the measured site. A mercury-in-glass thermometer was the choice for most parents (78%) and preferred site for measurement was axillary region (85%). The fever was treated prior to arrival by 171 parents (83.4%). Paracetamol was the most frequently used antipyretic. Fifty-four parents (31.5%) failed to administer the correct antipyretic dose, and 73 parents (42.6%) failed to give the antipyretics at proper intervals. One hundred and fifty-three parents (67%) believed that if not treated fever could cause convulsions.

**Conclusion:** We conclude that parents share important misconceptions about definition, treatment, and consequences of childhood fever and tend to treat fever before seeking medical care with a substantial rate of wrong doses and wrong intervals.

**Key words:** Antipyretics, beliefs, childhood, fever, primary care

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## Introduction

Fever is a common problem in children and one of the most common reasons parents seek medical attention for their

children by presenting to either family medicine centers or emergency units in hospitals. In a prospective cohort study of 13,617 preschool children living in South-West England, up to 74% of the interviewed parents reported episodes of high temperature at least once every 6 months in children aged 6–56 months.<sup>[1]</sup> Furthermore, fever accounts for 20–30% of all practice visits and in most of the cases, nothing harmful is diagnosed.<sup>[2,3]</sup> Fever in

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children is usually a result of self-limited viral infections and evidence suggests that most febrile episodes are not dangerous and in fact, may be a beneficial response to infection.<sup>[4,5]</sup> It was reported that fever retards the growth and reproduction of bacteria and viruses, enhances neutrophil production and T-lymphocyte proliferation, and aids in the body's acute-phase reaction.<sup>[6]</sup> The degree of fever does not always correlate with the severity of illness. Most fevers are of short duration, are benign, and may actually protect the host.<sup>[7]</sup> Data show beneficial effects on certain components of the immune system in fever, and limited data have revealed that fever actually helps the body recover more quickly from viral infections, although the fever may result in discomfort in children.<sup>[8-10]</sup> A review of the literature showed that the only serious complications of fever were febrile status epilepticus and heat stroke, two rare entities.<sup>[4]</sup> Several studies published in the early and mid-1980s evaluated unjustified parental concerns or namely "fever phobia" and found that parents had many misconceptions regarding childhood fever.<sup>[4,11,12]</sup> Parents demonstrated undue fear of consequent body damage from fever if left untreated including convulsion, brain damage, stroke, coma, serious vague, illness, blindness, and even death.<sup>[13-16]</sup> These studies also showed that parental education decreased misconceptions about fever, increased appropriate management of febrile episodes, and reduced inappropriate physician visits and telephone calls. These findings prompted some investigators to recommend that education of parents about fever should become a routine part of pediatric care.<sup>[11,16]</sup>

It was also reported that parents' beliefs and practices regarding childhood fever varied by race, ethnicity, sociodemographics, and the child's insurance coverage.<sup>[17]</sup> In the case of Turkish parents, there are a few recent large studies addressing this matter; one study in Germany with Turkish mothers and others in tertiary pediatric hospitals in Turkey.<sup>[18-22]</sup> In a study carried out in a hospital pediatric emergency department with two hundred parents, Erkek *et al.* reported that Turkish parents preferred measuring their children's fever by using a mercury-in-glass thermometer from the axillary site prior to attendance, but only 27.5% of parents knew the correct temperature for fever.<sup>[19]</sup> Langer *et al.* reported that mothers with a Turkish background living in Germany were more likely to relate to the concept "fearful" about their children's fever.<sup>[18]</sup> Arikan *et al.* reported incorrect antipyretic dosing among Turkish parents attending to an emergency department with 66.5% incorrectly dosing with paracetamol (54% underdosing and 8.4% overdosing) and 37.3% with ibuprofen (27.7% underdosing and 9.6% overdosing).<sup>[22]</sup> We aimed to investigate beliefs and practices of Turkish parents regarding their children's fever solely in a primary care setting with a multicenter study.

## Materials and Methods

We performed a cross-sectional survey which was conducted as face-to-face interviews from April 2014 to July 2014 in nine different cities of Turkey (Adana, Afyon, Aksaray, İstanbul, Karaman, Niğde, Ordu, Rize, and Sakarya) by family medicine specialists. Ethical approval was obtained from local ethics committees.

