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Home Management of Fever in Under-Five Children: Knowledge, Attitude and Practice among Mothers Attending a Paediatric Outpatient Clinic in Port Harcourt, Nigeria

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ABSTRACT

Fever is a common problem in children especially in under-fives. Most fevers start outside the hospital thus management of fevers at home may limit complications from febrile illnesses.
This study assessed mothers' knowledge, attitude and practice of home management of fever in under-five children.
It was a cross-sectional study and data was analyzed using SPSS version 23.
Of 219 respondents, majority were of age group 31-40 years 114(52.1%) and of middle social class 56(50.0%). Most respondents correctly defined fever 165(75.3%), knew the causes of fever 149(68.0%), and the correct site of measurement using a thermometer 114(52.1%) but did not know high body thermometer 132(60.3%). Majority knew fever could be managed at home 184(84.0%) and was harmful 207(94.5%). The commonest source of information about fever was obtained from health workers/hospitals 118(54.9%). more than half of respondents had thermometers 141(64.4%), knew how to use it 136(62.1%) and would measure their child's temperature at home if fever was suspected 161(73.5%). Most would monitor their child's temperature at home 191(87.2%), would manage child's fever at home 171(78.1%), would visit the hospital because of child's fever 204(93.2%) and would do so within 2-3 days of onset of fever 59(40.1%).
Only about a third of respondents had good knowledge (39.7%) and good practice (33.2%) on the home management of fever in children while about half (59.8%) had good attitude.
Massive enlightenment campaigns on home management of fever should therefore be carried out so as to reduce complications that could arise from unduly high temperature at home.

Key words: Knowledge, Attitude, Practice, Fever, Home management

INTRODUCTION

Fever is a common symptom of many diseases among children under the age of five years. [1,2] Fever is not just a common cause of concern among parents but a cause of frequent presentations in the hospital. [1-3] Fever is defined as a rectal temperature of ≥ 38^{o}C which is equivalent to an axillary temperature of 37.5^{o}C, and an oral temperature of 37.8^{o}C. [4] To the lay man fever is simply a rise in body temperature above the normal or hotness of the body. The causes of fever can be organized into four main categories: infectious, inflammatory, neoplastic and miscellaneous [4,5] and these produce fever by three different mechanisms: pyrogens, heat production exceeding heat loss, and defective heat loss. [3,4] Different methods can be used to assess fever - contact or non-contact. Contact method of assessing fever

can be subjective (by touch of hands) or objective by the use of thermometers which includes electronic contact thermometers (digital rectal, oral, axillary) and chemical thermometers (mercury-in-glass thermometers). The non-contact method includes the infrared non-contact thermometers (tympanic, temporal, jugular). The use of a thermometer is the objective way of determining if a child has a fever and measures to what degree.

Home is where management of most childhood sicknesses (including fever) starts. [6] Care provided at home for fever determines recovery and should start as soon as possible to reduce complications and ensure a good outcome. [6] The role of caregivers especially mothers are important in the recognition and management of fever in children which may influence its' outcome. Treatment of childhood febrile illnesses at home before presentation to a health facility is a common practice within and outside Nigeria [1,5,7-9] and this is recommended by the United Nations Children's Fund (UNICEF). [6] Common practices of home management of fever were mainly symptomatic to bring down the temperature. This consist of reducing the child's clothing, exposing the child to air, tepid sponging, use of analgesics such as paracetamol or ibuprofen as well as administering antimalarial medications. [1,6,10-12]

Studies have shown that parents have misconceptions, fears and inadequate knowledge on fever and its' home management [12-14] giving rise to the term 'fever phobia'. [15] Fever phobia is a term and concept coined by Barton Schmitt in 1980 to help understand the unrealistic, exaggerated misconceptions and fears of parents concerning the possible damage especially neurologic, that a fever can cause. These parents are also afraid the child may die hence the aggressive treatment of the fever at home before presentation in the hospital. [15]

Different studies have reported that parents are not correctly informed or well educated about the definition, measurement, diagnosis and home management of fever leading to practices such as covering the child with warm and extra clothing during a fever. [10-14] Over wrapping a child during a fever traps the fever and can lead to higher temperatures. Accurate knowledge of fever will be helpful in the pre-hospital management of fever thereby reducing the morbidity and mortality associated with high fever. It will in addition, avoid over treatment as well as allay the fears of mothers concerning fevers.

Fever in itself is not life threatening but rather a normal physiological response to illnesses and infection. Complications of fever due to underlying causes include convulsion, febrile status epilepticus, heat stroke, coma, brain damage, death, and dehydration. Benefits of monitoring fever at home and home treatment of fever include reducing the temperature thereby making the child feel better, reducing the risk of febrile convulsion as well as reducing the risk of dehydration when increased fluid is given to children.

Some studies on the perception and home management of fever have been reported in rural [8] and urban areas in Nigeria. [1,9-11] Two of those studies were done earlier in the University of Port Harcourt Teaching Hospital (UPTH) in 2011 and 2012 more than a decade ago. None has been conducted in the RSUTH hence the need for this study to revisit the knowledge, attitude and home management of fever in children under the age of five years. In the two studies there was good knowledge of fever and all parents gave some form of home management before presentation at the hospital consisting mainly of paracetamol, tepid sponging and removing clothing. This study also aims to determine the appropriateness of home management of fever, identify practices that are either useful or harmful in the home management of fever in children under the age of five years.

METHODOLOGY

This was a cross-sectional study conducted among parents and caregivers in the paediatric outpatient department of the Rivers State University Teaching Hospital (RSUTH), in Southern Nigeria. The RSUTH is one of the tertiary healthcare facilities in Rivers State and receives patients from public and private healthcare facilities within and outside the State. The Paediatric Outpatient Clinic is run by consultants and resident doctors from Monday to Friday.

Interviewer-administered pre-tested semi-structured questionnaires were used to assess the knowledge, attitude and practice of fever at home over a six-month period from the 1st of June 2022 to November 30th 2022.

