

Kuwaiti parent's knowledge of their children's fever and their patterns of use of over the counter antipyretics

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RESEARCH

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ABSTRACT

Background

Many parents consider fever a disease with the continuation of fever phobia and overuse of antipyretics to reduce it.

Aims

Identifying Kuwaiti parent's knowledge of their children's fever and determining their patterns of use of Over-the-Counter- Antipyretics.

Methods

A descriptive cross-sectional study in which we have recruited 614 Kuwaiti mothers of well children aged between six months and five years. Data was collected over six-months from September 2015 to March 2016, using a self-administered questionnaire.

Results

A total of 614 mothers participated in the study, with a response rate of 94.5 per cent. Twenty-seven per cent (166) of them considered a temperature $\leq 38.5^{\circ}\text{C}$ to be a high-

grade fever, with the level of education significantly influenced mothers' reports of high-grade fever ($F=4.68$, $df.=4$, $P=0.001$, $n=207$). Almost all the parents believed that heat could cause harm, and 48 per cent (294) of them stated that fever is very harmful. Fifty-three per cent of mothers (309) would give antipyretic medication when body temperature is $\leq 38^{\circ}\text{C}$. Sixty-one per cent (375) of the mothers had alternated antipyretic paracetamol and ibuprofen. Forty-five per cent (274) of parents think that antipyretics are without potential harm. Level of education had a positive impact on the perception of fever [χ^2 ($df=8$)= 70.68 , $p<0.001$]. Usual practices targeted temperature reduction using antipyretics by 53.7 per cent.

Conclusion

Mothers have an imperfect knowledge of fever. Fever phobia is widespread, leading to an overuse of antipyretics.

Key Words

Fever, parents' knowledge, children, over-the-counter antipyretics

What this study adds:

1. What is known about this subject?

Parents and some doctors usually consider fever in children to be a serious sign. These concerns lead to an increased use of antipyretics and health services.

2. What new information is offered in this study?

- Kuwaiti parent's knowledge of children's fever and best interventions.
- Patterns of use of Over-the-Counter-Antipyretics

3. What are the implications for research, policy, or practice?

This research will help in designing parents' educational sessions considering fever, its management as well as the proper use of antipyretics.

Background

Fever and febrile illness are some of the most commonly treated childhood sickness.¹ It consistently causes high levels of anxiety in parents and professionals alike, who fear that it may be associated with increased morbidity, such as seizures, brain damage or death.^{2,3}

Despite its prevalence, correct management of febrile illness remains unclear in the general population leading to the widespread and often unnecessary use of antipyretic medications.^{4,5}

Crocetti and Serwint,⁶ define fever as 37.8°C orally, 38.0°C by tympanic and rectal methods and 37.2°C in the axilla. These confirm earlier definitions that 38.0°C indicate a childhood fever. Temperatures up to 40.0°C show moderate increase in temperature, 40.5°C high rise and 41.6°C dangerous fever.⁷

Parents should realise that fever is not an illness, but is, in fact, a physiological mechanism that has beneficial effects in fighting infection.^{8,9}

A study by Crocetti et al. indicated that parents still have a limited understanding of fever. Also, they found little change in the knowledge of American mothers, beliefs and practices over a 20-year interval.¹⁰

Three decades ago, Schmidt, described “fever phobia”, and parents’ concern toward the harmful effects of temperature.¹¹ Since then little has changed in parents’ negative attitude towards that,¹² and other researchers have confirmed that parental perceptions are largely unjustified.^{13,14}

Parental response to heat leads to over engagement with healthcare practitioners and futile consultations,¹⁵ and many parents feel that they are neglecting their children if they are not treating their child’s fever.¹⁶

Parents and some paediatricians often consider a rise in temperature as a significant and harmful sign of illness, rather than a symptom.¹⁷ Their consistent and most serious concern is that untreated high fever may lead to seizures, brain damage, and even death.¹⁸

An increase in temperature plays a pivotal role in the anti-inflammatory response; antipyretics may interfere with this reaction and should be avoided unless overriding conditions exist.¹⁹ Reducing fever to prevent febrile convulsions is ineffective and unwarranted as they are benign events in

five per cent of children aged three months to five years.²⁰

The current World Health Organization (WHO) guidelines on the management of fever recommend the use of paracetamol for treating children with a temperature over 38.5°C which indicates that mild to moderate rise, should not be routinely suppressed.²¹

Parental knowledge about normal temperature and the temperature that means fever is weak. They classify mild fever as high, and actively reduce temperatures, sometimes average temperature. In a study by Bilenko et al., approximately one-half of parents considered a temperature of less than 38°C to be a fever.²² In Kuwait, a previous study by Al-Abdel Jalil et al. showed that a child was considered febrile at body temperatures of 37°C or less by 40.7 per cent of mothers.²³

