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ORIGINAL ARTICLE

FEVER PHOBIA - WHERE ARE WE NOW

Cecília Gomes Pereira[1], Sara Nogueira Machado[1], Rita Lages Pereira[2], Alicia Rebelo[1], Miguel Salgado[1].
[1]Pediatric Department, Hospital Senhora da Oliveira, Guimarães, Portugal,
[2]Pediatric Department, Hospital de Braga, Braga, Portugal.

ABSTRACT

Fever is a common complaint in the Emergency Department. Despite being frequently benign, it's still a cause for anxiety for caregivers. This study aimed to characterize parents' knowledge and attitudes towards fever.

A cross sectional and descriptive survey was conducted by applying a questionnaire to pediatric patients' caregivers that attended consultation from April to August 2021. It included questions regarding sociodemographic data, knowledge and myths about fever and interventions used to treat it. Descriptive analysis was performed.

A total of 1014 questionnaires were considered valid. The thermometer was used by 97.7% caregivers to measure fever, with armpit being the preferred location (80.9%). Around 87% wrongly defined fever. About 11.8% didn't offer antipyretics before seeking health care, mostly because of fear of masking the disease (47.7%). Approximately 91% undressed the child in thermal ascent and 49% used sponging with cold water to decrease temperature. Caregivers sought help mainly in primary care (66.2%). The physician was the preferred source of information (75.8%). Seizures (83.4%) were named as the main complication, 10.3% thought death was a possible effect. Around 78% answered dental eruption was a cause of fever, 54.8% considered it to be harmful for children's health, 67% believed temperature will go up indefinitely if not treated and 85.2% answered that temperature should always reach normal values after taking antipyretics.

Fever phobia is still a reality, with wrong beliefs and misconceptions about its consequences and treatment. It's important to inform parents about this subject to improve the management of fever and reduce caregivers' anxiety.

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Fever, Phobia, Antipyretic.

Introduction

Fever is one of the most frequent signs of illness and cause for seeking medical help in the pediatric age.[1,2,3] Although most episodes of fever in children are benign[3], it still remains a major cause of concern and anxiety for parents and health care professionals.[4,5,6,7]

In 1980, Schmitt defined, for the first time, the concept of fever phobia, after surveying a group of caregivers in a hospital-based pediatric clinic.[1] This study suggested an excessive worry regarding fever and that, in consequence, caregivers treated it too aggressively. Since then, fever phobia means an exaggerated and irrational fear of the sign and its effects, which might result in overtreatment.[8]

Since Schmitt first described this phenomenon, several studies have been published in different populations, revealing that parents lack understanding, have several misconceptions and wrong beliefs about fever, its role in illness and its management.[4,5,6,7,9,10,11,12,13,14,15,16,17]

Current guidelines recommend that fever doesn't need to be treated unless the child shows signs of distress or pain and that, unless the complaints are prior to the timings of re-administration of the drug, there is no advantage in alternating between antipyretics.[18,19,20] However, studies suggest that caregivers frequently misuse antipyretics and routinely alternate between substances to manage fever. Despite the fact that the two most commonly used drugs, paracetamol and ibuprofen, are very safe, all drugs have potential side effects and should be administered carefully.[18,19,21,22] Investigation shows that overdosage of antipyretics isn't uncommon.[6] The use of physical measures to lower body temperature, like cold baths or sponging with water or alcohol, also seems to be a frequent parental practice.[4,9,10,13], despite not being recommended, as their effectiveness in reducing temperature is short-lived and may be uncomfortable for the child.[18,19,20] Sponging with alcohol could also be dangerous, because the fumes can be absorbed across the alveolar membrane and possibly across the skin, with the possibility of central nervous system toxicity.[23] Parents' fever phobia and exaggerated practices to manage it are probably related to fear of what they believe to be the consequences of untreated fever, like brain damage, dehydration, seizure and death.[4,6,10,16]

Our goal was to characterize our population's knowledge

Address for Correspondance: Cecília Gomes Pereira, Rua dos Cutileiros, Creixomil. 4835-044 Guimarães, Portugal.
Email: ceciliapereira@hospitaldeguimaraes.min-saude.pt

Table 1. Socio-demographic data of Caregivers and Children Surveyed.