Ethical clearance was gotten from the RSUTH Ethics Review Committee. The mothers/caregivers were educated on the research and were reassured of the confidentiality of the data obtained. Informed consent was thereafter obtained from them before the interview was commenced.

The study population comprised of mothers/caregivers of children 0-5 years with or without fever attending the Paediatric outpatient clinic.

The inclusion criteria were all mothers/caregivers of children 0-5 years with or without fever attending the Paediatric outpatient clinic who gave consent to participate in the study. The exclusion criteria were mothers/caregivers of children above 5 years and/or those who did not give consent to participate in the study. Fathers were also excluded from the study due to paucity of information.

Convenient sampling technique was used for this study. Thus mothers/caregivers who gave consent were consecutively recruited into the study throughout the study period.

Two research assistants (House officers) were recruited to assist in administering the questionnaires to the mothers/caregivers. A training session was carried out by the researchers and every detail was duly explained before commencement of the research.

A pre-tested questionnaire developed by the researchers was used to collect data for the study. The questionnaire was divided into four sections. The first section was on the demographics of the parents - age, sex, occupation, level of education, religion, marital status as well as the age and sex of the child. The second section was on their knowledge of fever and its causes, source of information on fever as well as measurement of body temperature. The third section covered the respondents' attitude towards fever while the fourth section was about their practices at home for a child having a fever. Socioeconomic status of the respondents was categorized using the classification by Oyedeji. [16] The questionnaire was administered directly to the participants by one-on-one interview by the researchers and research assistants.

A total of 11 questions were asked to assess their knowledge whereas 6 and 10 questions were asked to assess attitude and practice respectively. For every correct answer, a mark was awarded. The total score of each participant was collated and the percentage of the total score was calculated. To assess knowledge, a score of 70-100% and above was considered good knowledge while 50-69% was fair knowledge and below 50% was poor knowledge. The same was done to assess attitude and practice of the mothers on home management of fever.

The data was entered into an Excel sheet and analysis done using the SPSS software version 23. Data were presented as percentages, tables and figures. Pearson Chi square and Fishers' Exact test were used to test for association between categorical dependent and independent variables. The level of statistical significance was set at 5% with 95% confidence interval. The test of association was said to be significant if the *P* value was < 0.5.

RESULT

Socio-demographic characteristics of the respondents

Of 219 respondents, the commonest age group was 31-40 years 114(52.1%) with mean age of 34.53 ± 6.96 years. Majority were married 208(95.0%), parity of one 63(28.8%) and were Christians 216(98.6%). Most mothers had tertiary level of education 153(69.9%) and were mainly businesswomen/traders 98(44.7%). Majority of the fathers had tertiary level of education 156(71.2%) and were mainly businessmen/traders 67(30.5%). Most families were of middle socio-economic class 56(50.0%), Table I.

Table I: Socio-demographic characteristics of the respondents

Variables	Frequency, n = 219 (%)
Age group (years)	
21 – 30	73 (33.3)
31 – 40	114 (52.1)
> 40	32 (14.6)
Marital status	
Married	208 (95.0)
Single	11 (5.0)
Parity	
One	63 (28.8)
Two	59 (26.9)
Three	57 (26.0)
≥ Four	40 (18.3)
Religion	
Christianity	216 (98.6)
Islam	3 (1.4)
Mother's level of education	
Primary	5 (2.3)
Secondary	61 (27.8)
Tertiary	153 (69.9)
Mother's occupation	
Business/trader	98 (44.7)
Civil servant	27 (12.3)
Public servant	30 (13.7)
Artisan	21 (9.6)
Professionals	17 (7.8)
House wives/students/unemployed	26 (11.9)
Father's level of education	
Nil	2 (0.9)
Primary	5 (2.3)
Secondary	56 (25.6)
Tertiary	156 (71.2)
Father's occupation	
Business/trader	67 (30.5)
Civil servant	36 (16.4)
Public servant	33 (15.1)
Artisan	28 (12.8)
Professionals	54 (24.7)
Retired	1 (0.5)
Socio-economic class, n = 112	
Upper	29 (25.9)
Middle	56 (50.0)
Lower	27 (24.1)

Respondents' knowledge of fever and it's home management

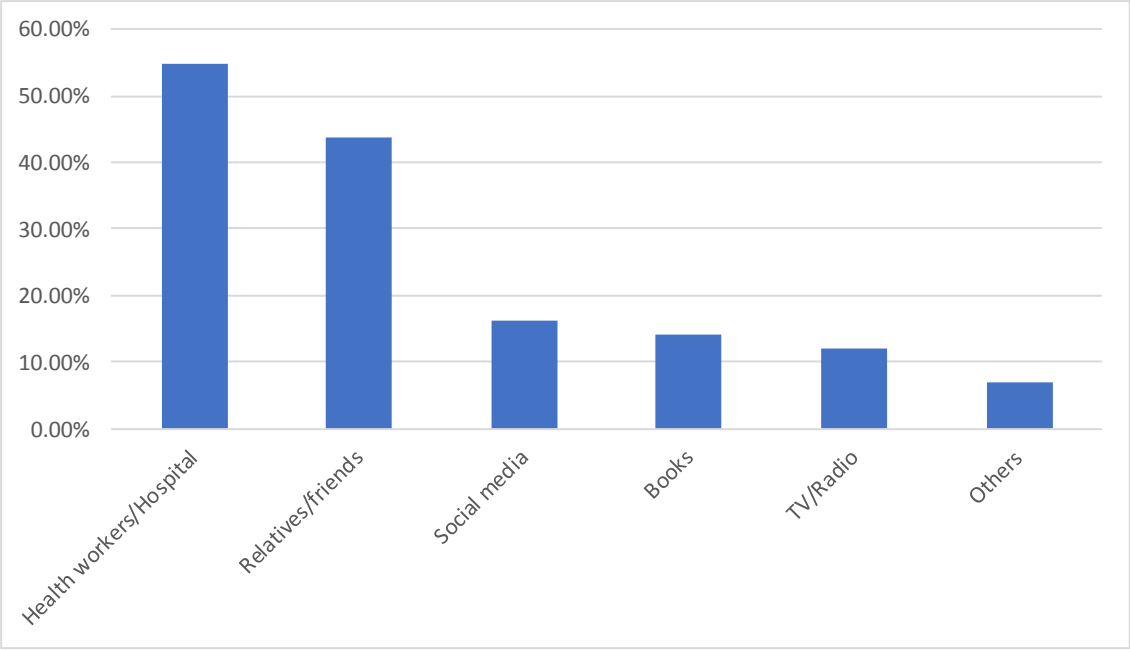
Majority of the respondents correctly defined fever 165(75.3%), knew normal body temperature 123(56.2%) but did not know high body temperature 132(60.3%). Most respondents knew causes of fever 149(68.0%), convulsion as complication of fever 119(54.3%}, how fever is detected 195(89.0%) and the correct site of measurement using a thermometer 114(52.1%). Majority knew fever could be managed at home 184(84.0%), knew the correct treatment for fever 176(80.4%) and knew fever was harmful 207(94.5%), Table II.

