


Knowledge, Attitude, and Practice in Management of Childhood Fever Among Saudi Parents

Global Pediatric Health
Volume 7: 1–9
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/2333794X20931613
journals.sagepub.com/home/gph


Shalam Mohamed Hussain, PhD¹ , Osama Al-Wutayd, MD, SBCM², Ahmed Hamad Aldosary, MD², Abdullah Al-Nafeesah, MD³, Ashwaq Al'E'd, MD⁴, Modhi Saleh Alyahya, MD⁵, Anfal Saleh Alfeneekh, MD⁶, Sirin Ahmed AlKadi, Intern⁷, Ghaida Abdulrahman Alghasham, Intern⁷, and Ghadah Abdulaziz Aloyaidi, Intern⁷

Abstract

Fever is considered as a frequent symptom in childhood and is the cause of almost 65% to 70% of pediatric visits. Saudi Arabia has about 10% of child population (under 4 years of age), imposing a high burden of childhood illnesses including fever. A total of 1700 questionnaires were distributed to Saudi parents with children visiting pediatric clinic. Most of the participants were mothers (77.4%). A temperature of 38.0 °C was defined fever by 42% of participants. The majority of parents (80%) believed seizure is the consequence of untreated high fever. A total of 72.5% indicated that 40.7 to 43.20°C is the highest temperature that can be reached if untreated. There was a statistically significant relationship between mothers and fathers for overall knowledge, attitude, and practice scores. This study indicates that numerous misconceptions still persist regarding fever as more than 90% of parents demonstrated undue fear of consequent body damage from fever and also believed antibiotics can reduce high temperature.

Keywords

fever, knowledge, qassim, temperature, pediatrics, antipyretics

Received December 3, 2019. Received revised April 28, 2020. Accepted for publication May 7, 2020.

Introduction

Fever is considered a frequent symptom in childhood and is cause of almost 65% to 70% of all pediatric visits.¹ Fever is a self-limited disease but causes discomfort among parents and is the reason of distress and anxiety to them. These aspects combined raise health care costs and lead to unnecessary use of antibiotics. Additionally, parents tend to make unnecessary telephone calls and visits to doctors, which may end up in unrequired laboratory tests or even unnecessary prescription of medications to children only to soothe parents' concerns.^{2,3}

Fever phobia among others has also been documented in parents, causing most frequent hospital visits from several studies including Italy, Ireland, Jordan, Nigeria, Canada, Morocco, and France.⁴⁻⁶ The reported outcomes of such studies uncovered several aspects including inadequate parental knowledge regarding fever leading to erroneous approach to fever such as inappropriate usage of antipyretic drugs and antibiotics,

improper use of physical methods of lowering and measuring fever, wrong perception of fever as a disease rather than as a symptom or sign of illness misconceptions about its effects on their children's health.⁷ The

¹Former faculty, College of Pharmacy, Qassim University, Saudi Arabia

²Department of Family and Community Medicine, Unaizah College of Medicine and Medical Sciences, Qassim University, Saudi Arabia

³Department of Pediatrics, Unaizah College of Medicine and Medical Sciences, Qassim University, Saudi Arabia

⁴Department of Pediatrics, College of Medicine, Qassim University, Saudi Arabia

⁵ICU Department, King Abdulaziz Medical City, Riyadh, Saudi Arabia

⁶Pediatric Department, King Saud Hospital, Unayzah, Saudi Arabia

⁷Medical Student, Unaizah College of Medicine and Medical Sciences, Qassim University, Saudi Arabia

Corresponding Author:

Shalam Mohamed Hussain, Former faculty, Department of Pharmacology, College of Pharmacy, Qassim University, Saudi Arabia.
Email: shalam26@yahoo.co.in



variations found among these studies are possibly due to cultural, economic, geographical, demographic, and educational differences in populations among countries. In these situations, some educational programs would benefit parents for appropriate fever management.