The drugs most commonly used and the approved antipyretics for treating fever in children are paracetamol (acetaminophen), and ibuprofen.⁹ Paracetamol is considered a safe medication; however, there are genuine concerns about hepatotoxicity in children five weeks to ten years of age.²⁴ Recent studies show the association between the excessive use of paracetamol and greater morbidity as asthma, allergic rhinitis, and eczema.²⁵

Physicians should emphasise that fever is not an illness. It is a physiological mechanism that has a beneficial effect in fighting infections. Interventions to reduce fever may negatively affect the outcome of the sickness. Also, parents should realise that the primary goal of treating a febrile child should be to improve the child's overall comfort rather than focusing on the normalisation of body temperature.

In light of that, the purpose of this study is to identify Kuwaiti parent’s knowledge of fever and their attitudes about it. Also, it aims to determine the patterns of use of Over-the-Counter (OTC) antipyretics and management practices at home. According to the results, educational programs can be developed to target specific modifiable factors such as knowledge deficits, negative attitudes and unsafe practices.

Method

Sample frame

A descriptive cross-sectional study in which, Kuwaiti parents were recruited to measure their medical knowledge and management level to treat their children’s fever. We used Non-probability convenient sampling.□

Recruitment methods

Inclusion criteria

- Kuwaiti parent of a child aged between six months and five years,
- Parents have ever given their children an antipyretic medication at some point.
- Parents who voluntarily agreed to participate in the survey.

Sample size

Total sample size was 600 parents. We used the equation, $n = z^2 pq / e^2$, to calculate the sample size (Cochran, 1963). Where n = sample size, $Z = 1.96$ at a confidence level of 95 per cent, e = precision desired as a decimal 0.05, P = estimated variance in the population, as a decimal 0.5 for 50-50 $q = 1 - p$. 10 per cent of the calculated n number were re-added assuming a response rate of 90 per cent. The power used to determine the difference in population between different groups at the 5 per cent significance level was 0.85. To provide such a power, we multiplied the calculated number of sample size by 2, to have a total sample size of 600.

Data collection

Collection of data was over a period of six months from September 2015 to March 2016, using self-administered questionnaire.

Selection of data sample was from the six Kuwaiti governorates. The collection was from shopping centres, hospitals, housing areas, outpatient clinics and kindergartens.

Questionnaire development

We developed the questionnaire from other previous similar validated and reliable surveys.^{10,17} It contained 25 items to evaluate the parent's knowledge about their children's fever, and their beliefs towards it. The items also were chosen to explore their patterns of use of OTC antipyretics and temperature management practices.

Data analysis

The questionnaires collected were hand-checked for completeness before data entry. The data were analysed using statistical package for the social science (SPSS, V22).

The descriptive statistics, frequencies, and percentages were used to describe socio-demographic characteristics. Pearson Chi-square test of independence was used to verify the association between educational status with the mother's perception of fever and fears. A p -value ≤ 0.05 was

considered to be statistically significant. Level of education was explored using ANOVA and Bonferroni post hoc tests, t -test and chi-squared tests as appropriate. Differences of p -value ≤ 0.05 were considered statistically significant.

Results

Over the study period, a total of 614 caregivers participated in the study, with a response rate of 94.5 per cent. Table 1 shows demographic data of the study population. Mothers made up the whole sample; their age ranged from 20 to 50 years with a mean of 34.6 ± 4.83 years. Half of them (307) had full-time jobs, 39 per cent (239) had one child, and 38 per cent (234) had two children. Thirty-four per cent of the mothers (207) were educated to university or postgraduate levels, while 66 per cent (407) had a high school level or lower. To enable comparisons between the literature and parent's definitions of fever, temperatures 36.0 to 37.8°C were considered normal, 37.8 to 38.9°C mild fever, 38.9 to 40°C moderate fever and 40 and over, are high fever.²⁶⁻²⁸

The normal temperature, as stated by the mothers, had a mean of 37.2 ± 0.3 °C, and ranged from 37.0 to 38.5°C, with 95.4 per cent (586) of them reported a normal temperature between 37.0 and 37.5°C. Temperature representing mild fever had a mean 37.9 ± 0.37 °C, and ranged from 37 to 39°C; 33.2 per cent of mothers considered the temperature of ≤ 37.5 °C to be a mild fever. The high heat had a mean of 38.99 ± 0.48 °C and ranged between 38.0 and 40.0°C, with 73 per cent reported 39 to 40.0°C as high fever, and 27.1 per cent considered a temperature ≤ 38.5 °C to be a high fever. The educational level of mothers significantly influenced their reports of high fever. Parents with postgraduate and university education reported lower temperatures than those with lower educational degrees. ($F = 4.68$, $d.f. = 4$, $P = 0.001$, $n = 207$) [Tables 2 and 3].