Table II: Respondents' knowledge of fever and it's home management

Variables	Frequency, n = 219 (%)
Knew correct definition of fever	
Yes	165 (75.3)
No	54 (24.7)
Knew normal body temperature	
Yes	123 (56.2)
No	96 (43.8)
Knew high body temperature	
Yes	87 (39.7)
No	132 (60.3)
Knew causes of fever	
Yes	149 (68.0)
No	70 (32.0)
Knew convulsion as complications of fever	
Yes	119 (54.3)
No	100 (45.7)
Knew how fever is detected	
Yes	195 (89.0)
No	24 (11.0)
Knew the site of measurement using thermometer	
Yes	114 (52.1)
No	105 (47.9)
Fever can be treated at home	
Yes	184 (84.0)
No	35 (16.0)
Knew the correct treatment for fever	
Yes	176 (80.4)
No	43 (19.6)
Knew fever is harmful	
Yes	207 (94.5)
No	12 (5.5)

Sources of information about fever

The commonest source of information about fever was obtained from health workers/hospitals 118(54.9%) followed by relatives/friends 94(43.7%) and social media 35(16.3%), Figure 1.



TV= Television

Figure 1: Sources of information about fever

Respondents fears about fever

Majority of the respondents' fear about fever was convulsion (81.1%) followed by death (15.1%) and weakness (6.3%), Figure 2.

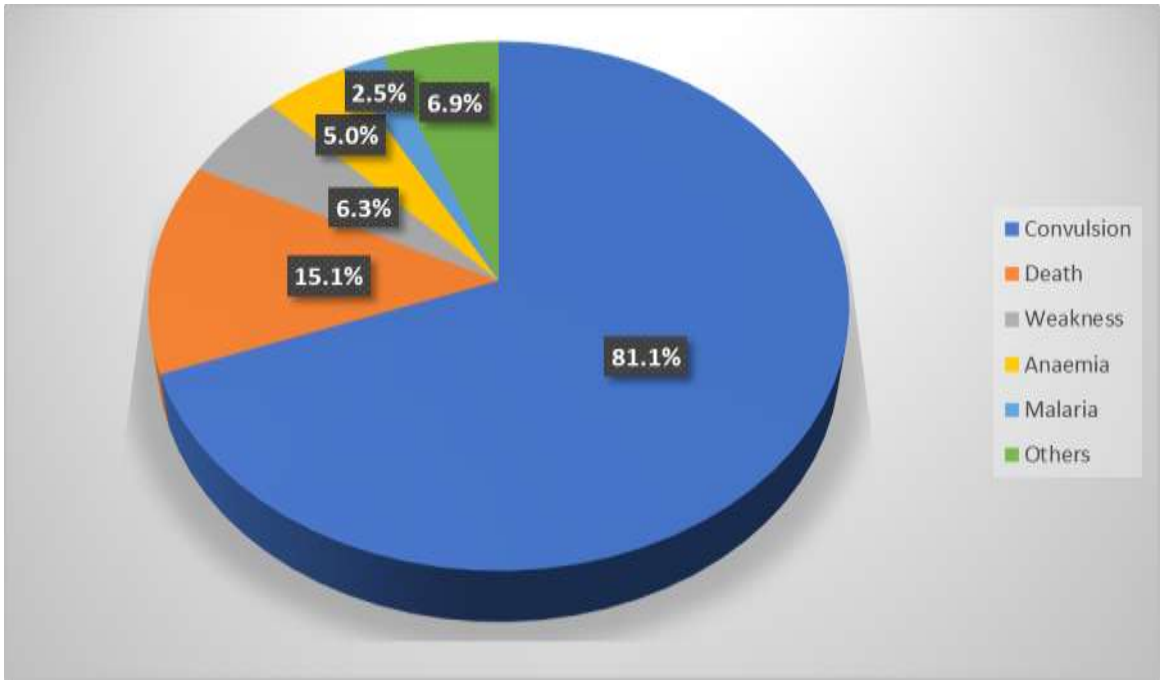


Figure 2: Respondents' fears about fever

Other symptoms other than fever children presented with

The commonest symptoms other than fever respondents' children presented with was chills 76 (42.5%), followed by excessive cry 25 (14.0%), cough 17 (9.5%) and body pains 15 (8.4%), Figure 3.

