

Parental and health care provider understanding of childhood fever: a Canadian perspective

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ABSTRACT

Objectives: Fever is common in children and causes misconceptions among parents. Many investigators have called for improved parental education to dispel "fever phobia." Our objectives were to assess parental and health care provider understanding of fever, its treatment, and beliefs about its consequences, as well as to identify parental sources of information about fever.

Methods: Self-administered surveys were distributed to 3 parent groups and 4 health care provider groups. Parent groups included parents of children with fever presenting to the emergency department (ED) (fever group, $n = 209$), parents of children with an injury presenting to ED (injury group, $n = 160$), and parents of healthy school children (school group, $n = 141$). Provider groups included pediatric ED physicians ($n = 16$), pediatric ED nurses ($n = 39$), general pediatricians ($n = 26$) and family physicians ($n = 79$).

Results: Parent groups considered a temperature of 37.9°C to be a fever, 39.1°C to be a high fever, and 39.9°C to be a dangerous fever. Parents were most concerned about discomfort, seizures and dehydration, and parents in the "fever group" worried more about dehydration ($p = 0.01$) and brain damage ($p = 0.03$) than other parents. Most physicians were concerned about dehydration and seizures, but family physicians were most likely to express concerns about brain damage (40.5%) and death (34.1%).

Conclusions: Fever phobia exists among parents and health care providers and is most likely in parents of febrile children and family physicians. Health care providers varied in their knowledge of fever and its treatment. Greater education of health care workers is required in order to provide families with appropriate information.

Key words: fever, treatment, parental beliefs, health care provider beliefs

RÉSUMÉ

Objectifs : La fièvre, fréquemment rencontrée chez les enfants, est souvent source d'idées fausses chez les parents. De nombreux chercheurs recommandent que les parents soient mieux renseignés concernant la «phobie de la fièvre». Nos objectifs étaient d'évaluer la compréhension des parents et des dispensateurs de soins des symptômes de la fièvre, de son traitement et des croyances quant à ses conséquences, ainsi qu'identifier les sources d'information pour les parents au sujet de la fièvre.

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Méthodes : Des auto-questionnaires furent distribués à trois groupes de parents et à quatre groupes de dispensateurs de soins. Les groupes de parents comprenaient des parents se présentant à l'urgence avec un enfant fiévreux (groupe fiévreux $n = 209$), des parents se présentant à l'urgence avec un enfant blessé (groupe blessé $n = 160$) et des parents d'enfants d'âge scolaire en bonne santé (groupe scolaire $n = 141$). Les groupes de dispensateurs de soins comprenaient des médecins d'urgence pédiatrique ($n = 16$), des infirmières d'urgence pédiatrique ($n = 39$), des pédiatres généralistes ($n = 26$) et des médecins de famille ($n = 79$).

Résultats : Les groupes de parents considéraient une température de $37,9^{\circ}\text{C}$ comme de la fièvre, de $39,1^{\circ}\text{C}$ comme une forte fièvre et de $39,9^{\circ}\text{C}$ comme une fièvre dangereuse. Les parents étaient préoccupés principalement par l'inconfort, les convulsions et la déshydratation et les parents du «groupe fiévreux» s'inquiétaient plus de la déshydratation ($p = 0,01$) et des lésions cérébrales ($p = 0,03$) que les autres parents. La plupart des médecins étaient préoccupés par la déshydratation et les convulsions, mais les médecins de famille étaient plus susceptibles de manifester leur inquiétude face aux lésions cérébrales (40,5 %) et à la mort (34,1 %).

Conclusions : La phobie de la fièvre existe parmi les parents et les dispensateurs de soins et est plus susceptible de se manifester chez les parents dont les enfants sont fébriles et chez les médecins de famille. Le niveau de connaissance des dispensateurs de soins face à la fièvre et à son traitement était variable. Il est important de mieux former les dispensateurs de soins au sujet de la fièvre afin de bien renseigner les parents.