Almost all the mothers believed that a rise in temperature could cause harm, and 48 per cent (294) of them stated that fever is very harmful. Considering the possible harm of fever, 36 per cent of mothers (221) believed that untreated fever could lead to febrile convulsion, 22 per cent (135) stated brain damage, and seven per cent (43) thought that heat could result in death. According to mothers, the harmful temperature ranged from 37.0 to 40.0°C with a mean of 39.78°C (± 0.42). The temperature at which parents would give antipyretic also ranged from 37.0 to 40.0°C but with a lower mean of 38.24°C (± 0.52). Thirty-seven per cent of mothers (230) stated that they start antipyretic medication when the body temperature is 38°C, and 15.8 per cent of them (97) would initiate treatment for a body temperature of 37°C or less.

The most commonly administered antipyretic was paracetamol. Fifty-one per cent of mothers (311) used it. Forty-six per cent (286) reported using ibuprofen, and three per cent (17) reported using acetylsalicylic acid to reduce fever.

Sixty-one per cent (375) of the mothers had alternated antipyretics paracetamol and ibuprofen. This alternation was according to a physician's advice in 45 per cent of the cases (169), due to return of fever in 34 per cent (127), or lack of response after using one antipyretic in 21 per cent (79). Eighty-one per cent (495) of the mothers believed that feverish children still need antipyretics even if they are active. Also, they reported that they might administer antipyretics without measuring temperature. Furthermore, 80 per cent (494) of the mothers reported awakening their child from sleep to give them antipyretics. When we asked them about their beliefs, whether the antipyretics carry a potentially harmful effect on their children, only 32 per cent (202) believed that there is potential harm, 45 per cent (274) thought that antipyretics are harmless, and 23 per cent (138) were not sure about that. The results of the Chi-square test were significant, $\chi^2(8)=70.68$, $p<0.001$, suggesting that the distribution of the level of education and beliefs whether the antipyretics carry a potentially harmful effect on their children are unlikely to be independent. Administering antipyretics was the most frequent practice in fever management (53.7 per cent, 330), temperature monitoring (49.7 per cent, 305), and offering fluids (43.6 per cent, 268). Regarding Tepid versus cool sponging, 45 per cent (275) of mothers stated that they always apply cool water sponging in comparison to 32 per cent for tepid water sponging. The practice of alcoholic compresses was also popular among the mothers as 49 per cent states that they apply alcoholic compresses.

Discussion

The majority of parents held unwarranted and unrealistic concerns about fevers; first termed as 'fever phobia' by Schmitt in 1980.¹¹ In this descriptive cross-sectional study, Kuwaiti mothers were recruited to identify their knowledge about fever of their children and determine their patterns of use of Over-the-Counter-Antipyretics.

The present study shows that mothers have inadequate knowledge about temperatures that indicate different levels of fever. Thirty-three per cent of them considered a temperature of $\leq 37.5^\circ\text{C}$ to be a mild rise, and 27.1 per cent considered a temperature $\leq 38.5^\circ\text{C}$ to be a high fever. Inadequate definition of different grades of heat was also evident in comparative studies. In Kuwait, a previous study

showed that a child was considered febrile at body temperatures of 37°C or less by 40.7 per cent of the mothers, at 38°C and above by 57.2 per cent and 2.1 per cent did not know when to consider their child had a fever.²³ A survey was done by Walsh et al., in which 30.3 per cent of parents identified a temperature below 38.0°C as fever. And they ranged high temperature between 37.5 to 42.6°C ($39.4\pm 0.8^\circ\text{C}$), with 51 per cent correctly reporting 39.1 to 40.4°C ; and, many (47 per cent) identified lower temperatures.²⁹ Also, this goes with the results of Crocetti M et al., as they found that half of the parents considered a temperature of 38°C or less to be a fever.¹⁰ Educational attainments significantly influenced Kuwaiti mothers' reports of high fever, so mothers with postgraduate and university levels of education reported lower temperatures for high fever than those with lower degrees. ($F=4.68$, $d.f.=4$, $P=0.001$, $n=207$). Influence of level of education was also a finding of similar studies in which educational attainment influences the knowledge of the mothers.^{29,30}

