

# *Perception and Experience of Childhood Malaria Management among Mothers of Under-five Children in Osogbo Osun State, Nigeria*

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## Research

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## Abstract

Malaria remains a major health challenge in Nigeria despite efforts at reducing its prevalence. Previous studies on malaria focused mainly on the biomedical aspects with little attention given to the social characteristics influencing malaria management among mothers as primary caregivers of under-five children. This study, therefore, investigated perception and experience of childhood malaria management among mothers of under-five children in Osogbo Metropolis classified in literature as area with high childhood malaria prevalence. The Health Belief Model was adopted as theoretical framework, while the cross-sectional survey research design was employed using both quantitative and qualitative methods. The study was conducted among selected mothers of under-five children using a multi-stage sampling procedure. Cochran's formula was used to determine the sample size of 561 respondents used. A structured questionnaire was administered on mothers to elicit information on socio-demographic characteristics, perceptions and experience of childhood malaria. Twelve focus group discussions were conducted with mothers whose under-five children had malaria in the six weeks preceding the study. Quantitative data were analysed using descriptive statistics and Chi-square at 0.05 level of significance. Qualitative data were content analysed. The age the mothers was  $41.00 \pm 7.2$  years. About 98.0% of the mothers perceived malaria as treatable, 54.0% of mothers perceived fever as major symptom of malaria, 58.3% said mosquito bite was the cause of malaria, while 65.6% stated that Insecticide Treated Net was the most effective method of malaria prevention. There were significant associations between knowledge of malaria prevention and income ( $\chi^2 = 57.00$ ), and between knowledge of consequences of malaria and education ( $\chi^2 = 50.55$ ). Misconceptions still surround perception of malaria management among mothers of under-five children. More enlightenment efforts are needed to dispel fallacies mitigating against malaria management.

## Introduction

Consistent studies have shown that malaria remains a great burden to humanity. Malaria is responsible for about 214 million malaria infections in 2015 around the world however, African countries collectively account for about 88% of it (World Malaria Report, 2015). This data makes malaria the leading causative agent of diseases and mortality in Africa particularly in children below the age of five years. Furthermore, World Malaria Report (2015) reveals the increasing malaria epidemic among African children despite significant advances made in its management. For instance, malaria caused the death of 292,000 (42%) of African children below five years in 2015. In addition, malaria ranks the third prominent cause of death among children below five years old globally next to pneumonia, diarrhoea and also the second prominent cause of death from contagious diseases in Africa, after HIV/AIDS (World Malaria Report, 2019).

Malaria is a serious health challenge in Nigerian population given the fact that it accounts for the highest incidence of deaths ever recorded in any country of the world. For instance, World Malaria Report (2015) shows that Nigeria and Democratic Republic of the Congo collectively contributed to over 35% estimated malaria deaths worldwide. Also, the health burden of malaria in Nigeria is inexhaustible. Nigerian Demographic Health Survey (2013) reported that Nigeria has an average of 42% childhood malaria prevalence. These statistics are worrisome given the significant level of improvement and innovation made in malaria management.

Socio-cultural misconceptions have unabatedly continued to hinder malaria management to the extent that many mothers believe that malaria fever in children cannot be prevented (Fatou, Susan Charlotte, Sarah, Umberto, Juliet & Koen, 2016). It reported that certain socio-cultural beliefs - walking in the sun, consumption of plenty yam and yam-related food, excess use of palm oil, smoking, witches, gods and more are held sacrosanct as the causes of malaria among the southwest Yoruba in Nigeria (Orimadegun and Ilesanmi, 2015). Socio-cultural belief system has prevented mothers from initiating prompt malaria treatment measures for their children on notion that malaria is a natural occurrence which disappears when it has exhausted its course.

Conscientious efforts such as insecticide treated nets (ITNs), indoor residual spraying (IRS), artemisinin combination therapy (ACT) and more have been adopted in curbing the rising incidence of malaria. In spite of these, malaria burdens remain enormous due to some underlying factors such as poverty, a significant factor in malaria management (Amzat, 2009). Worst still, many people have held on to use of pyrethroids in mosquito parasite control, which mosquito has developed resistance to its use

in many sub-Saharan Africa nations (Machani, Githeko, Sang, Ochomo, Bonizzoni, Zhou, Yan & Afrane, 2018; Machani, Ochomo, Sang, Bonizzoni, Zhou, Githeko, Yan & Afrane, 2019).

The foregoing analysis underscored the need to re-examine the perceptions of childhood malaria given the high prevalence of child mortality caused by malaria parasite. This study examined perceptions of childhood malaria management among mothers of under-five children in Osogbo, metropolis.

## Justification For The Study

The current malaria prevalence in children is high in sub-Saharan Africa, particularly Nigeria which has 42% prevalence (NDHS, 2013). This is expected to rise given the unabated misconceptions about malaria by caregivers. Nigeria has the largest population of children in sub-Saharan Africa and by approximation will remain so till the next decade, this portends a source of concern for the health of children and pregnant women especially, in Osun state with the worst Roll Back malaria indicators in Nigeria. Therefore, to examine the perception and experience of childhood malaria management of mothers, demonstrates a devotion to the social context of the health status and welfare of children. The study focus takes into account the perception of malaria management as important, its correct understanding is fundamental to the well-being of children and pregnant women (WHO, 2015).

## Perception Of Childhood Malaria

### *The Epidemiology of Malaria*

Malaria is caused by parasitic [protozoans](#) belonging to the species of [Plasmodium](#) transmitted by female anopheles mosquitoes (WHO, 2014). Malaria manifests varieties of symptoms such as fever, [fatigue](#), [vomiting](#) and [headaches](#). However, in complicated case, it could lead to [seizures](#), yellow coloration of the skin, [coma](#) and [death](#). Furthermore, the symptoms of malaria usually manifest between ten to fifteen days after a healthy person has been bitten by carrier female anopheles' mosquito (WHO, 2018). Immediate treatment based on correct diagnosis should be administered to combat the toxic effect of malaria. If the treatment fails, the malaria may reoccur after several months in the future in a person (WHO, 2014). Re-infection in people who have recently survived an infection can lead to milder symptoms which disappear over months to years as far as the person has no continuing exposure to malaria (Carrabolla, 2014).