Introduction

Fever is a common problem in children, and one of the most common reasons parents bring their children to medical attention. Evidence suggests that most febrile episodes are not dangerous and may, in fact, be a beneficial response to infection.¹⁻⁴ In children, these are usually self-limited viral infections.^{1,4} Several studies published in the early and mid-1980s evaluated parental “fever phobia” and found that parents had many misconceptions.^{1,5,6} The investigators showed that parental education decreased misconceptions about fever, increased appropriate management of febrile episodes, and reduced inappropriate physician visits and telephone calls.⁵⁻⁸ These findings prompted the investigators to recommend that fever teaching become a routine part of pediatric care. Similar studies found that many physicians have exaggerated concerns about fever and that physicians often give mixed messages by telling parents that fever is not dangerous while advising them to treat it aggressively.⁹⁻¹¹ A study of pediatric emergency nurses came to similar conclusions.¹²

Our primary objective was to assess parental and health care provider understanding of fever, its potential consequences and its treatment. Our secondary objective was to determine whether their sources of information on this subject have changed in recent years — particularly with the increasing popularity of health issues in contemporary magazines and on the Internet. Our hypotheses were that parents of children presenting with fever would have different perceptions and attitudes than parents of nonfebrile

children, and that different types of health care providers would have different perceptions depending on the patient population they serve.

Methods

This was a cross-sectional survey of 3 groups of parents and 4 groups of health care providers.

Parental survey

A questionnaire was developed, pilot tested on 15 parents presenting to the Alberta Children's Hospital (ACH) Emergency Department (ED), then revised to ensure clarity. The final 4-page survey contained questions pertaining to duration and treatment of fever, utilization of health care resources, sources of information and general knowledge of fever, its treatment and potential consequences. For most questions, parents were asked to choose responses from a checklist, and were given the opportunity to add items not on the checklist. In addition, demographic and postal code data were gathered for estimation of socioeconomic status. Investigators distributed the survey directly to a convenience sample of parents who brought their child to the ACH ED with fever (fever group) or injuries (injury group); a school nurse distributed the survey to parents of healthy children in kindergarten and grade 1 at local schools (school group).

Health care provider survey

A questionnaire was developed and pilot tested on a sam-

ple of 10 physicians and nurses from the ACH ED, then revised for clarity. The final 2-page survey contained questions pertaining to general knowledge about fever, its potential consequences, and the health care worker's recommendations for treatment. Four groups of health care providers were surveyed: pediatric emergency nurses, pediatric emergency physicians, general pediatricians and family physicians. The questionnaire was distributed directly to all pediatric emergency nurses and attending physicians in the ED (including 6 general pediatricians who work primarily in the ED, 6 Royal College-trained emergency physicians, 3 CCFP(EM)-trained emergency physicians, and 1 fellowship-trained pediatric emergency physician). In addition, the survey was mailed to all local general pediatricians and a random sample of local family physicians. A second and third mailing was performed for nonrespondents. Parental and health care provider surveys were self-administered.

Data analysis

Data was entered on Microsoft Access 97® and analyzed on Microsoft SPSS Base 9.0®. Descriptive statistics, including proportions, means, standard deviations, medians and ranges were calculated. One-way ANOVA (analysis of variance) was used to compare continuous variables with normal distribution. Kruskal-Wallis one-way ANOVA was used to compare continuous variables that did not have a normal distribution. Chi-squared analysis was used to compare group proportions. If a *p* value was <0.05 it was considered significant. This study was approved by the Medical Research Ethics Board at the University of Calgary, Faculty of Medicine.

Results

Parent groups

The survey response rate was 69.7% (209/300) in the fever group, 64.0% (160/250) in the injury group and 47.0% (141/300) in the school group. Parental respondents were mothers in 72.7%, 69.4% and 94.3% of cases, respectively. The mean age of the children was 2.8 ± 2.6 years in the fever group, 7.9 ± 4.4 years in the injury group and 5.5 ± 0.6 years in the school group, and the mean age of parental responders was approximately 30 years greater: 33.0 ± 6.5 years, 38.3 ± 7.2 years, and 35.5 ± 4.8 years in the fever, injury and school groups respectively. The level of parental education and socioeconomic status were similar in all 3 groups.