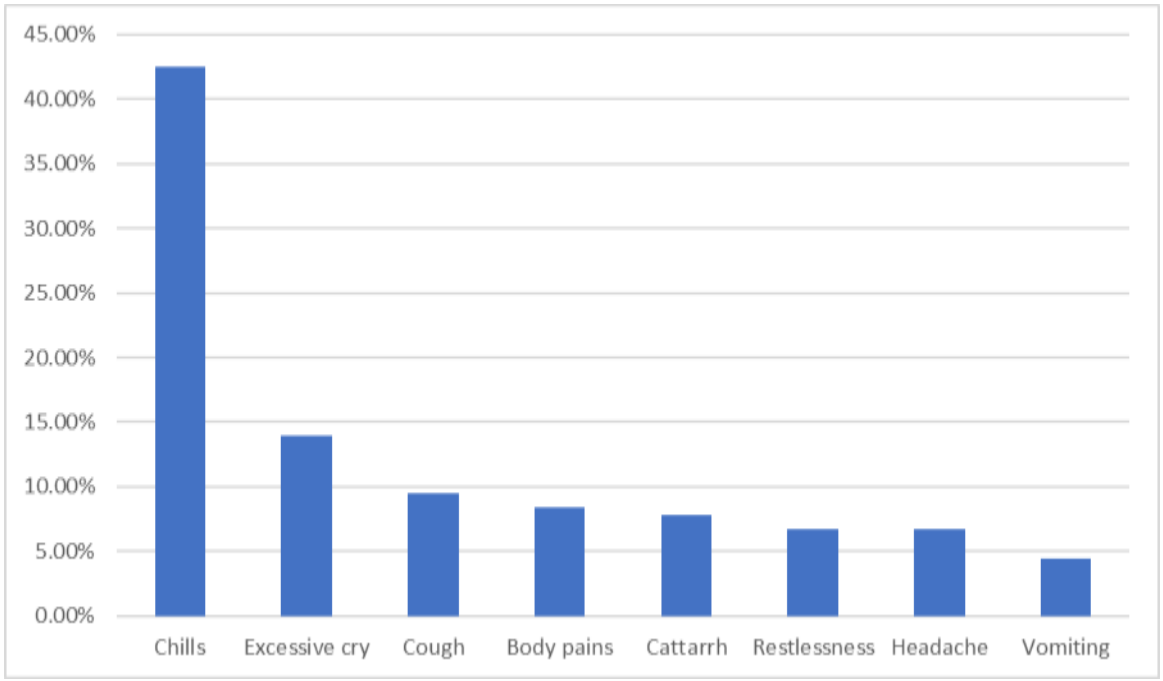


Figure 3: Other symptoms other than fever respondents' children presented with

Attitude of respondents towards home management of fever in under-five children

Majority of respondents had a thermometer 141(64.4%), knew how to use it 136(62.1%) and would measure their child's temperature at home if fever was suspected 161(73.5%). Most respondents would monitor their child's temperature at home 191(87.2%), would manage child's fever at home

171(78.1%) and would visit the hospital because of child's fever 204(93.2%), Table III.

Table III: Attitude of respondents towards home management of fever in under-five children

Variables	Frequency, n = 219 (%)
Has thermometer at home	
Yes	141 (64.4)
No	78 (35.6)
Knew how to use a thermometer	
Yes	136 (62.1)
No	83 (37.9)
Would measure child's temperature at home if fever is suspected	
Yes	161 (73.5)
No	58 (26.5)
Would monitor child's temperature at home	
Yes	191 (87.2)
No	28 (12.8)
Would manage child's fever at home	
Yes	171 (78.1)
No	48 (21.9)
Would take child to the hospital because of fever	
Yes	204 (93.2)
No	15 (6.8)

Practice of respondents on home management of fever in under-five children

Two hundred and eleven children (96.3%) had fever in the past, majority within 1 - 5 days of the interview 80(37.9%). Most respondents detected fever by touch 169(68.7%) of which the dorsum of the hand was mainly used 145(83.8%). Mercury-in-glass thermometer 78(67.1%) was the commonest type of thermometer used. Axilla was the commonest site of measurement of temperature 110(94.8%) with the mercury-in-glass thermometer kept within stipulated time of 2 minutes in minority of respondents 10(11.4%). Majority treated their child's fever at home 171(81.0%); 160(62.5%) gave paracetamol while 16(6.3%) gave ibuprofen. Most respondents gave more fluid because of the fever 122(55.7%), reduced child's clothing 191(87.2%), while a minority 17(7.8%) increased child's clothing during fever episode. Most took their children with fever to the hospital 154(70.3%) and was done mostly within 2 – 3 days of onset of the fever 59(40.1%). Of 62 children who were not taken to the hospital, majority 42(64.6%) were taken to the pharmacy/chemist for treatment. Convulsion with fever was reported in 22 (10.4%) of these children, Table IV.

Table IV: Practice of respondents on home management of fever in under-five children

Variables	Frequency, n = 219 (%)
Child ever had fever	
Yes	211 (96.3)
No	8 (3.7)
How long-ago child had fever (days), n = 211	
< 1	78 (37.0)
1 – 5	80 (37.9)
≥ 6	53 (25.1)
How fever was detected, n = 246 (multiple responses)	
Touch	169 (68.7)
Thermometer	70 (28.5)
Excessive cry	4 (1.6)
Restlessness	3 (1.2)
If touch, part of hand used, n = 173	
Dorsum	145 (83.8)
Palm	28 (16.2)
Type of thermometer used, n = 73	
Digital	24 (32.9)
Mercury-in-glass	49 (67.1)
Site of measurement, n = 116 (multiple responses)	
Axilla/armpit	110 (94.8)
Forehead	4 (3.5)
Rectal	2 (1.7)
Duration of thermometer in the axilla before being read, n = 88	

2 minutes	10 (11.4)
< / > minutes	78 (88.6)
Treated child's fever at home, n = 211	
Yes	171 (81.0)
No	40 (19.0)
Treatment for home management of fever, n = 256	
Paracetamol	160 (62.5))
Ibuprofen	16 (6.3)
Tepid sponging	25 (9.8)
Antimalarials	34 (13.3)
Antibiotics	15 (5.8)
Others	6 (2.3)
Gave child with fever more water	
Yes	122 (55.7)
No	97 (44.3)
Reduced child's clothing	
Yes	191 (87.2)
No	28 (12.8)
Increased child's clothing	
Yes	17 (7.8)
No	202 (92.2)
Took child to the hospital	
Yes	154 (70.3)
No	65 (29.7)
Duration of fever before child was taken to the hospital (days), n = 147	
≤ 1	50 (34.0)
2 – 3	59 (40.1)
≥ 4	38 (25.9)
If not hospital, where child was taken to, n = 65	
Pharmacy/Chemist	42 (64.6)
Stayed home	13 (20.0)
Church/Prayer house	6 (9.2)
Traditional consultation	1 (1.6)
No answer	3 (4.6)
Child had convulsion with fever, n = 211	
Yes	22 (10.4)
No	189 (89.6)

Knowledge, attitude and practice of home management of fever in under-five children

There was good knowledge, good attitude and good practice among mothers/caregivers on home management of fever in under-five children in 39.7%, 59.8% and 33.2% respectively of the respondents, Figure 3.

