European Journal of Biology and Medical Science Research
Vol.12, No.1, pp.,11-40, 2024
Print ISSN: ISSN 2053-406X,
Online ISSN: ISSN 2053-4078
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

Socio-demographic variables and utilization of Insecticide Treated Bed Net among pregnant women in Southern Cross River State, Nigeria

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doi: https://doi.org/10.37745/ejbmsr.2013/vol12n11140 Published January 21 2024

Citation: Obo E.A., Eze, E.A., O'Neill M.E. and Anyam A.A. (2024) Socio-demographic variables and utilization of Insecticide Treated Bed Net among pregnant women in Southern Cross River State, Nigeria, *European Journal of Biology and Medical Science Research*, Vol.12, No.1, pp.,11-40

ABSTRACT: *This study investigated socio-demographic variables and utilization of insecticide treated nets among pregnant women in Southern Cross River State, Nigeria. To achieve the purpose of this study, two null hypotheses were formulated and tested at 0.05level of significance. There was a detailed review of related literature on the variables of the study. Survey research design was employed in the study. Simple random sampling technique was adopted in selecting the health facilities used for the study while the systematic random sampling technique was adopted in selecting the health facilities used for the study while the systematic random sampling technique was adopted in selecting the seven hundred and forty one respondents used for the study. A structured questionnaire was the instrument utilized for data collection. The instrument was subjected to validity by relevant experts. Cronbach alpha method was employed to establish the reliability of the research instrument. Totest the various hypotheses that were formulated for the study, one-way analysis of variance and Pearson product moment correlation statistics were utilized for analysis of data. The result obtained from data analysis and hypotheses testing in the study revealed that there was a significant influence of age, educational status on utilization of insecticide treated nets among pregnant women. it was recommended among other that pregnant women across various groups especially the younger ones should be adequately sensitized on the need to effectively utilize insecticide treated nets in order to prevent the incidence of malaria during pregnancy*

KEYWORDS: socio-demographic variables, utilization of insecticide, treated bed net , pregnant women, southern Cross River State, Nigeria

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INTRODUCTION

Background to the Study

Malaria is a febrile disease caused by infection with genus plasmodium transmitted through a bite of infected female mosquitoes. The disease is endemic in Nigeria and in Sub-saharan African region. Recent studies have shown that almost about 40% of the population of the world especially those who live in under-developed countries are most likely to be infected by this deadly disease called malaria (World Health Organization, 2015). Insecticide treated net is very important in the control or prevention of malaria infection from mosquito bites, if not treated properly could lead to other health related problems during pregnancy and if care is not taken could also result to sudden death. Sleeping under Insecticide Treated Nets (ITNs) is the most widely adopted measure against malaria globally. Alaii (2003) posited that Insecticide Treated Nets are effective because in the majority of malaria endemic regions of the world, the female mosquito that transmits malaria only bites at night. Health care service practitioners have admitted that Insecticide Treated Nets and especially Long Lasting Insecticidal Nets (LLINS) represent a cost effective means of malaria prevention for a risk population.

Insecticide treated net is used for personal protection that has been shown to reduce malaria illness, severe disease and death in malaria endemic regions. Insecticide treated net forms a protective barrier around people sleeping under it. Insecticide treated net kills mosquitoes as well as other insects. The insecticides used in ITNs also repel mosquitoes, reducing the number that enter the house and attempt to feed on people inside the house.

Eisele (2009) reported that perhaps, this could be the reason(s) government at all tiers have been embarking on regular intensive malaria eradication campaign programmes aimed at distribution of insecticide treated nets to every household so as to combat or prevent the mosquito bites and also to prevent the spread of malaria. Campaigns on the level of usage among pregnant women indicates that utilization of insecticide treated nets and malaria preventive measures have received immense encouragement by Cross River State Government as reported by Praise (2011). There have been committed efforts, by government and donor agencies to curb the menace through the distribution of insecticides-treated nets, indoor residual spraying (IRS) with insecticides, diagnosis and treatment with anti-malarial drugs, particularly artemisinin-based combination therapies (ACTs), intermittent preventive treatment in pregnancy (IPTp), a drug treatment for pregnant women that prevents complications from malaria for a woman and her unborn child), intermittent preventive treatment in infants (IPTi, and seasonal malaria chemoprevention (SMC), a treatment course administered at monthly intervals to children aged 3 to 59 months during the high malaria transmission season. Rapid Diagnostic Test Kit (RDT), SulphaDixni tablet (SP), Roll Back Malaria Programme and National Malaria Elimination Programme.