In children with fever, the median duration of fever prior to presentation was 36 hours (range 1–336 hours). In this

cohort, 84.2% of parents measured their child's temperature with a thermometer, most often using the axillary route. Parents checked their child's temperature a median of 6 times in a 24-h period (range = 0–48 times) and recorded temperatures from 37.4°C to 41.7°C (median = 39.5°C). Ninety-five percent of parents treated the fever prior to arrival. Most (177/209; 84.7%) used acetaminophen, some (20/209; 9.6%) used ibuprofen, and none used aspirin. Seventeen percent (36/209) used cold water baths or sponging, 29% (61/209) used tepid water baths or sponging, 5.3% (11/209) removed excess clothing, 4.3% (9/209) applied cool cloths, 1% (2/209) used alcohol rubs and 1% used other over-the-counter cold remedies. A third (64/197) had been to one physician, and 5.6% (11/197) had seen 2 or more physicians in the 48 hours preceding their ED visit. Fifty-five percent (114/207) of parents in the fever group, 45.9% (72/157) in the injury group and 34.5% (48/139) in the school group stated that they had previously brought their child to an ED because of a fever.

Table 1 shows that parents in all 3 groups had similar perceptions regarding the significance of different degrees of temperature elevation. Table 2 outlines what parents felt were potential consequences of fever. In addition to the concerns described in Table 2, 20 parents were worried about "missing an infection," 9 about "not knowing the cause of the fever," 3 about "organ damage" and 2 about sterilization. Table 3 summarizes the information sources that parents used to learn about fever.

Health care providers

All 16 pediatric emergency physicians, 39 (73.5%) of 53 pediatric emergency nurses, 26 (62.0%) of 42 general pediatricians and 79 (43.0%) of 185 family physicians returned the questionnaire. Table 1 shows that the health care provider groups had similar definitions of fever, high fever and treatable fever. Table 4 summarizes physician and nurse beliefs regarding the potential consequences of fever.

Two pediatricians (9.1%) and 1 ED nurse (4.5%) stated that they would treat any fever. Four (25.9%) ED physicians, 5 (22.7%) ED nurses, 3 (13.6%) pediatricians and 6 (9.1%) family physicians stated that they based treatment decisions on the clinical state of the child. Eight (50.0%) ED physicians, 21 (95.5%) ED nurses, 11 (42.3%) pediatricians, and 7 (10.6%) family physicians said they would treat the fever only if the child was experiencing discomfort. Table 5 summarizes health care provider recommendations for the treatment of fever. There were no significant differences between groups in the recommended frequency of checking the temperature, or in whether a specific route was encouraged.

Table 1. Perceptions of parent groups and health care provider groups regarding the significance of different degrees of temperature elevation

Questions from self-administered survey	Mean temperature value, °C (and standard deviation)							
	Parent group,* no. of respondents			Health care provider group,† no. of respondents				
	Fever n = 209	Injury n = 160	School n = 141	Emergency physician n = 16	ED nurse n = 39	Pediatrician n = 26	Family physician n = 79	
What temperature do you consider to be a "fever"?	37.9 (0.7)	37.8 (1.1)	37.9 (0.8)	37.9 (0.5)	38.2 (0.3)	38.3 (0.3)	38.0 (0.5)	
What do you consider to be a "high" fever?	39.2 (0.7)	39.1 (1.1)	39.1 (0.9)	39.9 (0.8)	39.9 (0.7)	39.6 (0.7)	39.2 (0.7)	
At what temperature do you treat a fever?	38.2 (0.7)	38.0 (1.1)	38.0 (0.7)	38.6 (0.3)	38.6 (0.3)	38.4 (0.5)	38.4 (0.5)	
At what temperature do you think a fever is dangerous?*	39.9 (0.8)	39.7 (1.1)	39.8 (0.9)	NA	NA	NA	NA	

ED = emergency department

*No differences between parent groups were statistically significant.

†No differences between health care provider groups were statistically significant.