Once parasitic protozoa are deposited from the saliva gland of infected female anopheles mosquito into the blood system of its victim, they migrate quickly to the liver cells where they mature and reproduce. Five species of plasmodium have identified capable of infecting humans and spread by humans includes *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae*, and *P. knowlesi* Carrabolla, 2014). *P. falciparum* has account for most of the deaths recorded in human population, while *P. vivax*, *ovale*, and *malariae* cause mild malaria. The *P. knowlesi* species hardly cause disease in humans (WHO, 2014: Carrabolla, 2014).

Malaria infection in human host is confirmed by the microscopic examination of blood using [blood films](#), or with [antigen-based rapid diagnostic tests](#) (Carrabolla, 2014). Other methods such as use of reaction has been developed to detect the parasite's [DNA](#), but are rarely used in endemic malaria areas because they are expensive and complex (Nadjm and Behrens, 2012).

The danger posed by malaria parasite to the health of people can be ameliorated using nets and spraying of insecticides in stagnant water (Caraballo, 2014). Medications exist to protect migrants to endemic malaria areas from contracting the disease such as intermittent doses of [sulfadoxine/pyrimethamine](#) medications is approved for infants and mothers immediately they cross their first trimester of [pregnancy](#) in areas where there are rampant incidents of malaria (NDHS, 2013).

### Perception of Childhood Malaria

Misselbrook (2014) maintains that sick is a deviation from the acceptable standard of well-being. The observable changes in the body function are represented by symptoms which are native skills use for establishing, diagnosing or defining the condition. During illness condition, changes from the societal standard pattern of behaviours are manifested due to the inability of one to perform his legitimate routine functions in the society. What this assertion signifies is that an illness state is evaluated by biomedical conditions, the definition of the illness by the sick person and his response to illness.

Malaria practices are most times culture bound and can impede the effectiveness of malaria management (Dhiman, 2019). This revelation justifies the need to take into consideration influence of cultural dictates in formulating programmes aimed at improving the health status of the people. The decision to adopt either the preventive or the treatment measures may be decided by the way an individual understands his ill-health state in addition to their level of belief about the effectiveness of such methods (Dhiman, 2019). It is significant to note that in societies across the globe people have a variety of belief on the causes and spread of malaria that differ with cultural, educational and economic considerations that have direct effects for management seeking behaviour and other measures in place to control malaria (Hlongwana and Tsoka-Gwegweni, 2017). Serious concentration on these perceptions is central to public health management strategies because beliefs that are in variation from scientific explanation may lead to action, delay in action or ineffective action, all with serious consequences.

Differentials in illness perceptions have been emphasized scholars (Kucukarsian, 2012: Gibbons, Kenning, Coventry, Bee, Bundy, Fisher and Bower. 2013: De Gucht, Garcia, Engelsman, and Maes, 2017: Vos, Kasteleyn, Heijmans, de Leeuw, Schellevis, Rijken, Rutten, 2018: Kaehler, Adhikari, Cheah, Seidlein, Day, Paris, Tanner & Pell, 2019). Perceptions can be thought of in terms of precise statement of illness (its causes(s), susceptibility, severity and means of spread). It is further argued that socio-cultural beliefs are not outside of human environment, but incorporated internally as part of human body, hence illness is, culture-bound.

Every culture defines illness in a peculiar way, which might be different from one another. It is observed that the notion that the culture of an individual, behaviour and lifestyle contribute significantly to determining health and risk of death is not new. The perceived causes of illness maybe divided into natural causation (blood infection, worm infestation in the body and so on), supernatural causations (induced by supernal forces like witchcraft), mystical causation, angered by ancestors, violated taboos or ritual errors) and genetically transmitted disease (Amzat, 2009). These are differential causations, which may require differential treatments. Knowledge about illness is the central factor that influences the health of population which should be evaluated and considered to guaranty the effective control strategy that would be put in place. It is important to know that peoples' behaviour determines the success or failure of many management programmes of tropical diseases (Short and Mollborn, 2015). This is why it is imperative to know how humans define and react to illness in order to establish pragmatic disease management programmes.

Studies have shown that there is no specific illness concept that exactly describes malaria globally, therefore illness like malaria can be classified in a general term. Among the Yorubas Southwest Nigeria, malaria is called 'Iba' in local term which also describes other illness conditions that present like it. Among the Dangme of Ghana, 'Asra' was a controversial illness concept for malaria which is also describes some other disease conditions (Jegade, 2005). In the study conducted on Bodija market women in Ibadan, Nigeria, revealed that 'Iba' is the concept designated for malaria, yet the aetiology of malaria is still subjected to misconception as majority (59.1%) of the women attributed malaria to inappropriate causes (Jegade, Salami, Adejumo, and Oyetunde, 2005). In a study among the Bwatiye of Nigeria, the Hausa word Zazzabi, is used to designate malaria which literally means an ordinary illness that does not kill (Akogun and John, 2005). The perception of severity may influence the way the community response to malaria management. There are other common misrepresentations about malaria among respondents such as that consumption of alcohol is a safeguard against mosquito bites is the causative factor of malaria (Chen, Thanh, Lover, Thao, Luu, Thang, *et al* (2017).

The way mothers understand and explain the disease should not form a strong set of belief system, but they may be used to give graphic statement on position of the illness in their children which do not include a strong model of causality. In line with this assertion mothers in Kilifi, Kenya simultaneously reported that malaria is a sickness that afflicts children below the age of five which is accompanied with hotness of the body, hence it was perceived as a mild illness, caused by natural processes, treatable with herbs but not preventable. It was also discovered that 50% of mothers mentioned mosquitos as the cause of malaria while

10% of mothers understood the modes of transmission (Amzat, 2009). Other studies observe high level awareness of mosquitos as the transmitting agents of malaria (Singh, Musa, Singh and Ebere, 2014; Konlan, Amu, and Japiong, 2019).

In a research conducted in Yaoundé among urban dwellers, 94% of the respondents were aware that mosquito is the cause of malaria (Talipouo, Ngadjeu, Doumbe-Belisse, Djamouko-Djonkam, Bamou, Awono-Ambene *et al*, (2019). In rural Ghana majority (65%) of the participants, associated malaria with mosquito bites while few reported that eating of oily foods, eating of sugary foods, heat from the sun and other causes as the causes of malaria (Laar<sup>1</sup>, Laar<sup>2</sup>, and Dalinjong, 2013). Among the Ibibio of Nigeria, certain symbolic and symptomatic presentations are used to describe malaria. For instance, colour is associated with uto-enyin perceived to be caused by exposure to sunlight, nutrition is linked to adan/akom, believed to be caused by eating too much of oil, bio-physical actions and spiritually-caused fever is associated with atuatuak/nkpo ntokeyen perceived to be caused by unidentified forces and spiritually-induced shortage of blood is related to uto-enyin ekpo perceived to emanated from evil spirits (Nsikanabasi, 2014). There were also misconceptions as respondents mentioned that malaria could be due to supernatural forces such as witches, deities, ghosts, sorcery and forest spirits and more (Pell, Tripura, Nguon, Cheah, Davoeng, Heng, *et al*. 2017; Lim, Tripura, Peto, Sareth, Sanann, Davoeng *et al* 2017).

