

Full Length Research Paper

Parental recognition and home administration of pyrexia in children in a malaria infested region

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Accepted 16 September, 2014

Fever is one of the most common symptoms of disease in children, accompanies a range of illnesses and is often treated at home before medical attention is sought. An investigation of fever management among parents of children under five was carried out to evaluate parental perception. Parents of 1143 children were randomly selected and interviewed to answer a questionnaire about fever. Majority of parents (63%) perceived fever to be hotness of the body and had no idea of the normal body temperature and so did not use a thermometer. 621 parents representing 54% irrespective of their educational qualification and age suspected malaria as the most likely cause of fever which made them act within 24 h by administering antimalarial drugs at home without medical diagnosis. Parents felt that an untreated fever could result in convulsion (16%) and even death (14%) which informed some harmful practices. The educational level of parents was statistically insignificant ($p>0.05$) and had no bearing on the knowledge of fever while the age of parents had a strong correlation with their perception and fever management. Based on the outcome of this study, there is a need for appropriate education to prevent the abuse of antimalarial drugs and also to stop some crude and harmful practice employed to arrest a convulsive child.

Key words: Fever, parental, perception, management, children.

INTRODUCTION

Fever is common in childhood and parents have been shown to have unrealistic fears of the harmful effects of fever to their children. Therefore they tend to overestimate its dangers, and make inappropriate telephone calls and unnecessary clinic visits, leading to excessive utilization of healthcare services (Schmitt, 1980; Adam and Stankov, 1994). It should however be considered that, since the underlying cause of fever contributes to

morbidity and mortality the fears and actions based on these fears of parents may be viewed as justified. An elevation of temperature is perceived as fever by parents and it is one of the most encountered symptoms given by parents to clinicians in pediatrics emergency rooms and clinics as signal of illness of the child (Crocetti et al., 2001).

Fever is however a common symptom of a wide spectrum

of illnesses and is characterized by an elevation of body temperature above the normal range of 36.5 to 37.5°C (97.7 to 99.5°F) due to an increase in the temperature regulatory set-point. This increase in set-point triggers increased muscle tone and chills. A fever can be caused by many different viral or bacterial conditions ranging from benign to potentially serious. However, fever could also be a defense mechanism as the body's immune response can be strengthened at higher temperatures (Krauss et al., 1991).

As mentioned earlier, there is an unrealistic fear of fever by parents and care givers and this fear is referred to as 'fever phobia'. This fear is induced by loss of personal control as the parent is overwhelmed by the perceived threat of something bad happening to the child. Schmitt was the first to use this terminology laying emphasis on the unrealistic nature of such fears. The author emphasizes that this unrealistic fear often leads to dangerous actions taken by parents to arrest the situation (Schmitt, 1980).

Fever phobia is still a common phenomenon (Krauss et al., 1991) and may result in parents taking potentially harmful actions, such as use of herbal concoctions, scarification, and excessive use of antipyretics, amongst others because the most dreaded consequence of fever in children is febrile convulsion, which occurs in approximately 3% of all children with high fever by their fifth birthday (Ajayi and Falade, 2006). Some of the harmful actions by parents could even lead to the death of the child and will not help in reducing the under-five mortality rate in Nigeria which is 13% (WHO, 2015). Nigeria already losses about 2,300 under-five year old making the country one of the largest contributor to the under-five mortality rate in the world (NPS, 2008). The Millennium development goal in 2014 was to reduce by two thirds, between 1990 and 2015, the under-five mortality rate. Educational intervention such as health literacy campaign, health education during antenatal/ clinic visit will help improve parental understanding and management of fever and reduce inappropriate physician contacts and medication errors

The purpose of the study was to determine the status of knowledge and attitude of parents about fever in Yenagoa, Southern Nigeria. This result of the study will provide statistics from this part of Nigeria where no data is available and help the health ministry to educate parents about fever.

MATERIALS AND METHODS

The study took place in Yenagoa which is the headquarters of Bayelsa State located in the Niger delta area of Nigeria. Bayelsa state is a tropical rain forest with more than three quarters covered with water and lies entirely below sea level with a maze of creeks and mangrove forest. The sample size for this survey was 1143 patients. Sample size was determined using the formular $n = t^2 \times p(1-p)/m^2$ as described by Magnani (1997). Parents of children within the age range of 0 of 5 years in Yenagoa were invited to