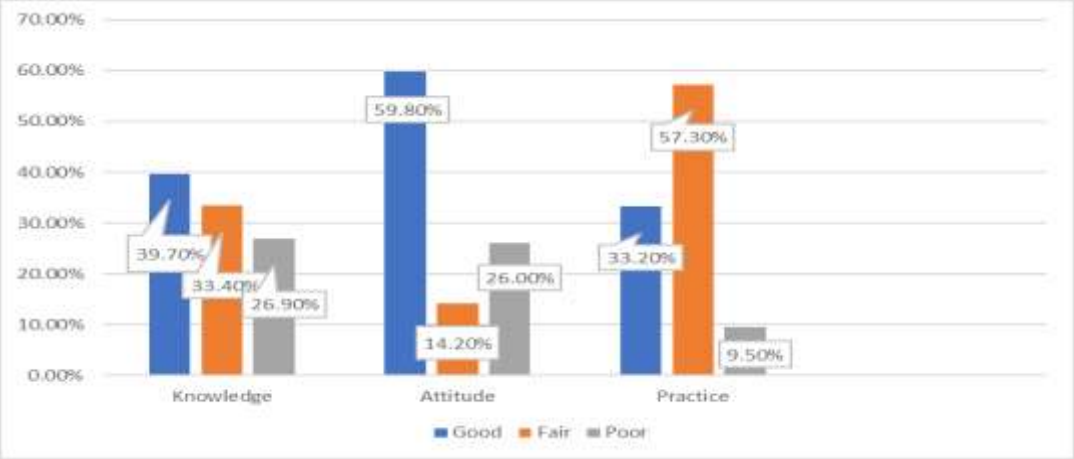


Figure 3: Knowledge, attitude and practice of home management of fever in under-five children

Association between socio-demographic variables and knowledge of respondents on home management of fever in under-five children

Mother's level of education and father's level of education were significantly associated with the knowledge of respondents on the home management of

fever in under-five children (*P* values = < 0.001 and 0.009 respectively), Table V.

Table V: Association between socio-demographic variables and knowledge of respondents on home management of fever in under-five children

Variables	Knowledge			Test of Association
	Good,n(%)	Fair,n(%)	Poor,n(%)	*P* value
Age group (years)				
21 – 30	30(34.5)	23(31.5)	20(33.9)	
31 – 40	45(51.7)	37(50.7)	32(54.2)	0.902
> 40	12(13.8)	13(17.8)	7(11.9)	
Marital status				
Married	84(96.6)	68(93.2)	56(94.9)	0.584*
Single	3(3.4)	5(6.8)	3(5.1)	
Mother's level of education				
Primary	0	2(2.7)	3(5.1)	
Secondary	14(16.1)	22(30.1)	25(42.4)	< 0.001*
Tertiary	73(83.9)	49(67.1)	31(52.5)	
Mother's occupation				
Business/Trader	38(43.7)	30(41.1)	30(50.8)	
Civil servant	12(13.8)	10(13.7)	5(8.5)	
Public servant	18(20.7)	8(11.0)	4(6.8)	0.609
Artisan	4(4.6)	9(12.3)	8(13.6)	
Professionals	8(9.2)	6(8.2)	3(5.1)	
House wife/unemployed	7(8.0)	10(13.7)	9(15.3)	
Father's level of education				
Nil	0	0	2(3.4)	
Primary	2(2.3)	1(1.4)	2(3.4)	0.009*
Secondary	13(14.9)	24(32.9)	19(32.2)	
Tertiary	72(82.8)	48(65.9)	36(61.0)	
Father's occupation				
Business/Trader	24(27.6)	21(28.8)	22(37.3)	
Civil servant	12(13.8)	15(20.5)	9(15.3)	
Public servant	16(18.4)	12(16.4)	5(8.5)	0.285*
Artisan	8(9.2)	8(11.0)	12(20.3)	
Professional	26(29.9)	17(23.3)	11(18.6)	
Retired	1(1.0)	0	0	
Socio-economic class				
Upper	10(20.0)	5(17.2)	14(42.4)	
Middle	27(54.0)	17(58.6)	12(36.4)	0.136
Lower	13(26.0)	7(24.1)	7(21.2)	

***=Fisher's Exact *P* value**

Association between socio-demographic variables and attitude of respondents on home management of fever in under-five children

Marital status, mother's level of education, father's level of education and socio-economic class were significantly associated with the attitude of the respondents towards home management of fever in under-five children (*P* value = 0.043, < 0.001, < 0.001, < 0.001 respectively), Table VI.