## Theoretical Framework

2.6.1 The Health Belief Model(HBM) refers to the bold attempt made by social psychologists Hochbaum, Rosenstock and Kegels working jointly in the United States of America's public health facilities in the 1950s to explain health practices focusing exclusively on the actions of people. The model was a postulated response to the disappointment of unrestricted tuberculosis health screening scheme. Since its existence, the HBM has been extensively used to examine an array of long and short-term health actions like harmful sex practices and HIV/AIDS spread.

### Components of Heath Belief Model

*Perceived Susceptibility:* This construct assumes that perceived susceptibility to the debilitating effects and death of malaria in children will probably inspire mothers to adopt appropriate health measures towards ameliorating the illness situation.

*Perceived Seriousness:* The model assesses perceived severity in connection with existing illness conditions such as the complications emanating from childhood malaria infections. Perception of seriousness of childhood malaria infection would instil fear in mothers to initiate prompt treatment in health institutions with adequate facilities to manage the situation.

*Perceived Benefits of Taking Action:* The construct presupposes that mothers would embrace health-related actions suitable to address malaria condition of their children. The suitability of health action taken by mothers depends, on the extent other health alternatives are perceived inadequate or opposed to the successful implementation of malaria control measures in children.

*Barriers to Taking Action:* This construct stresses that existing obstacles can discourage a mother from taken specific health actions to address the childhood malaria condition notwithstanding her conviction taken specific health actions are reasonable and effective in addressing malaria challenges.

*Cue to Action:* The model emphasizes that availability of healthcare information and role of relevant others could assist mothers to take constructive health actions that could facilitate quick resolution effects of childhood malaria. Unfettered access to health information would undoubtedly enhance proper methods of childhood malaria management.

**Self-Efficacy:** This construct explains the capability of mothers to initiate and successfully carry out malaria treatment on their own with the help of malaria management information received The can purchase essential malaria drugs outside the existing formal healthcare system and without prescription of medical experts to treat their children of malaria.

## 3.0 Research Methodology

### 3.1 Research Design

This is an exploratory and descriptive study cross sectional survey which combines quantitative and qualitative techniques of social inquiry. The design is appropriate to the study because the procedure of identifying the perceptions of childhood malaria by mothers need exploratory and descriptive analysis of malaria management behaviour patterns of mothers.

### 3.2 The Study Area

Osogbo comprises of two **Local Government Areas**, Osogbo and Olorunda Local Government Areas. Osogbo occupies an area of about 47 km<sup>2</sup> with a population of approximately 3.5 million (2006 census). There are more men than women in the state with the number of males at about 1,734,149, while the females are about 1,682,810. Under 5 years old children comprise about 20% of the total population (NDHS, 2008).

### 3.3 Study Population

The study sampled mothers of under-five children who were 20 years and above because they spend greater part of their time with children than other categories of caregivers. Therefore mothers provide a comprehensive understanding of the issues investigated in the study.

### 3.4 Sampling Method

The study adopted the multistage random sampling technique for the selection of the mothers of under-five children, who are the main study respondents. Firstly, two Local Government Areas, Osogbo and Olorunda (LGAs) with high prevalence of malaria in the state were purposively selected. This was followed with the random selection of fourteen wards with large population size. The next stage involves random selection of households from the Enumeration Areas (EAs). Lastly, selection of mothers in the communities was done using the ratio of sample population to the projected population. Also, where there was more than one mother of under-five children in a household, balloting was used to pick one.

#### 3.4.1. Inclusion Criteria

- Mothers whose under-five children suffered from malaria in the six weeks preceding the interview and have lived upwards of four months in the present location were chosen in each household.
- Only respondents that gave consent of inclusion were selected for the survey.

### 3.5 Determining the Sample Size

The study adopted the Cochran's (1977) sample size estimation formula to calculate and arrived at the sample size 510.87. The addition of 10% non-response rate to 510.87 gave a total sample size of 561. Using the formula below:  $N = \frac{Z^2 P(1-P)}{e^2}$

Hence, the sample population =  $\frac{1.96^2 [0.069 (1-0.069)]}{0.022^2} = 510.87714 + 51.0 = 561$

$$0.022^2$$

### 3.6 Research Instruments

The collection of primary and secondary data for the study involved the triangulation of research instruments which carefully described the quantitative and qualitative methods respectively. The semi-structured questionnaire, focus group discussion guide and five field assistants used for data collection.

#### 3.6.1 Semi-structured Questionnaire

Semi structured questionnaire consisting of both close-ended (restricted) and open-ended (free) questions were administered on 561 prospective mothers. It has 35 questions format which elicited information on the perceptions and experiences of childhood malaria management. It was categorised into two sub-sections namely, socio-demographic information and perceptions of malaria management of mothers of under-five children.

### 3.6.2 Focus Group Discussion (FGD)

The FGD composed of twelve mothers of under-five children for easy moderation. This gave room for interactive group discussions which facilitated group understandings of underlying factors that shouldn't have been possible on individual perspective. It also provided platform for vetting and counterbalancing of findings from other sources.

**TABLE 3.1: CATEGORIES OF MOTHERS OF UNDER-FIVE CHILDREN IN FGDs**

No of FGDs	Educated Category	Age Category
3	Non-educated mothers	15-30
3	Non-educated mothers	30 and above
3	Educated mothers	15-30
3	Non-educated mothers	30 and above
<b><u>12 (Total)</u></b>		

### 3.7 Validity and Reliability

Content and construct validity were maintained by collecting the items used in constructing the structured questionnaire from the FGDs. The questionnaire was designed in English language and translated into standard Yoruba language and transcribed back into English. The questionnaire was validated by the malaria control department of Ladoke Akintola University of Technology Teaching Hospital (LAUTECH) and Pilot-tested at Egbedore Local Government Area with similar environmental conditions to Osogbo before final corrections were made and administered on mothers. Reliability of data was ensured through review of the generated data and close supervision of research assistants on daily basis. Cases of omission dictated necessitated return of the interviewers to the field for re-collection of adequate data from the same set of respondents.

