Research Paper Medical Science

Knowledge, Attitudes and Beliefs of Parents Regarding Fever in Children in Bhubaneswar: A Hospital Based Study

Dr Dillip Kumar Dash	M.D, Associate Professor, Department of paediatrics, IMS & SUM Hospital, ,Bhubaneswar.
Dr M.D Mohanty	M.D, Professor, Department of paediatrics, IMS & SUM Hospital, Bhubaneswar.
Dr Naresh acharya	Senior resident,,Departmet ofpaediatrics, IMS & SUM Hospital, Bhubaneswar.
Dr Pratik swain	2nd year PG Student,Departmet ofpaediatrics, IMS & SUM Hospital, Bhubaneswar.

ABSTRACT

Background: "Give me a fever and I can cure the patient," Hippocrates was said to have taught his students. One of the greatest teachers in early medicine, Hippocrates understood that the body has an innate capacity for self-healing. But when a child is running a fever of >102F, how many parents will say to themselves, "Oh great, my little's body is fighting the infection just the way it is supposed to?" Most parents will run for the thermometer and the paracetamol to try and bring the fever down due to their fear that their child will suffer brain damage.It accounts for more phone calls and visits to paediatricians' offices than almost any other symptom. But parents aren't the only ones who have this fever phobia. Numerous studies have found that doctors actually perpetuate fever phobia by fixating on a child's temperature when inquiring about symptoms7.Fever in children is common and mostly caused by self-limiting infections or inflammation. However, the number of (re)consultations in primary care is high, driven by lack of knowledge and fear among parents.Thisresult in a lot of unnecessary medication and many more. Medical literature interest in parents' management of fever appears to have originatedfrom an article written by Schmitt in 1980 where he coined the phrase 'feverphobia' to describe parents' unrealistic fears about fever2. Since this time parents'fever phobia, confirmed by their overuse of medical practitioners for minor febrileillnesses, has been the interestingimpetus for the majority of research in this area. The objective of this study was to survey parents about their knowledge and attitude concerningfever in their children & its management at home.

Patients and Methods: The study involved the random selection ofparentsadmitted their children with varying diseases condition associated with fever to IMS & SUM hospital, Bhubaneswar. They were interrogated during their hospital stay by providing the questionnaires".650Parents were interviewed over a period of 6 month using a standard questionnaire to obtain sociodemographic information,current knowledge of fever and targeting parents' temperature-taking, antipyretic administration, attitudes, practices and information-seeking behaviours.. For the parental survey, a questionnaire, based onthe study of Schmitt et al. 1980 and Crocetti et al. 20012,3 was developed to elicitinformation about definition of fever, concerns about fever and fever management.Additional information included methods and frequency of temperature monitoring, usedmethods for body temperature control, sources of information and beliefs regarding potentialconsequences of fever were added for more information. Approximately 75% of the respondents were female, and the ages of the most were in the range of 20-40years. More than 70% of the parents had two or more children.

Results:More than 90% of parents showed a poor concern & understanding of the definition of fever, high fever, maximum temperature of untreated fever, and threshold temperature warranting antipyretics. About 32% ofparents considered temperatures less than 38.0oC to be fever, another 32% did not know the definition of fever,64% felt that temperatures of less than 40.0oC could be dangerous to a child, and 25% could not define highfever. Another 15% believed that if left untreated, temperatures could rise to 42.0oC or higher, but 38% could notprovide an answer, and 43% did not know the minimum temperature for administering antipyretics.Approximately 80% of parents demonstrated undue fear of consequent body damage from fever, includingconvulsion, brain damage or stroke, coma, severe illness, blindness, and even death.

Conclusion: Parental misconceptions about fever reflect the lack of active health education in our community. Our results indicate that parents often misuse the antipyretics medications, incorrectly manage their child's fever, follow inappropriate practices to reduce fever, and generally have poor knowledge of basic information regarding fever.Knowledge regarding Home treatment for fever was very poor in parents in terms of antipyretics of choice, dose, and route of administration. Instrument use to administer drug& other remedies in addition to drugs is very questionable.

KEYWORDS : Convulsion, fever,antipyretics, hyperpyrexia.