Table VI: Association between socio-demographic variables and attitude of respondents on home management of fever in under-five children

Variables	Attitude			Test of Association
	Good,n(%)	Fair,n(%)	Poor,n(%)	*P* value
Age group (years)				
21 – 30	40(30.5)	13(31.5)	20(35.1)	
31 – 40	70(53.4)	13(41.9)	31(54.4)	0.609*
> 40	21(16.0)	5(16.1)	6(10.5)	
Marital status				
Married	128(97.7)	28(90.3)	52(91.2)	0.043*
Single	3(2.3)	3(9.7)	5(8.8)	
Mother's level of education				
Primary	1(0.8)	1(3.2)	3(5.3)	
Secondary	20(15.3)	10(32.3)	31(54.4)	< 0.001*
Tertiary	110(84.0)	20(64.5)	23(40.4)	
Mother's occupation				
Business/Trader	55(42.0)	14(45.2)	29(50.9)	
Civil servant	20(15.3)	2(6.5)	5(8.8)	
Public servant	21(16.0)	4(12.9)	5(8.8)	0.121*
Artisan	9(6.9)	3(9.7)	9(15.8)	
Professionals	14(10.7)	1(3.2)	2(3.5)	
House wife/unemployed	12(9.2)	7(22.6)	7(12.3)	

Father's level of education				
Nil	0	0	2(3.5)	
Primary	1(0.8)	2(6.5)	2(3.5)	< 0.001*
Secondary	19(14.5)	10(32.3)	27(47.4)	
Tertiary	111(84.7)	19(61.3)	26(45.6)	
Father's occupation				
Business/Trader	35(26.7)	9(29.0)	23(40.4)	
Civil servant	25(19.1)	5(16.1)	6(10.5)	
Public servant	23(17.6)	4(12.9)	6(10.5)	0.340*
Artisan	12(9.2)	5(16.1)	11(19.3)	
Professional	35(26.7)	8(25.8)	11(19.3)	
Retired	1(0.8)	0	0	
Socio-economic class				
Upper	11(15.9)	1(9.1)	17(53.1)	
Middle	36(52.2)	7(63.6)	13(40.6)	< 0.001*
Lower	13(26.0)	7(24.1)	7(21.2)	

***=Fishers Exact *P* value**

Association between socio-demographic variables and practice of respondents on home management of fever in under-five children

Age group, marital status and socio-economic class are significantly associated with the practice on the home management of fever in under-five children by respondents (*P* value = 0.042, 0.034 and 0.036 respectively), Table VII.

Table VII: Association between socio-demographic variables and practice of respondents on home management of fever in under-five children

Variables	Practice			Test of Association
	Good,n(%)	Fair,n(%)	Poor,n(%)	P value
Age group (years)				
21 – 30	28(40.0)	36(29.8)	6(30.0)	
31 – 40	28(40.0)	68(53.2)	14(7.0)	0.042*
> 40	14(20.0)	17(14.)	0	
Marital status				
Married	62(88.6)	118(97.5)	20(100.0)	0.034*
Single	8(11.4)	3(2.5)	0	
Mother's level of education				
Primary	2(2.9)	2(1.7)	1(5.0)	
Secondary	20(28.6)	34(28.1)	5(25.0)	<0.794*
Tertiary	110(84.0)	20(64.5)	23(40.4)	
Mother's occupation				
Business/Trader	31(44.3)	55(45.5)	8(40.0)	
Civil servant	11(15.7)	13(10.7)	2(10.0)	
Public servant	8(11.4)	16(13.2)	5(25.0)	0.931*
Artisan	6(8.6)	12(9.9)	2(10.0)	
Professionals	6(8.6)	9(7.4)	2(10.0)	
House wife/unemployed	8(11.4)	16(13.2)	1(5.0)	
Father's level of education				
Nil	0	2(1.7)	0	
Primary	2(2.9)	1(0.8)	2(10.0)	0.117*
Secondary	18(25.7)	30(24.8)	7(35.0)	
Tertiary	50(71.4)	88(72.7)	11(55.0)	
Father's occupation				
Business/Trader	31(44.3)	28(23.1)	4(20.0)	
Civil servant	11(15.7)	20(16.5)	4(20.0)	
Public servant	8(11.4)	20(16.5)	5(25.0)	0.090*
Artisan	6(8.6)	18(14.9)	4(20.0)	
Professional	13(18.6)	35(28.9)	3(15.0)	
Retired	1(1.4)	0	0	
Socio-economic class				
Upper	9(25.7)	14(21.9)	6(66.7)	
Middle	14(40.0)	37(57.8)	2(22.2)	0.036*
Lower	12(34.3)	13(20.3)	1(11.1)	

***=Fishers Exact *P* value**

DISCUSSION

Majority of the mothers interviewed were within the age groups 31 – 40 years (52.1%) corroborating with studies in Saudi Arabia, [17] India [18] and Turkey. [19] Younger women predominated in other studies in Nigeria [1],[20] and Qatar. [21] These variation in age could be attributable to the varying

geographic regions with different cultural practices in areas of marriage and child birth.

About 3/4th (75.3%) of respondents correctly defined fever as hotness of the body whereas only slightly above 1/3rd (39.7%) knew the correct temperature considered as fever in the present study. Fever was similarly defined by 83.3% and 93% respondents in Lagos, [1] Nigeria and India [22] respectively. All 93% in the Indian study [22] did not know normal temperature. This is not surprising as more than 2/3rd (77%) of the respondents were illiterates whereas in the present study all the respondents had some form of formal education with more than 2/3rd with tertiary education and above. In addition, Hussain et al, [23] AlAteeq et al, [12] Elajez et al [21] and Mallick et al [24] reported 67%, 64.4%, 65.8% and 55.5% respondents being able to define fever correctly in Saudi Arabia, Qatar and India respectively whereas only 46.8% respondents did in Enugu, [20] southeast Nigeria. Also, Arica et al [19] in Turkey documented up to 21.9% respondents did not know what temperature was considered as fever as also documented by Rkain et al [2] where 96.5% respondents had same findings. This difference in the knowledge level could be attributable to the ready accessibility of information on health of the respondents as well as their varying levels of education. The low level of knowledge among mothers about the correct definition of fever with regards to the temperature calls for an immediate increase in educational programs in and outside the hospital. This should include increased health talks in the clinics (paediatrics and antenatal), jingles on radio and televisions etc.

Most respondents (68%) knew some causes of fever as also documented by Oshikoya and Senbanjo, [1] Ayogu et al, [20] Mallick et al [24] and Khan et al [22] in Nigeria and India respectively.