Almost all the mothers believed that fever could cause harm, and 48 per cent (294) of them stated that rise in temperature is very harmful. Similar to their international counterparts, the most consistently identified serious concern of Kuwaiti mothers was that high fevers if left untreated, will be associated with febrile convulsions, brain damage, and death.^{10,17,31} So 36 per cent of mothers (221) believed that untreated fever could lead to febrile convulsion, 22 per cent (135) stated brain damage, and seven per cent (43) felt that fever could lead to death. Thirty-seven per cent of mothers (230) reported that they start antipyretic medication when body temperature is 38°C , and about 15.8 per cent of them (97) would initiate treatment for a body temperature of 37.5°C or less. Comparable studies also show that antipyretics usually are given at low grades of fever. In Crocetti et al.'s, study 25 per cent of caregivers would give antipyretics at a temperature less than 37.8°C .¹⁰ Also, in the study done by Chiappini et al., about five percent of parents declared that they would give antipyretics for body temperature $<37.8^\circ\text{C}$.³² The educational level of Kuwaiti mothers had a significant impact on their perception of fever [$\chi^2(df=8)=70.68$, $p<0.001$].

Paracetamol and ibuprofen are the most frequently purchased OTC medicines for children.²⁴ Also in the current study, the most commonly administered antipyretic is paracetamol. 51 per cent (311) of the mothers reported using it. 46 per cent (286) stated using ibuprofen. Of concern is three per cent of mothers (17) who reported using aspirin to reduce fever. Use of aspirin as an antipyretic

by some Kuwaiti mothers indicates a lack of awareness of the potential hazard associated with the use of aspirin. Several previous studies had linked aspirin to Reye syndrome, which is a severe encephalitis-like illness.³³

In the current study, more than half (61 per cent, 375) of the mothers had alternated antipyretic paracetamol and ibuprofen. The practice of alternating antipyretics is frequently used to control fever. In a survey of 256 parents, 67 per cent reported alternating acetaminophen and ibuprofen for fever control, and 81 per cent of them stated that they had followed the advice of their health care provider or pediatrician.³⁴ In the study done by Al-Abdel Jalil et al., mothers used mainly paracetamol as antipyretic since the practice of alternating antipyretics was not yet familiar.²³ In the current study, 81 per cent (495) of the mothers believed that fever in children still need antipyretics even if they are active. Furthermore, 80 per cent (494) of them reported awakening their child from sleep to give them antipyretics. These findings were similar to that of Crocetti M et al., as 85 per cent of parents (340) reported awakening their child from sleep to give antipyretics and forty-three per cent (264) of the mothers, indicated that they administer antipyretics without measuring their children's temperatures.¹⁰ Parents should know that clinical research tested this observation. It was found that experienced mothers were wrong in 50 per cent of the time in diagnosing low-grade fevers (38.3–38.9°C) by touch.³⁵ Alarming, in the current study, there was poor awareness about the real risk of misusing of antipyretics. When we asked the mothers about their beliefs, whether the antipyretics carry a potentially harmful effect on their children, only 32 per cent (202) of them believed in its potential harm. Forty-five per cent (274) thought that antipyretics are harmless, and 23 per cent (138) were not sure. Chiappini E et al. also found this decreased awareness about the potential harm of antipyretics. In their study, one-third of parents thought that a higher dose of antipyretics is not dangerous.³²

Considering fever management practices at home, 53.7 per cent (330) of the mothers stated that they always use antipyretics. Relatively high percentage of them (49 per cent, 301) reported using alcoholic compresses, and 45.0 per cent (276) reported practicing cold water compresses.

Some of the findings warrant further investigation, such as the relatively high percentage of mothers who are practicing alcoholic sponging can be misleading since some participants might not complete the survey as carefully as they would act in real settings.

The current study shows that parents, perceiving that they were knowledgeable, reported mild fever as high, and believe the moderate rise in temperature to be harmful and may lead to febrile convulsions or brain damage, and usually reduced average temperatures and mild fevers with antipyretics. The current paediatric practice for a feverish child includes the use of antipyretics when the temperature is greater than 38.5°C; therefore, antipyretics should, be used with discretion and not given automatically. Parents should know that fever is not an illness, but is, in fact, a physiological mechanism that has beneficial effects in fighting infection.^{8,9}

The practice of alternating two types of antipyretics has become widespread at home and paediatric wards, but is this method supported by evidence and does it results in complications?³⁶

