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MANAGEMENT OF FEVER IN CHILDREN: KNOWLEDGE AND PRACTICE OF MOTHERS IN SOUTH-EAST NIGERIA

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ABSTRACT

Fever is one of the most common symptoms of different diseases in children. Management of febrile conditions by mothers is very important considering the fact that most times, mothers are the first to identify presence of fever in a child and the serious outcomes of prolonged fever in children. The objective of the study was to assess the knowledge and practice of mothers in the management of fever in their children. A hospital-based survey was conducted in the paediatric, ante natal and immunization units of two secondary hospitals. A well-constructed and validated questionnaire was self-administered to mothers in these units. About 250 mothers participated, 58.1% were between the ages of 18-30 years; 46.8% had secondary school as their highest educational qualification and are mostly traders. More than half (58.4%) of the mothers perceive fever as, less than one third 21.6 and 22.8% identified malaria and teething as the possible causes of fever in children respectively. About half (45.6%) of them didn't have thermometer at home, the most common antipyretic and antimalarial used paracetamol (80.4%) and artemether-lumefantrine (38.0%) respectively while antimalarial used while only a few (15.6%) gives antipyretic at the appropriate temperature. About 55.2% and 48.8% had good knowledge and practice towards fever management respectively. This study has shown that mothers in the study area still have poor knowledge of fever management, which is evident by the poor practice they exhibited. There is need for active fever management health education in our community.

KEYWORDS: Knowledge, practice, fever management, antipyretics

INTRODUCTION

When body temperature rises above 38 °C per rectum, 37.8 °C orally and 37.4 °C in axilla the conditioned is termed as fever [1]. Fever may be a sign of both infectious and non-infectious disorders. The process of fever begins to be a defensive response , when pyrogens eternally secretes into blood stream in reaction to entrance of microbes their toxins and other mediators these chemicals migrates to hypothalamus a part of brain involved in thermoregulation. Hypothalamus get disturb and respond in rising of body temperature or fever [2]. Fever occurs commonly in children and makes their parents unduly worried and panic as they perceived it a danger ailment denoting some serious illness in their children [3]. Despite established evidence since 1980 about the positive effects of mild to moderate fever parents still consider it dangerous in children [2] and studies from all over the world regarding parenteral beliefs about fever and its management reveals that nothing has been changed on their part in perception of fever [4].

Fever and febrile illness accounts for 6% of total visits to paediatricians, along with numerous visits to general practitioners (GPs), emergency departments (EDs), primary care paediatricians and out-of hours care services [5]. In most children, fever is due to identifiable microbiological agent and result from the interaction of various infectious and non-infectious agents with host defence mechanism; it could also occur due to excessive exposure to environmental heat or during heavy

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physical activity and exercise [6]. Children have higher metabolic rates and smaller surface area than adults and therefore higher temperatures [7]. In 2005 childhood fever was defined as 37.2ºC axillary, 37.8ºC orally and 38.0ºC by tympanic or rectal methods [8]. Previously, following a systematic literature review, a range of temperatures was reported to indicate childhood fever: oral 37.6º to 37.8ºC and rectal 38.0ºC to 38.3ºC. Literature definitions of fever include 40.0ºC as moderate fever; 40.5ºC high fever and 41.7ºC dangerous fever (with associated brain damage)[9]. These sources make it possible to identify a range of temperatures for children: normal temperature 36.0ºC to 37.9ºC, mild fever 38.0ºC to 39.0ºC, moderate fever 39.1ºC to 40.4ºC and high fever above 40.5ºC. Confusingly for health professionals and parents, definitions of fever coincide with literature definitions of 'normal' and 'mild fever', high fever with 'moderate fever' and very high fever with 'high fever' [10].

