

Unrealistic Concerns about Fever in Children: The Influence of Cultural-Ethnic and Sociodemographic Factors

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Abstract

Background: Parental fear and misconceptions about fever are widespread in western society. Ethnicity and sociodemographic factors have been suggested as contributing factors.

Objectives: To test the hypothesis that undue parental concern about fever is less in traditional than in western cultural-ethnic groups.

Methods: Bedouin (traditional society) and Jewish (western society) parents of children aged 0–5 years with fever were interviewed in a pediatric emergency unit. Interviews were conducted in the parents' most fluent language (Arabic or Hebrew). A quantitative variable (a 9 item "fever phobia" scale) was constructed.

Results: The parents of 101 Jewish and 100 Bedouin children were interviewed. More Bedouin parents were unemployed, had less formal education and had more and younger children than the Jewish parents. Parents in both groups expressed erroneous beliefs and practices about fever; quantitative but not qualitative differences in fever phobia variables were documented. Compared with their Jewish counterparts, more Bedouin parents believed that fever may cause brain damage and death, administered antipyretic medications for temperature $\leq 38^{\circ}\text{C}$ and at excessive doses, and consulted a physician within 24 hours even when the child had no signs of illness other than fever (all P values < 0.001). The mean fever phobia score was higher in the Bedouin than in the Jewish group ($P < 0.001$). By multivariate analysis, only the cultural-ethnic origin correlated with fever phobia.

Conclusions: A higher degree of fever phobia was found among parents belonging to the traditional Bedouin group as compared to western society parents.

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Ethnicity, culture and socioeconomic factors may influence parental attitudes and practices regarding health and illnesses. The limited data available with regard to fever in children of sociodemographically diverse populations point to differences in parental beliefs and practices [1-4]. The erroneous belief that fever in children may cause damage such as brain injury and death is fairly recent [5]. According to Akerren [5], in ancient times fever was considered an important body defense whose purpose was to "drive the phlegm out of the body." In the 16th and 17th centuries the concept prevailed that fever was a bodily reaction to help the organism to separate and expel the noxious substances and to signal the presence of an invading foreign body [6]. Numerous views were held throughout history, and di-

verse practices were applied to treat the febrile patient (laxatives, friction, bloodletting, induced vomiting, sweating, among others) [6]. The unrealistic fear of fever (or "fever phobia") has been attributed to misinterpretation of 19th century studies showing that an increase of 5–6 degrees Celsius in body temperature in experimental animals may cause death [4].

How parents in non-industrialized societies relate to fever today has not been investigated. Ancient beliefs are likely to predominate in traditional societies, therefore we hypothesized that traditional cultural-ethnic groups exhibit a much lesser extent of fever phobia. Consequently, this study compared parental beliefs and practices regarding fever in two markedly different cultural-ethnic populations, particularly with regard to fever phobia. The populations studied were westernized Jews and the traditional Bedouin, who live side by side in the same geographic region in the Negev (southern Israel). Traditionally desert nomads living in tent encampments in family or tribal groups, the Bedouin are presently in the process of settling in towns and villages. As a result of their isolated existence they have maintained their customs and traditions.

Patients and Methods

This was a cross-sectional study carried out in winter and spring months (February to May) in 2002. Our findings constitute part of a survey that is also investigating the parental use of antipyretic medications in febrile children.

Study population

The population studied consisted of parents (or usual caregivers) of children up to 5 years old, Jews and Bedouins, living in the Negev district in Israel, who visited the Pediatric Emergency Unit of the Soroka University Medical Center because of a febrile illness. This is the only hospital pediatric emergency unit in the district. Since 98% of the children were accompanied by their parents, we refer to all caregivers as parents. The reason we included only caregivers of children with fever was to obtain information on what they actually did in the course of the child's illness rather than to test their knowledge on how to deal with fever in children. Parents of children with liver disease or with allergy to one of the antipyretic medications were excluded. Parents gave their consent prior to the interview.

Data collection

We used a 50 item questionnaire containing personal and demographic data, definition of fever, concerns about the dangers of fever, and the mode of treatment. Questions were open ended; a range of possible answers was offered only when an issue was not clearly understood. The questionnaire was translated by physicians familiar with both cultures and fluent in both languages, from Hebrew into Arabic, and back-translated into Hebrew to assure that both versions were identical. The questionnaire was administered by one of the investigators (H.T.) and a trained interviewer in the parent's most fluent language: Hebrew for Jewish and Arabic for Bedouin parents. A convenient sample of parents was chosen. Interviews were conducted on different days of the week and at different times of the day. Twenty pilot interviews for questionnaire testing were carried out prior to initiating the formal study. The study was approved by the institutional Ethics Committee for Human Investigations.