All nine family physicians had 5364 registered patients aged between 0 and 14 years and based on previous electronic medical records including a history or finding of fever, we estimated that approximately 108 children with fever present to these centers each month. Hence, the sample size for this study was calculated as 204 parents with a 95% confidence level using a web-based sample size calculator.<sup>[23]</sup> A total of 205 consecutive parents presenting to primary care centers with a child with fever aged between 0 and 14 years were asked to participate and give written consent. No rejections were reported. Parents were interviewed in person by use of a questionnaire consisting of 33 questions asked by family physicians. If both parents were present, questions were directed to the mother. All interviews were performed after the examination of the children not to delay examination and to make parents more comfortable to answer and lasted for approximately 15 min. The participants were asked open ended, yes/no and multiple-choice questions about sociodemographic data, children's previous history relating to fever, antipyretic use, and other interventions used to reduce fever before presenting to the primary care center, parental beliefs, and practices concerning fever. Parents were also asked to show how they measure their children's fever. The parents were given no assistance with answering the questions. A thorough medical examination was carried out on each child and symptoms, findings, and diagnoses were also recorded.

In this study, the same model infrared tympanic thermometer (Braun AG, Germany) was used by all family physicians to measure the body temperature of children. We used generally accepted values of above 38°C for tympanic membrane and above 37.2°C for the axillary region as the definition of fever when analyzing both findings and parents' measurements at home.<sup>[24-26]</sup>

Appropriate dosage and interval of paracetamol and ibuprofen were considered as 10–15 mg/kg/dose at intervals of 4–6 h.<sup>[27]</sup> Statistical analyses were performed using Statistical Package for the Social Sciences for Windows, version 11 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were presented with percentages and fractional data.

## Results

A total of 205 parents of 82 boys (40%) and 123 girls (60%) participated in this study. The mean age ( $\pm$  standard deviation) of the mothers was  $33.4 \pm 6.6$  years and they had a mean of 2 children (range: 1–9 children). The mean age of children was  $62 \pm 40.3$  months (range: 4–167 months). The educational status of the participants was as follows: five parents (2.4%) were illiterate, two (1.4%) were just can read and write, majority of parents (105, 51.2%) were primary school graduates, 58 parents (28.2%) were graduated from secondary school or high school, and 35 parents (17%) were graduated from university.

Parents performed temperature measurements from axilla in eighty children (39%) with a glass or electronic thermometer (70 glass thermometers, 10 electronic thermometers) and from the tympanic membrane with an electronic thermometer in 14 children (6.8%). One hundred and eleven parents (54.1%) checked their children's fever manually by just touching their skin without any measurement. We found that only 36 parents who measured their children's fever (38%) used the thermometer correctly. Moreover, it was noted that only 38 parents of all parents (18.5%) knew the correct temperature definition of fever for the measured site.

During medical examination, only 47 children (23%) had  $\geq 38^\circ\text{C}$  fever. Parents checked their child's temperature a median of 1.3 times in a 24 h period (range: 0–15 times) and recorded temperatures from  $36^\circ\text{C}$  to  $40^\circ\text{C}$  (median =  $38.2^\circ\text{C}$ ). One hundred and seventy-one parents

(83.4%) treated the fever prior to arrival. Paracetamol was the most frequently used antipyretic. Antipyretics used by parents prior to attendance at the Primary Care Center are shown in Table 1.

Of the 171 parents who used antipyretics, 79 parents (46.2%) used the antipyretics recommended by a physician in previous visits, 92 parents (53.8%) administered antipyretics of their choice. Dose regimens suggested by doctors in previous visits were used by 78 parents (45.6%) and the doses of antipyretics were decided by parents themselves in 93 patients (54.4%). Fifty-four parents (26.3%) failed to administer the correct dose of antipyretics (15.3% incorrectly dosing with paracetamol with 3.2% underdosing and 12.1% overdosing and 11% with ibuprofen with 3.5% underdosing and 7.5% overdosing), and 73 parents (35.6%) failed to give the antipyretics at proper intervals. Seventy-eight parents (38%) reported that they learned this dosage

**Table 1: Antipyretics used prior to attendance at primary care center**

Antipyretics	Frequency: n (%)
Paracetamol	84 (41)
Ibuprofen	73 (35.6)
Did not use any antipyretics	34 (16.5)
Paracetamol + ibuprofen	12 (5.8)
Metamizole	2 (1)

**Table 2: Interventions to treat fever other than drugs**

Interventions to treat fever other than drugs	Frequency: n (%)
Wet towel	64 (22.8)
Bathing with warm water	51 (18.2)
Undressing	40 (14.2)
Undressing + wet towel	23 (8.2)
Rubbing with vinegar	11 (3.9)
Bathing with warm water + wet towel	9 (3.2)
Rubbing with cold towel	5 (1.7)
Bathing with cold water	3 (1)
Others	5 (1.7)