Despite the concern of Nigeria´s present and past administration efforts on the provision of ITNs, malaria remains a foremost public health issue among pregnant women in Cross

River State. Malaria infection during pregnancy poses substantial risk to the mother, her foetus and neonate (World Health Organization WHO, 2019). Apart from the high maternal and infant mortality associated with its infection, it leads to intra-uterine death, abortion, anemia in pregnancy, delivery of premature infants and low birth weights due to intrauterine growth retardation (IUGR) resulting from placental parasitization (World Health Organization, 2019). Hence, its enormous physical, emotional, social and economic impacts on the clients, families and the nation at large cannot be quantified.

Alonso, Brown and Avero-Herrera (2011), reported that about one-quarter of Nigerian pregnant women were found to have malaria parasites in their blood, which can be prevented with the use of Insecticide treated nets. This report is a dangerous development and a high threat. Nigerian pregnant women are therefore expected to acquire Insecticide Treated Nets to prevent high endemic and transmission rates. The primgravidae are more susceptible to malaria infection than multigravidae, because the former are still in the process of acquiring natural immunity to placental malaria (Ministry of Health, MOH, 2014). Adverse effects that may result from malaria infection on both mother and child include anemia in pregnancy, low birth weights, pre-term deliveries, stillbirths and pre-natal mortality (of either mother, child, or both).

Pregnant women are susceptible to symptomatic malaria due to invasion of the placenta by plasmodium. Malaria increases the risk of adverse pregnancy outcomes for mother, the fetus and new-born. The effective utilization of insecticide treated nets would be of benefit to these vulnerable women. The World Health Organization (2019) strategic frame work for malaria prevention and control during pregnancy in areas of stable malaria transmission recommends three interventions; intermittent preventive treatment (IPT), Insecticide-treated nets (ITNs) and case management of malaria illness and anemia. But of these three major interventions, ITN is considered accessible, cheap and applicable regardless of invention and education. This justifies the choice of ITN in the study.

The malaria preventive health behaviours among pregnant women as well as the knowledge about malaria and the treatment – seeking behaviours in the rural communities have been found to be generally poor across the three senatorial districts in Cross River State (Jamison, 2016). The National Control Programme Annual Report of 2016, noted knowledge and utilization of insecticide treated nets as some of the major challenges in Roll Back Malaria Campaign and Implementation in Nigeria (Kolaczinski& Hanson 2016). Furthermore, the symptoms of uncomplicated malaria are easily missed in pregnancy at the home and community level because of ignorance and this leads to poor outcomes of pregnancy (Praise, 2011).

The utilization of insecticide treated net (ITN) may depend on some socio-cultural factors. The attitude of the pregnant women is one factor that could determine the utilization of insecticide treated Nets (ITNs). A negative attitude towards the use of ITN stands a chance of mosquito bites which leads to malaria infection and its health implication or consequences in the health of a pregnant mother. Therefore, pregnant women who do not use ITN rendered themselves vulnerable to malaria infection. This is in line with Chinwe

(2018) who opined that ITN is considered to be the most efficacious of all currently feasible interventions for malaria control in Africa. Consistent use of ITNs in pregnancy has been shown by several studies to produce beneficial maternal and infant outcomes (Gamble, Ekwaru&Kuile, 2009). Therefore, for the wellbeing of pregnant women and the unborn child, pregnant women need to be advisedonthe adequate use of the ITNs facilities available for the improvement of their healthy living. The attitude to the use of ITN by pregnant women is therefore very important because it is considered to be one of the dispositions that could predict their vulnerability to malaria infections.

The uncompromising behavior among pregnant women towards the utilization of ITN may also be connected to pregnant women socio-demographic variables like their age, educational status, belief in the use of ITN for malaria control, family size and level of income. The United Nations (UN) with respect to age defined old people as person or individuals who are over 50years of age. This therefore, means that any one below the age is automatically a youth or considered young. However, many people over 50 years of age do not just want to be associated (or identify themselves) with the word old. And this consequently highlights the risk associated with stereotyping some pregnant women as old people. It is traditionally believed that an increase in age results in a decrease in the tendency to utilize insecticide treated net. Deladem (2013) asserts that age could be a predictor of pregnant women's utilization of ITNs. The younger women tend to embrace the use of ITNs more often than the older women. This is because the child bearing age of a woman favours the younger generation of women who are more given to conception and child bearing, thereby requiring more of the insecticide treated bed nets.