Temperature does not determine the severity of a child's illness. Fever is beneficial in normal healthy children in the home setting; many easily tolerating mild, low grade fevers to 39.0°C [11]. However, there is consensus that moderate fevers, 40°C and higher, should be avoided. Associated with fever are increased metabolic, heart and respiratory rates, increased oxygen demand and insensible fluid loss [10]. Children who are otherwise well and eating and drinking are not harmed by the increased physiological demands of the febrile response. However, it is imperative children remain hydrated as dehydration is the most common and dangerous side effect of fever [12]. Fever can compromise seriously ill children. These children behave differently to those with self-limiting viral infections, they are unusually quiet, drowsy or irritable and cry differently, moaning or have an inconsolable loud cry [13]. Fever should be reduced in children placed at risk by the additional physiological burden: this includes seriously ill children and those who have cardio-respiratory, neurological or metabolic disorders; are malnourished, dehydrated or have epileptic lesions [14].

In rural areas or households, mothers diagnose fever using their simple sense of touch by checking the temperature variation of the back of their palm and forehead of the child, the neck and sometimes the chest [15]. In the hospitals, fever is measured objectively with thermometer, in which case the fever can be classified based on the value obtained as low or high grade. This is followed by strict medical protocol and supervision until the fever is resolved, together with the underlying disease.

Commonly used and readily available antipyretics, paracetamol and ibuprofen, are believed to inhibit prostaglandin synthesis in the thermoregulatory control area of the brain blocking the conversion of arachidonic acid to prostaglandins such as PGE2 inhibiting prostaglandin synthesis [15]. This is thought to be critical in their antipyretic activity. PGE2 production is a widely regulated and critical step in thermoregulation and for temperature increase and control when the febrile response is activated [14]. Antipyretics also inhibit the maturation of monocytes into macrophages and interfere with lymphocyte activation and antibody production. Antipyretics reduce temperature by 0.9°C to 1.3°C [16]. Recently the practice of alternating antipyretics to normalise fever and prevent it returning has become more common with both health professionals and parents [11]. There is minimal evidence of the benefits of this practice. Some studies have compared the use of different antipyretic drug doses and alternating the drugs in the management of fever; they reported no significant difference in alternating the drugs or their doses. [11-13]. The overall additional temperature reduction from alternating the antipyretics was between 0.03°C and 1.0°C over a 24 hour period [12].

Although antipyretics are considered safe medications, serious side effects are well-known. Liver failure from paracetamol overdose is possible and caution is recommended when used in those with impaired hepatic or renal function [13]. There is concern about hepatic toxicity in children who were unwell, anorexic, vomiting and/or dehydrated with a febrile illness [14]. Most at risk from liver toxicity are children under 2 years of age and acutely malnourished febrile children [15]. The most common reactions to ibuprofen are gastrointestinal disturbances and haemorrhage, and bronchospasm in children with asthma. Caution is recommended when ibuprofen is used in children with renal impairment, Chron's disease and Ulcerative Colitis [15]. The burden of poor knowledge and practice of fever management by mothers could present as long duration of fever, progression of health complications, wrong and inappropriate medicine use and increased cost on health budget thus there is need to assess knowledge and practice of mothers in the management of childhood fever [17].

Evidence about parents' fever management knowledge and attitudes is limited in Nigeria and particularly in Enugu state. Parents' knowledge and actual practices for handling childhood fever have

not been investigated in Enugu state. Therefore, the aim of this study is to assess the knowledge and practices of mothers in the management of childhood fever.

METHODOLOGY

Research design

This study was a prospective cross-sectional survey of mothers attending the antenatal and immunization clinics.

Research setting

The research was carried out at the paediatrics, ante natal and immunization units of Bishop Shanahan hospital and District hospital both in Nsukka, Enugu state south eastern Nigeria. These hospitals are secondary hospitals located within Nsukka Local Government Area of Enugu State.
All mothers visiting the Paediatrics ante natal and Immunization units of the two hospitals within the months of September to November were used for the study.

Mothers who met the eligibility criteria and gave their consent were assessed within five clinic visits to each of the hospitals. The inclusion criteria for this study were mothers whose child or ward under 12 years of age is currently having fever and mothers whose child or ward under 12 years of age has had fever in the past.

Ethical consideration

Ethical approval was obtained from both hospitals

Study technique and tools

A modified self-administered questionnaire was used in the study, which contains three domains; Socio demographic data of mothers, mothers knowledge, and practice domains. Each domain contains questions that assess mothers' knowledge (10 questions) and practice (9 questions) on fever management in their children.

