DOI: https://doi.org/10.67203/gjhrr.2021.nidjjx92

# ASSESSMENT OF KNOWLEDGE OF MALARIA PREVENTION STRATEGIES AMONG MOTHERS OF UNDER-FIVE CHILDREN IN NORTH CENTRAL ZONE, NIGERIA

**[1]Musa Paul Hannatu, [1]Umaru Musa, [2]Babayo Mohammed Tukur, [1]Vechit Dashe, [1]Longji Hassan, [1]Murna Thomas, [3]Yusuf Bello & [1]Ayuba Christiana Samndi**

[1]Department of Human Kinetics and Health Education, Ahmadu Bello University, Zaria.
[2]Department of Nursing Sciences, Ahmadu Bello University, Zaria.
[3]Kaduna State College of Midwifery Tudun-Wada, Kaduna.
**Corresponding author:** hannatuwa@gmail.com

***Abstract***
*This study was conducted to assess the knowledge of malaria prevention strategies among mothers of under-five children in North Central Zone, Nigeria. To achieve this purpose, an ex-post-facto research design was used. A total sample of 768 mothers of under-five children in the North-central zone, Nigeria from a population of 3,641,445 was selected through multi-stage sampling procedures of simple random sampling and proportionate sampling. The instrument used for the study was the researcher's structured questionnaire which was pilot tested using Cronbach Alpha reliability. Inferential statistics of a one-sample t-test was used to test the formulated hypothesis at a 0.05 level of significance. The result revealed that knowledge of malaria prevention strategies among mothers of under-five children in the north-central zone, Nigeria was significant (p = 0.001). Based on the result it was concluded that mothers of under-five children have knowledge of malaria prevention strategies. Based on the conclusion, it was recommended that health educators should carry out awareness campaigns through rendering health talks which would help to further sustain the already existing knowledge of malaria prevention strategies among the mothers of under-five children in North-Central Zone, Nigeria.*

**Keywords:** Knowledge, Children, Malaria, Mothers, Prevention.

## Introduction

Malaria has continued to be a leading cause of mortality particularly among under-five years children and pregnant women in tropical African countries. The estimate showed that 3.3 billion people were at risk of contracting the disease worldwide (World Health Organization, WHO, 2015; Ahmed, Haque, Haque & Hoissan, 2009). In Africa, malaria is known to be a disease of the poor and a severe cause of poverty (Roscoe, 2012). This was revealed in a recent economic analysis of 150 countries where 44 countries with intensive malaria transmission grew 1.3 per cent less per year than countries without high levels of malaria. The study further revealed that a 10 per cent reduction in malaria was associated with 0.3 per cent higher economic growth. Thus, malaria reduces a country's productivity through loss of investment and reduced income from tourism (Gallup & Sachs, 2001; Guyatt & Snow, 2014).

In Nigeria, malaria is responsible for around 60% of the out-patient visits to health facilities, 30% of childhood death, 25% of death in children under one year and 11% of maternal deaths (Noland, Graves, Sallau, Eigege, Emukah, Patterson, Ajiji, Okorofor, Oji, Umar & Alphonsus, 2014). Similarly, about 70% of pregnant women suffered from malaria, which contributes to maternal anaemia, low birth weight, stillbirths, abortions and other pregnancy-related complications (Federal Ministry of Health (FMoH), 2015). The financial loss due to malaria is estimated to be about 132 billion Naira annually in form of treatment costs, prevention costs and loss of man-hours (WHO, 2012).

Malaria, a debilitating febrile and life-threatening illness, is caused by a parasite called Plasmodium. Its route of transmission remains as bites from infected female anopheles mosquitoes. Environmental factors and behavioural patterns of vectors and human populations combine to provide favourable conditions for malaria transmission (Boutin, Pradines, Pages, Legros, Rogier & Migliani, 2005). Proven effective options to reduce morbidity and mortality include early diagnosis, combined with prompt effective therapy and malaria prevention through reduction of human-vector contact, especially with the use of Insecticide Treated Nets (ITNs) (WHO, 2007). Perceptions about malaria illness, particularly households' perceived susceptibility and beliefs about the seriousness of the disease, are important preceding factors for decision-making concerning prevention and curative actions (Rakhshani, Ansari Moghadam, Alemi & Moradi, 2003). The understanding of the possible causes, modes of transmission, and individual preference and decision-making about the adoption of prevention and control measures vary from community to community and among individual households. There have been a considerable number of reports about knowledge, attitude, and practice relating to malaria and its control from different parts of Africa. These reports concluded that misconceptions concerning malaria still exists (Laver, Wetzels & Behrens, 2001; Obol, David & Christopher, 2011).