There is still a significant contrast between scientific evidence on the one hand and current concepts and practices on the other. Although studies provide some evidence that combination therapy may be more effective at lowering temperature, there remain to be some questions regarding the safety of this practice and whether it is effective in improving discomfort: which is the primary treatment endpoint. It should be realised that the custom of alternating antipyretics increases the potential for inaccurate dosing or overdosing because of the increased possibility that parents will either not receive or not understand dosing instructions, combined with the wide array of formulations that contain these drugs.^{37,38} Several studies do not recommend the practices of combining or alternating paracetamol and ibuprofen as this is of limited value.^{36,37} Awakening sleeping children just to give antipyretics probably indicates fears and anxiety from fever and its harmful effect. However, mothers should realise that sleeping children should not be awakened solely to administer antipyretics.³⁹ Parents should also know that tactile temperature taking practice has shown to be an inaccurate screening test for fever. Inadequate awareness about the potential harm of antipyretics is particularly alarming because, even if antipyretic drugs are demonstrated to a great extent to be safe and efficient, there are reports that their misuse may lead to possible toxic effects. Parents learned about fever and the dose of antipyretic from multiple sources: doctors were the primary source of information for 48 per cent (294) of the mothers. This finding may be due to the peculiar organisation of the Kuwaiti health system: as there is no charge to pay for medical visits, and there is a very close follow-up for the children. Also, this reminds us that health personnel are

important teachers of parents concerning fever. Parental counselling should focus on the most significant benefit of antipyretic therapy, which is improving child comfort and the accompanying improvements in activity and feeding. Parents attention should be turned to monitoring of child's activity, and observing signs of serious illness. And making sure that the child is receiving an appropriate fluid intake to maintain hydration and clothing should be kept to minimum.⁴⁰ Furthermore, health caregivers should inform parents that their children have to receive the adequate dose of an antipyretic.⁴¹ Cold water, ice, or rubbing alcohol, should not be used. Adding rubbing alcohol to the water can be breathed in and cause a coma.

Strengths of this study may include that

- It is the first study that specifically deals with Kuwaiti parents. It addresses a gap in the literature on Kuwait; especially in terms of the patterns of Over-the-Counter antipyretics.
- The study adds valuable results regarding the Kuwaiti parent's basic knowledge of fever and its management in children.
- It adds value to the Arabian Gulf region scientific literature.
- It proves that correct management of febrile illness remains unclear, leading to the widespread and often unnecessary use of antipyretic medications.
- It elaborates on the needs to continue educating parents regarding fever in children and the proper ways of managing it.

Weaknesses of this study

- Despite the attempts to recruit a heterogeneous sample, all respondents were mothers. So the medical knowledge and beliefs of fathers about fever were not tested.
- Analysis of data should consider that self-reported behaviour can be misleading since some participants might not complete the survey as carefully as they would in real settings.

Conclusion

Fever phobia remains extremely widespread among parents and the vast majority believes that a rise in temperature is harmful. Healthcare professionals have to provide parents with accurate information about childhood fever and its home management based on the latest scientific evidence. We hope that by identifying weak areas in the parents' management of their children's ailments, better planned educational and behavioural modification efforts can be made to elevate the knowledge level among the parents

when they manage their children. Future studies are needed to evaluate the effectiveness of such interventions.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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Table 1: Demographic data of mothers participated in the study

Characterises	n (%)
Age (years)	
20-30	227(37)
31-40	283(46)
41-50	104(17)
Employment	
Housewife	86(14)
Student	154(25)
Full-time	307(50)
Part-time	67(11)
Education	
Less than high school	55(9)
high school	118(19)
Diploma	234(38)
University	166(27)
Postgraduate	41(7)
Number of children	
1	239(39)
2	234(38)
3	98(16)
>3	43(7)

Table 2: Analysis of the correlation between the level of education and the level which was considered as high fever

Variable	η^2	SS	df	F	p
(Intercept)	1	251434.1	1	1098292	<.001***
Postgraduate and University	0.03	4.28	4	4.68	0.001**
Residuals		139.42	609		

Partial η^2 (partial eta squared)

SS (Sum of squares)

df (degrees of freedom for ANOVA)

F (F ratio)

p (probability value)

Table 3: Comparisons between different levels of education and definition of high fever

Comparison	diff	lower	upper	p
diploma-bachelor	0.15	0.01	0.28	0.021*
postgraduate-bachelor	0.23	0	0.46	0.051
less than high school-bachelor	-0.06	0.26	0.15	0.947
diploma-high school	0.12	0.03	0.26	0.194
postgraduate-high school	0.2	0.04	0.43	0.155
less than high school-high school	-0.09	0.3	0.13	0.809
less than high-school-diploma	-0.2	0.4	0.01	.039*
less than high school-postgraduate	-0.28	-0.55	-0.01	.035*