Background

Fever is one of the commonest clinical manifestations of disease in childhood. It is also a common reason to consult in primary care[24, 25]. Most children are diagnosed with self-limiting infections and do not need short-term treatment. However, re-consultation within the same illness episode is common, especially when fever persists[11,26]. Reasons contributing to these re-consultations are lack of knowledge among parents, anxiety about fever, and experience of inconsistencies in the approach of different healthcare professionals[27]. Parents havebeen shown to have unrealistic fears of the harmful effectsof fever in their children, and they generally see it as themain component of an illness[1,2]. Parents are unable todefine fever accurately, tend to overestimate its dangers,and make inappropriate telephone calls and unnecessaryclinic visits, leading to excessive utilization of healthcareservices[5,6,30].Anecdotal experiences suggest that physicianscontribute to parental misconceptions about fever, althoughit is unclear which part of the patient-doctor interactionpromotes this fear[7]. Parents' knowledge about the effectiveness and appropriate dosing of antipyretics isquestionable. They possess incorrect knowledge about concentration differencesbetween liquidparacetamol and paracetamol drops (65%)[10,23,29].The purpose of the study was to determine the status of knowledge, attitude of parents about fever in their children and alsoKnowledge regarding Home treatment for fever in terms of antipyretics of choice, dose, route of administration, Instrument use to administer & other remedies in addition to drugs.

Patients and Methods

Parents admitted their children with varying diseases condition associated with fever to IMS & SUM hospital, Bhubaneswar are interrogated during their hospital stay by providing the questionnaires".Children whowere judged to be critically ill were excluded from thestudy. Each eligible parents was interviewed in vernacular by a male or female research assistant, using a standard questionnaire designedto obtain background socio -demographic information andcurrent knowledge of fever.Parents were given no assistance with answering thequestions and none refused to be interviewed. In an attemptto obtain unbiased data that truly reflected parents'perceptions about fever, the questionnaire relied principallyupon open-ended questions (i.e., no suggestions of the"right" answer).Demographic data obtained included age of bothparents, accompanying parent, level of education attained,current occupation of parents, and number of children caredfor by the parent. The questionnaire items were designed toascertain parents' knowledge, attitudes and fearsconcerning fever in their child. The questions asked were asfollows: how do you know if your child has a fever?Whatis the temperature reading that constitutes a fever in achild?What do you consider&what is the temperature reading for a high fever?How high couldthe fever reach if it is not treated?What is the important harmthat high fever can cause to a child? The questions wereframed in such a way that a average lay person tounderstand and respond, yet. Fever was defined as a documentedtemperature of 38.0ºC or higher per rectum (or "rectalequivalent"). A rectal equivalent temperature wascalculated by adding 0.5ºC to the oral temperature and0.8ºC to the axillary temperature. The appropriateness ofresponses to questions was determined on the basis ofcurrent medical literature.

Results

A total of 560 parents of children wereinterviewed. A description of the sociodemographiccharacteristics of the study parents is presented in **Table 3**.The majority of the parents interrogated were living in Bhubaneswarcity. Most parentsparticipating in the study were housewives in their latetwenties or early thirties, with at least a primary schooleducation.A wide range in parental age, educational level, occupation and family size was noted. Around 70% cases mother brought theirchildren to the hospital and only 35% cases father was the accompany person. In 20% case both parents brings their children to the hospital. Roughly 40% of respondentshave four children or more. Only 12% father & 24% mother are illiterate shows any major difference in response to the supplied questionnaires. Interestingly site/mode of measurement and type of thermometer used shows very poor response i.e. Axillary (51%), rectal (14%) &oral (4%). One third of parents believed that they could tellwhether their child had a fever by the appearance orpalpation of the child. Study shows 47% parents used mercury in glass thermometer followed in sequence by digital (30%). Only 40% of parents measured theirchild's temperature at home.Data concerning parental monitoring method depicted in **Table 1.**

In this study, the quoted bodytemperatures refer either to the true rectal measurement orits "rectal equivalent." Thirty-six per cent of the parentsconsidered body temperatures of less than 38.0ºC to befever, 26% considered 38.0ºC to be fever, and 20% did notknow the definition of fever. A dangerous fever was said tobe a temperature of 40.0ºC or less by 58% of parents, and39.0ºC or less by 34%. Approximately 15% of all parentsthought an untreated fever could keep rising to 42.0ºC orhigher, 4% responded that the body temperature couldclimb to 50.0ºC or more shown in **table 4**.