The issue of educational qualification of pregnant women cannot be over looked when discussing the pregnant women utilization of ITNs. This is because through education, knowledge is acquired, awareness is created and ignorance is removed. Awareness, perceptions, attitudes and beliefs on prevention of malaria are areas that have been researched on to find out how they affect utilization of ITNs. Education and awareness of proper utilization of ITNs has a range of benefits to the individual, husband, family and the entire society as a whole to curb the spread of malaria.

David (2018) opined that socio-cultural factors such as religious values, primitive beliefs especially faith belief, affect the utilization of ITNs among pregnant women. A review on community acceptance of bed nets has shown that various factors influence the use of bed nets, including cultural, behavioural and demographic factors, ethnicity, accessibility, gender relations and seasonality of malaria. Winch (2017) asserted that although ITNs are effective, local perceptions, acceptance and use of ITNs, as well as use of other preventive methods are neededformalaria control.

Family size may be considered from two perspectives. At the individual (Micro) level, it defines one aspect of an individual´s family background or environment. As such, it represents a potential influence on the development and accomplishments of family members. At the societal (Macro) level, family size is an indicator of societal structure that may vary over time, with concomitant implications for individual development and social

relations in different cohorts while the term family size is sometimes used to represent the total number of individuals comprising a family unit, Guerra et al. (2018) argues convincingly for decomposing the concept into two components: numbers of children and numbers of adults in the household. This distribution is important, as observed patterns of change in overall family size may be attributable to one component or the other.

Based on the philosophical ideas of humanism, the economic position of a man determines the action of the individual. This decision also includes the sexual and reproductive decision, the maternal health, child spacing, timing of children, number of children and when the children should come and also proper utilization of insecticide treated net. Mardiana, San and Khatijah (2015), observed that proper utilization of insecticide treated nets is an important practice for women of child bearing age. The study concluded that large family size creates condition leading to increased economic challenges and increase in human numbers in the household thus resulting to poor ITNs utilization. Clara (2015) opined that the ability to attain the desired utilization of ITNs is the function of the family income and living standard of the couples. Also, Ujiro (2012), asserted that income has been commonly used as measure of wealth and general level of social and economic development of a society and in particular, the family and women who are educated tend to embrace the idea of ITNs utilization. However, because of the low-income status of some households, there is high level of maternal and infant death due to the high level of poverty in the family and the whole community, this serves as bane to the use of insecticide treated nets.

Sonia and Robert (2018) stated that income level could have a strong influence on the use of insecticide treated net of the people who are sexually active. The low income status of family especially the pregnant women tends to affect the maternal state of physical, mental, emotional, physical and general wellbeing of the family especially the under-five children. These factors sometimes manifest as maternal morbidity and miscarriages. It has therefore been observed that low income pregnant women and women in general are always in the struggle of survival hence, becoming depressed, hopeless and lack interest or confidence in doing anything including non-utilization of ITNs at night. Poor access and cost of ITNs have remained one of the reasons for unmet need of ITNs use in the emerging economy. It is against this back drop that this research seeks to find out the level to which pregnant women demographic variables influence utilization of Insecticide Treated Net in the Southern Cross River State, Nigeria.

Purpose of the Study

Specifically, the study aims at investigating the influence of;

1. Age of pregnant women on utilization of insecticide treated net in Southern Cross River State, Nigeria.
2. Educational status of pregnant women on the utilization of insecticide treated net in the Southern Cross River State, Nigeria.

Research Questions

The following questions were raised to guide the study:

1. To what extent does age of pregnant women influence utilization of insecticide treated Nets (ITNs) in Southern Cross River State, Nigeria?
2. How does educational status of pregnant women influence utilization of Insecticide Treated Nets (ITNs) in Southern Cross River State, Nigeria?