Understanding variations in health-related beliefs and practices among Saudis is important because as per the census data 2016, Saudi Arabia has about 10% of child population (under 4 years of age) and Al-Qassim is its seventh most populated province, imposing a possible high burden of childhood illnesses including fever.⁸ Studies elsewhere showed poor knowledge and perceptions of parents regarding childhood fever. Limited studies, however, were reported in Saudi Arabia and none from this region.^{5,9}

The present study was carried to explore the awareness of parents of children younger than 5 years with regard to management of childhood fever. The study attempted to understand differences between mothers' and fathers' awareness and to recognize correlates that determine the behavior of parents toward fever management practices. We believed that having an accurate assessment will help us design and implement a region-specific and need-based educational programs for rational fever management and to help in decreasing the burden on health care spending.

Materials and Methods

Study Questionnaire

A quantitative observational cross-sectional study was carried out among parents who attended pediatric clinics or ward at government-run King Saud Hospital, Unaizah city, from February to July 2019. Parents were interviewed by one of the interns where the interviewer wrote down the answers, included all Saudi parents, while parents who have critically ill child or non-Saudi were excluded. The study and the purpose of the study was explained to parents, and a consent form was given to all participants. The questionnaire used in the present study was adopted from the study of Chiappini et al,¹⁰ and additional questions were formulated to seek the behavior of parents toward the use of antibiotics for fever management. The questionnaire included 2 sections, first about demographic data and the second about fever-related questions (23 questions). The pilot study was conducted on a sample of 20 parents to test data collection logistics, suitability/whether the tools of data collection are clear or not, and to estimate the time needed to collect data and then finalize. The results of the piloted questionnaires were not included in the analysis. The questionnaire was reviewed by pediatricians and epidemiologist to ensure the content validity.

Definitions and Score Calculation

The definitions for values for fever temperature used in the present study were adopted from the refereed questionnaire.¹⁰ However, other sources were also adopted by consensus among authors. Childhood fever among under-5 children was defined as a temperature at or above 38 °C,¹¹ body's cutoff temperature at more than 40 °C is considered as high fever, and high fever and administering antipyretics paracetamol or ibuprofen were considered as appropriate drugs for management of fever.^{12,13} Parents were considered to be using correct site of measuring body temperature in children if rectum, armpit, or mouth were used.⁵ Use of mercury or digital thermometer by parents was considered appropriate for measuring body temperature in children.¹² In order to broaden the understanding of the knowledge of parents, their behavior and beliefs, and overall practices adopted for the management of childhood fever, a domain score was constructed using questions from respective domains.

The first domain score was knowledge score that contained 4 questions; knowledge about the best site to measure temperature and cutoff body temperature for fever, high fever, and administering antipyretics. Each question carried 1 point. The possible total score was subcategorized as follows: good (score ≥ 3) and poor (score < 3).

The second domain score was attitude score that contained 4 questions; preference for paracetamol as antipyretic, belief of association of 2 or more antipyretic drugs for uncontrolled fever, consideration of child's body weight in calculation of antipyretic, and belief that largest dose of antipyretic drug is efficacious for high fever. Each question carried 1 point. The possible total score was subcategorized as follows: good (score ≥ 3) and poor (score < 3).

The third domain score was practice score that contained 4 questions; continued hourly measurement of temperature, adopting physical measures to control body temperature along with antipyretic drug, practicing use of correct dosimeter for calculating the dose of antipyretic drug, and following pediatrician's order. Each question carried 1 point. The possible total score was subcategorized as follows: good (score ≥ 3) and poor (score < 3).

Data Analysis

Data were coded and entered using the Statistical Package for Social Sciences (SPSS) Version 20 (IBM Corporation). Data were presented as frequency and percentages. A value of $P < 0.5$ was considered significant. All variables were transformed into dummy variables and the outcome variable into dichotomous forms (good/poor). In univariate analysis, a cross-tabulation analysis was used to search for factors that influenced parents' knowledge, their practices, and beliefs regarding fever.

Table 1. Demographic Characteristics of Parents Participating in the Study (n = 1679).