Table 4 shows that less than 10% of all parents wouldgive antipyretic medications for body temperatures lessthan 38.0ºC (i.e., possibly normal body temperature). About22% advocated treatment for body temperatures of 38.0 to39.0 º C and less than 10% felt that body temperatures of39.0ºC and more should be treated. Surprisingly, 42% ofthe surveyed parents could not determine the minimumbody temperature for initiation of antipyretic medications.Approximately 15% of parents stated they would bathe orsponge their child if the temperature reached 38.0 or38.9ºC, and an additional 13% would do the same if itreached 39.0 to 39.9ºC. Only 10% of respondents indicatedtheir readiness to bathe or sponge their child if the bodytemperature reached 40.0ºC or more. About 58% of parentsdid not know the threshold body temperature for bathing orsponging their febrile child.

Table 2 shows that 96% of parents believed fever cancause harm, and 4% believed it could cause death.Specific types of damage feared included convulsions(79%), brain damage and stroke (14%), coma (5%),serious illness (25%) and blindness (0.8%).The most frequent harmful effect of fever reported by parents is brain damage, followed by seizures and dehydration. These results are similar to study findings in other countries such as Kuwait, Australia, Palestine and Israel[32, 34, 35, 36.].No significant differences in patterns of response toquestions were found among parents with regard to theirsociodemographic features such as educational level,occupation or family size except family history of febrile convulsion in children. Most of the parents declared the source of information regarding fever obtained from paediatrician (60%) along with reading the package leaflet of medicine (48%) and according to the dose that advised by paediatrician previously (11.02%) (Table 2).Parents knowledge and attitude about fever treatment at home was very erratic in view of drug and dosage etc.Paracetamol was the best choice (60%) followed by ibuprofen (9%) and others (homeopathy & Ayurveda) 10%. Regular tablespoon or teaspoon was the most common instrument used to provide medicine **(Table 5)**. 60% parents believed that every child with a fever has an infectious/serious problem, 30% suggests bacterial infection and only 10% remarks virus is the causative agent **(Table6).**

Discussion

A fever is itself not an illness. It is a body reaction by which the body fights infections or inflammation inhibiting the production of viruses and bacteria[28]. This induces the neutrophil production and T-lymphocyte proliferation, helping the body's acute-phase reaction[31]. Most parents do not know the important benefits of fever and shows a high level of anxiety and apprehensiveness regarding its possible side effects[32,33,35]. Although quite a large number of parents are aware that an overdose of paracetamol could be dangerous (62%) [37]or lethal (53%)[34,36,38], few are aware of the possibility of liver toxicity (26%) 37. They (45%) expect antipyretics to reduce temperatures to normal and to remain lowered for longer than the therapeutic time period[37,39]. Knowledge about the effectiveness of antipyretics influences their decisions to seek medical assistance. The failure of fever to respond to antipyretics is frequently the reason parents attend emergency departments[16,37,39].

In this hospital based survey parents represented abroad demographic, cultural and socioeconomic spectrum from different part of eastern part of odisha.They were surveyed at the time when their children werefebrile, and not when they were well. It might be arguedthat parents' anxiety and misunderstanding would beexaggerated by the development of fever in their children,and that their real fears and misconceptions would beoverestimated. However, our concern was with thepotential consequences of parents' attitude when theirchildren actually developed a fever. Hence, it is morerelevant, to survey parents of febrile childrenrather than a general poll of parents of well children,because the opinion of the latter is of little practicalimportance, as shown in a previous study[6].In this study, parents showed little understanding of thenormal range of body temperature and individual diurnalvariation, and as well demonstrated inadequate knowledgeof what actually constitutes a fever or high fever. We werealso surprised that parents of high socioeconomic status andthose with many children and, therefore, with previousexperience with fever, were not different in terms ofknowledge of fever from parents of lower socioeconomicbackground and limited previous experience. It seems thathealthcare providers have not done enough in educatingparents in this basic information.The definition of normal body temperature is complex.DuBois found the normal ranges of body temperature forchildren to be from a low of 36.2ºC to a high of 38.0ºCwhen measured rectally, and from 36.0ºC to 37.4ºC whentaken orally[12].The maximum body temperatures for childrenoccur between 5 and 7 p.m., and the minimum temperatures occur between the hours of 2 and 6 a.m. Hence, it is not unusual for an active normal child's temperature to be as high as 38.0ºC rectally in the late afternoon.Adam D et all showsa rise in temperature above 38.0ºC may also be caused by physical exercise, warm clothing, hot or humid weather, or warm food/drinks[4].Such external factors should be eliminated before measuring the temperature. Fever is defined as a temperature above the normal range. A rectal temperature of 38.0ºC or more, an oral temperature of 37.5ºC or more, and an axillary temperature of 37.2ºC or more, are all considered fever[2,4,14]. About 36% of the study parents identified fever as a temperature of 37.9ºCor less, and another 20%