### 3.8 Data Analysis

#### 3.8.1 Qualitative Data Analysis

Data generated through Focus Group Discussions were transcribed while field notes were organised thematically. Thematisation of data was carried out using qualitative data analysis software (Atlas.ti 6.2).

#### 3.8.2 Quantitative Data Analysis

Quantitative data were analysed at univariate and bivariate levels with the aid of the Statistical Package for the Social Sciences (SPSS v 20).

#### *Univariate Analysis*

This level of analysis was useful in identifying perceptions rather than relationships in the study. Univariate analysis through frequency distribution and percentages provided the general over view of the socio-demographic and economic characteristics of the respondents.

#### *Bivariate Analysis*

The chi-square was used in analyzing the study data at 0.05 level of significance, an engagement of variables like age, gender, marital status, religion and education were measured to determine an association with others variables like perception of causes, consequences and prevention of malaria

### 3.9 Ethical consideration

Ethical approval was sought and gotten from the Chairman, Health Ethical Review Committee of Ladoke Akintola University of Technology (LAUTECH), Osogbo. Participation in the study was completely voluntary and written informed consent was obtained from each respondents

### 3.10 Problems Encountered during Data Collection

It was difficult persuading the mothers in the sample that the study was purely for research purposes this led to cutting down of the number of FGD participants. This problem was resolved through the intervention of the community leaders who allayed the fear of the mothers that the FGD is for the interest of children.

It took time to gather twelve mothers to participate in FGD secessions despite identification and selection of contact persons in the community. Several appointments were scheduled and cancelled until when the mothers were relatively free from their household duties and other commitments.

### 3.11 Limitation to the Study

The study is limited by the cosmopolitan nature of the Osogbo which comprises people from diverse backgrounds- cultures, belief systems, languages among other factors influence healthcare seeking behaviours Osogbo residents. The outcome of diversity was that contributions to the subject matter of the study could not be correctly made in order to avoid succumbing to the danger of invalidation by subsequent data.

## 4.0 Results

### 4.1 Sociodemographic Characteristics

Table 4.1 highlights the socio-demographic information of mothers of under-five children the respondents of the study. The data revealed that most (37.8%) of the mothers were within the age groups 30-34 years. Majority (89.7%) of the mothers were married while 10.7% were unmarried, divorced, widowed or remarried. Again, more than half (53.8%) of the mothers were Muslims, 5.1% were Christians while less than 2% were traditional religious practitioners. Significant majority (97.8%) of the mothers were literate and most (44.4%) had secondary education. Majority (83.2%) of the mothers were gainfully employed, 48.4% were civil servants in government establishments while 20% were employed in the private sector, 14.1% were employed in the agricultural sector, 1.0% were corporate workers and 16.6% of the mothers were unemployed,. **An appreciable number (45.6%) of the mothers earn income between #20,001 and #30,000 which is relatively small to afford the cost of treatment malaria.**

*Table 4.1: Percentage Distribution of Respondents by Sociodemographic Characteristics*

Characteristics	Categories	Frequency	Percentage
<b>Age Group</b>	20-24 years	25	4.5
	25-29 years	159	28.3
	30-34 years	212	37.8
	35-39 years	93	16.6
	40-44 years	44	7.8
	45 and above	28	5.0
	<b>Total</b>	<b>561</b>	<b>100.0</b>
<b>Marital Status</b>	Never been married	33	5.9
	Married	503	89.7
	Widowed	15	2.7
	Separated	-	-
	Divorced	10	1.8
	Remarried	1	0.2
	<b>Total</b>	<b>561</b>	<b>100.0</b>
<b>Religion</b>	Christianity	253	45.1
	Islam	302	53.8
	Traditional	6	1.1
	<b>Total</b>	<b>561</b>	<b>100.0</b>
<b>Education</b>	No Formal Education	12	2.1
	Primary Education	201	35.8
	Secondary Education	249	44.4
	University Education	24	2.3
	HND	30	7.0
	NCE/OND	45	8.3
	<b>Total</b>	<b>561</b>	<b>100.0</b>
<b>Occupation</b>	Unemployed	93	16.6
	Agriculture	82	14.1
	Civil Service	271	48.3
	Clergy	-	-
	Corporate Organization	4	1.0
	Private Business	112	20.0
	<b>Total</b>	<b>561</b>	<b>100.0</b>

Figure 4.1 shows that majority (53.5%) of the mothers perceived fever as the common sign and symptom of childhood malaria. This finding aligns with the observation of Akogun and John (2005). This finding indicates that majority of mothers correctly identified the symptoms of malaria which conforms to the clinical manifestations. This revelation has significant implication for the type of health-seeking behaviour of mothers for childhood malaria management. This finding was elaborated in group narrative discussion that childhood malaria is always accompanied with fever. According to a mother:

When I observed that my child is running temperature, feeling restless and loss of appetite for food, I know he is having malaria. At times his breathing becomes fast and he throws up at the smell of food. Similarly, he develops nasty mouth-sores and sweats profusely. Once these symptoms manifest, certainly it is malaria (*FGD/Educated Young Mother/Osogbo/2019*).

Another mother reported:

Malaria remains the main sickness that afflicts my children. At times when they have malaria, it comes with extreme feverish condition. However, mothers should be very careful because sometimes fever may be an indication of another illness. For instance, the last time my three-year-old son had fever, I thought it was malaria not until went for laboratory test that it was discovered it was to be measles (*FGD/Educated Middle Aged Mother/Osogbo/2019*).

The foregoing narratives emphasize the importance of confirmatory laboratory blood test before commencement of malaria treatment because typhoid and some opportunistic diseases childhood diseases manifest similar and overlapping symptoms of fever (Ukaegbu, Nnachi, Mawak, and Igwe, 2014).