"Fever phobia" scale

For the purpose of comparing unrealistic concerns about fever between the two cultural-ethnic groups, a new quantitative variable was constructed. A 9 item "fever phobia" scale was designed due to the misconceptions about fever in children as described by Schmitt [1]: fear of brain damage or death as a result of fever, administration of antipyretic medications for temperature $\leq 38^{\circ}\text{C}$, sponging for temperature $\leq 39^{\circ}\text{C}$, administration of antipyretics without measuring temperature, administration of antipyretics at higher than recommended doses or administration at shorter than recommended intervals, waking the child from sleep for administering antipyretics, consultation with a physician within 24 hours even when the child had no signs of disease other than fever, and too-frequent measuring of body temperature. Each component contributed one point to the score.

Statistical analysis

Data were analyzed with the use of the Statistical Package for Social Sciences (SPSS Version 11 for Windows; SPSS, Inc, Chicago, IL, USA). The association between continuous variables was examined by Student's *t*-test. For comparison of categorical variables the chi-square test (or Fisher's exact test when appropriate) was performed. Odds ratios and their 95% confidence intervals were calculated. Multivariate logistic regression models were used to examine the adjusted association between ethnicity and fever phobia. All *P* values were two-sided. The statistical significance level of 0.05 was accepted.

Results

Parents of 201 children were interviewed: 101 Jews and 100 Bedouin. Most of them (81% Jews, 93% Bedouins) arrived at the emergency unit with a referral letter from their personal physicians. Parents of only two children refused to participate.

Sociodemographic data

As expected, considerable sociodemographic differences were documented. Over one-third of Bedouin families were living in

tents or huts in non-urbanized encampments. Other sociodemographic characteristics by cultural-ethnic groups are presented in Table 1. Bedouin parents were somewhat younger, had less formal education, and had more and younger children than their Jewish counterparts; among Bedouins, only 62% of fathers and 10% of mothers worked for a living.

Measurement and treatment of fever

Four percent of the Jewish and 10% of the Bedouin parents did not use a thermometer to assess their children's temperature. The vast majority of parents treated fever with antipyretics (acetaminophen and/or ibuprofen) and with tepid water sponging. Only 13% of Jewish and 18% of Bedouin parents did not use sponging, and only one Jewish and two Bedouin children were not given antipyretic medications. In addition to sponging and giving antipyretic medications and water to drink, 17% of Jewish parents and 19% of Bedouin parents used unconventional measures such as various plant infusions, sponged the feet or the whole body with alcohol or vinegar, or overdressed the child.

Degree of concern

The parents of both cultural ethnic groups reported numerous erroneous beliefs and practices regarding fever [Table 2].

Table 1. Sociodemographic data of the study population by cultural-ethnic origin

| | Jews (n=101) | Bedouins (n=100) | <i>P</i> |
|-------------------------------|-----------------|---------------------|----------|
| Mother's age (yrs) | 30.7 \pm 6.2 | 27.7 \pm 5.6 | < 0.001 |
| Father's age (yrs) | 34.1 \pm 6.2 | 31.9 \pm 7.3 | 0.028 |
| Maternal schooling (yrs) | 12.8 \pm 2.9 | 7 \pm 4.6 | < 0.000 |
| Paternal schooling (yrs) | 13.1 \pm 3.5 | 9.2 \pm 4.2 | < 0.001 |
| Child's age (mos) | 23.8 \pm 18.3 | 17.6 \pm 15.1 | < 0.01 |
| No. of children in the family | 2.8 \pm 2 | 4.4 \pm 2.6 | < 0.001 |
| Child order in the family | 2.7 \pm 2 | 4.1 \pm 2.7 | < 0.001 |
| Mothers working for income | 63 (62.4) | 10 (10.0) | < 0.001 |
| Fathers working for income | 87 (86.1) | 62 (62.0) | < 0.001 |
| Child's gender (male) | 54 (53.5) | 67 (67.0) | 0.069 |

Data are presented as mean \pm standard deviation or as numbers (percent)