According to WHO (2014), there are four types of malaria parasites: falciparum, vivax, malariae and ovale. Plasmodium falciparum is responsible for most malaria deaths, especially in Africa. The infection can develop suddenly and produce several life-threatening complications, Plasmodium vivax is the most geographically widespread of the species, and produces less severe symptoms. Plasmodium malariae infections not only produce typical malaria symptoms but also can persist in the blood for very long periods, possibly decades without ever producing symptoms. A person with asymptomatic (no symptoms) P. malariae, however, can infect others, either through blood donation or mosquito bites. Relapses**,** however, can occur for up to 3 years, and chronic disease is debilitating and Plasmodium ovaleis rare, can cause relapses, and generally occurs in West Africa (WHO, 2015). Distinction based on clinical symptoms is difficult without laboratory examination. Falciparum parasite produces the most fatal form of malaria (WHO, 2014).

Malaria is a major cause of child mortality in Nigeria with approximately 100 million episodes in children under five years of age every year (FMoH, 2005). The mortality rate among children under five years is 143 per 1,000 live births in the country (WHO, 2012) and deaths among this category of children often occur within two days of developing symptoms of malaria (Diallo, De Serres, Beayogui, Lapointe & Viens, 2011; Federal Ministry of Health, 2008). Malaria increases susceptibility to other infections and retards growth and development in children. It is associated with a considerable economic burden including the direct loss to government productivity. Malaria kills Nigerian children every 30 seconds, hence, pregnant women and their unborn children are also vulnerable to malaria which serves as a major cause of maternal anaemia and prenatal death (Davidson, 2010). Attempts at different periods by governments and concerned organizations in these regions aimed at control and eradication have not been satisfactory. This perhaps informed the shifts in the campaign from eradication to control. Findings have shown that good knowledge, attitude and practice of any public health disease by individuals and communities seems necessary if effective prevention measures are to be realistic (Ahmed, Haque, Haque & Hoissan, 2009; Iwueze, Ezugbo-Nwobi, Umeanaeto, Egbuche & Anaso, 2013).

Malaria prevention strategies refer to the methods used to prevent the spread of disease or to protect individuals in areas where malaria is endemic. These methods are numerous, Oreagba, Onajole, Olayemi and Mabadeje (2014) pointed out among others prophylactic drugs, mosquito eradication and the prevention bites. In support Afolabi (1996) classified malaria prevention into four levels. They are; a) Preventing infection by avoiding bites by parasite-carrying mosquitoes. b) Preventing disease by using anti-malaria drugs prophylactically. c) Prevention and control in endemic areas; through the use of vector control, insecticide-treated nets and mosquito repellent creams. d) Prevention treatment with

anti-malaria drugs of vulnerable groups such as under-five children who receive intermittent treatment. Patel, Gupta, and Oswal (2012) and Okwa (2013) revealed from reviewed current trends in the battle against malaria by use of insecticide-treated nets, vector control, indoor residual spraying (IRS), use of mosquito repellent, electric mosquito zapper and health education on knowledge, attitude and practice.

Knowledge is the ability to recall or recognize something such as a fact concept, principle or custom (Kalua, 2011). It is further stated that knowledge can be acquired through formal or informal settings either with the help of someone or alone. Ashikeni, Envuladu and Zoakah (2013) stated that the mothers of children less than five years in Kuje had poor knowledge of the cause of malaria, its prevention and possible complications, good knowledge of the prevention of malaria among mothers such as the use of ITNs, insecticide sprays, nets on windows and doors or protective clothing, was found to be 5.4% at baseline in the intervention group but this increased to 25% at post-intervention. It showed that adequate and proper health education to women especially in the language they understood increased their knowledge and improved their practice of the treatment of malaria in children.