### ***Perceived Causes of Childhood Malaria***

**Table 4.2: Distribution of Mothers by Perception of Causes of Childhood Malaria**

<b>Perceived Causes of Childhood Malaria</b>	<b>Frequency</b>	<b>Percent</b>
Eating of palm oil	117	20.9
Eating of sugar	42	7.5
Mosquito bite	271	58.3
Genetic factors	33	5.9
Heat from the sun	48	4.6
Don't know	50	2.8
<b>Total</b>	<b>561</b>	<b>100.0</b>

A table 4.2 shows that 58.3% of mothers reported that mosquito bite was the main cause of malaria. This finding was corroborated by (Talipouo, Ngadjeu, Doumbe-Belisse, Djamouko-Djonkam, Bamou, Awono-Ambene *et al.* 2019: Espinoza, 2019). This finding was elaborated further in narrative group discussion by mothers that among the factors responsible for malaria, mosquito bite remains the main cause of malaria. According to a mother:

The source of malaria is mosquito bite which is transmitted to the infected person mostly at night. From its silvery gland, the parasite is passed into the blood stream of the child. The child in response develops symptoms such as aching body, feverish feeling among others causing a child to pass out yellow urine (*FGD/Young Uneducated Mother/Osogbo/2019*).

The narrative above is correct to the extent that mosquito bite causes malaria however, yellow urine, as indication of childhood malaria remains a speculation than a fact. The extraction of surplus B vitamins from body, food and water consumed and outcome of the metabolic processes in the body can give rise to yellow coloration of urine (Emyibe, 2014). Therefore, coherent healthcare information is required to counter such misconception.

Several others causes of childhood malaria apart from mosquito bite were identified and reported by the mothers in FGD which revealed that the direct causal agent associated with malaria is not yet understood by the mothers notwithstanding the fact that malaria is a prevalent health issue among under-five children. The study revealed that some mothers opined that when a child consumes too much oily food, he or she is bound to contract malaria. Consuming of much sugar, exposing a child to intensive heat, and genetic factors would make a child venerable to malaria. This finding aligns with (Amzat, 2009; Orimadegun, 2015; Tobin-West and Kanu, 2016; [Oladimeji, Tsoka-Gwegweni, Ojewole, and Yunga, 2019](#)), this explains why malaria seems unpreventable as there is no way a child cannot be exposed to these factors. This finding was emphasized in narrative group discussion which revealed that misconception is inimical to malaria management because it wrong treatment of malaria. According to a mother:

There is no stage of malaria that 'agbo' (herb) cannot cure. Yoruba believe strongly on the efficacy of herbs. This is why we do not fall sick to 'Iba' so often. When a child is administered with 'agbo' at the onset of malaria, it is eliminated from the body system from the urine which can be seen as it evaporates from the ground (*FGD/Uneducated Old Mother/Osogbo/2019*).

Another mother said:

When malaria is caused from eating of too much oil, it will appear as yellow foams on the ground during urination. On the other hand, if the malaria was caused by 'Abiku' (evil spirits), the urine will dry up immediately with whistling sound as it touches the ground (*FGD/ Uneducated Old Mother/Osogbo/2016*).

Another mother reported:

I am aware that mosquito bite is the main cause of malaria. However, a child who plays in the sun may contract malaria. Furthermore, a mother or family member can pass malaria to their children (*FGD/Uneducated Young mother/Osogbo/2019*).

The study revealed that mothers were unaware of how mosquitos transmit malaria. In the FGDs, significant number of mothers could not really explain how malaria transmitted except the educationally sophisticated mothers who mentioned from the silvery gland of infected mosquito to the host body. This ignorance is indicates a lacuna in health communication techniques because most people are unaware of the real causes and transmission of malaria.

Studies have shown that despite the fact that misconceptions are inimical to malaria management, yet they are acceptable in the society as invaluable part of healthcare maintenance system. For instance, Africans and various ethnic groups in Nigeria have their own beliefs and values that have implication for their conception of health and illness and so have fashioned mechanisms aimed at resolving emergent health issues within their cultures ([Kahissay, Fenta, & Boon, 2019](#)). The study shows that misconceptions are not limited to any age group of mothers as both young and old do not differ in terms of their causal explanations of perceptions of malaria.

Furthermore, the perception of the causes of malaria is influenced by level of education attainment of mothers. The study revealed that most of the educated mothers were aware of the connection between mosquitos and malaria. However, some of the educated mothers were guilty of mentioning other factors instead of mosquito bite as the cause of malaria. For instance, significant numbers of mothers in narrative group discussions, particularly uneducated mothers were unable to explain the link between malaria and mosquitos. Given the high spread of malaria, there is the need for better causal issues of malaria for proper comprehension of malaria management in children.

### **Perception of Consequences of Childhood Malaria**

**Table 4.3: Distribution of Mothers by Knowledge of Perception of Consequences of Childhood Malaria**

Perceived Consequences of Malaria	Frequency	Percent
Convulsion	286	51.0
Anaemia	55	9.8
Loss of Appetite	45	8.0
Loss of Concentration for work	45	8.0
Death	44	7.8
Coma	32	5.7
Breathing difficulty	28	5.0
Low Body Immunity	26	4.6
<b>Total</b>	<b>561</b>	<b>100.0</b>

Table 4.3 examines the perceived consequences of childhood malaria among mother. The finding shows that majority (51.0 %) of the mothers reported that febrile convulsion was the major consequence of childhood malaria. This finding aligns with the discovery of Amzat (2009) which maintained that febrile convulsion 'Giri' in local parlance was reported by the mothers as the leading outcome of malaria in children and accompanied by breathing difficulty, contraction of the muscles, faints, involuntary moaning, crying, and passing of urine.

The study also reveals most of the most the mothers explained clearly in FGDs the connection between convulsion and malaria which has been reported to be very fundamental because convulsion is a physical, psychological and behavioural disorders that affect children, creates fear and anxiety for parents which may subsequently affect the family's quality of life (Kanemura, Sano, Mizorogi, Tando, Sugita and Aihara, 2013; Sajadi and Khosravi, 2017; Westin and Sund, 2018). According to a mother FGD stated that:

Convulsion is a terrible experience to behold because the last time my child had convulsion it stretched him out to the point of death, rolling him on the floor. My consolation is that conceived legitimately. It is a child borne from adulterous sex affairs that experience convulsion in his/her developmental stages of life except the parents confess their illicit act to each other, the child *(FGD/Uneducated Young Mother/Osogbo/2019)*

Another mother maintained:

Febrile convulsion emanates from witches and wizards sent by people of evil intent to punish children people who offended them. However, herbalists have the power to stop convulsion from occurring through pacification of the spirits concerned with convulsion *(FGD/Uneducated Old Mother/Osogbo/2019)*.