Data analysis

Statistical analysis was performed using SPSS Software version 16. Descriptive statistics was used to analyze the data. Results were presented as mean, frequencies and percentages. Chi square was used to test for the association between knowledge, practice and their demographic data. Statistical significance was set at $P < 0.05$.

RESULTS

A total of two hundred and fifty (250) questionnaires were completely filled by mothers visiting the Paediatrics, antenatal and immunization units of Bishop Shanahan and District hospital Nsukka. Data analysis showed 58.1% of while more than 88% had highest educational level at secondary school. Other information on their demographic data is shown in Table 1.

Knowledge of mothers about fever management

When mothers were asked if fever was a disease, 58.4% answered "No" while 94.0% were able to correctly identify fever as a symptom of disease. When they were asked the likely causes of fever in children, 6.4% and 40.4% mentioned infection and malaria respectively, while 55.6% and 25.2% were able to identify convulsion and typhoid as the consequences of fever respectively. The other responses to the knowledge questions asked are shown in Table 2.

Practices of mothers towards fever management

In management of fever, 52.4% of mothers determined their child's temperature at the armpit, 54.6% have thermometer in their homes, 80.4% and 38.0% used paracetamol and artemether-lumefantrine respectively in feverish condition. Other practices towards fever management are shown in Table 3

Overall percentage score for knowledge and practice

The mean knowledge and practice scores 61.9% and 63.7% respectively, 55.2% and 48.8% of the respondents had good knowledge and practice respectively, while 44.8% and 59.6% had poor knowledge and practice respectively.

Table 1: Socio-demographics of mothers

Variables	n (%)
Age(years)	
18 – 30	143(58.0)
31 – 40	94(37.0)
41 – 50	13(5.0)
Occupation	
Civil Servant	47(18.8)
Trader	113(45.2)
Student	43(17.2)
Self-Employed	47(18.8)
Educational level	
Primary	30(12.0)
Secondary	117(46.8)
Tertiary	90(36.0)
Post-Graduate	13(5.2)
Number of children	
1 – 2	108(43.2)
3 – 4	94(37.6)
5 and above	48(19.2)
Monthly income	
≤5000	52(21.1)
6000 – 20,000	102(41.5)
21,000 – 39,000	47(19.1)
40,000 – 59,000	28(11.4)
≥60,000	12(4.9)

Table 2: Responses on the causes, complications of fever of fever and methods used to identify fever

Knowledge questions	Responses n(%)
Causes	
Infection	16(6.4)
Malaria	101(40.4)
Measles	25(10.0)
Mosquito bite	89(35.6)
Teething in children	1(0.4)
Dirt environment	1(0.4)
Bad water	14(5.6)
Do not know	3(1.2)
Complications	
Dehydration	15(6.0)
Convulsion	139(55.6)
Typhoid fever	63(25.2)
Brain damage	10(4.0)
Death	4(1.6)
Coma	2(0.8)
Anemia (shortage of blood)	10(4.0)
Weakness	7(2.8)

Fever is present when	
Body is hot	117(46.8)
Child lost appetite	60(24.0)
Child is weak	19(7.6)
Child cries excessively	18(7.2)
Child's urine is yellow	13(5.2)
Child is not playing well	11(4.4)
Child is dreaming	12(4.8)
Temperature at which fever is treated	
36 - 37°C	11(4.4)
37.1 – 37.5°C	44(17.6)
37.6°C – 38.0°C	87(34.8)
38.1 – 38.9°C	104(41.6)
39.0°C and above	4(1.6)