Statement of Hypotheses

The following null hypotheses were formulated to direct the study:

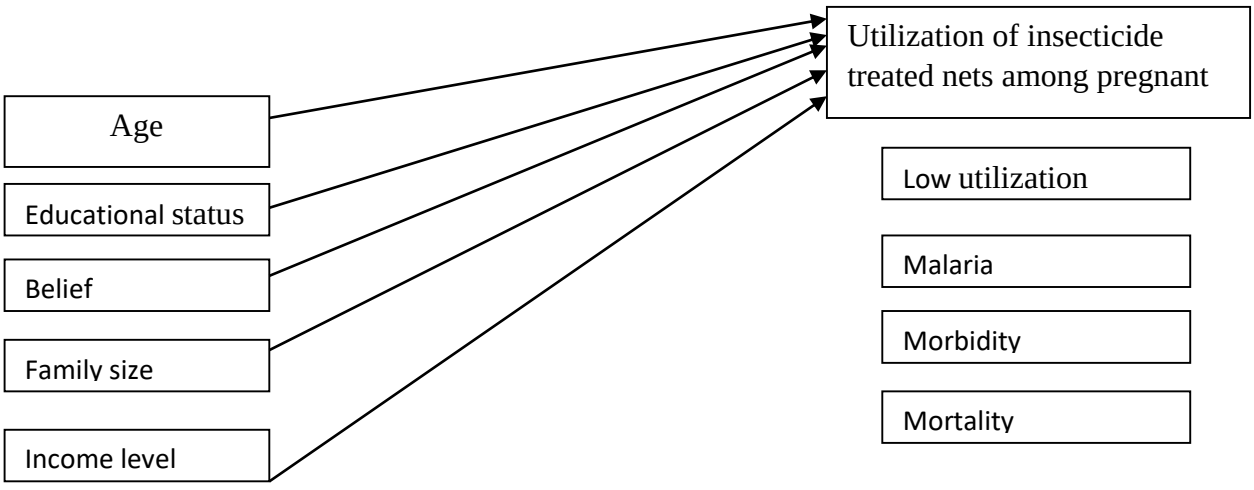
1. Age of pregnant women has no significant influence on utilization of insecticide treated Nets (ITNs) in Southern Cross River State, Nigeria.
2. Educational status of pregnant women has no significant influence on utilization of insecticide treated Nets (ITNs) in Southern Cross River State, Nigeria.

LITERATURE REVIEW

This chapter is concerned with the review of related literature on the socio-demographical variables and the utilization of insecticide treated nets among pregnant women in the Southern Cross River State, Nigeria. Literatureswere reviewed under the following:

.1 Age of pregnant women and utilization of insecticide treated net
.2 Educational status of pregnant women and utilization of insecticide treated net

Conceptual framework



The conceptual framework portrays the relationship that exists between socio-demographic variables and utilization of insecticide treated nets among pregnant women in Southern, Cross River State. The utilization of insecticide treated nets can be influenced by an individual's age, educational status, belief, family size and income level. These variables can either encourage or discourage pregnant women from effectively utilizing insecticide treated nets in the study area. The low utilization of insecticide treated nets has

resulted in high incidence of malaria parasites because of exposing the pregnant women to mosquito bites, which has further resulted in high rate of morbidity and mortality among pregnant women.

Theoretical Framework

Anderson health service utilization theory (1968)

The theory was developed by Ronald M. Anderson in 1968. Anderson's health service utilization theory conceptually aims at demonstrating the factors that lead to the use of health services. The theory assumes that the usage or utilization of health services is determined by three dynamics: predisposing factors, enabling factors and need as noted by Andersen (1995). Predisposing factors can be characteristics such as race, age and health beliefs. For instance, an individual who believes health services are an effective treatment for an ailment is more likely to seek care. Examples of enabling factors could be family support, access to health insurance, one´s community etc. Need represents both perceived and actual need for healthcare services (Andersen, Pauela&Baumeister, 2015).