**Table 3: Symptoms, medical examination findings, and diagnoses**

	Frequency: n (%)
<b>Symptoms</b>	
Cough	94 (23.4)
Sore throat	83 (20.6)
Rhinorrhea	59 (14.7)
Fatigue	50 (12.4)
Nasal obstruction	47 (11.7)
Diarrhea	10 (2.5)
Postnasal drip	5 (1.2)
Hoarseness	3 (0.7)
Loss of appetite	2 (0.5)
Others	13 (3.3)
<b>Medical examination findings</b>	
Pharyngeal hyperemia	131 (56.4)
Only fever	39 (16.8)
Postnasal drainage	17 (7.3)
Soft and hard palatal petechie	16 (6.8)
Tonsillary hyperemia	13 (5.6)
Abnormal pulmonary sounds	6 (2.5)
Hyperactive gut sounds	5 (2.1)
Ear membrane hyperemia	4 (1.7)
Others	1 (0.4)
<b>Diagnosis</b>	
Upper respiratory tract infection	60 (27.5)
Nonspecific (possibly viral)	45 (20.6)
Acute tonsillitis	38 (17.4)
Acute sinusitis	16 (7.3)
Acute otitis	14 (6.4)
Acute bronchitis	13 (6)
Acute gastroenteritis	9 (4.1)
Normal examination	9 (4.1)
Acute cryptic tonsillitis	9 (4.1)
Urinary tract infection	5 (2.3)
Total	218 (100)

**Table 4: Parents' beliefs and concerns regarding their children's fever**

Parent knowledge about fever	No: n (%)	Yes: n (%)	I have no idea: n (%)
Does treating fever mean curing the disease?	158 (77)	25 (12)	22 (11)
Does fever have any good outcome?	94 (46)	51 (25)	60 (29)
Does fever have any bad outcome?	6 (3)	178 (87)	21 (10)

**Table 5: Parents' answer to the question: "What worst would happen if fever is not treated?"**

Answer	n (%)
Convulsions	153 (67)
Meningitis	20 (9)
Paralysis	18 (8.1)
Meningitis + convulsions	10 (4.5)
I have no idea	7 (3.1)
Meningitis + paralysis	7 (3.1)
Others	7 (3.1)

from their earlier visits to healthcare professionals. Using a wet towel was the most common intervention other than medication to treat fever among Turkish parents. Interventions and behaviors to treat fever other than drugs are shown in Table 2.

The most common symptoms presented were cough and sore throat. Pharyngeal hyperemia was the most common physical finding revealed by medical examination, and upper respiratory tract infection was the most common diagnosis. Symptoms declared by parents, physical findings revealed by medical examination and diagnoses are shown in Table 3.

When asked about their beliefs and concerns about fever, 87% of parents reported that they believe fever has a bad outcome; 77% of them also stated that treating fever does not mean curing the disease indicating that they believed that fever is a symptom rather than a disease. Parents' beliefs and concerns regarding their children's fever are shown in Table 4. Parents' answers to the question what would happen if fever left untreated were almost all the central nervous system-related disorders such as convulsions, meningitis, and paralysis [Table 5].

## Discussion

The present study is an analysis of Turkish parents' current beliefs, knowledge, and practices about childhood fever in a multicenter primary care setting. It was well established that parents had many misconceptions regarding their children's fever.<sup>[4,11,12]</sup> These misconceptions and unjustified fear that fever can cause serious damage may not only lead parents toward a more frequent use of antipyretic drugs

with possible side effects by overdosage but also may cause unnecessary attendance to healthcare centers adding an extra burden to both workload of healthcare providers and health expenditures.

The parents interviewed in this study were all mothers which was compatible with other studies.<sup>[17-19]</sup> Failure to know what temperature constitutes a fever causes inappropriate use of antipyretics, unnecessarily visits to emergency departments, delays in appropriate treatment, and adverse outcomes.<sup>[28]</sup> We found that more than 80% of the parents failed to say or did not know the correct temperature for fever for the measured site which was similar to the findings of previous reports in Turkey and culturally diverse populations in different countries.<sup>[12,15,19,20]</sup> Of 205 parents, only 94 parents (45.8%) measured their children's fever with a glass or an electronic thermometer while remaining 111 parents (54.2%) settled for touching their children to recognize fever, this has been shown to be highly inaccurate.<sup>[29]</sup> Previous studies within Turkish population reported fever measurement with a thermometer ranging from 43.5% to 60% among parents with a child with fever.<sup>[19-21]</sup> In a recent study from Palestine, Zyoud *et al.* reported that only 34.6% of parents used a thermometer to measure their children's fever.<sup>[15]</sup>