did not know the temperature level that constituted a fever. Although the definition of high fever is arbitrary (i.e.,>40.0ºC), 61% of the parents defined high fever as 40.0ºCor less. Also of great concern is the misconception on the part of 15% of study parents who indicated that untreated fever could reach 42.0ºC and above, and those parents who did not know the effects of untreated fever was 37%.With these misconceptions of fever, it is not surprising that parents would treat fever aggressively. An analysis of temperature charts during febrile illnesses before the advent of antimicrobial therapy showed that peak temperatures almost never exceeded 41.1ºC[12,19].Hyperpyrexiais defined as a temperature of 41.0ºC or greater. Fevers of this magnitude are rare. Tomlinson reported temperatures of higher than 41.1ºC in only two children in his study on high fevers in ambulatory patients during 13 years of private paediatric practice[15].McCarthy and Dolan found only 100 children with temperatures of41.1ºC or higher among 210,000 consecutive patients overan eight-year span[16], an incidence of only 0.05%.The body temperature is controlled by a thermoregulatory enter in the hypothalamus via a complex feedback system[17]. This hypothalamic "thermostat," if uninfluenced by complicating circumstance (e.g., heat stroke or drugs), seems to exert a shutoff valve phenomenon so that high temperatures are generally kept below a level that would seriously damage body tissues. Most temperatures above 41.1ºC in children are due to human errors from excessive heat load or from interference with heat loss. Examples are wrapping a febrile child in too much clothing or blankets, placing a baby near a heat radiator, or placing a child in a car in direct sunlight[2].Too much clothing is more dangerous during a heat wave in tropical countries[18]. Children uncommonly develop hyperpyrexia (temperatures of 41.1ºC or greater) because of central nervous system infections, namely meningitis[12,15]and cerebral malaria[20], underlying structural brain defects such as Down syndrome or hydrocephalus, and braintumor[12].Our study showed that parents were overly concerned about the harmful effects of fever. The type of harm that parents thought their children would suffer from fever were varied, and included convulsions, brain damage or stroke, coma, dehydration, blindness and death. The same fears were found among parents in other previous studies[2,6]. The adverse effects of fever include discomfort, mild dehydration, febrile delirium and uncomplicated seizures. Heat stroke, a catastrophic circulatory failure characterized by hyperpyrexia, delirium, coma and anhidrosis, rarely occurs in children, and is mostly caused by environmental factors such as overheating or too much clothing[4,21]. Although febrile convulsions are terrifying to parents, they carry no risk to subsequent neurologic or developmentaldisabilities[22].Febrile convulsion is a common cause of convulsion in childhood and about 4% of children in the age group of one to six years have at least one episode of febrile convulsion[8,9].Of these, up to 30% have recurrent seizures and many get admitted to the hospital[8,9]. When parents witness their child's convulsion they are understandably shocked and many think that the child may die[8,40]. Correct and adequate knowledge of relationship between fever and febrile convulsion, and its usual good prognosis are important for lessening the parental anxiety and apprehension associated with febrile convulsion. Many parents may even develop fever phobia and each febrile episode of the child can be a nightmare for the parents[3].In the early 2000's Sarrell et alconducted a large survey among paediatricians, nurses and parents in Israel. Several discrepancies were observed between parents and paediatricians/ nurses habits. For example, the majority of parents believed it necessary totreat children with low-grade fever without any other sign of illness, whereas the physiciansand nurses did not [13].

