

Parents' knowledge, attitudes, and practice in childhood fever:

an internet-based survey

Abstract

Background

Fever in children is common and mostly caused by self-limiting infections. However, the number of (re)consultations in primary care is high, driven by lack of knowledge and fear among parents. These drivers have only been studied in parents when consulting with their sick child.

Aim

To study knowledge, attitudes, and practice in childhood fever in parents within the general population.

Design and setting

Internet-based survey of a sample of 1000 parents from the general population of the Netherlands.

Method

A 26-item cross-sectional survey was conducted of parents with one or more children aged <5 years.

Results

Of 625 responders (average age 34.9 years), 63.4% and 43.7% indicated ever visiting their GP or GP's out-of-hours centre with a febrile child, respectively. 88.3% knew the definition of fever (>38°C), 55.2% correctly stated that antibiotics are effective in treating bacterial infections and not viral infections, and 72.0% knew that not every child with a fever needs treatment with antibiotics or paracetamol. When asked to prioritise aspects of a GP's consultation, 53.6% considered physical examination as most important. Obtaining a prescription for antibiotics or antipyretics was considered least important.

Conclusion

Knowledge, attitudes, and practices concerning childhood fever varied among parents with young children. Parents generally expect thorough physical examination and information, but not a prescription for medication (antibiotics or antipyretics) when consulting with a febrile child. GPs must be aware of these expectations as these provide opportunities to enhance consultations in general and prescription strategies in particular.

Keywords

antipyretics; child; fever; general practice; infection; parents.

INTRODUCTION

Fever in children is a common reason to consult in primary care.^{1,2} Most children are diagnosed with self-limiting infections and do not need short-term treatment. However, reconsultation within the same illness episode is common, especially when fever persists.³ Known factors contributing to these (re)consultations are lack of knowledge among parents, anxiety about fever, and experience of inconsistencies in the approach of different healthcare professionals.⁴ This may lead to parental uncertainty, frustration, dissatisfaction with care, and incorrect assumptions about fever in children. Moreover, these factors in combination with a high consultation and reconsultation rate increase healthcare costs and drive unnecessary antibiotic use.^{5,6}

Since the introduction of the term 'fever phobia' 30 years ago,⁵ there have been few studies on changes in parental knowledge and fears, while the availability of information about fever has increased rapidly through use of the internet. The small number of studies that have been conducted were almost exclusively performed in secondary care, and parents were always questioned when children were acutely ill. However, parental knowledge and fear may be strongly influenced by the stressful situation when their child is unwell. Nonetheless, decisions on medication and healthcare-seeking behaviour in acute illness are shaped by public beliefs and knowledge. It is therefore

important to understand why and when parents actually consult with their feverish child, what self-management activities they practice, and which information gaps they experience, to better target information at parents both within the consultation as well as outside acute care.

This study aimed at determining public parental knowledge, attitudes, and practices in fever in young children in a nationwide online survey among parents with young children in the general population.

METHOD

A cross-sectional internet-based survey was conducted among a randomly selected sample from a community-based nationwide internet panel of 16 000 individuals (Flycatcher Internet Research BV, Maastricht, the Netherlands) during a 2-week period in December 2012. Six-hundred responders were considered an adequate sample target to ensure generalisability of answers. A response rate of 60% was expected, therefore 1000 eligible adult responders (≥16 years and all parents) were invited to participate in this study. As consultation for fever in children is highest in the young age groups,² and to ensure an equal distribution of parity, the sample was divided into two groups of parents: parents with one child (≤5 years); and parents with more children, with the youngest being <5 years of age. It was hypothesised that parents with more children would express

EGPM de Bont, MD, GP trainee and PhD student; **G-J Dinant**, MD, PhD, professor of general practice; **JWL Cals**, MD, PhD, GP and assistant professor, Department of General Practice, CAPHRI School for Public Health and Primary Care, Maastricht University, Maastricht, the Netherlands. **NA Francis**, MD, PhD, GP and senior research fellow, Department of Primary Care and Public Health, School of Medicine, Cardiff University, Cardiff, UK.