Majority of respondents in the present study believed that fever was harmful as also documented by Elajez et al [21] in Qatar where 95.7% was of the opinion that untreated fever could cause harm to the child. It was also observed in the present study that more than half (54.3%) of respondents knew complications of fever with convulsion (81.1%) being the commonest followed by death (15.1%) and weakness of the body (6.3%). Convulsion being the commonest complication of fever was also documented by most other researchers [1,12,17,20-25] whereas dehydration which may result from fluid loss was reported as commonest by respondents in Lahore [26] India and brain damage in Calabar [27] Nigeria and Jordan. [28] Death was considered as a complication of fever by 15.1% respondents in the present study. A higher percentage of 17% and 31.3% respondents in India [22] and Lagos [1] Nigeria respectively was reported while others [21,25,27,28] reported much lower percentages than the present study. Fever in children could therefore lead to anxiety in caregivers predisposing them to erroneous practices. It is pertinent to note that anxiety could affect care givers attitudes and behaviours. [29,30]

The commonest source of information by respondents was from the hospitals and health workers which was similarly documented by other researchers. [1,12,19] In contrast, the internet was documented as the commonest source of information by Kelly et al [31] in Ireland. This is not surprising as internet services is very common and basic in developed countries unlike in developing countries like Nigeria where it is not readily available and affordable. Increased health education on fever and its' home management can thus be increased via radio/television as well as social media.

About 2/3rd (64.4%) mothers in the present study had possession of a thermometer although slightly less than this fraction (62.1%) said they knew how to measure their children's temperature correctly. In practice however, only 10 (11.4%) correctly measured their children's temperature. In contrast, only 1.4% in a study in Turkey [19] did not know how to use a thermometer.

This is not surprising as in the present study, majority had possession of the mercury-in-glass thermometer which is more technical and difficult to interpret unlike the digital/electronic thermometer which is battery operated and automatic. Encouragingly, more than 82% of caregivers in a study in Saudi Arabia [23] owned a thermometer and in other studies [17,21] in same locality only 20% and 2.1% did not have a thermometer. In Morocco [2] however, although close to 2/3rd (61.2%) had thermometers, just about half of the respondents could use it correctly.

Most respondents (70.3%) detected fever on their children by touching their bodies with their hands in the present study while only 29.7% used thermometer. Touch or tactile method of detecting fever was similarly the commonest method in other parts of Nigeria, [1,11,20] Saudi Arabia, [12] India [18,22] and Turkey. [25] In contrary, thermometer was majorly used in another study in India [26] and Morocco. [2] These differences could be due to varying levels of knowledge in the use of thermometer, its' ready availability and varying geographic locations. In Turkey, redness of the face and ears as well as restlessness accounted for close to 1/3rd (32.1%) method of detecting fever. This wrong assumption of fever could lead to unnecessary treatment with analgesics and other medications. It is worthy of note that thermometer is the only way to detect accurately if a child has fever or not as touch could be subjective. [13]

Mercury-in-glass thermometer was the commonest thermometer used as also observed in Enugu, [20] Nigeria. This was at variance with the digital/electronic thermometer which was used commonest in Qatar, [21] Saudi Arabia [17,23] and Jordan. [28] This difference could be because of varying geographic locations and the availability of the thermometers. It is pertinent to note that mercury-in-glass thermometers are no longer popular and not recommended for home use due to the poisoning effect of mercury when broken.

The commonest site for measurement of temperature in the present study was the axilla/armpit as similarly observed in Enugu, [20] Nigeria, Turkey [19] and Jordan [28] whereas the forehead was the commonest site observed in Saudi Arabia, [17,23] rectum in India [26] and the ears in Qatar. [21] This varying site could be attributed to the different types of thermometers popularly used in the different geographic locations and their standard operating procedures.

Among mothers who used the mercury-in-glass thermometer, over 80% (88.6%) respondents wrongly kept the thermometer for either too short or longer than the stipulated duration of time of 2 minutes. This was similarly (87%) documented by Khan et al [22] in India. This wrong technique of temperature measurement carried out by caregivers could lead to inaccurate result which thus misinforms the doctor during consultation as well as the unnecessary use of drugs on their babies.

More than 3/4th (81%) mothers commenced treatment of their children's fever at home. This was similarly observed in Calabar, [27] Nigeria where 79.5% did home management of fever. Lower percentages of 66.7%, 58.4%, 37.5% and 13% were documented in other parts of Nigeria, [1,20] Saudi Arabia [17] and India [24] respectively. The very low percentage of 13% reported in a study in India [22] could be attributed to the fact that up to 3/4th (77%) respondents were illiterates and thus may not have been informed about home management of fever unlike in the present study where all the mothers had some form of education with over 2/3rd (69.9%) with tertiary education and above. In addition, the very small sample size of 30 participants in the Indian study [22] could have been responsible.

Paracetamol (acetaminophen) was the commonest analgesics given at home by mothers for home management of fever in the present study corroborating findings of other studies. [1,2,11,17,19-24,27] This is in consonance with the current World Health Organization (WHO) guidelines on the

management of fever with the use of paracetamol. [32] This was at variance with other studies where ibuprofen was given mostly [26] and tepid sponging done predominantly. [25,28] Differences in the home management of fever could be attributed to variations in the information passed on to mothers/caregivers. In the present study, administration of ibuprofen to children by care givers accounted for only 6.3%. This is not surprising as ibuprofen is not routinely prescribed or advised as the drug of choice in the relieve of fever. It is usually avoided because of its' gastric side effects as well as its renal complications. Tepid sponging in the present study accounted for less than 10% (9.8%) in the present study as similarly reported in Lahore, [26] India and Enugu, [20] Nigeria accounting for 8.8% and 14.4% respectively whereas 42.1%, 67.7%, 75.9% and 100% respondents sponged their children to relieve fever in Turkey, [19,25] Jordan [28] and Calabar [27] Nigeria respectively. It is sad to note that antibiotics were among the medications given by caregivers to relieve fever in children and in the present study, this accounted for 5.8%. This was in consonance with other studies in Saudi Arabia, [17] Turkey, [25] Lagos [1] Nigeria, Jordan [28] and India [26] accounting for 3.1%, 4.9%, 7.8%, 14.32% and 15.4% respectively. In a study in Saudi Arabia, [17] more than half (57.2%) of the respondents believed that antibiotics reduced high fever. This is worrisome as unnecessary use of antibiotics could lead to antibiotics resistance and predisposes children to side effects of these drugs.