participate in the study. Each eligible male or female parent was interviewed by a research assistant, using a standard questionnaire designed to obtain background socio-demographic information and current knowledge of fever. Parents were given no assistance with answering the questions and none refused to be interviewed. In an attempt to obtain unbiased data that truly reflected parents' perceptions about fever, the questionnaire relied principally upon open-ended questions and no suggestions of the "right" answer. Demographic data obtained included age of both parents, level of education attained and current occupation of parents. The questionnaire items were designed to ascertain parents' knowledge, attitudes and fears concerning fever in their child. The questions asked were as follows: How do you know if your child has a fever? what is the normal body temperature; what is the temperature reading that constitutes a fever in a child?; what is the greatest harm that high fever can cause to a child?; what is your method of fever detection, what is your presumptive diagnosis? What action do you take when your child has a fever. Other items used to determine knowledge and perception explored the spheres of: causes of fever and management of fever. The questions were framed in a way as to enable the average lay person to understand and respond, yet an attempt was also made to obtain definitive data.

Statistical analysis

Statistical analysis was performed with the GraphpadPrism version 4® (Graphpad software, San Diego, CA). Differences between groups were determined by the one way analysis of variance (ANOVA) or paired t- test with the level of significance set at $p < 0.05$.

RESULTS

A total of 1143 parents of children under 5 years were interviewed and a description of the socio-demographic characteristics of the study parents is presented in Table 1. The majority of parents interviewed were living in Yenagoa while others came from the adjoining towns. The mean ages of the children were 2 years and 5 months with a male to female ratio of 1:1. Parents recruited for the survey had their mean age range as 28 years and 8 months with a father to mother ratio of 1:3. Parental knowledge and perception of fever is shown in Table 2.

Tactile method of touching the forehead and body parts of the child was the most utilized method for detecting a fever by the parents. This method was employed by 1008 (88%) of the parents while a small fragment 135 (12%) makes use of a thermometer. Parts of the body touched to detect fever by parents were the forehead 180 (15%), neck 90 (8%), stomach and back 270 (24%), combination of all 603 (53%). Majority of parents interviewed (47%) had no idea of the normal range of the body temperature, some parents gave values higher (7%) while others (20%) gave lower values and 24% knew the correct normal temperature range. Recognition of fever by 720 parents (63%) was an increase in body temperature, 162 parents (14%) felt a weak child was a sign of fever, 90 (7.9%) knew their child has a fever with a convulsive fit. Blisters at the side of the child's mouth was a sign of

Table 1. Socio-demographic characteristics of 1143 study parents.

Characteristic	Number	%
Parent		
Father	261	23
Mother	882	77
Residence		
Yenagoa	1000	87.5
Outside Yenagoa	143	12.5
Age of parent (range 15 to 60 mean 29)		
> 30	648	57
40-49	315	27
>50	180	16
Parent's education		
Illiterate	225	20
Primary	306	27
High school/secondary school	360	31
University graduate and above	252	22
Parent's occupation		
Skilled	468	41
Unskilled	378	33
Student	45	4
Unemployed	252	22

fever for 90 parents (7.9%) while another 81 (7%) had varying ways of recognizing a fever such as a lack of appetite, restlessness and rashes on the body.

Fever phobia was expressed in different ways, out of the 1143 participating parents, 54.3% cause of fever phobia was malaria and 20 parents (15.7%) perceived a fever could lead to convulsion with majority in the graduate category. The child's death was the perception of 162 (14.2%) parents while 90 parents representing 7.9% perception of a fever was an infection. 90 parents out of the 1143 parents had no idea what a fever could lead to. Presumptive diagnosis by parents were malaria (42%), teething (30%), diarrhea (24%) while 48 parents thought the fever was as a result of an infection representing 4%. Parents were asked what action they took when they noticed their children had a fever, 605 parents acted within 24 h while 477 acted after 24 h and 63 interviewed their child only without taking any other action.

Action taken by the parents ranged from visiting a chemist (28%) and herbal treatment (16%) to visiting a government hospital (17%). Other actions taken by parents were laboratory investigations (8%) and home treatment or medication (31%). Parents who did self medication at home were asked what type of medication

was used. Out of the 1143 parents recruited into the study, 396 representing 35% gave their children an antimalarial, 17% gave antibiotics, 16% used local herbs, and 25% used both antimalarial and antibiotics while 8% administered an antipyretic only.

DISCUSSION

This study showed that there is considerable anxiety and misinformation about fever in the population surveyed, and that this anxiety is related to aggressive early treatment of fever. Previous studies in Nigeria (Ajayi and Falade 2006; Fawole and Onadeko 2001; Salako et al., 2001), Africa (Deming et al., 1989; Lubanga et al., 1997) and other parts of the world reveal the same anxiety which Schmitt labeled "fever phobia" as a worldwide phenomenon (Schmitt 1990).