Characteristics	Number	%
Relationship		
Mother	1299	77.4
Father	380	22.6
Education level of parents		
Illiterate	74	4.4
Secondary	541	32.2
Higher	719	42.8
University	344	20.5
Occupation		
Government employed	561	33.4
Nongovernment employed	89	5.3
Self-employed	39	2.3
Student	108	6.4
Homemaker	663	39.5
Retired	172	10.2
Unemployed	47	2.8
Number of children per parent		
1	2620	36.9
2	278	16.6
3	202	12
4	198	11.8
5	174	10.4
>5	207	12.3
Age of parents, mean (SD)	37.78 (10.276)	
No. of children, mean (SD)	3.60 (2.021)	

Variables found with $P < .1$ in any of the domains were further entered into the multivariate analysis using logistic regression to assess the relationship of predictors among themselves and their influence on other predictors and outcome variables. Ethical approval was obtained from the Regional Research Ethics Committee, Qassim Province, Saudi Arabia (No. 1440-1161468).

Results

Demographic Characteristics

A total of 1700 parents with children were interviewed to collect demographic and other parameters about childhood fever. Table 1 summarizes participant demographic characteristics. Most of the participants were mothers (77.4%). The mean age of participants was 37.78 (SD = 10) years, and the number of children was 3.60 (SD = 2). Among parents, over 20% of them were educated up to university level. Among mothers, 48.7% of them had education more than the college level. With regard to employment status, 39.5% of parents were homemakers and approximately 33% were government

employees. A total of 36.9% of parents reported to having a single child.

Knowledge of Parents About Childhood Fever

Participants were asked to define the temperature associated with normal body fever and high fever with the methods used for measurement of body temperature. For 42% of participants, a temperature of 38 °C was a definition of fever, and over 27% responded as 37.5 °C. With regard to awareness about high fever, almost two thirds responded incorrectly (Table 2). With regard to the site used for recording of temperature, the most common was touching the forehead (43.3%), while 26.6% reported using the armpit of the child and also measuring temperature in the mouth (25.8%). Around 57.4% of parents indicated that they used digital thermometer to record temperature. Majority of the parents were aware about the use of paracetamol as antipyretic (91.2%) drug for managing fever in children. Approximately 94.2% of parents displayed poor knowledge about the fever as per the score formulation (Table 4).

Parents Attitude and Beliefs Toward Potential Consequences of Fever

The majority of parents (80%) believed that seizure as the consequence of untreated high fever and 10% believed that it can cause delirium. Most of them (72.5%) indicated that 40.7 to 43.2 °C as the highest temperature that can be reached if untreated. Ninety percent of the parents believed that high dose of antipyretic drug is dangerous without any efficacy. However, over 55% of them believed that antibiotics can reduce high fever and 35% of them prefer to go to emergency room in case of fever (Table 2). Around 78.4% of parents exhibited poor attitude toward fever management (Table 4).

Management Practices Followed by Parents for Childhood Fever

The prevalence of fever management practices was encouraging with the parents. The most common fever management practice adopted was cold sponging (40%) among physical measures and administering antipyretics (91.2%) followed by ibuprofen (4.3%). Antibiotics were given to children after being prescribed by doctors by 81% of parents (Table 2). Majority of parents (80.6%) preferred oral route of administration for antipyretic drug and used dosimeter for measuring correct dose of antipyretic. However, only 15.7% admitted using antibiotic to treat high fever without prescription. Around 56.8% of parents exhibited poor practices for fever management (Table 4).

Table 2. Frequency Distribution of Parental Awareness, Attitude, and Practices of Childhood Fever.