Another mother reported:

Convulsing children lack physical strength to perform domestic activities at home. We make sure that they are excluded from carrying out task that may subject them to stress because the evil spirits in them are very lazy and would not like to be disturbed through energy sapping activities. This spirit called Ogbanje in Igbo dialect or Abiku in Yoruba dialect may come repeatedly in a child's the life time if nothing drastic is done to stop such reappearance *(FGD/Uneducated Old Mother/Osogbo/2019)*.

Misconceptions such as expressed above by mothers in the study can influenced their decision on the type of treatment given to children with febrile convulsion. It is important to note that connection between febrile convulsion and the mystic perceptions of the consequence of childhood malaria has not been substantiated medically. However, convulsion has been linked to the malfunction in the brain causing unusual emission of electrical waves by several cranial cells, simultaneously devastating these cranial cells leading to muscular seizures, loss of consciousness and more related complications (Seinfeld and Pellock 2013).

**Table 4.4: Percentage Distribution of Mothers by Selected Socio-demographic Variables**

Socio-demographic	Consequences of childhood malaria								
	Convulsion	Anaemia	Loss of Appetite	Coma	Breathing Difficulty	Low body immunity	Loss of concentration	Death	Total
<b>Age in Groups</b>									
20-24 years	9 (1.6)	5 (0.9)	1 (0.2)	3 (0.5)	2 (0.4)	2 (0.4)	2 (0.4)	1 (0.2)	<b>25 (4.5)</b>
25-29 years	79 (14.1)	17 (3.0)	15 (2.7)	7 (1.2)	6 (1.1)	8 (1.4)	13 (2.3)	14 (2.5)	<b>159 (28.3)</b>
30-34 years	109 (19.4)	21 (3.7)	16 (2.9)	9 (1.6)	9 (1.6)	11 (2.0)	21 (3.7)	16 (2.9)	<b>212 (37.8)</b>
35-39 years	58 (10.3)	3 (0.5)	9 (1.6)	4 (0.7)	7 (1.2)	3 (0.5)	4 (0.7)	5 (0.9)	<b>93 (16.6)</b>
40-44 years	21 (3.7)	4 (0.7)	2 (0.4)	6 (1.1)	2 (0.4)	1 (0.2)	3 (0.5)	5 (0.9)	<b>44 (7.8)</b>
45+ years	10 (1.8)	5 (0.9)	2 (0.4)	3 (0.5)	2 (0.4)	1 (0.2)	2 (0.4)	3 (0.5)	<b>28 (5.0)</b>
<b>Total</b>	<b>286 (51.0)</b>	<b>55 (9.8)</b>	<b>45 (8.0)</b>	<b>32 (5.7)</b>	<b>28 (5.0)</b>	<b>26 (4.6)</b>	<b>45 (8.0)</b>	<b>44 (7.8)</b>	<b>561 (100.0)</b>
<b><math>\chi^2 = 34.518, df 35, P = .491</math></b>									
<b>Education</b>									
No formal Edu	6 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)	4 (0.7)	2 (0.4)	0 (0.0)	0 (0.0)	<b>12 (2.1)</b>
Primary Edu.	94 (16.8)	24 (4.3)	17 (3.0)	10 (1.8)	4 (0.7)	9 (1.6)	22 (3.9)	21 (3.7)	<b>201 (35.8)</b>
Secondary Edu	137 (24.4)	26 (4.6)	18 (3.2)	15 (2.7)	15 (2.7)	6 (1.1)	16 (2.9)	16 (2.9)	<b>249 (44.4)</b>
Tertiary Edu	49 (8.7)	5 (0.9)	10 (1.8)	7 (1.2)	5 (0.9)	9 (1.6)	7 (1.2)	7 (1.2)	<b>99 (17.6)</b>
<b>Total</b>	<b>286 (51.0)</b>	<b>55 (9.8)</b>	<b>45 (8.0)</b>	<b>32 (5.7)</b>	<b>28 (5.0)</b>	<b>26 (4.6)</b>	<b>45 (8.0)</b>	<b>44 (7.8)</b>	<b>561 (100.0)</b>
<b><math>\chi^2 = 50.553, df 21, P = .000</math></b>									

Table 4.4 shows that there is no significant relationship between age of mothers and their perceptions of malaria since  $p > 0.05$ . The table shows that value = 34.518, df = 35 and p-value calculated is 0.491.

Table 4.4 also shows a strong relationship between education of mothers and their perceptions of malaria consequences given that  $p < 0.05$ . =50.553, df = 21 and p-value calculated = 0.000.

Furthermore, table 4.4 shows there is no relationship between income and perception of malaria consequences because  $p > 0.05$ . The table indicates that  $t = 33.675$ ,  $df = 35$  calculated  $P$ -value = 0.532.

### Perception of Preventive Methods of Childhood Malaria

Figure 4.2 shows that significant number (65.6%) of mothers reported that mosquito net is the most effective method of childhood malaria prevention. This finding aligns with Lindblade, Steinhardt, Gimnig, Shah, Wong, Wiegand, & Howell (2015) which reported that mosquito net use remains the most reliable device for malaria prevention especially in children because it can reduce both transmission and mortality rates by at least 25% when used properly. This finding indicates that majority of mothers in the study are conscious of the potential contributions of use of mosquito nets in malaria management. This finding be adopted to give important insight in formulating policies that will improve the allocation and utilization of mosquito nets by mothers in Osogbo where the distribution and ITNs use are at the lowest ebb (Osun State Ministry of Health, 2012). Also, the

Similar findings were reported in a study in Ghana that most of the respondents were highly convinced that use of bednets is capable of preventing malaria (Konlan, Amu, and Japiong, (2019). The high level of awareness of malaria prevention knowledge among the population in northern Ghana was the outcome of the health education messages continually given to them by health workers in the area which, in turn, accounts for the appreciable understanding of malarial management measures. Also, it was reported that the use of ITNs can lower to a large extent the threat from malaria death and illness (Afoakwa, Nunoo, & Andoh, 2015). In conclusion, Macintyre, Littrell, Keating, Hamainza, Miller and Eisele (2011) reported that insecticide treated nets (ITNs) are the most effective protective means against malaria death among children in high malarial transmission setting. In the FGD sessions expressed their perception of ITN use in malaria management thus:

Sleeping under the cover of ITN prevents children from developing malaria because mosquito cannot bite them. However, I have stopped using it in my home since the one we had got torn and worn out. Nonetheless, I have applied to the relevant health officials for another bednet instead of buying it from the open market to avoid buying fake bednets (*FGD/Young Literate Mother/Osogbo/2019*).