Caregivers		
Age of caregiver in years (mean ± SD)		38,15 ± 7,2
		Frequency (%)
Relationship of participant to child (n=999)	Mother	862 (86,3%)
	Father	115 (11,5%)
	Other	22 (2,2%)
Education level (n=976)	Elementary school	52 (5,3%)
	Middle school	390 (40%)
	High school	323 (33,1%)
	University	211 (21,6%)
Child		
Age of the child in years (median, IQR)		7 (2-11)
		Frequency (%)
Number of children in the family (n=1009)	One	332 (32,9%)
	Two	514 (50,9%)
	Three or more	163 (16,2%)
Gender of the child (n=993)	Male	575 (57,9%)
	Female	418 (42,1%)

about fever, usual practices and most common beliefs regarding the subject, as well as preferred sources for medical help and advice.

Methods

A cross-sectional descriptive monocentric study was carried out between March and September 2021, with a convenience sample of caregivers that presented to the pediatric consultation in a Portuguese hospital between April and August 2021. All participants were adults aged 18 to 62 years old who provided verbal consent. Caregivers who agreed to participate answered an anonymous questionnaire with 23 items. The Portuguese survey included questions regarding demographics, fever definition and temperature measurement habits, use of home antipyretics, use of physical methods, usual source of information on the subject, places where they usually seek medical help, warning signs in a febrile child, consequences and some myths about fever. All questions were multiple choice. All questions were based on portuguese and international published guidelines and studies regarding this subject.[1,3,4,9,12]

The reference values for fever were established by the national standards in effect[23], although there is no universal consensus.[9,13,15,16] Statistical analysis was performed using SPSS v26.0® for Windows®. Appropriate measures of central tendency were used to describe data, including mean and standard deviation for normal continuous variables and median for non-normal continuous variables. Binary and categorical variables were described with frequencies and percentages. Qui-square test was performed to compare dictomic variables. To compare answers with education level, we divide the subjects into below high school and at least high school. $P<0.05$ was considered statistically significant. Surveys with at least 80% of the questions answered were included.

Results

We gathered a total of 1014 questionnaires. Table 1 shows the distribution of the socio-demographic characteristics of participants and respective child. The mean age (±SD) of caregivers was 38,15±7,2 years. Most of them were mothers (86,3%) and around 54,7% had at least high school education, 5,3% had elementary school education. The median age of the child was 7 years old with an interquartile range (IQR) of 2-11 years. Most of the children were male (57,9%). The majority of families had two children in the household (50,9%).

3.1 Managing of childhood fever

Table 2 summarizes the caregiver's habits when managing fever. Almost all chose the thermometer as the main method to evaluate the child's temperature (98,6%), with the armpit being the favoured location to evaluate fever (75,8%). It is noteworthy that no participant chose the mouth as the place of evaluation. When asked what temperature they considered the child febrile, regardless of the measurement site, around 49,6% defined it as a normal value. Almost all caregivers stated having antipyretics at home (98,8%). Of those, 40,6% had paracetamol and 52,3% paracetamol and ibuprofen. More than half (54,4%) said they used to alternate between antipyretics. No relation was found between schooling and this habit ($p>0.05$).

Questioned about physical cooling in temperature rise, 90,7% usually undressed the child, while sponging with cold water was the second most chosen option (49,1%). Although rare, there were caregivers who opted for sponging with alcohol (1,3%) or vinegar (0,5%). Only 1,3% mentioned not using physical cooling. No relation was found between level of education and not performing physical cooling.

Table 2. Caregivers methods for managing childhood fever.