Malaria presently remains one of the worst menaces of tropical countries of the world. It is a killer and debilitating disease that affects the physical and economic well-being of people living in endemic areas of Africa. The high intensity of the spread of malaria makes it an enormous public health problem. African countries are most hard hit by the disease, where it ravages communities. In most parts of Nigeria, malaria is a preventable and curable disease that is highly endemic, where the vast majority of cases occur in children under the age of five, due to this, mothers of under-five children need to be more empowered concerning Mother related Knowledge, Attitude and Practice (MKAP). The importance of information on KAPs in designing and improving malaria control activities has been emphasised. An understanding of mother's perceptions and practices on malaria is crucial for policymakers to incorporate disease prevention into the socio-cultural dimensions of the affected communities (Afolabi, 2016; Obi, Nwanebu, Okangba & Nwanebu, 2012). KAP studies are also essential in establishing epidemiological and behavioural baselines and may be used to identify indicators for monitoring malaria control programmes. Achieving sustainable control of the disease depend on extensive public health promotion programmes which focus on current and proven methods of malaria prevention and management.

Malaria is a killer and debilitating disease that affects the physical and economic well-being of people living in endemic areas of Africa. The high intensity of the spread of malaria makes it an enormous public health problem. The ever-growing increase in the number of malaria cases observed by the researcher in the North Central zone of Nigeria was among under-five children. This growing number of cases suggested that malaria preventive strategies are either not known or practised by the mothers of these children. The steady increase in the number of infant mortality due to malaria-related cases is worrisome. 157 deaths per 1,000 live births, which translates to one in every six children born in Nigeria dying before their fifth birthday (National Population Commission and Macro, 2010).

This high number of infant mortality in the country continues to be an issue of great concern to public health practitioners. The ultimate goal of the Roll Back Malaria programme is to see that disease transmission and burden is reduced drastically across the country. But that is not the reality in Nigeria today. Despite all efforts, it is observed that insecticide-treated nets shared freely to protect against malaria can be seen used to tend seedling beds and plants around some houses in some communities. These issues among others prompted the researcher to take up this study with the aim to assess knowledge of malaria prevention strategies among mothers of under-five children in the North-central zone, Nigeria.

**Material and Methods**

To achieve the purpose of this study, an ex-post facto research design was adopted for this study. The population of the study comprised of Three million, six hundred and forty-one thousand, four hundred and forty-five (3,641,445) mothers of under-five children in North-central zone, Nigeria

(National Population Commission (NPC) and ICF Macro, 2016). A sample size of seven hundred and sixty-eight (768) respondents who are mothers of under-five between the ages of 18 – 49 years was used for the purpose of this study. To arrive at the sample size Research Advisor (2016) table for determining sample size was used. They suggested that in a population of 1, 000, 000 and above a sample size of 384 can be used. However, in order to cover for possible attrition, the researcher increased the sample size by 100% which gives a total of 768.

A multi-stage sampling technique that involved simple random sampling, proportionate sampling technique and purposive sampling was used for this study. The first stage involved the use of a simple random sampling technique to select six (6) states in the north-central zone (Kogi, Niger, Benue, Kwara, Plateau and Nasarawa). The researcher wrote the names of all the states on pieces of paper, folded them and placed them in a container. The researcher shuffled it asked one of the research assistants to dip his hand and pick a piece of paper one at a time. The selected state picked was then written down. This procedure continued until a total of six (6) states were selected.

The second stage involved the use of simple random sampling techniques to select two (2) general hospitals from each state. The researcher wrote down all the names of general hospitals from each state on pieces of paper, folded them and dropped them in a container. The researcher shuffled it and the selection was made by one of the research assistants. The procedure continued for each state until a total of twelve (12) general hospitals were selected and used to collect data. At the third stage, the researcher employed the use of purposive sampling to select the respondents (mothers of under-five children) attending each general hospital at the paediatric unit and ante/post-natal clinic in each general hospital selected for the study. Those who had children under the age of five were considered potential respondents for the study.

At the fourth stage, proportionate sampling was used to determine the number of respondents per general hospital. The researcher divided the population of mothers of under-five children at each LGA by the total population from all LGAs selected and multiplied it by the sample size (768).

Proportionate sampling technique $= \frac{n}{N} \times 768$

Where n = population of mothers of under-five in a LGA
N = total population of mothers of under-five children

In the fifth stage, the researcher employed a systematic random sampling procedure to select the respondents at the general hospitals. The researcher and her four (4) research assistants selected every second mother of under-five children that visited the hospital as they visit the facility. This procedure continued until the total sample size required for the study was gotten.