Conclusions

"Fever phobia" remains extremely widespread among parents and the vast majority believesthat fever is harmful even very fatal. Parents consider paediatricians as their primary source of informationand this is demonstrated also by the consistency between our reports and previous studies.Some of identified behaviours (widespread use of suppositories, alternating use ofantipyretics, use of spoons and teaspoons to dose antipyretics) expose children to the risk ofoverdose. Educational programs targeted to educate paediatricians may be an effective actionto change the parents' understanding and management of fever and prevention of simple febrile seizure, unnecessary hospitalization and dangerous antipyretic over dose. Our results indicate that parents often misuse the antipyretics medications, incorrectly manage their child's fever, follow inappropriate practices to reduce fever, and generally have poor knowledge of basic information regarding fever. This study indicates that child health care providers have apparently not done enough in educating parents about fever and its consequences, and considerable efforts will be required to correct such parental misconceptions. The busy clinician is frequently delivery healthinformation which is mostly so abbreviated and perfunctory that which is not well understood by an anxious parentsdistracted by a sickchild. Health education aids that are well-designedand structured and entertaining manner would be more helpful. Hence, an audio-visual health educationon fever in vernacular message would be definitely better to bring down the problems.

Table 1 Temperature monitoring method used by parents (n = 650) in the study

Site/Mode of measurement	No of Parents	%
Axillary	333	51.23
Rectal	14	2.15
Groin crease	7	1.07
Oral	28	4.30
Auricular	02	0 .03
Plastic strip placed on forehead	66	10.15
Palpation by hand	200	30.76
Type of thermometer owned/recommended		
Mercury-in-glass	308	47.38
Digital	196	30.15
Auricular	08	1.23
Skin Infrared	04	0.61
Plastic strip placed on forehead	05	0.76
No thermometer owned/recommended	129	19.84

Table 2 Beliefs regarding harmful effects and possible highest degree of fever, intervals of fever monitoring, and resources of information reported by 650 parents

Harmful effects of fever, reported by parents n	(%)
Seizure	356	79.11
Brain damage	96	14.76
Death	16	03.55
Dehydration	196	43.5
Really sick	166	25.53
Coma	24	05.3
Delirium	78	17.3
Blindness	4	0 .08
Other	19	04.2
Belief that if left untreated fever can reach		
<40.6 °C	172	(44.3)
40.7-43.2 °C	204	(52.6)
> 43.3 °C	12	(3.1)
Time intervals of fever monitoring		
<16 minutes	23	5.1
16-30 minutes	46	10.2
31-60 minutes	188	41.77
61-120 minutes	138	30.6
>121 minutes	73	16.2
Declared source of information		
According to my paediatrician order	386	59.38
Reading the package leaflet of medicinal/advice line	170	(26.15)
Consulting other persons	18	(0.2)
According to information gathered by internet, TV, papers	0	(0.0)
According to the dose that paediatricians had advised me previously	72	(11.07)

***Total is more than 100% because parents may have given multiple answers**

TABLE 3.Sociodemographic characteristics of 650 study parents.

Characteristic	Number	%
Accompanying parent		
Mother	456	70.9
Father	188	15
Both parents	152	14.1
Others	74	11.38
Residence		
Bhubaneswar	424	75.7
OutsideBhubaneswar city	226	24.3
Age of father (range 19-70, mean 37 years)		
<30	151	23.23
30-39	433	66.61
^{3}40	66	10.15
Age of mother (range 15-55, mean 29.6 years)		
<30	366	56.30
30-39	201	30.92
^{3}40	83	12.76
Father's education		
Illiterate	82	12.61
Primary/secondary school	187	28.76
High school/some university	206	31.69
University graduate and above	175	26.92
Mother's education		
Illiterate	158	24.30
Primary/secondary school	267	41.07
High school/some university	146	22.46
University graduate and above	79	12.15
Father's occupation		
Skilled	197	30.30
Semiskilled	326	50.15
Unskilled	117	18
Retired	02	0.03
Student	08	1.2
Mother's occupation		
Skilled	71	10.92
Semiskilled	112	17.23
Unskilled	34	0.052
Housewife	371	57.07
Student	62	09.53
Number of children (range 1-15, mean 4)		
1	156	24
2-3	236	36.30
4-5	132	20.30
^{3}6	126	19.38

TABLE 4.Parental knowledge and attitudes about fever.