*Health care providers were not asked the 4th question.

Table 2. Parental responses to the survey question: What do you worry about when your child has a fever?

Most common concerns indicated by parents†	No. (and %) of respondents from each group who selected a specific response*			
	Fever n = 209	Injury n = 160	School n = 141	p value
Discomfort of child	156 (74.6)	105 (65.6)	106 (75.2)	NS
Seizures	146 (69.9)	102 (63.8)	98 (69.5)	NS
Dehydration	168 (80.4)	124 (77.5)	94 (66.7)	0.01‡
Brain damage	111 (53.1)	74 (46.3)	55 (39.0)	0.03‡
Death	74 (35.4)	54 (33.8)	35 (24.8)	NS

* Parents were invited to report as many concerns as desired.

†Less common concerns are itemized in the text.

‡Fever group vs. school group

Table 3: Parental responses to the survey question: Where did you learn about fever?

Information source	No. (and %) of respondents from each group who selected a specific response*			
	Fever n = 209	Injury n = 160	School n = 141	p value
Physician	148 (70.8)	115 (71.9)	104 (73.8)	NS
Family	113 (54.1)	87 (54.4)	92 (65.2)	NS
Nurse	100 (47.8)	71 (44.3)	73 (51.8)	NS
Book or magazine	101 (48.3)	63 (39.4)	58 (41.1)	NS
Pamphlet	59 (28.2)	36 (22.5)	32 (22.6)	NS
Friends	54 (25.8)	41 (25.6)	30 (21.3)	NS
Advice line	51 (24.4)	22 (13.8)	21 (14.9)	0.02
Internet	11 (5.3)	3 (1.9)	3 (2.1)	NS
Television	30 (14.3)	17 (10.6)	7 (5.0)	NS

* number totals to more than N for each group because parents gave multiple answers.

Discussion

In this study, we found that most parents believed that fever may cause seizures, dehydration and brain damage, that parents of febrile children were significantly more concerned about the possibility of dehydration and brain damage (than parents of otherwise well school children), and that many parents believe fevers in the range of 39.7°C or higher are dangerous. A similar majority of physicians (all types) were concerned about dehydration and seizures, and ED nurses were significantly less concerned about seizures. A surprisingly high proportion of family physicians expressed concerns about brain damage (40.5%) and death (34.1%), and family physicians were more likely than surveyed parents to express concerns about all of the potential complications (dehydration, seizures, brain damage and death).

Like Kramer and colleagues,¹³ we found that parents of febrile children tended to be more worried about adverse effects of fever than parents of otherwise well children.

This may be in part because parents of febrile children are younger and have younger children, but we found no other potentially explanatory sociodemographic differences. Knowledge was otherwise comparable between the 3 groups: all had similar definitions of fever, high fever and dangerous fever and all had similar treatment thresholds for fever.

Treatment decisions

More health care providers than in a previous study¹¹ indicated that they consider the child's clinical state and comfort level when making treatment decisions; however, parents did not indicate that clinical factors influence their decision to treat. This supports previous studies showing that most parents treat fevers aggressively regardless of the clinical state of the child.^{1,5-8,13,14} In addition, many parents stated that they woke their child at night to check the temperature — also consistent with previous findings.^{1,13}

In this study, like others,¹⁵ parents more often treated their child's fever with medicine than with comfort mea-

Table 4. Health care providers' responses to the survey question: What are the potential effects of fever?

Response	No. (and %) of respondents from each group who selected a specific response				
	Emergency physician n = 16	ED nurse n = 39	Pediatrician n = 26	Family physician n = 79	p value
Discomfort of child	16 (100)	38 (97.4)	24 (92.3)	79 (100)	NS
Seizures	13 (81.0)	24 (61.5)	24 (92.3)	73 (92.4)	0.001*
Dehydration	10 (62.5)	27 (69.2)	20 (76.9)	68 (86.1)	NS
Brain damage	2 (12.5)	2 (5.1)	5 (19.2)	32 (40.5)	0.03†
Death	1 (6.2)	2 (5.1)	2 (7.7)	27 (34.2)	0.003†