Table 3: Respondents' practices towards fever management

Practices	**Frequency n (%)**
Type of thermometer used	
Mercury in glass	106(42.2)
Electronic or digital	22(8.8)
Auricular	8(3.2)
Do not have thermometer	114(45.6)
Part of body used for temperature check	
Armpit	131(52.4)
Rectum	26(10.4)
Groin crease	53(21.2)
Mouth	30(12.0)
Ear	10(4.0)
Other actions taken to manage fever	
Treat with drug at home	146(58.4)
Tepid sponge	36(14.4)
Remove clothing	30(12.0)
Visit hospital	26(10.4)
Bath with cold water	12(4.8)
Antipyretics given during fever	
Paracetamol	201(80.4)
Aspirin	14(5.6)
Teething powder	13(5.2)
Ibuprofen	22(8.8
Antimalarial given during fever	
Artemether-lumefantrine	95(38.0)
Sulphadoxime-pyrimetamine	20(8.0)
Chloroquine	53(21.2)
Do not know the name of the drug	82(32.8)
Factors considered in choosing the dose of the drug	
Age	165(66.0)
Weight	26(10.4)
Height	1(0.4)
Age + height	50(20.0)
Age + weight	8(3.4)

Table 4: Respondents overall knowledge and practice scores

Variables	Overall score n(%)
Knowledge	
Good	77(61.6)
Poor	47(37.6)
Mean Percentage Score	124(63.53)
Practice	
Good	97(38.8)
Poor	149(59.6)
Mean Percentage Score	122(60.55)

Relationship between respondents' knowledge and demographic data

Considering age, 54.9% of the women with good knowledge were between the ages of 18-30 years, while for education, 43.6% of those that attended secondary education had good knowledge. Both age and education did not significantly affect the respondents knowledge (P<0.05). The other demographic data and their relationship with respondents' knowledge are shown in Table 5.

Table 6: Relationships between knowledge and demographic data

Variables	Good knowledge (%)	P value
Age of respondents		
18 – 30	54.9	
31 – 40	42.9	0.21
41 – 50	4.2	
Highest educational level of respondents		
Primary	13.5	
Secondary	43.6	0.62
Tertiary	36.8	
Post-graduate	6.0	
Number of children of respondents		
1 – 2	38.3	
3 – 4	40.6	0.48
5 and Above	21.1	
Monthly income of respondents		
≤ 10,000	20.6	
11,000 – 20,000	30.1	
21,000 – 40,000	19.5	0.09
41,000 – 60,000	21.8	
≥ 61,000	8.0	

P-value is significant at <0.05

Relationship between respondents' practice and demographic data

The age of the respondent significantly affected their practice (P = 0.04) while the relationship between education, number of children in a family, monthly income earned and their practice was not statistically significant (P > 0.05). The percentage contribution of each variable was shown in Table 6.

Table 6: Relationships between respondents' practices and demographic data

Variables	Good practice n (%)	P value
Age (years)		
18 – 30	48.5	
31-40	46.5	**0.04***
> 40	5.2	
Education		
Primary	12.4	
Secondary	40.4	0.75
Tertiary	39.3	
Postgraduate	8.0	
Number of children		
1 -2	37.1	
3 – 4	45.4	0.20
5 and above	16.5	
Monthly income		
≤ 10	12.4	
11 – 20	42.3	
21 – 40	22.7	0.11
41 – 60	14.4	
≥ 61	8.2	

DISCUSSION

In this study, it was observed that as easy as fever management may appear, about half of the mothers still had poor knowledge and practice towards fever management. Almost all of them agreed that fever is a symptom of a disease, while about half of them see fever as a disease. Perceiving fever as a disease suggests that these mothers may not seek for further medical attention following each fever spike thinking reduction of fever with antipyretic is enough, this practice will expose the child to complications due to high fever. Less than one third of the mothers were able to identify malaria as cause of fever while very few mentioned measles, mosquito bite and bad water as cause. This implies that most of them did not associate fever in malaria to mosquito bite which will affect their practice towards prevention of mosquito bite. This observation is lower than what was reported in another study in Port Harcourt, which reported that 47.0% and 21% of mothers identified malaria and mosquito bite as causes of fever respectively [18]. It is also surprising that some of them were able to identify infection as a cause but were not able to associate bad source of water to fever in a child.
Convulsion was the most commonly identified complications of fever. This result corroborates the finding of Alex-Hart in Port-harcourt, Nigeria [18].