The instrument that was used for data collection was a researcher-structured questionnaire made up of four (4) sections (sections A – D). Thus, to score any response a mean score of 2.5 was used. To establish the face and content validity of the instrument, the questionnaire was vetted by five (5) experts in the Department of Human Kinetics and Health Education, Nursing Sciences and Community Medicine, Ahmadu Bello University, Zaria for comment, observations, corrections and suggestions. After incorporating all the suggestions made by the experts, the final copy of the questionnaire was pilot tested to further validate the instrument. A pilot test was conducted to test the reliability of the instrument; the results revealed a Cronbach Alpha reliability of 0.833 closer to 1 and therefore considered reliable. Descriptive statistics of frequency count and percentages, means and standard deviations were used to describe the demographic characteristics of the respondents, and to answer the structured research questions respectively. While inferential statistics of one-sample t-test was used to test the formulated hypothesis at 0.05 alpha level.

**Results and Discussion**

**Table 1: Demographic Characteristics of the Respondents**

| S/N | Variable | Option | Frequency | Percentage (%) |
|---|---|---|---|---|
| **1.** | **Age Range of mothers of under-five children** | 15 – 24 years | 114 | 14.9 |
| | | 25 – 34 years | 311 | 40.7 |
| | | 35 – 44 years | 253 | 33.1 |
| | | 45 years and above | 87 | 11.4 |
| | | **Total** | **765** | **100.0** |
| **2.** | **Level of Education** | No formal Education | 134 | 17.5 |
| | | Primary Education | 265 | 34.6 |
| | | Secondary Education | 299 | 39.1 |
| | | Tertiary Education | 67 | 8.8 |
| | | **Total** | **765** | **100.0** |
| **3.** | **Number of Children per Family** | 1 – 3 children | 414 | 54.1 |
| | | 4 – 6 children | 285 | 37.3 |
| | | 7 children and above | 66 | 8.6 |
| | | **Total** | **765** | **100.0** |
| **4.** | **Occupation** | Civil Servant | 238 | 31.1 |
| | | Self – Employed | 185 | 24.2 |
| | | Full–time housewife | 342 | 44.7 |
| | | **Total** | **765** | **100.0** |

Table 1 shows that many 311 (40.7%) of the respondents are between the ages 25-34 years, 253 (33.1%) of the respondents are between the ages of 35 – 44 years, 114 (14.9%) are between the ages 15-24 years, while 87 (11.4%) of the respondents were between the age of 45 years and above. Furthermore, Table 4.1 reveals that 114 (17.5%) of the respondents have no formal education, 265 (34.6%) of the respondents have a primary school education, 299 (39.1%) of the respondents have secondary education while 67 (8.8%) of the respondents have tertiary education. The majority of 414 (54.1%) of the respondents have 1 – 3 children, 285 (37.3%) of the respondents have 4 – 6 children while 66 (8.6%) of the respondents have 7 children and above. 238 (31.1%) of the respondents were civil servants, 185 (24.2%) of the respondents were self – employed while 342 (44.7%) of the respondents were full–time housewives.

**Research Question**: What is the knowledge of malaria prevention strategies among mothers of under-five children in North Central Zone, Nigeria?

**Table 2: Mean scores of responses on the knowledge of malaria prevention strategies among mothers of under-five children in North Central Zone, Nigeria**

| Item | Mean | Std. Dev. |
|---|---|---|
| Mosquito coil can prevent the mosquito from biting my child | 3.55 | 1.59 |
| Insect repellent use can prevent the mosquito from biting my child | 3.61 | 0.10 |
| Mosquito net when used can help to prevent mosquitoes from biting my child | 3.28 | 0.59 |
| Window net when fixed properly can help to prevent mosquitoes from biting my child | 3.44 | 1.40 |
| Door nets when fixed can help to prevent mosquitoes from biting my child | 3.22 | 0.98 |
| Cutting bushes around the house can help to prevent mosquitoes from breeding | 3.37 | 1.40 |
| I know that disposing of empty containers harbouring water can help to prevent the breeding of mosquitoes | 3.35 | 1.50 |
| The use of an electric mosquito zapper can help to prevent mosquitoes from biting my child | 2.81 | 0.95 |
| Dressing the children in protective clothing such as long-sleeve shirts can help prevent them from mosquito bites | 3.44 | 1.43 |
| Indoor residual spraying of insecticide can completely prevent mosquitoes from staying in dark corners of the rooms | 3.42 | 0.95 |
| Sleeping inside an insecticide-treated mosquitoes net prevent mosquitoes from biting my child | 2.71 | 1.01 |
| **Aggregate Mean** | **3.29** | **1.08** |