Overall findings of this study suggest that parents had minimal knowledge of fever and this knowledge also informed early and aggressive treatments. Our finding collaborates with the report in Enugu (Tagbo et al., 2010) and Illorin (Abdulkadir and Johnson, 2013) respectively. Tactile method of fever assessment is a common practice in most homes and communities and

Table 2. Parental knowledge and perception of fever.

Characteristic	Number	%
Recognition of fever		
Increase in body temperature	720	63
Weakness	162	14
Convulsive fit	90	7.9
Blisters	90	7.9
Others	81	7.0
Method of fever detection		
Thermometer	135	12
Tactile	1008	88
Knowledge of body temperature		
Above normal	99	7
Below normal	234	20
Normal	270	24
No idea	540	47
Parental fever phobia		
Malaria	621	54
Convulsion	180	16
Death	162	14
Infection	90	8
Others	90	8
Parent's presumptive diagnosis		
Malaria	483	42
Teething	306	30
Diarrhea	270	24
Infection	48	4
Intervention by parents		
Acted within 24 hours	603	53
Acted after 24 hours	477	41
Interviewed child only	63	6
Action taken by parent		
Visiting a government hospital	189	17
Visiting a chemist	324	28
Herbal treatment	180	16
Laboratory investigations	90	8
Home treatment	360	31
Drugs used at home		
Antimalarial	396	35
Antibiotics	189	17
Antipyretics	90	8
Antibiotics and antimalarial	288	25
Local herbs	180	15

Used to a large extent as reported by other findings (Tagbo et al., 2010; Oshikoya et al., 2008; Abdulkadir and Johnson, 2013), this also conforms to this study where 88% of parents used the dorsum of the hand in detecting a fever. Despite the fact that the specificity of this method is not 100% accurate and limited

to that of a screening tool (Deming, 1999), it was still the choice of detecting a fever by majority of parents. Generally observed from this study, is the common perception by parents that the head, abdomen and back were the most important parts of the body from which fever is detected. Fore head tactile assessment findings from this study is also similar to the findings of Singh et al. (2003) who reported that adults felt the fore head to identify fever.

Parents showed little understanding of the normal range of body temperature and individual diurnal variation, as well as demonstrating inadequate knowledge of what actually constitutes a fever. This report is similar to studies in some other urban cities in Nigeria (Ajayi and Falade 2006; Fawole et al., 2001; Salako et al., 2001; Tagbo et al., 2010) and in other parts of Africa (Deming et al., 1989; Lubanga et al., 1997) but contrary to a study in Lagos (Oshikoya, 2008) where mothers were quite knowledgeable of fever. The researchers were also surprised that parents of high socio-economic and educational status were not different in terms of knowledge of fever from parents of lower socioeconomic/ educational background and limited previous experience. It seems that healthcare providers have not done enough in educating parents in this basic information.

The definition of normal body temperature is complex. DuBois in 1948 found the normal ranges of body temperature for children to be from a low of 36.2°C to a high of 38.0°C when measured rectally, and from 36.0°C to 37.4°C when taken orally. The maximum body temperatures for children occur between 5 and 7 p.m., and the minimum temperatures occur between the hours of 2 and 6 a.m. Hence, it is not unusual for an active normal child's temperature to be as high as 38.0°C rectally in the late afternoon. A rise in temperature above 38.0°C may also be caused by physical exercise, warm clothing, hot or humid weather, or warm food/drinks and such external factors should be put into consideration before measuring the temperature. Fever is defined as a temperature above the normal range. A rectal temperature of 38.0°C or more, an oral temperature of 37.5°C or more, and an axillary temperature of 37.2°C or more, are all considered fever (Mackowiak, 1991).

About 24% of the responding parents could identify what constitutes the normal body temperature, and another 47% did not know what value is referred to as a normal body temperature. This is of great concern as most parents did not know that temperature constitutes a fever and this ignorance could be the reason why there is great fear and anxiety and such aggressive methods in treating a feverish child. Highest presumptive diagnosis by parents was malaria which conforms to other reports by other Nigerian researchers (Ajayi and Falade 2006; Fawole et al., 2001; Salako et al., 2001; Tagbo et al., 2010) and other African countries (Deming et al., 1989; Lubanga et al., 1997). This diagnosis by parents may be due to the endemic nature of malaria in Africa and also the fact that it is the major ailment affecting children below five years in the continent. The large proportion of parents presumptive diagnosis of malaria is a cause of concern because over diagnosis of