This finding may result from past experience as most common manifestation of fever is convulsion.
However, dehydration is an important consequence of high fever. Increase in temperature causes fluid loss in a febrile child; this will lead to dehydration and consequent electrolyte imbalance. Current research has shown that electrolyte imbalance or disturbances can cause acute symptomatic seizures [20]. About half of the mothers identify fever in their child only when the body is hot, while one third suspects fever when the child lost appetite. Most of the mothers do not know the normal temperature of a child; this was evidence by more than half of them indicating that they will treat fever only when the temperature is above 38°C. This knowledge and practice is not encouraging as normal body temperature reading for measurement via the rectum is above 38 °C, orally is 37.8 °C while axilla is 37.4 °C [1]. While some children may be symptomatic at temperature of 37.8°C others may not be symptomatic. This finding is in accordance to findings of a study from Riyadh Saudi Arabia where parents were ignorant of the normal body temperature range [20].

It was surprising to know that half of the mothers do not have a thermometer at home, among those that had; majority owned the mercury in glass thermometer. This practice is poor; it implies that

most mothers used the tactile method (touching) for detecting fever, This tactile temperature taking practice has been shown to be inaccurate with a high percentage of false-negative or false-positive fever determination [21]. Besides, digital thermometer is recommended over mercury in glass thermometer due to poisoning from mercury when broken. This finding is similar to the findings of Hart *et al* where more than 76% Nigerian mothers used to detect temperature by touching their children [18]. However, this observation differs greatly with the report of Chiappini *et al* in Italy that reported 100% use of thermometer to measure temperature, 52.3% were mercury in glass while 65.7% were digital thermometer [22]. This obvious difference between our finding and that of Chiappini may be due to environmental influence from study area as Italy is a western and developed country against Nigeria that is a developing country. Our findings also showed that the most preferred site for temperature reading using thermometer is the armpit. This is in agreement with the report by another study that recorded 82% preference for armpit [22].

More than half of the mothers in this study practiced home management of fever with drugs. This is in support of previous studies that were carried out among Mali [23] and Nigerian [7, 24-25] women, where majority of them treated their child's fever at home. It however contrasts with a study done in Ethiopia were majority of the mothers visited village based community health workers or health centers [26]. The most common antipyretic used by mothers at home for fever management is paracetamol. Others include aspirin, teething powder and ibuprofen. In the course of treatment with drugs, more than one third of the mothers use artemether-lumefantrine, less than one third still use chloroquine while one third of them do not know or remember the name of the drug they gave to their child. The use of chloroquine in the treatment of uncomplicated malaria has been replaced with artemether-lumefantrine in Nigeria due to resistant to chloroquine, hence these mothers need to be informed on the appropriate medications to be used. The observation that mothers give drug without knowing the name may imply that they are using a remained drug from a previous treatment; which may increase the chances of giving wrong dose to the child or not completing the dosage.

The analysis of the relationship between knowledge and practice and the demographic data revealed that mothers between the ages of 18-30 years had better knowledge than the rest probably due to the fact that they are younger and embrace knowledge given to them during ante natal. They are equally more inquisitive to try out newer ideas than elderly ones that are likely to cling tight to their belief and culture. Mothers with secondary school as their highest educational level have better knowledge than tertiary and post graduate respectively, this is probably due to sample size disproportionate factor. This is in contrast to similar research in Ireland where mothers with higher educational qualification showed better knowledge than those with lower educational level [10]. From our result, knowledge of mothers generally varies proportional with the number of children and their monthly income, but there was no significant difference in the variation ($P > 0.05$). However in their practices, age of mothers significantly affected their practice ($P = 0.04$). Other demographic data did not significantly affect their practice ($P > 0.05$).

CONCLUSION

Our study has shown that as simple as fever management appears, half of the mothers have poor knowledge and practice towards fever management. Most mothers do not know that mosquito bite and unclean water can cause fever and do not have common thermometer at home. There is every need for an active education awareness geared towards fever management in immunization centres, antenatal clinics, hospitals and in the communities.

CONFLICT OF INTEREST

The authors alone are responsible for the content of this research and report no conflict of interest

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