A mercury-in-glass thermometer was the choice of parents in this study to measure the fever of their children. These thermometers are widely available and very cheap in Turkey which may explain this finding. Erkek *et al.* reported that 11.5% of all measurements were made by digital thermometers.<sup>[19]</sup> In a more recent study, Halicioğlu *et al.* reported a higher number of digital thermometer use which was almost twice the glass thermometers.<sup>[20]</sup> In this study, we found that 21.2% of measurements were carried out with electronic thermometers either an infrared thermometer targeted on tympanic membrane or a simpler and cheaper thermoresistor which was held in the axillary region. Just like family centers country-wide, in nine family medicine centers in which this study was conducted, it is common practice to use digital thermometers to measure fever. The observation of the use of digital thermometers by healthcare professionals during primary care visits may have led the parents to use them.

In this study, the preferred site of measurement was the axillary region (85%). This finding confirmed previous Turkish research.<sup>[20,30]</sup> However, unlike these studies none of the parents used the rectal route to measure their children's fever which was shown to be the most accurate way of measuring an infant's temperature.<sup>[31]</sup> Parents were not asked why they did not prefer rectal measurement, but we postulate that they might have thought that they accidentally could hurt their children or measuring fever with a rectal temperature was more appropriate for health care professionals. Kai mentioned that the main reason

for the reluctance of parents about rectal temperature measurement seemed to be related with sexual intimacy, abuse, or taboo.<sup>[32]</sup> Recently, Zyoud *et al.* reported that parents from Palestine preferred oral route to measure the fever.<sup>[15]</sup> Again, none of the parents in this study used oral route which was also compatible with previous Turkish studies.<sup>[20,30]</sup> This may be linked to their experiences they had at emergency rooms or family medicine offices or pediatrician visits where oral route might have been avoided.

In this study, the highest temperature noted in physical examination by investigators was 39.2°C. Only 36 of 94 parents (38%) who measured their children's fever with a thermometer could use the thermometer correctly. This finding was in accordance with a recent Turkish study which reported that 36.5% of the parents used thermometers correctly.<sup>[19]</sup>

Turkish parents including those living abroad do not hesitate to use antipyretics in the management of fever.<sup>[18,20,21,29]</sup> Erkek *et al.* reported that 90% of the parents used antipyretics prior admission to the pediatric emergency department which was very similar with our findings.<sup>[19]</sup> Zyoud *et al.* recently reported that only 44% of parents with a child with fever used antipyretics in Palestinian population.<sup>[15]</sup> Arıkan *et al.* reported that 54% of the children with fever received inaccurate doses of antipyretics.<sup>[22]</sup> In our study, we found that 26.3% of parents failed to administer the correct antipyretic doses and in contrast with their results overdosing was more common among our parents. Aspirin as in other Turkish studies was never used in this study group. This may be attributed to the information given to parents about the disadvantages of aspirin use in febrile children such as Reye syndrome and gastrointestinal bleeding by the health care providers for so long. Nonpharmacological methods were applied in 66.3% of the parents; undressing the child and bathing with warm water is the most common one in accordance with previous Turkish studies.<sup>[19,21]</sup> Rubbing with vinegar, a traditional folkloric method was observed in 11 patients (5.3%).

Numerous studies from different countries starting from mid-1980s regarding parents' perceptions of childhood fever have one thing in common: They all reported an increased rate of unjustified parental concerns or namely "fever phobia."<sup>[4,11,12,16,27]</sup> Turkish parents were no exception. Langer *et al.* found that Turkish mothers who lived in Germany described fever as a "fearful" concept.<sup>[18]</sup> Moreover, Erkek *et al.* reported that nearly all the parents in their study believed that fever could have dangerous effects, even death, to their children and of all the parents, 84% listed febrile convulsion as the most common harmful effect of fever.<sup>[19]</sup> Similarly, we found that 153 parents (67%) believed that if not treated fever could cause convulsions. Parental educational status did not show a significant effect on the parents' beliefs and misconceptions about fever, in

accordance with the findings of studies from Turkish and other populations.<sup>[15,17,19,20,33-35]</sup>

Although it was carried out in nine different cities in Turkey representing a diverse study population from different socioeconomic and ethnic groups with a multicenter approach in only primary care setting, this study has important limitations: The sample of parents was relatively small and the investigators were volunteers from physicians who worked in primary care. The survey mainly depended on parents' statements which may limit the findings by recall bias.

## Conclusion

We conclude that parents share important misconceptions about definition, treatment, and consequences of childhood fever and tend to treat fever before seeking medical care with a substantial rate of wrong doses and wrong intervals.

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## Conflicts of interest

There are no conflicts of interest.

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