Variable	Number	%
Minimum temperature considered as fever (range, 30.0-41.0°C)		
<37.0°C	54	8.30
37.0-37.9°C	188	28.92
38.0°C	172	26.46
38.1-39.0°C	96	14.76
>39.0°C	13	02
Unknown	127	19.53
Temperature considered as high fever (range, 35.0-50°C)		
<38.0°C	56	8.61
38.0-39.0°C	166	25.53
39.1-40.0°C	188	28.92
40.1-41.0°C	52	8
>41.0°C	22	3.3
Unknown	166	25.53
How high could temperature go without treatment (range, 37.0-100.0°C)		
<40.0°C	46	7.07
40.0-40.9°C	162	24.92
41.0-41.9°C	98	15.07
42.0-43.9°C	68	10.46
>44.0°C	33	05.07
Unknown	243	37.38
Threshold temperature for giving an antipyretic		
<38.0°C	64	09.84
38.0-39.0°C	146	22.46
^{3}39.0°C	164	25.23
Unknown	276	42.46
Threshold temperature for bathing/sponging		
<38.0°C	28	4.30
38.0-38.9°C	93	14.30
39.0-39.9°C	84	12.92
^{3}40.0°C	66	10.15
Unknown	379	58.30

TABLE 5. Parental knowledge and attitudes about fever treatment at home

Drug administered for fever	Number	%
Acetaminophen	389	59.84
Ibuprofen	56	8.61
Aspirin	23	3.53
Antibiotics	57	8.76
Other	66	10.15
Remedies used in addition to drugs		
Cold sponging	187	28.76
Ice pack	78	12
Tepid sponging	76	11.69
I use drugs only	278	42.76
None/Do not know	31	4.76
Site of medication administration		
Orally	556	85.53
Rectally	94	14.46
Instrument used to administer the medication		
Regular tablespoon or teaspoon	225	34.61
Specific measuring spoon or syringe of the drug	178	27.38
Measuring spoon or syringe of other drug	247	38

Table 6.

Statement	Agree, % (*n*)	Don't know, % (*n*)
Every child with a fever has an infection/serious problem	61.23(398)	22.76 (148)
infections caused by bacteria	30.92 (201)	30.46 (198)
infections caused by virus	13.53 (88)	10.61(69)
Any cause	15.69(102)	50.46(328)
Every child with a fever needs medication (PCM and/or AB)	65.07 (423)	3.2 (20)
Every child with a fever needs paracetamol	41.23 (268)	18 (117)
Every child with a fever needs antibiotics	10.15 (66)	14.49 (97)

Responders' knowledge and beliefs on fever, and medication in fever and infections

References

1. Kai J. (1996a) Parents' difficulties and information needs in coping with acute illnesses in preschool children: a qualitative study. *British Journal of Medicine* **313**, 987-990.
2. Schmitt BD. Fever phobia: misconceptions of parents about fevers. Am J Dis Child 1980;134:176-81.
3. Crocetti M., Moghbeli N. &Serwint J. (2001) Fever phobia revisited: have parental misconceptions about fever changed in 20 years? *Pediatrics***107**, 1241-1246.
4. Adam D, Stankov G. Treatment of fever in childhood. Eur J Pediatr1994;153:394-402.
5. Singhi S., Padmini P. &Sood V. (1991) Urban parents' understanding of fever in children: its danger and treatment practices. *Indian Pediatrics***28**, 501-505.
6. Kramer MS, Maimark L, Leduc DG. Parental fever phobia and its correlates.Pediatrics 1985;75:1110-3.
7. May A, Bauchner H. Fever phobia: the pediatriciancontribution.Pediatrics 1992;90:851-4.
8. Nelson KB, Ellenberg JH. Prognosis in children with febrile seizures.Pediatrics 1978; 61:720-727.