Interestingly, more than 2/3rd (70.3%) respondents took their children to the hospital for further care mostly after 2 – 3 days of unremitting fever as agreed by 40.1% of respondents in the present study. Similar fraction of caregivers was the case in Saudi Arabia [12,17] and Ireland [31] accounting for 63.6%, 64.6% and 69.8% respectively while in a study in India, [24] 78.1% visited a physician within 6 hours of onset of fever. In Turkey, [19] majority (95.8%) of the respondents did same. In contrast, only 10.4% and 20.9% in Enugu, [20] Nigeria and another study in Saudi Arabia [17] took children with fever to the hospital. This poor health seeking behaviour must be discouraged among caregivers as early presentation of sick children to the hospital is key in the reduction of childhood morbidity and mortality. Health education to discourage this trend is therefore recommended.

There was good knowledge on the home management of fever in slightly above a 1/3rd (39.5%) of the respondents in the present study which was higher than the 20% and 5% reported in a study in India [18] and Saudi Arabia [23] respectively but lower than the 61.6% and 62% reported in Enugu [20] Nigeria and Egypt [33] respectively. Another study in Saudi Arabia [17] documented a very high level of poor knowledge (94.2%) on the home management of fever in children. These variations could be attributed to the different scoring criteria used, variation over time as well as the level of education of the study participants. This thus corroborates the findings by Hussain et al [23] stating that parents with education above college (OR=1.129;95% CI=0.725-1,760) had positive correlation with good knowledge. In the same vein, Hassona et al [33] in their study in Egypt also showed that parents with tertiary education was significantly associated with good knowledge (P = 0.001). Other factors could be sociocultural as well as the age of the caregivers. The gender of the caregivers could also contribute to the level of knowledge as observed by Elajez et al [21] in Qatar where mothers were found to define fever more appropriately than fathers (P = 0.004). Increased awareness program on the home management of fever will therefore improve the populace knowledge about fever, correct use of thermometers as well as correct home management of fever so as to avoid complications such as febrile convulsion.

More than half (59.8%) respondents in the present study had good attitude towards

home management of fever in children which is similar to the 59.9% reported by Hassona et al [33] in Egypt. This could be because, most of the respondents in the present study were highly educated with more than 2/3rd having tertiary education. This was not the case in the study in Saudi Arabia [23] where only 22% had good attitude towards home management of fever which could be because, only 20% respondents had tertiary education. The analysis could have been skewed as much fewer questions (4) were used for the assessments as also observed in the study in Saudi Arabia. [17] In contrast in India, [18] more than 2/3rd (78.4%) respondents had positive attitude. This could be due to varying scoring criteria used.

About 1/3rd (33.2%) respondents had good practice of the home management of fever in the present study which corroborates the 38.8% in Enugu [20] Nigeria but higher than the 27% and 21.9% reported in India [18] and Egypt [33] respectively. A slightly higher practice levels of 40% and 42.9% were reported in Saudi Arabia. [17,23] These variations could be due to variations in the scoring criteria as well as the level of education of the study participants. It is pertinent to note that in both studies in Saudi Arabia, [17,23] only 2 and 4 questions were used respectively unlike in the present study where more questions were asked the participants.

In the present study, mother's level of education and father's level of education were significantly associated with the level of knowledge ($P < 0.001$ and $P = 0.009$ respectively) with tertiary education being significantly associated with good knowledge. This was also the findings by Arica et al [19] in Turkey, Rkain et al [2] in Morocco and Hassona et al [33] in Egypt. Thus, investing on education of the populace will go a long way in improving knowledge as well as health in general. Contrary to the present study however, Ayogu et al [20] in Enugu, Nigeria did not find any significant association between the level of education and age of the participants with the knowledge level whereas Hussain et al [23] in Saudi Arabia documented employment status as been significantly associated with knowledge level ($P < 0.005$). Also, Arica et al [19] documented statistically significant correlation between the level of knowledge and socioeconomic status, mothers age and the number of children ($P < 0.01$) while Rkain et al [2] reported parents' level of education ($P < 0.001$), profession ($P = 0.007$) and socioeconomic status ($P < 0.001$) being significantly associated with correct knowledge. In addition. Salih et al [17] in India reported age of parents as being significantly associated with good knowledge.

Mothers and fathers' level of education, marital status and family socioeconomic status were significantly associated with the attitude towards the home management of fever in the present study. Hassona et al [33] in Egypt similarly reported level of education of fathers as being significantly associated with attitude level. In contrast, Hussain et al [23] in Saudi Arabia documented the number of children as being significantly associated with attitude level of the participants as also observed by Hassona et al. [33]

Age group, marital status and socioeconomic status of the respondents were significantly associated with the practice levels of the respondents in the present study. Similarly, Hussain et al [23] and Ayogu et al [20] reported age as being significantly associated with practice level. Hussain et al [23] also reported level of education and the parents' level of education as being significantly associated with the practice level as against the present study. In addition to age group of mothers being significantly associated with the practice levels similar to the present study, Hassona et al [33] reported the number of children, residence, mothers' level of education, mothers' occupation, fathers' level of education, fathers' occupation and family income being also significantly associated with practice. These variations in

the associations could be because of varying sample sizes, geographic locations and different cultural practices.

CONCLUSION

Only about a third of mothers attending the outpatient paediatric clinic of the Rivers State University Teaching hospital had good knowledge (39.7%) and good practice (33.2%) on the home management of fever in their under-five children while about half (59.8%) had good attitude.

Massive enlightenment campaigns in and outside the hospitals on home management of fever prior to hospital consultation should therefore be carried out so as to reduce complications that could arise from unduly high temperature.

Declaration by Authors

Ethical Approval: Approved

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