Table 2 reveals the mean score of the responses on the knowledge of malaria prevention strategies among mothers of under-five children. The result shows that mothers of under-five children have knowledge of malaria prevention strategies. The respondents knew that mosquito coil can prevent mosquito from biting my child (3.55; SD=1.59), insect repellent use can prevent mosquito from biting my child (3.61; SD=0.10), mosquito net when used can help to prevent mosquitoes from biting my child (3.28; SD=0.59), window net when fixed properly can help to prevent mosquitoes from biting my child (3.44; SD=1.40), door nets when fixed can help to prevent mosquitoes from biting my child (3.22; SD=0.98), cutting bushes around the house can help to prevent mosquitoes breeding (3.37; SD=1.40), know that disposing of empty containers harbouring water can help to prevent breading of mosquitoes (3.35; SD=1.50), use of electric mosquito zapper can help to prevent mosquitoes from biting my child (2.81; SD=0.95), dressing the children in protective cloths such as long sleeve shirts can help prevent them from mosquito bites (3.44; SD=1.43), indoor residual spraying of insecticide can completely prevent mosquitoes from staying in dark corners of the rooms (3.42; SD=0.95) and sleeping inside insecticide treated mosquitoes net prevent mosquitoes from biting my child (2.71; SD=1.01). The aggregate mean score of the items is 3.29 which was found to be greater than they know about mosquito coil which can prevent mosquito bites (3.55). This implies that mothers of under-five children have knowledge of malaria prevention strategies in the North Central zone, Nigeria.

**Hypothesis Testing**

**Hypothesis**: Knowledge of malaria prevention strategies among mothers of under-five children in the north-central zone, Nigeria is not significant.

**Table 3: One sample t-test analysis of knowledge of malaria prevention strategies**

| Variable | Aggregate Mean | Std. | df | t-value | P-value. |
|---|---|---|---|---|---|
| **Knowledge** | 3.29 | 1.08 | 764 | 4.37 | 0.001 |

t (764)= 1.960< 0.05

The result in Table 3 shows knowledge of malaria prevention strategies among mothers of under-five children in the north-central zone, Nigeria is significant because the t-value of 4.37 is greater than the t critical 1.960 at 764 degrees of freedom (df) and p-value of 0.001 is less than 0.05 with this observation, the null hypothesis that states knowledge of malaria prevention strategies among mothers of under-five children in the north-central zone, Nigeria is not significant was rejected.

This study was conducted to assess the knowledge of malaria prevention strategies among mothers of under-five children in the north-central zone, Nigeria. With regards to knowledge of malaria prevention strategies among mothers of under-five children. The results of this study revealed that mothers of under-five children in North Central Zone, Nigeria were knowledgeable (p=0.001) about malaria prevention strategies. This study disagreed with the study of Ashikeni, Envuladu and Zoakah (2013) which stated that the mothers of under-five children in Kuje area council Abuja had poor knowledge of the cause of malaria, its prevention and possible complications, good knowledge of the prevention of malaria among mothers of under-five children such as the use of ITNs, insecticide sprays, nets on windows and doors or protective clothing, was found to be 5.4% at baseline in the intervention group but this increased to 25% at post-intervention. This was statistically significant (p= 0.0002). In the control group, good knowledge of prevention of malaria increased marginally from 7.7% to9.7% but this was not statistically significant (p= 0.369). The findings of the study revealed that adequate and proper health education to mothers of under-five children especially in the language they understood increased their knowledge and improved their practice of the treatment of malaria. Although prevention of malaria has been globally accepted as a significant aspect of malaria control the majority of mothers of under-five children often do not learn the tenets of prevention (Falade, Ogundiran & Bolaji, 2013; Obrist, Mayumana, & Kessy, 2010).