When the mothers were asked of the source of the ITNs they use in FGDs, an overwhelming majority of them claimed that they got theirs from Non-Government Organizations (NGOs) free of charge and they were impregnated with chemical. The study revealed further that not all the nets used by mothers were impregnated with chemicals. Factors such as ignorance, scarcity of funds, limited treated nets and long waiting time before the nets were made available at the officials designated centres were the main reasons why mothers went for the non-treated mosquito nets. This finding was corroborated by a mother that:

The bednet we use in our house is not insecticide treated. I bought it at the market because it is difficult to get from the health facility. During the day time, I keep it aside and tie it up at night. However, I was advised by healthcare providers the last time my child had malaria to sleep under it day and night always because some species of mosquitos bite during the day time (*FGD/Middle Aged Educated Mother/Osogbo/2019*).

The study also revealed that possession of bednet may not guarantee its usage due to some underlying inconveniences reported by most of the mothers that bednets generation a lot of heat because the chemical used in coating them have irritating smell. Some of the mothers reported in FGD sessions that they stopped using bed nets because of the inconvenience they encountered while sleeping under it. They claimed that sleeping under bednet cover gave their children body rashes, cough, catarrh and restlessness. According to a mother:

Sleeping under the ITN is very inconveniencing. My children sweat a lot from the heat it emits, feel restless, roll from one side of the bed to another in an attempt to get air. The smell of the chemicals used in treating the net is very irritating, thereby giving them cough and catarrh. They develop skin itching and rashes all over their bodies which made us to stop using bearing in mind the consequence of doing so (*FGD/Old Uneducated Mother/Osogbo/2019*).

Despite some of the reported difficulties encountered with the use of bednet in the narrative above, practical evidence suggests that the advantages of using mosquito nets are far greater than the difficulties experienced in its use. Parent have spent substantial amount of money in treating severe malaria complications. A critical search of literature has not reported death

linked to sleeping under ITNs. The non-use of ITN by some mothers to prevent malaria infection in their children does not, in any way, reduce its acceptance and usage as the most effective method of controlling malaria (Kyalo, 2013). Therefore, efforts should be expended to scale up the use of ITNs through effective public enlightenment education programmes.

## 5.1 Summary Of Findings

### ***On the perceived signs and symptoms of childhood malaria, the study found out that:***

- i. Majority of the mothers had appreciable knowledge of the symptoms of malaria because they correctly linked observed clinical manifestations on sick children with malaria infection.
- ii. Majority of the mothers identified that fever is the main sign and symptom of childhood malaria.
- iii. Ability to identify the major symptoms of childhood malaria by mothers facilitates prompt management of severe malaria.
- iv. There is symptom complex for malaria as mothers explain collection of sign and symptoms for malaria which could also be attributed to childhood illnesses.

### ***On the perceived causes of childhood malaria, the study found that:***

- i. Appreciable percentage of the mothers reported that the cause of malaria is mosquito bite yet misconception influenced their perceptions about the causes of malaria.
- ii. Overwhelming proportion of the mothers linked malaria infection to mosquito bite, however, many of them failed to state categorically the manner in which malaria is transmitted by mosquitos.
- iii. Indices like perceived causes and method of transmission of malaria are better understood among educated mothers than among uneducated mothers.

### ***On the perceived consequences of childhood Malaria, the study found out that:***

- i. Majority of the mothers belief that convulsion is the major consequence of malaria but were unable to explain the connection between the two.
- ii. The appreciable knowledge of mothers could not change the misconception they held about the cause of febrile malaria.
- iii. Febrile convulsion affects the quality of life in a family because it is accompanied with great fear and anxiety.
- iv. Mode of contraction malaria is still indescribable among the mothers of under-five children in the study

### ***On the perceived prevention of childhood malaria, the study found out that:***

- i. Most of the mothers perceived mosquito net as the most effective method of malaria prevention.
- ii. Appreciable usage of insectidal treated nets in the study is attributed to the high level of public enlightenment health information messages.
- iii. Possession of ITNs does not guarantee its usage because some mothers have them do not use them but due to heat they emit.
- iv. Knowledge of mosquito prevention does not necessarily lead to improvement in malaria management efforts.
- v. Improved educational programmes in the rural communities are needed to enhance the development right practices and participation in malaria management

## Conclusion

The study examined perception and experience of childhood malaria among mothers of under-five in Osogbo which revealed that bold efforts have gone into malaria elimination programmes, however misconception has continued to hamper malaria management in Nigeria. It was discovered that misconceptions are age and education specific as both the young, old, educated and uneducated mothers were involved in propagating misconceptions. The study showed that mothers of under-five children exhibited appreciable knowledge of malaria of preventive measures by indicating that ITN was the most effective method of malaria prevention. However, certain factors such as scarcity of ITN and inconveniences reported by mothers prevented mothers from using it. The study also revealed that most of the mothers demonstrated commendable level of awareness of the signs and symptoms of childhood malaria, however, this finding contradicted the high malaria prevalence in Osogbo Metropolis.

Conclusively, adequate public enlightenment campaigns will continue to be useful response to childhood malaria management. Therefore, efforts should be intensified to enhance appropriate public education programmes aimed at reducing misconceptions and ignorance associated with malaria management which lead to severe malaria complications in children.

## **Recommendations**

### **Need to strengthen of community Health Information System**

The study revealed fundamental inaccuracies in malaria management effort which should be addressed urgently because malaria burden in Nigeria remains unacceptably high despite availability of cheap and fordable interventions. The study revealed the need for equal access to quality childhood malaria management through proper documentation of the target risk groups- children and pregnant women in need of ITNs. Comprehensive health information system should be established in the rural communities to document treated malaria cases, outcomes and distribution of free ITN to the rural communities using health workers to facilitate usage in high malaria endemic areas. The study reveals that some mothers had never used ITN many years after it was launched, this is an indictment on the operation roll back malaria projects in Nigeria. Therefore, adequate community health information management system that will ensure both acquisition and usage of ITN should be emphasized.