Table 2. Fever phobia components in the two cultural-ethnic groups

| | Jews (n= 101) | Bedouins (n= 100) | <i>P</i> |
|---|------------------|----------------------|----------|
| Fear of brain damage or death as result of fever | 33 (32.7) | 82 (82.0) | < 0.001 |
| Gives medication for temperature $\leq 38^{\circ}\text{C}$ | 63 (62.4) | 84 (84.0) | < 0.001 |
| Sponges for temperature $\leq 39^{\circ}\text{C}$ | 71 (70.3) | 73 (73.0) | NS |
| Gives medication without measuring temperature | 24 (23.8) | 36 (36.0) | NS |
| Gives medication at intervals ≤ 3 hrs | 17 (16.8) | 25 (25.0) | NS |
| Gives medication at dose $\leq 110\%$ of maximal recommended dose | 22 (21.8) | 48 (48.0) | < 0.001 |
| Wakes the child to give medication | 70 (69.3) | 80 (80.0) | NS |
| Consults physician < 24 hrs of fever | 51 (50.5) | 86 (86.0) | < 0.001 |
| Measures temperature too frequently | 46 (45.5) | 55 (55.0) | NS |

Data are presented as absolute numbers (percent)

Quantitative, but not qualitative differences were documented between the two groups with regard to the harmful effect of fever, the lowest temperature at which fever may cause harm, how soon they treat a febrile child and take him/her to a physician, how often they monitor temperature during a febrile illness, the lowest temperature at which they give antipyretic medications and sponge the child, use of antipyretics without measuring temperature, administration of antipyretics at too frequent and/or too large doses, and waking the febrile child to give antipyretics. Bedouin parents scored higher in each one of the fever phobia items. More Bedouin than Jewish parents believed that fever may cause brain damage or death, and more Jewish than Bedouin parents were aware that fever may cause seizures ($P < 0.001$). Similar rates of seizures in the child (Bedouin 16%, Jewish 14%, not significant) and in siblings (Bedouin 13%, Jewish 8%, not significant) were reported by parents in the two cultural-ethnic groups. More Bedouin parents administered medications for temperature $\leq 38^{\circ}\text{C}$, and at $\geq 110\%$ of the maximal recommended dose and turned to a physician within 24 hours even when the child had no symptoms other than fever (all $P < 0.001$) [Table 2].

Most parents (62%) reported five or more "fever phobia" items. Frequency of fever phobia items inversely correlated with parental schooling ($P < 0.001$), and directly correlated with the number of children in the family ($P = 0.007$) and with the child order in the family ($P = 0.01$). The mean fever phobia score was higher in the Bedouin (5.6 ± 1.4 , mean \pm SD) than in the Jewish group (4.2 ± 1.6 , mean \pm SD); this difference was statistically significant ($P < 0.001$). The Bedouin group had a higher score in each one of the nine fever phobia items. By univariate analysis, the frequency of "fever phobia" items was related to cultural-ethnic origin and to paid employment (both $P < 0.001$). By separate analysis of both cultural-ethnic groups, no independent relationship was found between sociodemographic status and fever phobia. Multivariate analysis showed that only cultural-ethnic origin correlated with fever phobia items ($P < 0.001$) [Table 3].

Discussion

In a separate communication [7] we reported that more Bedouin than Jewish caregivers exposed their children to higher than recommended antipyretic doses (48.0 vs. 21.8%, $P < 0.001$). Multivariate analysis indicated that lighter body weight and the use of acetaminophen suppositories were associated with the administration of excessive acetaminophen doses [7].

Using a new quantitative variable, the 9 item "fever phobia scale," we now show that the family cultural-ethnic background independently influenced parental misconceptions and practices regarding fever in children. Differences in attitudes and practices have been attributed both to race (black vs. white) and to socioeconomic factors. In this regard, Crocetti et al. [2] reported differences between American black and white caregivers. In a controlled study of Afro-American and Latino parents, Taveras and colleagues [3] reported that socioeconomic as well as ethnic factors affected misconceptions and practices about fever. Kramer et al. [4] found that parents of higher socioeconomic status

Table 3. Multivariate analysis for prediction of fever phobia by sociodemographic variables

| | Beta-coefficient | 95% confidence interval | P |
|---------------------------|------------------|-------------------------|---------|
| Bedouins vs. Jews | -0.99 | -1.54; -0.45 | < 0.001 |
| No. of children in family | 0.0003 | -0.43; 0.44 | 0.99 |
| Child order in family | -0.002 | 0.44 ;0.4 | 0.92 |
| Mother's schooling | -0.004 | -0.11; 0.02 | 0.16 |
| Father's schooling | -0.0005 | -0.07; 0.06 | 0.87 |
| Mother working for income | 0.28 | -0.26 ;0.82 | 0.31 |