Item	Number of responses, n	%
<i>Knowledge</i>		
Site/mode of measurement		
Armpit	446	26.6
Rectum	50	3
Ear	22	1.3
Mouth	434	25.8
Forehead	727	43.3
Definition of fever		
Correct	1132	67
Incorrect	547	33
Type of thermometer		
Mercury-in-glass	253	15.1
Digital	964	57.4
Auricular	164	9.8
Skin infrared	16	1
Plastic strip placed on forehead	198	11.8
Dummy-pacifier style	69	4.1
No thermometer owned/ recommended	15	0.9
<i>Attitude</i>		
Harmful effects of fever		
Seizure	1339	79.7
Brain damage	49	2.9
Coma	21	1.3
Dehydration	14	0.8
Really sick	76	4.5
Delirium	160	9.5
Death	4	0.2
None	16	1
Fever if left untreated can reach		
≤40.6 °C	73	4.3
40.7 to 43.2 °C	1218	72.5
>43.3 °C	152	9.1
Do not know	236	12.8
Largest dose of antipyretic drug		
Efficacious	163	10
Dangerous	1516	90
Antibiotics can reduce high fever		
Yes	928	55.3
No	751	44.7
When the child has fever		
Go to clinic	331	19.7
Go to pharmacy	123	7.3
Go to emergency room	594	35.4
Wait at home	630	37.5
<i>Practice</i>		
Physical measures		
Cold sponging	671	40
Non-cold sponging	461	27.5
Bath	368	21.9

(continued)

Table 2. (continued)

Item	Number of responses, n	%
Use of drugs for fever		
Paracetamol	1531	91.2
Ibuprofen	72	4.3
Aspirin	39	2.3
Cortisone	3	0.2
Antibiotics	34	2
Route of administration of antipyretics		
Oral	1353	80.6
Rectal	324	19.3
Instrument to measure right dose		
Spoons	98	5.8
Dosimeter of antipyretic drug	1474	87.8
Dosimeter of other drugs	107	6.4
Use of antibiotics without prescription		
Yes	264	15.7
No	1415	84.3

Mothers' Versus Fathers' Knowledge, Awareness, and Practices for Childhood Fever

There was a statistically significant relationship between mothers and fathers for overall knowledge, attitude, and practice scores ($P < .046$, $P < .110$, and $P < .001$, respectively). Among parents 73%, 60%, and 46% of mothers exhibited poor score performance in domains of knowledge, attitude, and practices, respectively. When we compared the performance among mothers across these 3 domains for good score, it was 5%, 22%, and 40% for knowledge, attitude, and practice, respectively (Table 4).

Correct Parental Responses for Perceptions of Childhood Fever Awareness, Concerns, and Treatment-Seeking Behavior

When parents were asked to assess their knowledge, only 3% of them responded correctly for the best site for recording body temperature in children, and 42% of them were able to correctly defined body temperature in °C. However, 80% of the parents know seizure as the harmful outcome of febrile ever, and 77% of them were aware of the importance of measuring temperature regularly when children have fever (Table 3). The parents were asked to what for they fear the most during a child's fever, almost all of them (99%) expressed due to mis-conceived fatal symptoms. More than 20% of parents believed that use of 2 or more antipyretics drugs is useful if temperature is not going down. When they were asked for their preference for seeking treatment for child's fever, 19.7% and 37.5% of them preferred to go

Table 3. Number and Percentage of Parental Responses for Perceptions of Childhood Fever Awareness, Concerns, and Treatment-Seeking Behavior.

Items	Total	Mother	Father
Knowledge of parents about fever			
Parental awareness of the best site of measuring body temperature	50 (3%)	34 (68%)	16 (32%)
Parental response for correct definition of fever temperature (°C)	709 (42.2%)	557 (78.6%)	152 (21.4%)
Parenteral knowledge of seizure as harmful effect of febrile fever	1339 (79.9%)	1081 (83.2%)	258 (67.9%)
Parenteral response for regular measuring of temperature	1643 (97.9%)	1271 (77%)	372 (23%)
Treatment-seeking behaviors and beliefs of parents regarding fever			
Parental attitude toward fatal symptoms of fever	1663 (99%)	1292 (77.7%)	371 (22.3%)
Parents belief of using of 2 or more antipyretics drugs to reduce body temperature	388 (23%)	300 (79%)	87 (21%)
Parents behavior in visiting clinic to seek treatment for their child's fever	331 (19.7%)	243 (84.6%)	88 (15.4%)
Parental behavior to take care of child fever at home	630 (37.5%)	533(73.4%)	97 (26.6%)
Parental belief that antibiotics reduce high temperature	928 (53.3%)	731 (78.8%)	197 (21.2%)
Fever management practices adopted by parents			
Parental ownership of a thermometer to record child's fever	1381 (82.3%)	1071 (77.6%)	310 (22.4%)
Use of cold sponging as an immediate measure to control child's fever by parents	671 (40%)	449 (66.9%)	222 (33.1%)
Parental practice to use of paracetamol to treat fever in child	1531 (91.1%)	1192 (77.9%)	339 (22.1%)
Parental consultation of doctors before giving antibiotics to child	264 (15.7%)	176 (66.7%)	88 (33.3%)