		Frequency (%)
How do you evaluate the fever? (n=10003)	Thermometer	1000 (98,6%)
	Touching child	3 (0,3%)
If you use a thermometer, where do you measure your fever? (n=951)	Axilla	769 (75,8%)
	Forehead	90 (8,9%)
	Rectum	77 (7,6%)
	Tympan	15 (1,5%)
	Mouth	0 (0%)
Do you consider a fever to be a temperature higher than...? (n=987)	38°C	322 (32,6%)
	37,5°C	287 (29,1%)
	37°C	131 (13,3%)
	37,8°C	130 (13,2%)
	37,6°C	95 (9,6%)
	38°C	22 (2,2%)
Do you have antipyretic at home? (n=1010)	Yes	1003 (98,9%)
	No	7 (0,7%)
What antipyretic do you have at home? (n=1005)	Paracetamol	408 (40,6%)
	Paracetamol and Ibuprofen	526 (52,3%)
	Ibuprofen	62 (6,2%)
	Other	9 (0,9%)
Do you alternate between antipyretics? (n=925)	Yes	553 (54,5%)
	No	372 (36,7%)
How do you approach thermal rise? (could chose more than one option) (n=1008)	Undress	920 (90,7%)
	Sponging with cold water	498 (49,1%)
	Wake up to offer medication	418 (41,2%)
	Bath with cold water	279 (27,5%)
	Other	44 (4,4%)
	None of other options	13 (1,3%)
	Sponging with alcohol	12 (1,2%)
	Sponging with vinegar	5 (0,5%)
Do you administer antipyretics before seeking medical help? (n=1010)	Yes	890 (87,8%)
	No	120 (11,8%)
If the answer is no, why? (could chose more than one option) (n=107)	I didn't want to mask the disease	51 (42,5%)
	I didn't know if I could offer it	47 (39,2%)
	I didn't know the dosage	16 (13,3%)
	I had no medication at home	4 (3,3%)

Of all the responders, 11,8% said they didn't offer medication to lower fever before seeking medical help. The most frequent reasons were not wanting to mask the disease (42,5%) and not knowing if they could offer it (39,2%).

Surprisingly, people with higher education responded significantly more that they did not offer anti-pyretics before the child was observed ($p<0,05$). Within this group, not wanting to mask the disease was also the main reason (56%).

3.2 Information and medical help sources

The data shows that the majority of parents look for medical help in the primary care center (66,2%), followed by public hospital (57,7%). People with lower education chose more primary care center, public

Table 3. Caregivers› source of information and medical help.

		Frequency (%)
Where do you seek medical help? (could chose more than one option) (n=1014)	Primary care center	671 (66,2%)
	Public Hospital	585 (57,7%)
	Health support phone line	275 (27,1%)
	Private Pediatrician	266 (26,2%)
	Private Hospital	153 (15,1%)
	Other	13 (1,3%)
Where do you look for information about fever? (could chose more than one option) (n=1011)	Physician	766 (75,8%)
	Health support phone line	353 (34,9%)
	Pharmaceutic	283 (28%)
	Nurse	277 (27,4%)
	Family	130 (12,9%)
	Internet	112 (11,1%)
	Never look	42 (4,2%)
	Flyers	4 (0,4%)
	Magazines	0 (0%)

Table 4. Alarm signs of a febrile child and parents' fears related to fever.

		Frequency (%)
What signs in a child with fever should make one seek medical attention quickly? (could chose more than one option) (n=1002)	Fever does not go down with medication	741 (74%)
	Seizure	604 (60,3%)
	Fever returns less than 4 hours after giving medication	574 (57,3%)
	Nonstop vomiting and diarrhea	562 (55,4%)
	Prostration	399 (39,8%)
	Cyanotic lips or fingernails	312 (31,1%)
	Persistent moaning	311 (31,0%)
	Rash	281 (28,0%)
	Weak or inconsolable crying	190 (19,0%)
	Playing less when fever rises	185 (18,5%)
	Losing appetite but drinking water or milk	177 (17,7%)
	Inability to sleep	120 (12,0%)
	Not wanting to be on the lap	11 (1,1%)
	None of the other options	7 (0,7%)
If left untreated, fever can cause? (could chose more than one option) (n=991)	Seizures	826 (83,4%)
	Dehydration	593 (59,8%)
	Loss of consciousness	291 (29,4%)
	Death	102 (10,3%)
	Coma	76 (7,7%)
	Cerebral infection	51 (5,1%)
	None of the other options	24 (2,4%)
	Blindness	17 (1,7%)

hospital and health support phone line, while people with higher education chose more private hospital and pediatrician, with significant differences between groups ($p<0,05$).

In relation to where they usually look for information on this subject, the physician was the main source (75,8%), followed by the portuguese health support phone line (34,9%), the pharmacist (28%) and nurse

Table 5. Parent›s beliefs about fever.