Address for correspondence

Eefje GPM de Bont, Maastricht University,

Department of General Practice, PO Box 616, 6200 MD Maastricht, The Netherlands.

E-mail: eefje.debont@maastrichtuniversity.nl

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How this fits in

Consultations for fever in children in general practice are common. Knowledge and expectations of parents in the general public influence decisions on medication use and healthcare-seeking behaviour. Knowledge, attitudes, and practices concerning childhood fever vary among parents. This study found that when parents consult with a feverish child they generally expect a thorough physical examination and information on what to expect, but not a prescription for (antibiotic) medication.

different attitudes and practices based on more experience. The sample that was taken was stratified for sex, age, education level, and province to ensure that the sample was an accurate representation of parents with children <5 years of age from the Dutch population. Flycatcher is an International Organisation for Standardisation (ISO) certified, independent research organisation working according to good clinical practice guidelines, and provides the opportunity to recruit a nationwide sample. Responders receive small rewards for completing surveys, which can be redeemed for vouchers of choice.

The questionnaire was developed by retrieving and defining important domains from literature and by seeking advice from medical experts. Questions to tap these domains were derived from previous international qualitative and quantitative scientific publications and further expert

opinion. A pilot among parents was performed to check for face validity, and the wording of some items were modified in the light of this experience. Twenty-six questions with sub-items were included in the final instrument. Response options, including yes/no, agree/disagree, and Likert-type scale response items were used as appropriate for each question. The internet-based questionnaire software required responders to answer a question with sub-items before continuing to the next question. There were questions about chronic diseases such as congenital heart and/or lung disease, Down's syndrome, or other conditions that may cause the child to get sick more often or more seriously than other children. Experiences with severe illnesses in children were queried as it is believed that these events could alter attitudes and practices. A severe illness was defined as an illness requiring hospitalisation.

Responders' answers were automatically entered into a data file and were analysed using SPSS (version 19.0). Analysis was based on frequencies and cross tables of pre-selected variables. χ^2 tests were performed to identify independent associations. Predefined dependent variables that were considered relevant were 'accurate knowledge of antibiotic effectiveness' (antibiotics are effective against bacteria but not viruses), 'accurate knowledge of the definition of fever' (body temperature higher than 38°C based on consensus in international guidelines and literature),^{7,8} and 'knowledge on fever treatment' (not every child with a fever needs to be treated with antibiotics or paracetamol). Variables with $P \leq 0.05$ were selected for inclusion in a multivariate logistic regression model to check for independence of associations. Odds ratios (ORs) with corresponding 95% confidence intervals (CIs) were calculated. All data were coded and treated according to the Good Clinical Practice guidelines⁹.

RESULTS

Participants' characteristics

Of the 1000 parents who were invited to participate, eight individuals could not be contacted because of incorrect or unavailable e-mail addresses. Of the 992 eligible responders, 625 fully completed the online questionnaire (response rate of 63%). Response was equally distributed among sex and the predefined parity groups. Parents had a mean age of 34.9 years (SD 5.5, range 19–55 years). Other characteristics are described in Table 1. Non-responders had

Table 1. Characteristics of responders (n = 625)

Characteristic	% (n)
Mean age, years (SD)	34.9 (5.5)
Male	42.9 (268)
Parity	
• 1 child	51.0 (319)
• >1 child	49.0 (306)
Education level	
• low	9.9 (62)
• middle	42.2 (264)
• high	47.8 (299)
Child with underlying (chronic) condition	4.6 (29)
Severe illness of child in medical history	13.0 (81)
Severe illness of child in direct proximity	23.2 (145)
Ever visited GP with child with fever	63.4 (396)
Ever visited GP out-of-hours service with child with fever	43.7 (273)

Table 2. Responders' knowledge and beliefs on fever, and medication in fever and infections

Statement	Agree, % (n)	Don't know, % (n)
Fever is a temperature >38°C	88.3 (552)	NA
Every child with a fever has an infection	52.6 (329)	8.6 (116)
Antibiotics are effective in treating:		
• bacterial but not viral infections	55.2 (345)	9.9 (62)
• infections caused by bacteria	74.7 (467)	12.5 (78)
• infections caused by viruses	30.4 (190)	12.3 (77)
Every child with a fever needs medication (PCM and/or AB)	28.0 (175)	3.2 (20)
Every child with a fever needs paracetamol	26.9 (168)	11.7 (73)
Every child with a fever needs antibiotics	6.4 (40)	5.3 (33)

AB = antibiotics. NA = not applicable. PCM = paracetamol.

comparable demographic characteristics. Most parents (63.4%) reported ever visiting a GP with their feverish child, and 43.7% indicated having visited a GP out-of-hours clinic with their child because of a fever at some point.