to clinic and remain at home to care, respectively. More than half of the parents believed that antibiotics can reduce high temperature (Table 3). More than 82% parents were found to own a thermometer to record temperature, and 40% of them use cold sponging as an immediate measure to control child's fever. Almost 91% of parents informed that they use paracetamol as an antipyretic drug. However, more than 80% of parents admitted that they do not consult doctors before giving antibiotics to their children.

Relationships Between Demographic Characteristics With Knowledge, Attitude, and Practice of Childhood Fever

Univariate analysis found relationships between parents' demographic characteristics and knowledge, attitude, and practice scores. In the analysis, relationship and employment status of parents were found to be significantly ($P < .046$ and $P < .005$, respectively) associated with knowledge scores of parents for childhood fever. However, for attitude score, only age and number of children in the family found significant ($P < .052$ and $P < .00$, respectively) association, whereas for practice score, relationship, age, education level, and number of children in the family had significant ($P < .001$, $P < .001$, $P < .002$, and $P < .001$, respectively) association (Table 4).

These variables were further entered into the multivariate analysis to find the independent correlates of

knowledge, behavior, and management practices for fever. Parents having education more than college (odds ratio [OR] = 1.129; 95% confidence interval [CI] = 0.725-1.760), being employed (OR = 1.687; 95% CI = 1.088-2.614), and the number of children (OR = 1.034; 95% CI = 0.918-1.165) were positively correlated with good knowledge of parents. However, being father (OR = 1.189; 95% CI = 0.882-1.604), having parents aged more than 37 years (OR = 1.019; 95% CI = 0.771-1.1345), and number of children (OR = 1.150; 95% CI = 1.074-1.232) were positively correlated with good attitude of parents. Regarding good practices for management of fever, parents having education more than college (OR = 1.291; 95% CI = 1.047-1.592) and number of children (OR = 1.031; 95% CI = 0.974-1.091) were positively correlated (Table 5).

Discussion

Demographic Characteristics

The purpose of this study was to explore the level of knowledge, beliefs, and practice of parents about fever in preschool children in Saudi parents visiting the pediatric clinic at King Saud Hospital, Unaizah. Most of the participants were mothers (77.4%), with 20% of them educated up to university level and one third of them being employed in the government sector. Among mothers, nearly 50% of them were educated more than college level, highlighting one of the possible reasons for better knowledge score of mothers. This plays an

Table 4. Bivariate Analysis of Factors Associated With Parental Knowledge, Attitude, and Practice About the Fever in Children.