	Frequency (%)	
	True	**False**
Fever is a disease. (n=983)	188 (19,1%)	785 (80,9%)
Fever is a normal response by the body to help fight an infection. (n=988)	889 (90,0%)	99 (10,0%)
Suppositories bring down fever faster than syrup. (n=931)	685 (73,6%)	246 (26,4%)
Most of the time, a child with fever does not need antibiotics. (n=997)	746 (74,8%)	251 (25,2%)
Fever is harmful to the child's health. (n=997)	527 (54,8%)	435 (45,2%)
Teething causes fever. (n=993)	775 (78,0%)	218 (22,0%)
The temperature rises endlessly if left untreated. (n=975)	653 (67%)	322 (33%)
If the child is feverish and in a good mood, he does not need an antipyretic. (n=975)	229 (23,2%)	746 (76,8%)
One should increase the fluid supply in a child with fever. (n=975)	973 (97,5%)	25 (2,5%)
The temperature should always drop to normal values after the medication is administered. (n=992)	845 (85,2%)	147 (14,8%)
Giving antipyretics can mask what is wrong with the child. (n=964)	574 (59,5%)	390 (40,5%)
Having the child drink cold liquids helps to lower the temperature. (n=975)	277 (28,4%)	698 (71,6%)
Vaccines can cause fever (n=1008)	991 (98,3%)	17 (1,7%)
After the antipyretic, it is normal for the fever to still rise. (n=988)	451 (45,6%)	537 (54,4%)

(27,4%). This information is described in Table 3.

Parents with more education chose significantly more the physician, the nurse and the internet as sources of information, while people with less education chose significantly more the pharmaceutic (p<0,05).

3.3 Knowledge about alarm signs and parents' fears related to fever

Participants were asked which signs should raise concern of critical illness and prompt medical attention when a child is febrile. Around three-quarters of caregivers chose "Fever does not go down with medication" (74,0%) as a reason to be observed as soon as possible by a physician, followed by seizures (60,3%) and fever rising less than 4 hours after offering medication (57,3%). Less than half chose prostration (39,8%), cyanotic lips or fingernails (31,1%), persistent moaning (31,0%) and rash (28,0%) as reasons for quickly seeking medical observation. Weak or inconsolable crying accounted for 19% and inability to sleep was chosen by 12% . Only 1,1% opted for "Not wanting to be on the lap" as an alarm sign.

Alarm signs like "prostration", "rash", "Cyanotic lips or fingernails", "Persistent moaning", "Nonstop vomiting and diarrhea", "seizure", "Not wanting to be on the lap" were chosen more by parents with higher education, with significant differences between the groups. "Playing less when fever rises" was significantly more chosen by people with less education (p<0,05).

Regarding the possible consequences of not treating the fever, the most chosen was seizures (83,4%) followed by dehydration (59,8%). Around 10% believed that, if left untreated, fever can result in death. Coma (7.7%) and cerebral infection (5.1%) were also consequences chosen by the parents. This information can be consulted in Table 4.

3.4 Knowledge and caregivers' beliefs about fever

Lastly, caregivers were asked if some statements about fever were true or false (Table 5). Parents demonstrated important knowledge about some aspects of fever origin and physiopathology as the majority of responders replied that fever by itself was not a disease (80,9%) and that it was a normal response to help fight an infection (90,0%). The largest proportion of parents also answered that, most of the time, a child with fever does not need antibiotics (74,8%). Despite identifying the physiological role of fever, more than half of the responders considered fever to be harmful to the child's health (54,8%) and that temperature rises endlessly if left untreated (67%). They also demonstrated lack of knowledge about antipyretics' mechanism of action by believing that temperature should always drop to normal values after medication is administered (85,2%) and around 26.4% believed rectal formulations to be superior to oral formulation in its action. Most parents also believed teething causes fever (78,0%) and that antipyretics must always be offered, regardless of the child's level of comfort (76,8%).

We compared the answer given with the level of education of the caregivers. In the sentences "Fever is a disease", "Fever is a normal response by the body to help fight an infection.", "Most of the time, a child with fever does not need antibiotics.", "Fever is harmful to the child's health.", "Teething causes fever.", "The temperature rises endlessly if left untreated.", "One should increase the fluid supply in a child with fever.", "The temperature should always drop to normal values

after the medication is administered", "Having the child drink cold liquids helps to lower the temperature". People with higher scholarity performed better, with statistically significant differences between groups ($p<0.05$).