### **Maternal Education**

Maternal education is essential factor in determining both the use of preventative care and risk of childhood malaria. The results of this study revealed that educated mothers performed better than uneducated mothers in recognising signs, causes and consequences of childhood malaria. This study will hopefully renew interest in the inclusion of educational facet to anti-malaria intervention programme. This study emphasises that any intervention which excludes the educational facet is ignoring a significant factor in illness control efforts. Therefore, malaria-specific education should be accelerated for the less educated mothers to enable them to understand the aetiology of malaria in highly endemic areas. Furthermore, increased maternal education will increase the bargaining powers and rights of mothers in the health seeking behaviour of their children. Therefore, the study advocates for the construction of more girls' schools and job opportunities for women outside of the home front.

## **Contribution To Knowledge**

The study expands the level of social awareness on the influence of common issues associated with perception, experience and contributory factors of childhood malaria management with enormous prospect of enhancing children's health status. The study enriches existing reservoir of information on childhood malaria management, in addition to generating facts concerning susceptible individuals cognitively unable to make health decisions without the help of others based on observed symptoms. The study will play a significant role in the area of strategies for managing malaria mostly in underage children by ensuring supply of appropriate data to mothers and other significant caregivers.

## **Declarations**

**Ethics approval and consent to participate:**

This study was approved by the Landmark University ethics review board. Although the paper was anonymized, informed consent to participate in the study was still obtained from participants in a written form via the tick options boxes provided on the questionnaire.

Besides, the dissemination of the study findings does not refer to specific objects but the general source population. The team obtained permission from the Maternities and Hospitals to interview some of the health workers who participated in the study.

**Consent to publish:**

'Not applicable'

**Availability of data and materials:**

All dataset generated and/or analysed during the current study are available from the corresponding author on reasonable request

**Competing interests:**

All authors are in consensus and have no conflict of interest to declare

**Funding:**

The study was funded by the authors

**Authors' contributions:**

J.N.N.: He conceived the idea of the paper and also wrote the introduction and statement of the problem

C. O. I and N. E.C.: They reviewed the literature, wrote the discussion of findings, compiled and edited the article.

N.E.E; He did the analysis and presentation of data.

A. O: and E.I.V Wrote the methodology and collected the data for the study.

All authors listed herein contributed significantly to the merit authorship of this study. Furthermore, I also confirm that all authors have read and approved the manuscript

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All the Authors declare that they have no conflict of interest

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## Figures

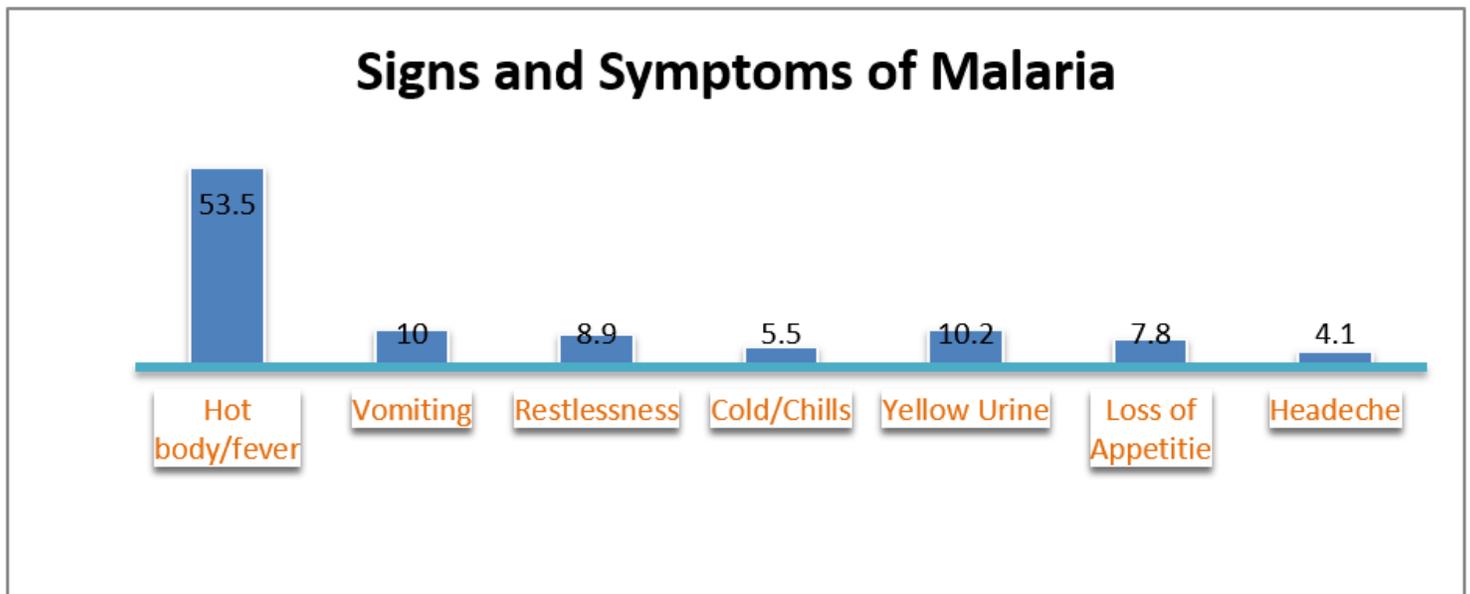


Figure 1

Percentage Distribution of Mothers by Knowledge of Signs and Symptoms of Childhood Malaria

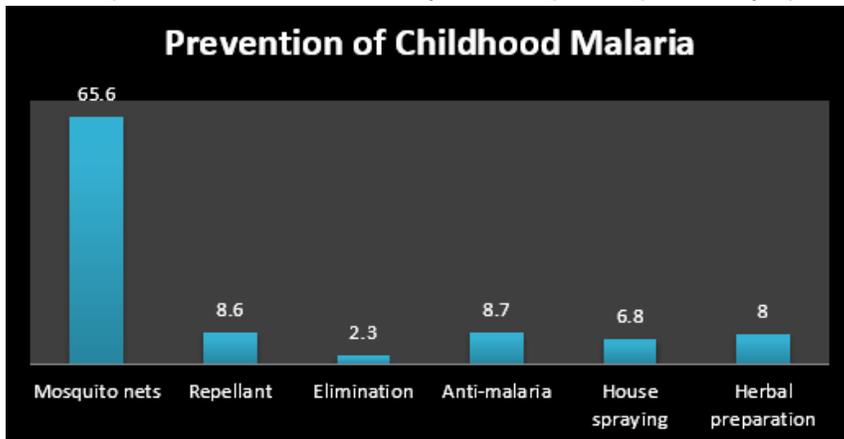


Figure 2

Shows percentage distribution of mothers by methods of prevention of Malaria

## Supplementary Files

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