Variables	Knowledge			Attitude			Practice		
	Poor, n = 1582 (94.2%), n (%)	Good, n = 97 (5.8%), n (%)	Crude OR (95% CI), P	Poor, n = 1316 (78.4%), n (%)	Good, n = 363 (21.6%), n (%)	Crude OR (95% CI), P	Poor, n = 953 (56.8%), n (%)	Good, n = 726 (43.2%), n (%)	Crude OR (95% CI), P
Relationship	1232 (94.8)	67 (5.2)	1.58 (1.01-2.06), <.046	1007 (77.5)	292 (22.5)	0.79 (0.59-1.06), <.114	772 (59.4)	527 (40.6)	1.61 (1.28-2.03), <.001
Father	350 (92.1)	30 (7.9)		309 (81.3)	71 (18.7)		181 (47.6)	199 (52.4)	
Age	819 (95)	43 (5)	1.35 (0.89-2.03), .155	692 (80.3)	170 (19.7)	1.26 (0.99-1.59), <.052	527 (61.1)	335 (38.9)	1.44 (1.19-1.75), <.001
>37 year	763 (93.4)	54 (6.6)		624 (76.4)	193 (23.6)		426 (52.1)	391 (47.9)	
Education level	580 (94.2)	36 (5.8)	0.98 (0.64-1.49), .929	494 (80.2)	122 (19.8)	1.19 (0.93-1.51), <.169	319 (51.8)	297 (48.2)	0.73 (0.59-0.89), <.002
College or more	1002 (94.3)	61 (5.7)		822 (77.3)	241 (22.7)		634 (59.6)	429 (40.4)	
Employment	636 (92.3)	53 (7.7)	1.47 (0.94-2.31), .005	536 (77.8)	153 (22.2)	0.94 (0.74-1.19), <.626	398 (57.8)	291 (42.2)	1.07 (0.88-1.31), <.488
Unemployed	946 (95.6)	44 (4.4)		780 (8.8)	210 (21.2)		555 (56.1)	435 (43.9)	
No. of children			1.473, .521			29.39 (6), <.001			1.02 (0.84-1.25), <.001

Abbreviations: OR, odds ratio; CI, confidence interval.

Table 5. Multivariate Analysis of Factors Associated With Parental Knowledge, Attitude, and Practice About the Fever in Children.

Variables		Adjusted OR (95% CI), P		
		Knowledge	Attitude	Practice
Relationship	Mother	0.70 (0.44-1.12), .134	1.19 (0.88-1.60), .256	0.60 (0.47-0.76), .001
	Father (ref.)			
Age	<37 year	0.88 (0.54-1.42), .598	1.02 (0.77-1.35), .896	0.76 (0.61-0.96), .019
	>37 year (ref.)			
Education level	Less than college	1.13 (0.73-1.76), .591	0.78 (0.60-1.01), .055	1.29 (1.04-1.59), .017
	College or more (ref.)			
Employment	Employed	1.69 (1.09-2.61), .019	0.97 (0.76-1.25), .811	0.867 (0.70-1.07), .185
	Unemployed (ref.)			
No. of children		1.03 (0.92-1.17), .585	1.15 (1.07-1.23), .001	1.03 (0.97-1.09), .199

Abbreviations: OR, odds ratio; CI, confidence interval.

emphasis on education of mothers for upbringing of children. Studies elsewhere reported similar findings, where the major determinants of the level of knowledge and management of children with fever were cultural backgrounds, socioeconomic status, and educational levels.^{3,14,15} The present study echoes these consistently and reinforces the popular belief that mothers are the major caretakers of children.

Knowledge of Childhood Fever Among Parents

The present study tried to understand the knowledge of parents about childhood fever with questions ranging from fever perceptions to attitudes toward it. With regard to definition for high fever, 67% of them responded correctly. It is also surprising that only 3% could answer as to what is the best site for measurement of body temperature. An American study reported that 55% of parents indicated a temperature of less than 37.8 °C as fever and 17.5% believed a temperature of less than 38.9 °C as indication of high fever.¹⁶ A local study reported a similar finding.⁵ However, the present study contrasts many studies including a Moroccan study, which reported that 96.5% of the studied parents indicated an incorrect definition of temperature.¹⁴ The use of a thermometer is the only way to determine accurately whether a child is febrile,¹⁷ and armpit temperatures are adequate means for clinical screening of fever. In our study, the site used for recording of temperature was most commonly by touching the forehead (43.3%), while 26.6% reported armpit of the child as the site to measure temperature. In the present study, parents had satisfactory awareness about cause of fever and common antipyretics used for children (91%). This

was similar to the findings of many other studies including a Netherlands study,¹⁸ in which 72.0% correctly mentioned the use of antibiotics or paracetamol. The major determinants of the level of knowledge and management of children with fever were socioeconomic status and educational levels in these studies. Further awareness programs may be carried at the community level to enhance correct knowledge to urban parents as well to augment better living.