Knowledge

Most parents (88.3%) knew the correct definition of fever (temperature >38°C). Just over one-half of the participants (55.2%) correctly stated that antibiotics are effective in treating bacterial infections and not viral infections (Table 2). Furthermore, 72% indicated that not every child with a fever needs to be treated with either antibiotics or paracetamol. These findings were independent of sex, age, or having more than one child (all $P > 0.05$). However, higher educational level was a predictor for better knowledge on antibiotic effectiveness (high versus low OR 3.00, 95% CI = 1.69 to 5.29, and intermediate versus low OR 1.96, 95% CI = 1.11 to 3.48). High education level was also a predictor for better knowledge on fever treatment compared with low education level (OR 3.01, 95% CI = 1.69 to 5.35). Multivariate analyses were not conducted as level of education was the only eligible variable from univariate analysis.

Attitudes and concerns

Most parents (81.1%) acknowledged that they believed fever to cause discomfort for their children. Around one in five (18.4%) stated that they worried about health consequences of fever in general, and more than one in three indicated that they were afraid fever might cause dehydration (34.9%) or febrile convulsions (36.8%). Only 13.3% of parents were concerned that fever could cause brain damage. No significant difference was observed in attitudes and

concerns between parents with one or more children. However, parents who indicated that their child ever experienced a serious illness were more concerned about the possibility of febrile convulsions (OR 1.72, 95% CI = 1.07 to 2.75). This was also the case for parents who ever saw a child with a serious illness in close proximity necessitating hospital admission (OR 2.25, 95% CI = 1.54 to 3.28).

Practice and experience

Most parents (76.6%) normally use rectal thermometers. Ear thermometers (17.4%) and axillary (1.4%) or oral (1.1%) measurement techniques were less commonly used. Most parents (64.2%) believed that feeling the forehead or skin can indicate whether their child has fever or not. If unwell, most parents (71.5%) measure their child's temperature two or three times a day.

Nearly all parents (91.4%) indicated that they commonly treat their feverish child with antipyretics like paracetamol. Only 2.8% of parents indicated doing so at a temperature lower than 38°C, and 86.9% would use antipyretics without consulting a doctor first. Table 3 shows that antipyretic use for fever differed substantially depending on concomitant symptoms.

The most frequently mentioned symptom combination urging a GP consultation was a fever for more than 3 days (81.3%). Only 2.7% of the parents answered that they visit their GP with their child most often or always for a fever in general (Table 3).

Parents' expectations and information-seeking behaviour

The elements of a consultation for childhood fever that parents value most (from a list of eight aspects presented to them) are

Table 3. Intention to give paracetamol and/or visit a GP in specific symptom combinations

Specific situations	Intention to give paracetamol, % (n)	Intention to visit GP, % (n)
Fever in general	20.2 (126)	2.7 (17)
Fever and less fluid intake	27.2 (170)	15.5 (97)
Fever and drowsiness	34.2 (214)	40.6 (254)
Fever and a skin rash	23.4 (146)	39.2 (245)
Fever and unstoppable crying	46.9 (293)	34.6 (216)
Fever and in pain	61.8 (386)	45.4 (284)

shown in Table 4. The most important aspect, prioritised by 53.6%, was a physical examination. Obtaining a prescription for medication like antibiotics or paracetamol was considered least important, with percentages of 1.6% and 0.3%, respectively.

Almost 90% (89.1%) of the parents indicated that they had ever received information about fever in children, mostly through the internet (63.4%) and their GP (51.8%) followed by the maternity centre (29.1%). Most parents prefer to receive information from a GP (67.5%) when their child is ill, whereas they prefer information from the internet in general (57.1%). Many parents (92.3%) share experiences about their sick child with family (84.0%) and friends (37.0%).