9. Freeman JM, Vining EPG, Pillas DJ. Seizures and epilepsy in childhood.A guide for parents.1st edition.Baltimore, John Hopkins University Press; 1990.pp 36-55.
10. Casey R, McMahon F, McCormick MC, Pasquariello PS, Zavod W, King FH. Fever therapy: an educational intervention for parents.Pediatrics 1984;73:600-5.
11. O'Neill MB. Fever in children. Can J Pediatr 1994;1:48-9.
12. DuBois EF. Fever and the regulation of body temperature.Springfield, Illinois: Charles C. Thomas, 1948.
13. Sarrell M, Cohen HA, Kahan E: **Physicians', nurses', and parents' attitudes to and knowledge about fever in early childhood.** *Patient EducCouns*2002, **46:**61–65.
14. Schmitt BD. Fever in childhood. Pediatrics 1984;74(Suppl):929-36.
15. Tomlinson WA. High fever. Am J Dis Child 1975;129:693-6.
16. McCarthy PL, Dolan TF. Hyperpyrexia in children: eight-year emergency room experience. Am J Dis Child 1976;130:849-51.
17. Dinarello CA, Wolff SM. Pathogenesis of fever in man. N Engl J Med 1978;298:607-12.
18. Stanfield JP. Fever in children in the tropics. BMJ 1969;1:61-5.
19. DuBois EF. Why are fever temperatures over 106oF rare? Am J Med Sci 1949;217:361-8.
20. Stern RC. Pathophysiologic basis for symptomatic treatment of fever.Pediatrics 1977;59:92-8.
21. Knochel JP. Environmental heat illness. Arch Intern Med 1974;133: 841-64.
22. Al-Eissa YA. Febrile seizures: rate and risk factors of recurrence. J Child Neurol 1995;10:315-9.
23 Barrett TW, Norton VC. Parental knowledge of different acetaminophen concentrations for infants and children. AcadEmerg Med. 2000;7(6):718-721.
24. Bruijnzeels MA, Foets M, van der Wouden JC, et al. Everyday symptoms in childhood: occurrence and general practitioner consultation rates. Br J Gen Pract. 1998;48(426):880–884. [PMC free article] [PubMed]
25. Hay AD, Heron J, Ness A. The prevalence of symptoms and consultations in pre-school children in the Avon Longitudinal Study of Parents and Children (ALSPAC): a prospective cohort study. Fam Pract.2005;22(4):367–374. [PubMed]
26. Huibers LA, Moth G, Bondevik GT, et al. Diagnostic scope in out-of-hours primary care services in eight European countries: an observational study. BMC Fam-Pract. 2011;12:30. [PMC free article] [PubMed]
27. Blumenthal I. What parents think of fever. FamPract. 1998;15(6):513–518. [PubMed]
28. Kohl KS, Marcy SM, Blum M, et al. Fever after immunization: Current concepts and improved future scientific understanding. Clin Infect Dis. 2004;39(3):389-394. doi: 10.1086/422454.
29. Hasday JD, Garrison A. Antipyretic therapy in patients with sepsis. Clin Infect Dis. 2000;31Suppl 5:S234-41. doi: 10.1086/317514
30. Jaffe DM. Assessment of the child with fever in: Rudolph CD, Rudolph AM, hostetter MK, lister GE, siegel NJ eds. Rudolph's Pediatrics. 21st ed. New York, NY: McGraw-hill; 2002:302–309. .
31. Kluger MJ. Fever: Role of pyrogens and cryogens. Physiol Rev. 1991;71(1):93-127.
32. Jalil H, Jumah NA, Al-Baghli AA. Mothers' knowledge, fears and self management of fever: A cross sectional study from the capital governorate in kuwait. Kwt Med J. 2007, 39(4):349–354.
33. Altun I, Cınar ND, Walsh A. Psychometric properties of the parents' fever management scale in a turkish population. HealthMED 2011. 5(3):567–575.
34. Walsh A, Edwards H, Fraser J. Parents' childhood fever management: Community survey and instrument development. J AdvNurs. 2008;63(4):376-388. doi: 10.1111/j.1365-2648.2008.04721.x; 10.1111/j.1365-2648.2008.04721.x
35. Zyoud SH, Al-Jabi SW, Sweileh WM, et al. Beliefs and practices regarding childhood fever among parents: A cross-sectional study from palestine. BMC Pediatr. 2013;13:66-2431-13-66. doi: 10.1186/1471-2431-13-66; 10.1186/1471-2431-13-66
36. Cranswick N.C., D (2000) Paracetamol efficacy and safety in children: the first 40 years. *American Journal of Therapeutics* **7**, 135-141.
37. Linder N., Sirota L., Snapir A., Eisen I., Davidovitch N., Kaplan G. &Barzilai A. (1999) Parental knowledge of the treatment of fever in children. Israel Medical Association Journal 1, 158–160.
38. Kapasi A., Lorin M., Nirken M. &Yudovich M. (1980) Parents' knowledge and sources of knowledge about antipyretic drugs. Journal of Pediatrics 97, 1035–1037.
39. Kelly L., Morin K. & Young D. (1996) Improving caretakers' knowledge of fever management in preschool children: is it possible? Journal of Pediatric Health Care 10, 167–173.
40. Cohee LM, Crocetti MT, Serwint JR, Sabath B, Kapoor S: Ethnic differences in parental perceptions and management of childhood fever. ClinPediatr (phila). 2010, 49(3):221–227.