Attitudes and Practices Regarding Childhood Fever Management

Ninety-nine percent of parents believed and feared that fever can cause fatal symptoms if left untreated and said that fever could cause seizure, brain damage, or death due to excess heat that affect the child's brain. They also have misconceptions that using 2 or more antipyretics drugs is useful to treat aggressively to bring down temperature, and they believe that antibiotics can reduce high temperature. These findings indicate that parents view fever frequently as caused by infections in their children, and this attitude may lead to irrational use and development of antimicrobial resistance. Similar concerns were raised in other studies as well.^{14,15,19} The common childhood fever treatment practices reported recording of temperature on the forehead and the armpit, consulting doctors for fever treatment (40%), and continuing to use antipyretics as prescribed by doctors (31%), and use of dosimeter (87.8%) to measure right dose of antipyretic. The most common fever management practice adopted was cold sponging (40%) among physical measures, and administering antipyretics (91.2%) followed by ibuprofen (4.3%). The Moroccan study also found 85.9% of parents used paracetamol, and 45.1% used traditional treatment.¹⁴ Moreover, a study

conducted among Turkish parents reported (42.4%) parents using over-the-counter medications.²⁰ These practices were concordant with childhood fever treatment practices worldwide.⁷ Some studies reported other practices including administering herbal medicine (Taiwan) and tepid sponging (Palestine), which was not observed in the present study.^{21,22} Apart from this, some studies also reported use of homeopathic and other traditional medicine. In sum, it may be stated that parents showed poor knowledge regarding various aspects of fever and misconceptions toward fever management. These may be attributable to several sociocultural factors including age, educational background, employment status, and number of children in the family of the parents.

Limitations

The current study has the largest possible sample size when compared to recently conducted similar studies. However, the results cannot be generalized to the diverse and large ethnic Saudi population as the present study represents the data collected from a single regional hospital setting.

Another possible limitation was the non-inclusion of the pediatricians of the region to elicit their opinion in the present study. There is also a possibility that participants who are not well versed in the management of childhood fever attended the interview, and those who are well versed stayed at home during the study period and hence such parents were excluded from the study. In addition, recall bias cannot be excluded as the data-dependent on parenteral self-report.

Conclusions

The results suggest that the awareness of parents regarding childhood fever management was poor and variable. The study highlights the numerous misconceptions regarding fever such as parents' undue fear of consequent body damage from fever, use of forehead as a site for measuring fever, use of antibiotics to reduce high temperature without prescriptions. Last, predictor analyses brought to light the profound influence of mother and her education level, age, employment status, and number of children in the family on the knowledge, beliefs, and management of childhood fever.

Further Scope of the Study

The local paediatricians and health professionals may be apprised of the present findings and collaborated with them to create effective educational programs for awareness among the local population about fever management and misconceptions about it.

The study may be replicated in multicentric hospitals in the country to generalize the knowledge, attitude, and practices of the Saudi population and can broaden the study to include pediatricians and general practitioners.

Author Contributions

Osama Al-Wutayd, Abdullah Al-Nafeesah, Ashwaq AIE'ed, Modhi Alyahya conceived the idea for the initial proposal and questionnaire.

Sirin AlKadi, Ghaida alghasham, Ghadah aloyaidi collected the data after ethical approval and contributed in the initial write up of the manuscript.

Shalam M.Hussain and Osama Al-Wutayd designed the write up, carried the data analysis, results, interpretation and finalized the manuscript.

Ahmed Hamad Aldosary and Anfal Alfeneekh helped in collecting the data and designing questionnaires.

All authors reviewed the initial manuscript and participated in the preparation of manuscript.