*ED nurses vs. 3 physician groups; †Family physician group vs. other 3 groups

Table 5. Health care providers' recommendations for treatment of fever

Recommendation	No. (and %) of respondents			
	Emergency physician n = 16	ED nurse n = 39	Pediatrician n = 26	Family physician n = 79
Acetaminophen	16 (100)	38 (97.4)	26 (100)	79 (100)
Ibuprofen	16 (100)	32 (82.1)	20 (76.9)	55 (69.6)
Aspirin	0 (0)	0 (0)	1 (3.8)	6 (7.6)
Cold water baths or sponging	0 (0)	0 (0)	1 (3.8)	6 (7.6)
Tepid water baths or sponging	7 (43.7)	14 (35.9)	12 (46.2)	61 (77.2)
Remove clothing; provide fluids*	6 (37.5)	19 (48.7)	4 (15.4)	15 (19.0)

*Comfort measures

sures alone, and acetaminophen was the medication of choice for both physicians and parents. Although doctors and nurses often recommended ibuprofen, parents seldom used it, probably because it has only recently been approved for use in Canada (i.e., October 1997 for ages 2–12 years and July 2000 for ages 3–24 months).

Despite the fact that sponging may increase discomfort and does not reliably reduce fever, many physicians, particularly family physicians,¹⁶ still recommend tepid water baths or sponging, and one-third of parents in this study reported still using these modalities. It is reassuring that no parent in the study admitted to using aspirin, but it is concerning that there are physicians who still recommend its use despite the association with Reye's syndrome.

Information sources

A recent study concluded that health care providers are in a unique position to educate parents with regard to fever,¹⁷ and our data suggest that physicians, family members and nurses are the most common source of information about fever. Our data also suggest that books and magazines are increasingly important information sources. We were surprised that relatively few parents reported using the Internet as an information source; however, we noted that its use more than doubled in the group with younger parents and children. This suggests that the Internet may be a growing source of health information or that parents are more likely to use it when their child is acutely ill (since more acutely ill children were younger). We have noted a similar trend in the use of the ACH advice line, which has been heavily advertised as a resource for parents in the last few years. Hopefully, information sources like this will enable parents to avoid unnecessary ED visits in the future.

Education and utilization

Given the apparent concern of health care providers for fever, it is not surprising that all provider groups recommended checking the temperature regularly and that some even recommended waking children to check for fever. In this context it is also understandable that most parents worried about major complications and were quick to seek medical attention for their febrile children. The fact that one-third of patients had seen a physician during the 48 hours prior to presentation to the ED, despite relatively short fever duration, suggests that failure of education at the initial visit, concern about the cause of the ongoing fever, or parents' fear of fever itself may lead to over-utilization of health care resources. Our data suggest that health care providers require education in order to dispel their own misconceptions about fever, that parents would

benefit from better fever awareness, and that closer scrutiny of information presented in lay publications is warranted.

Limitations

One of the limitations of this study is the difficulty in distinguishing "fever phobia" related to fear of the cause of the fever vs. fear of the fever itself. We feel that this distinction was made clear to the health care providers, but it is possible that uncertainty may have affected some parental responses. We are also concerned about the external validity of our findings relating to emergency physician perceptions. Although the emergency physicians surveyed have a variety of training backgrounds, all work in a tertiary care pediatric centre, and their experience, knowledge base and perspective may differ from physicians working in a general ED.

Conclusions

Childhood fever continues to inspire fear in both parents and health care providers, and "fever phobia" is more pronounced in parents of febrile children. Health care providers are a primary information source and may transmit mixed messages that increase parental anxiety and trigger avoidable health care utilization. Physicians and nurses must be trained to give parents correct and consistent information in order to counteract "fever phobia."

Competing interests: None declared.

Contributors: All of the authors participated in the concept, design, analysis and interpretation of data. Dr Karwowska was primarily responsible for drafting the manuscript, but all authors participated in revisions and have all approved the manuscript submitted.

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