DISCUSSION

Summary

This study allowed more insight into parental knowledge, attitudes, and practices in children with fever before children actually become unwell and parents consult. Knowledge on the definition of fever and the indications for antibiotic and antipyretic treatment varied widely among an internet-based sample of parents with young

children. Most parents visited their own GP or a GP out-of-hours clinic with their child during a past episode of fever, and 91.4% indicated they commonly treat their child with antipyretics. More than one-half of the parents (53.6%) prioritised a thorough physical examination as the most important aspect of a GP consultation, whereas obtaining a prescription for medication like antibiotics or paracetamol was considered least important.

Strengths and limitations

The strengths of this study are the large sample size and high response rate. A limitation of any survey is the potential for recall and response bias. The internet-based questionnaire may have introduced selection bias, as only internet users were able to participate in the study. However, it is likely that the percentage of internet users among the target population (parents with young children) is high. Comparing the levels of education of the study sample with the Dutch and UK general population shows that the percentage of people with a lower level of education is somewhat lower in the study sample (9.9%) compared with general population levels (UK 15.3%,

Table 4. Priority list of specific components of a GP consultation according to parents

Importance	Specific component of consultation	Prioritised as most important, %
Most important	Physical examination	53.6
	Information about the cause of the fever	16.8
	Reassurance	11.0
	Advice on alarm symptoms	8.6
	Information about self-management	6.4
	Information about the duration of illness	1.6
	Obtaining medication (antibiotics)	1.6
Least important	Obtaining medication (paracetamol)	0.3

Netherlands 17.1%), and the percentage of people having a higher educational level is somewhat higher in the present study sample (47.8%) compared with the Dutch population (42.3%), but corresponds well with the UK population (47.1%).¹⁰

The slight underrepresentation of lower-educated people is something that was expected to an extent considering that an internet panel was used. However, this may have contributed to the relatively high level of knowledge and is something to take into account when interpreting the results. Furthermore, parents were not asked about antipyretics other than paracetamol, as Dutch parents are advised not to give ibuprofen or other non-steroidal anti-inflammatory drugs to their children. This is also recommended in the guidelines of the Dutch College of GPs and advised at pharmacies and drugstores, as paracetamol and ibuprofen have a comparable effect on reducing body temperature in children⁸ and the risk of adverse events or dosage miscalculations is considered to be too great to advise the use of ibuprofen or other antipyretics in children.¹¹

An unexpected 23% of parents indicated that their child was ever seriously ill because of a fever-related illness. A recent study at Dutch GP-out-of-hours services showed that only 3.2% of children develop a severe illness caused by a fever-related illness and only 3.8% got admitted at initial presentation.¹² Some parents may have perceived more minor illnesses, such as a child that was examined in hospital but considered a minor illness, as being serious. However, it is parents' self-reported perception of serious previous illnesses which is captured in this survey, and it is believed that it is these perceptions that will shape anxiety and future help-seeking behaviour, and are therefore relevant to measure in this study.

Consultation behaviour and self-management will be shaped by general beliefs parents have. It is believed that these beliefs have been captured, which is a specific strength of the study. In the non-clinical setting, attitudes and concerns may be more realistic than when being asked at the point of acute care. This is only the second study ever to question parents with a survey in a non-acute setting, without possible influence of the stressful situation of their child being sick. The first study in a non-acute setting had a smaller sample size, a focus more directed at fever management and the main purpose was to develop an instrument to measure parents' fever management practices.¹³ The

absence of evidence on parental attitudes towards fever management in primary care is striking, considering the number of consultations annually.