All authors read the manuscript and approved it for submission.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Shalam Mohamed Hussain  <https://orcid.org/0000-0002-2398-5485>

References

1. Bertille N, Fournier-Charrière E, Pons G, Chalumeau M. Managing fever in children: a national survey of parents' knowledge and practices in France. *PLoS One*. 2013;8:e83469. doi:10.1371/journal.pone.0083469
2. Walsh A, Edwards H, Fraser J. Attitudes and subjective norms: determinants of parents' intentions to reduce childhood fever with medications. *Health Educ Res*. 2009;24:531-545.
3. Athamneh L, El-Mughrabi M, Athamneh M, Essien EJ, Abughosh S, James E. Parents' knowledge, attitudes and beliefs of childhood fever management in Jordan: a cross-sectional study. *J Appl Res Child*. 2014;5:8. <http://digitalcommons.library.tmc.edu/childrenatrisk/vol5/iss1/8>
4. Chiappini E, Bortone B, Galli L, de Martino M. Guidelines for the symptomatic management of fever in children: systematic review of the literature and quality appraisal with AGREE II. *BMJ Open*. 2017;7:e015404.
5. Al-Eissa YA, Al-Sanie AM, Al-Alola SA, et al. Parental perceptions of fever in children. *Ann Saudi Med*.

- 2000;20:202-205. <http://www.annsaudimed.net/index.php/vol20/vol20iss3-4/3490.html>
6. Gunduz S, Usak E, Koksal T, Canbal M. Why fever phobia is still common? *Iran Red Crescent Med J*. 2016;18:e23827.
 7. Walsh A, Edwards H. Management of childhood fever by parents: literature review. *J Adv Nurs*. 2006;54:217-227.
 8. General Authority for Statistics. Population estimates. Accessed May 11, 2019. <https://www.stats.gov.sa/en/43>
 9. AlAteeq MM, AlBader BO, Al-Howti SY, Alsharyoufi M, Abdullah JB. Parent's knowledge and practice in home management of fever in their children in Riyadh, Saudi Arabia. *J Fam Med Prim Care*. 2018;7:1012-1018.
 10. Chiappini E, Parretti A, Becherucci P, et al. Parental and medical knowledge and management of fever in Italian pre-school children. *BMC Pediatr*. 2012;12:97.
 11. Temperature measurement in paediatrics. *Paediatr Child Health*. 2000;5:273-284.
 12. Robinson JL. Body temperature measurement in paediatrics: which gadget should we believe? *Paediatr Child Health*. 2004;9:457-459.
 13. Section on Clinical Pharmacology and Therapeutics; Committee on Drugs; Sullivan JE, Farrar HC. Fever and antipyretic use in children. *Pediatrics*. 2011;127:580-587.
 14. Rkain M, Rkain I, Safi M, Kabiri M, Ahid S, Benjelloun BDS. Knowledge and management of fever among Moroccan parents. *East Mediterr Health J*. 2014;20:397-402.
 15. Thota S, Ladiwala N, Sharma PK, Ganguly E. Fever awareness, management practices and their correlates among parents of under five children in urban India. *Int J Contemp Pediatr*. 2018;5:1368-1376.
 16. Poirier MP, Collins EP, McGuire E. Fever phobia: a survey of caregivers of children seen in a pediatric emergency department. *Clin Pediatr (Phila)*. 2010;49:530-534. doi:10.1177/0009922809355312
 17. Taveras EM, Durousseau S, Flores G. Parents' beliefs and practices regarding childhood fever: a study of a multi-ethnic and socioeconomically diverse sample of parents. *Pediatr Emerg Care*. 2004;20:579-587.
 18. de Bont EG, Francis NA, Dinant GJ, Cals JW. Parents' knowledge, attitudes, and practice in childhood fever: an internet-based survey. *Br J Gen Pract*. 2014;64:e10-e16.
 19. Cohee LMS, Crocetti MT, Serwint JR, Sabath B, Kapoor S. Ethnic differences in parental perceptions and management of childhood fever. *Clin Pediatr (Phila)*. 2010;49:221-227.
 20. Cinar ND, Altun İ, Altunkaynak S, Walsh A. Turkish parents' management of childhood fever: a cross-sectional survey using the PFMS-TR. *Australas Emerg Nurs J*. 2014;17:3-10.
 21. Chang LC, Liu CC, Huang MC. Parental knowledge, concerns, and management of childhood fever in Taiwan. *J Nurs Res*. 2013;21:252-260.
 22. 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. <https://bmcpediatr.biomedcentral.com/articles/10.1186/1471-2431-13-66>