The findings of this study are also in consonance with a study that was conducted by Nwana (2011) in Cameroon which assessed the knowledge and utilization of insecticide-treated nets to prevent malaria. The result of the study revealed that caregivers had good knowledge of malaria prevention (n=78). The findings of this study is in line with the findings of a study conducted by Houmsou, Amuta, Wama, Bingbeng and Hile (2014) that examined the knowledge, attitudes and perceptions of the children's mothers regarding malaria and prevention measures. The results revealed that 99.50% of children's mothers have good knowledge of malaria prevention. The finding of the study is also in sync with the findings from a study by Amaechi and Ukpai (2013), who assessed knowledge, attitude and practice about malaria among mothers and caregivers in Aba South Local Government Area, Abia State, Nigeria. The knowledge of the symptoms, treatment-seeking behaviours and management of malaria amongst mothers and caregivers in Aba South LGA in South-Eastern Nigeria was assessed. The results of the study revealed that 97.01 % of mothers and caregivers know about malaria, as well as its prevention

**Conclusion**

Based on the finding, it was concluded that:

1. Mothers of under-five children have knowledge of malaria prevention strategies in the North Central zone of Nigeria.

**Recommendation**

Based on the conclusion drawn, it was recommended that:

1. Health educators should carry out awareness campaigns through health talks which would help to further sustain the already existing knowledge of malaria prevention strategies among the mothers of under-five children in North-Central Zone, Nigeria.

**References**

Afolabi, B. M. (1996). Knowledge, attitude and practice of malaria in an isolated community on the Atlantic coast of Lagos. *Malaria and Infectious diseases in Africa*, *4*(1), 6-13.

Ahmed, S.M., Haque, R., Haque, U. and Hoissan, A. (2009). Knowledge on the transmission, prevention and treatment of malaria among two endemic populations of Bangladesh and their health-seeking behaviour. *Malaria Journal*, *8*, 173 – 184.

Amaechi, E.C. and Ukpai, O.M. (2013). Knowledge, attitude and practice about malaria among mothers and caregivers in Aba South Local Government Area, Abia State, Nigeria. *Animal Research International, 10*(3), 1786 – 1791

Ashikeni, M.A., Envuladu, E.A. and Zoakah, A.I. (2013). Perception and practice of malaria prevention and treatment among mothers in Kuje Area Council of the Federal Capital Territory, Abuja, Nigeria. *International Journal of Medicine and Biomedical Research, 2*(3), 112-119.

Boutin, J. P., Pradines, B., Pages, F., Legros, F., Rogier, C., &Migliani, R. (2005). Epidemiology of malaria. *La Revue du praticien*, *55*(8), 833-840.

Davidson, B. (2010). *The Impact of Refugees on the Health Status and Health Services of Host Communities.* Comparing Bad with Worse. Disaster *9*:256-269.

Diallo, A.B., De Serres, G., Beavogui, A.H., Lapointe. C. and Viens, P. (2011). Home care of malaria-infected children less than 5 years of age in a rural area of the Republic of Guinea. *Bulletin of the World Health Organisation* 79: 28-32.

Falade, C. O., Ogundiran, M. O. and Bolaji, M. O. (2016). The influence of cultural perception of causation, complication, and severity of childhood malaria on determinants and treatment prevention pathways. International Quarterly of Community Health Education. *Journal of Policy and Applied Research 2016. 24.4: 347 – 363.*

Federal Ministry of Health (2015). *Federal Republic of Nigeria: Achieving health-related Millennium Development* Goals in Nigeria (A Report of the Presidential Committee on Achieving Millennium Development Goals in Nigeria). Abuja, Nigeria: FMOH.

Federal Ministry of Health Abuja (2005) Federal Ministry of Health Abuja Abuja: Federal Ministry of Health, Nigeria National malaria control programme annual report. 2005

Gallup, J. L., & Sachs, J. D. (2001). The economic burden of malaria. *The American journal of tropical medicine and hygiene*, *64*(1_suppl), 85-96.

Guyatt, H. L. and Snow, R. W. (2014). The management of fevers in Kenyan children and adults in an area of seasonal malaria transmission. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 98: 111-115.

Houmsou, R. S., Amuta, E. U., Wama, B. E., Hile, T. D., and Bingbeng, J. B. (2014). Occurrence of malaria in children under five years: knowledge, attitudes and perceptions among mothers in a Nigerian semi-urban area. *J Sci Res Rep*, *3*(8), 1127-1134.