Comparison with existing literature

It was found that 88% of parents could correctly define fever. Previous studies, performed in acute care settings in secondary care, showed a range of 44–84% of parents not knowing the correct definition of fever ($>38^{\circ}\text{C}$).^{6,14–16} Generally, it is known that parents' knowledge about fever and antipyretics is poor.¹⁷ This is in line with the present finding that almost one in three of the parents thought that every child with a fever needs to be treated with paracetamol or antibiotics. On the other hand, only 2.8% of parents indicated treating their child with paracetamol for a temperature $<38^{\circ}\text{C}$, in contrast with 25% of parents reporting doing so in another study.¹⁸

Parental knowledge on fever and antipyretics seems to be better than in most previous studies. One explanation could be that the educational level was relatively high in the present population (Table 1) and it was also shown that the level of education is an independent predictor for better knowledge on fever and antipyretics.

It was found that 55.2% of the participants correctly stated that antibiotics are effective in treating bacterial infections and not viral infections, which is somewhat higher than the percentage of 44.6% derived from identical questions in the survey on public beliefs of antibiotics and respiratory infections using the same internet panel.¹⁹ However, the present research population (parents with young children) is not directly comparable with that survey, which targeted the general adult population.

It is important to acknowledge that preferred temperature measurement techniques often differ between different countries. The guideline by the Dutch College of GPs states that rectal temperature measurements are preferable, but from a practical point of view tympanic measurements are also acceptable.⁸ However, the NICE guideline for feverish illness in children advises against the use of rectal measurements because of safety concerns and indicates that tympanic or axillary methods are preferred despite being less accurate. This is probably in agreement with the daily practice of healthcare professionals in the UK.⁷

In line with these differences between the Dutch and UK guidelines, it is important to realise that knowledge and beliefs about fever in children are likely to be influenced by

cultural aspects and healthcare systems.¹⁴ This is also something to bear in mind when developing interventions to improve parental knowledge and practice regarding childhood fever.

Interestingly, the most important reason for parents to consult a GP was if the child had a fever for more than 3 days. This is in agreement with one of the alarm symptoms of the guideline 'children with a fever' from the Dutch College of GPs, which states that children who have a fever for more than 3 days need to be seen by a GP the same day.⁸ The NICE guideline states that on the basis of existing evidence, duration of fever cannot be used to help predict serious illness. However, as a fever of more than 5 days is one of the diagnostic criteria for Kawasaki disease, such a duration is not included as a red flag but is included as an intermediate risk factor for having a serious illness.⁷

Strikingly, when parents were asked to prioritise eight common features of a GP consultation, parents indicated that a thorough physical examination was far more important than obtaining a prescription for antibiotics or antipyretics, which they indicated as least important. This is in line with previous studies^{20,21} that have shown that GPs' assumptions about patients' expectations for a prescription are often misguided. These expectations could be an important target for interventions aimed at reducing antibiotic prescriptions, especially in an out-of-hours centre as it is known that prescribing figures in out-of-hours care are higher than during routine GP care, with one in three children visiting a GP out-of-hours centre receiving an antibiotic prescription.²² Although illness severity could be higher in that specific population, it is unlikely that

such a high proportion of these infections are likely to benefit from treatment with antibiotics. So are prescriptions a result of patients' expectations or GPs' assumptions about those expectations?

Implications for practice

To improve managing febrile children and accompanying parental self-management strategies and information to parents, it is important to be aware of parents' knowledge, attitudes, and practices in childhood fever. Dutch parents seem to have realistic attitudes and concerns when their child is not sick, but parents of a child who has ever experienced a serious illness might need extra attention as they are more concerned about febrile convulsions. This was also found in other studies.^{23,24}

When parents consult with their febrile child, they consider a physical examination as most important, and obtaining a prescription for antibiotics or paracetamol least important. Particularly in an out-of-hours setting, where antibiotic prescribing rates are still relatively high, this provides ample opportunities to enhance prescribing and improve satisfaction by eliciting parental expectations and opinions and conducting an appropriate physical examination. When providing information about the need for treatment, GPs should bear in mind that more than one in four parents believe that every child with a fever should receive paracetamol or antibiotics. Finally, parents prefer the internet for information when their child is not sick and the GP when their child is sick. This should be taken into account when designing future interventions aimed at improving information on childhood fever and treatment.

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Ethical approval

This study was approved by the Medical Ethics Committee of the Maastricht University Medical Centre [NL 12-4-148.2/ivb].

Provenance

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Competing interests

The authors have declared no competing interests.

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