malaria can cause other life threatening conditions that require urgent medical attention, such as septicaemia, bronchopneumonia, tonsillitis and meningitis to be missed out by the parents and further delay their treatments. There is a need to educate parents especially mothers on how to recognize malaria with complications and other life threatening conditions that may mimic malaria so as to present their child early to the hospital. The causes of parental phobia of untreated fever in this study ranged from malaria, convulsion, infection and even death. The findings suggest that anxiety, which Schmitt labeled "fever phobia", is a widespread phenomenon as it conforms to other studies in parts of Nigeria (Ajayi and Falade 2006; Fawole et al., 2001; Salako et al., 2001; Tagbo et al., 2010) and in other parts of Africa (Deming et al., 1989; Lubanga et al., 1997) and the world (Stephenson, 1988; Chiapinni et al., 2012) at large. The high level of parental anxiety could be explained in several ways. The parent may have overestimated the seriousness of the consequences of fever or if unaware of the consequences, experienced fear of the unknown. The anxiety level could be greater if the parent has little experience in dealing with fever.

Management of fever at home by parents and care givers seems to be a common practice in most homes where it is referred to as home treatment or home doctoring. Home treatment in the context of this study, refers to the use of previously prescribed drugs, over the counter drugs, left-overs of previously used/prescribed drugs, non-prescribed drugs for a particular ailment or re-filling prescribed drugs with an old prescription without consulting with a doctor. The presumptive diagnosis of the doctors who attended to the sick children with fever might have accounted for the knowledge of what type of drug to use. The implication of this is not only the positive influence it has on the mothers to keep such drugs at home but the promotion of home doctoring which encourages misuse and overuse of such drugs. 31% of parents in this study managed their child's fever at home without seeking for professional help and only did so when there was no change in the condition. Management of fever at home by parents seems to be a practice in most parts of Nigeria as documented by previous researchers (Ibeh et al., 2005; Akogun and John, 2005) and also from the result of this study and this might be due to the poverty level. There is a need for further research on why parents engage in home management of fever instead of seeking professional help.

Antimalarials such as chloroquine and sulphadoxime/pyrimethamine) were the drugs used in home treatment of fever in the findings from previous studies (Fawole et al., 2001; Salako et al., 2001) but in this study, parents used more of Artemisinin combined therapy (ACT) and this could be as a result of the introduction of ACTs as the first line drug for treating malaria and its availability in the open market.

Presumptive treatment of all childhood fevers as malaria by most parents' results in malaria over diagnosis which means other causes of febrile illness will be missed until a much later time when the child's condition does not improve. Such trend is a cause for alarm because of the risk of resistant strains of the plasmodium parasite to ACTs emerging.

Home use of antibiotics as observed in this study is of great concern. The 17% rate utilized in this study is similar to the 13.5% antibiotics utilization rate documented in Lagos (Oshikoya et al., 2007) lower than 31.3% previously reported in Eastern Nigeria (Ibeh et al., 2005) and much lower than 62.0% reported in Iraq. It was noted that some parents in this study combined both antibiotics and antimalarial. The implication of this is that the children are at risk of developing adverse reactions since antibiotics constitute the leading cause of moderate to severe adverse drug reactions in children (Jaryawadene, 1993).

Also, the potential for antibiotic resistance and treatment failure could be high in such children. These drugs are easily obtained over the counter from pharmacies, chemists and even medicines shop without a prescription card. The accessibility to obtaining over the counter drugs could be the reason why 28% of parents in this study visited the chemist instead of going to the hospital and seeking professional help. Only 8% of parents did a laboratory investigation before giving drugs to their ward. This shows that there is a low awareness of the importance of laboratory investigations in proper health care delivery and there is a need to educate parents on the relevance of such investigations in proper diagnosis. Use of herbal medicine as observed in this study is not peculiar only to this study where 16% of parents resorted to herbal treatment of a fever, it is a common practice in Nigeria and has been documented by different researches (Ajaiyeoba et al., 2003; Ishola et al., 2014).

This study was done in an urban setting; the situation may be very different in a rural setting where people are at disadvantages of good health care facilities, quality education and poverty. A similar study in the rural setting is suggested so as to achieve generalized application of the observed interventions of fever home managements.

Conclusion

Parents in the study population had a poor knowledge of fever, normal body temperature and method of detection. This knowledge gap is likely to impact negatively on decisions regarding the home management of fever, presentation at a health facility, and the eventual outcome of febrile illnesses. Health education interventions such as health literacy campaigns and fever therapy talks during clinic visit will improve parental understanding and

management of fever

Conflict of Interest

The authors report no conflicts of interest.

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