Discussion

Four decades after the definition of the problem, our study demonstrates that fever phobia is still present nowadays. The fact that the thermometer in the armpit is the main method of temperature assessment shows that caregivers have some knowledge about how to evaluate fever. However, this study shows that parents' knowledge regarding the definition of fever is still deficient, with most responders defining fever below the accepted threshold. In our study and according to other studies as well[11,25], paracetamol was the most frequently used medication, followed by ibuprofen, although the majority had both at home. Our study shows that alternating antipyretics is still a common practice, as is the use of external cooling to manage fever.

Despite being well described that antipyretics don't alter the outcome or length of illness[18,26], not wanting to mask the disease is still the main reason to not offer antipyretics before seeking medical help. The primary care center was the most chosen source of medical help, reinforcing the role they can play in demystifying fever. This option was followed closely by the public hospital, raising the hypothesis that fever phobia explains why caregivers often go to the emergency department with benign illnesses that could be evaluated in primary care or don't require any observation at all.[27,28,29] The difference between the education levels and choice of source of medical health most likely reflects that higher education translates in a higher income.

As in other studies, the physician was the most frequently preferred source of information. This preference is well described in the literature and has led to performing similar studies in health care professionals, in whom fever phobia has also been described.[5,7,9,14]

We found the profound lack of knowledge of our population about the red flags in a febrile child to be alarming, with important alarm signs such as prostration, cyanotic lips or fingernails, persistent moaning, rash, weak or inconsolable crying, the inability to sleep or not wanting to be on the lap being chosen by less than half of the responders.[18,24,30] The fact that "Fever does not go down with medication" and "Fever returns less than 4 hours after giving medication" were two of the top three most chosen options makes it pretty clear how much fever phobia is still ingrained in our population nowadays.

Seizures and dehydration continue to be the most believed consequences among participants. Although uncommon, a section of the population still believes that fever can cause irreversible brain damage or death if left untreated. On the positive side, the majority of participants recognized that fever was not a disease and had a role in fighting the infection and that a febrile child does not need treatment with antibiotics in most cases. However, they still believed that it can be dangerous to the child's health. Some aspects of the physiology of fever are still unknown to the population as most believe that fever can rise endlessly if not treated. Although most respondents know that oral and rectal formulations of antipyretics perform similarly[31], most of them still believe that fever is not supposed to rise after the administration of antipyretics and that temperature should always drop to normal values after giving medication, showing the importance of educating caregivers about this issue. Other common beliefs in our sample was that even when feeling comfortable a child still needs medication, which goes against fever management guidelines.[18,24] One of the myths most commonly held in the population is that tooth eruption causes fever[32] and our study continues to verify this.

The fact that in answering to "true of false sentences" and when choosing alarm sings people with at least high school education performed significantly better, highlights the importance that schooling has in the health education of our population.

This is, to our knowledge, the largest study about this subject in our country and the large sample size is one of its major strengths. Furthermore, the questionnaire was not applied in an acute illness setting, in order to try to eliminate the anxiety that this may cause. Thus, we believe that this study may portray more realistic attitudes and concerns than those that might be chosen in a potentially stressful situation.

There are some important limitations to our study. First of all, our results may not be generalized to all portuguese population. Besides that, we were not able to estimate the response rate, since, after receiving the questionnaire, the parents were free to place it or not, in the collection box. Furthermore, some data was missing regarding some questions, as some caregivers opted to not answer them. We believe that responder bias is also an important limitation, as participants may have been more interested in the subject than non-participants. In addition to that, the results were based on the attitudes reported by the participants and therefore may not correspond entirely to the real practice.

Conclusion

Although four decades have passed since this problem was recognized, our study still shows an exaggerated fear and lack of knowledge about fever, its definition, consequences and warning signs that should motivate the search for medical help. Our study demonstrates the need and importance of investing in educating both healthcare professionals and the population about this issue so that we can evolve to a more informed approach. A better-informed population would allow for a better medical treatment of children and optimize the medical resources available. We believe that this issue should be recurrently addressed in child health follow-up consultations, as well as in the available media.

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