Iwueze, M.O., Ezugbo-Nwobi, I.K., Umeanaeto, P.U., Egbuche, C.M. and Anaso, C.I. (2013). Knowledge, attitude and management practice on malaria: A case study of Amansea, Awka North Local Government Area of Anambra State, Nigeria. *Journal of Bio-scientist*: 1(1): 32 – 38.

Kalua, F. (2011*).* The relationship between Knowledge, attitude and practice of caregivers and food hygiene in daycare centres. Unpublished. Dissertation, Pretoria, Technikon-Pretoria.

Laver, S. M., Wetzels, J., & Behrens, R. H. (2001). Knowledge of malaria, risk perception, and compliance with prophylaxis and personal and environmental preventive measures in travellers exiting Zimbabwe from Harare and Victoria Falls International airport. *Journal of Travel Medicine*, *8*(6), 298-303.

National Population Commission and ICF Macro (2010). *Nigeria Demographic and Health Survey 2014.* National Population Commission and ICF Macro, Abuja, Nigeria.

Noland, G.S., Graves, P.M., Sallau, A., Eigege, A., Emukah, E., Patterson, A.E., Ajiji, J., Okorofor, I., Oji, O.U., Umar, M. and Alphonsus, K., (2014). Malaria prevalence, anaemia and baseline intervention coverage prior to mass net distributions in Abia and Plateau States, Nigeria. *BMC Infectious Diseases*, *14*(1),1-13.

Nwana, T. B. (2011). *Knowledge and utilization of insecticide-treated nets to prevent malaria in Cameroon* (a case of the mount fako region). A thesis presented to the higher degree committee of Ritsumeikan Asia pacific university.

Obi, R.K., Nwanebu, F.C., Okangba, C.C. and Nwanebu, C.K. (2012). Malaria Prevalence in children under five years and pregnant women attending selected hospitals in IhitteUboma LGA, Imo State, Nigeria. *Nigerian Journal of Parasitology*, 33(1): 73 – 76.

Obol, J., David L., K., & Christopher G., O. (2011). Knowledge and Misconceptions about Malaria among Pregnant Women in a Post-Conflict Internally Displaced Persons' Camps in Gulu District, Northern Uganda. *Malaria research and treatment*, *2011*.

Obrist, B., Mayumana, I. and Kessy, F. (2010). Livelihood, malaria and resilience: A case study in the Kilombero Valley, Tanzania. *Progress in Development Studies. 2010. 10: 325.*

Okwa, O. O. (2013). The current trends in integrated prevention and control of malaria. A case study of some Nigerian communities. *Global Advanced Research Journal of Medicine and Medical Sciences* (ISSN: 2315-5159) 2(5), 104-107.

Oreagba, A.I., Onajole, A.T., Olayemi, S.O. & Mabadeje, A.F.B. (2014). Knowledge of malaria amongst caregivers of young children in rural and urban communities in Southwest. *Tropical Journal of Pharmaceutical Research*, 3 (1), 299-304

Patel, E.K., Gupta, A. & Oswal, R.J. (2012). A review on mosquito repellent methods. *International Journal of Pharmaceutical, Chemical and Biological Sciences*. ISSN: 2249-9504, 2(3), 310-317.

Rakhshani, F., Ansari Moghadam, A. R., Alemi, R., &Moradi, A. (2003). Knowledge, perceptions and prevention of malaria among women in SistanvaBaluchestan, Islamic Republic of Iran.

Roscoe, T.J. (2012). Fundamental Research Statistics for Behavioural Sciences. New York, Holt, Rinehart and Winston, Inc.

World Health Organization (2007) World Health Organization. Insecticide-treated mosquito nets: a WHO position statement. Geneva: WHO; 2007.

World Health Organization (2012). RBM Technical Support Network for ITMs: Scaling Up Insecticide Treated Netting Programmes for Africa: A Strategic Framework for Coordinating National Action. WHO. RBM, Geneva.

World Health Organization (2012). The Joint Committee on Health Education and Promotion Terminology report.

World Health Organization (2014). World Malaria Report 2014. Geneva: World Health Organization, 2007.

World Health Organization (2015). *What is Malaria Fact Sheet Geneva: WHO.* Available at www.mosquito.who.int/

World Health Organization. (2015). Fact Sheet on the World Malaria Report 2014.