$r^2 = 0.19$ (19% of fever phobia variance may be explained by this model)

Criteria for inclusion in the multivariate analysis were statistical significant association with fever phobia by univariate analysis.

were more concerned about brain damage and seizures resulting from fever than parents of lower socioeconomic status, while in the Taveras study [3] parental lower education and uninsured children were associated with erroneous practices. In the present investigation, no independent relationship was found between socioeconomic status and fever phobia. However, this relationship could not be ruled out: due to reticence of parents to report on family income and size of their house, socioeconomic status was evaluated only according to the number of children in the family, maternal and parental education, and working for income. The effect of health care providers' potential misconceptions regarding fever in children on parental attitudes and practice [2] was not investigated in this study.

Contrary to our intuitive hypothesis, we found that the traditional Bedouin society had a higher degree of fever phobia than the westernized Jewish population. This was an unexpected finding because of our assumption that ancient-time attitudes and beliefs would prevail in the traditional Bedouin society. The explanation for this is not readily apparent. The sudden exposure of Bedouin society in the Negev to the industrialized world over the last 50 years and to a modern, available and accessible health care system may have promoted marked changes in traditional health values and practices, including those related to fever in a child. Since the establishment of the State of Israel, Bedouin society in the Negev has been undergoing a process of transition to a settled semi-urban lifestyle; a considerably large percent of this group live today in permanent settlements and towns that offer social and health services [8]. Although complete equality in the provision of health services to the various sectors of the population has not yet been reached, the Israel National Health Insurance Law mandates the State to provide health services for all residents of the country, based on a national basket of basic services for all [9]. For instance, the immunization coverage of Bedouin children up to one year of age in the Negev in the year 2004 for diphtheria/tetanus/pertussis, inactivated polio virus, measles/mumps/rubella, and hepatitis B virus was between 85 and 91% (as compared with 94–97% for Jewish infants) [10]. The reason for the excessive misconceptions about fever in the Bedouin society could be attributed to a greater morbidity and

mortality often associated with febrile illnesses [11], and also to less accessibility to medical care. Moreover, they may be less exposed to the relevant information disclosed by the media.

It has been emphasized that when dealing with ethnically diverse populations, health care providers must not only translate instructions from doctors to patients whenever necessary, but must also consider the patient's culture and perspective [12]. The American Academy of Pediatrics recommends that high priority be given to develop effective education programs on fever and its management in a range of ethnic languages [13].

The high degree of fever phobia found in this study is consistent with a previous report involving a different Israeli population [14], according to which parents commonly treat temperatures of only 38°C and give overdoses of antipyretic medicines to their children.

Potential limitations

Some limitations of this study should be noted. In any research care must be applied regarding the influence of socioeconomic factors on health issues, as residual confounding can be a problem [15]. However, in this study nine indicators of sociodemographic status were used to minimize the possibility of residual confounding. In the present study interviews were carried out in a pediatric emergency unit. This may have represented a selected sample of over-anxious parents with a greater degree of fever phobia, as compared to those who attend local primary clinics, and thus, results may be less generalizable. On the other hand, parents interviewed in this study represented a cross-section of the ethnic and sociodemographic population of the district. More Bedouin than Jewish parents may have preferred to take their children directly to the pediatric emergency unit; however, more Bedouin (93%) than Jewish parents (81%) who were interviewed arrived at the unit with a referral letter from the personal physician ($P = 0.008$). It would have been of interest to stratify data to examine discrepancies among Jewish subgroups of various backgrounds (Ethiopian, Russian, North African, Israeli born, etc), but the sample size of the Jewish group was not sufficiently large as this was not an objective of this study. Finally, the data obtained in this study were obtained by parental interviews and not by direct observation; it is possible that some parents were motivated to answer what they believed was expected from them rather than accurately reporting what they do in practice.

In summary, this study supports the notion that the cultural-ethnic background of the family is an independent factor that influences parental excessive fear of fever. Using a novel "fever phobia scale," a higher degree of fever phobia was found in parents of a cultural-ethnic group whose lifestyle is in transition from nomadic to sedentary, as compared to western society parents. Health education programs suited to the beliefs and practices prevalent in the specific cultural-ethnic group are likely

to reduce parental anxiety and the misuse of measures when treating a febrile child. With the support of a governmental agency we are presently investigating the value of a fever educational program in the two cultural-ethnic groups discussed here.

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