The theory offers measures of access as its major strength. Andersen (2008) asserted four concepts within which access can be viewed through the conceptual framework. Potential access is the presence of enabling resources, allowing the individual to seek care if needed. Realized access is the actual use of care, shown as the outcome of interest. The Andersen theory makes a distinction between equitable and inequitable access. Equitable access is driven by demographic characteristics and need whereas inequitable access is a result of social structure, health beliefs and enabling resources (Andersen, 2008). The theory incorporates both individual and contextual determinants of health services use. It divides the major components of contextual characteristics in the same way as individual characteristics have traditionally been divided – those that predispose, enable or suggest need for individual use of health services. Andersen and Davidson (2001) described these three major components as follows:

i. Predisposing factors: Individual predisposing factors include the demographic characteristics of age and sex as biological imperatives; social factors such as education, occupation, ethnicity and social relationships (e.g. family status) and mental factors in terms of health beliefs (such as attitudes, values and knowledge related to health and health services).
ii. Need factors: At the individual level, the theory differentiates between perceived need for health services (that is how people view and experience their own general health, functional state, and illness symptoms) and evaluated need (that is, professional assessments and objective measurements of patients´ health status and need for medical care).

This theory has relevance in this study because of its healthcare utilization strength.It has implication for the usage of insecticide treated net and the health of pregnant women. Based on the theory, the utilization of insecticide treated net has the potential to reduce incidence of malaria attack on pregnant women and secure a positive health outcome. Educational status of women is seen to be predisposing factor in the utilization of

insecticide treated net among pregnant women. The higher the level of awareness on the benefits of ITNs, the more likely it will be acceptable and utilized among women. The enabling factors associated with the effective utilization of ITNs among pregnant women are affordability (income level) and availability. In other words, the financial situation of pregnant women and availability of ITNs are vital conditions enabling the utilization of these nets. Based on the theory, pregnant women financing factors involve income level and wealth at their disposal to pay for the ITNs. Organizational factor here include the distribution of insecticide treated nets by the health facilities responsible for this. Additionally, government health policy regarding the provision of ITNs is considered by this theory to fall into the category of contextual enabling factor. The need factor which implies how pregnant women view and experience their own general health care which is also linked with the level of mortality and morbidity in the family and community is a factor in the utilization of ITNs.

Empirical Review

The empirical review was based on the following sub-variables

Age of pregnant women and utilization of insecticide treated net
Educational status of pregnant women and utilization of insecticide treated nets

Age of pregnant women and utilization of insecticide treated net

The United Nations (UN) with respect to age defined old people as person or individuals who are over 50years of age. This therefore, means that any one below the age is automatically a youth or considered young. However, many people over 50 years of age do not just want to be associated (or identify themselves) with the word old. And this consequently highlights the risk associated with stereotyping some pregnant women as old people. It is traditionally believed that an increase in age results in a decrease in the tendency to utilize insecticide treated net.

Kennedy (2019), carried out a study on the utilization of insecticide treated net among Pregnant Women in Hohoe Municipality of Ghana. The purpose of the study was to examine the utilization of ITNs among Pregnant Women. Descriptive cross-sectional research design was adopted for the study. A multi stage sampling procedure was used to select a sample of 283 respondents from a population of 2883 household representatives in the study area. A questionnaire served as instrument used in collecting data from respondents. Descriptive, inferential statistics and STATA Version 14 were adopted in analyzing and presentation of data. The results revealed that ownership of ITNs was higher (80.7%) than its utilization (41.7%). The age of Pregnant Women was strongly associated with the utilization of ITNs (AOR = 2.00,95%, CI = 0.00, 0.02, p <0.001) among Pregnant Women. Pregnant Women aged 26-35 were 49% times less likely to use an ITNs as compared to those aged between 17 and 25 and the difference was statistically significant. The study recommended among others that in order to ensure a high ITNs coverage and utilization, there is the need for continuous distribution of ITNs to households. Households are to be sensitized to use the nets to prevent the continuous spread of malaria.

Alaii (2003) investigated age and temperature as determinant of utilization of insecticide treated nets. The study adopted the survey research design. The population of the study was made up of 8,213 pregnant women registered in government owned hospitals in Western Kenya. Purposive sampling technique was used in selecting a sample of 803 respondents. Structured interviews and questionnaire copies served as instrument for data collection. Descriptive statistics was used in analyzing data for the study. Findings indicated that, both age and temperature determined the probability that an individual will use the ITNs and that people are less likely to use ITNs when it is hot while older people are more likely to use ITNs than young children. The leading reason for non-adherence among the pregnant women in Western Kenya was that the net was too hot.

An assessment of the association between demographic variables and utilization of ITNs in Mirab Abaya District, Southern Ethiopia was carried out by Tassew, Hopkins and Deressa (2017). Correlational survey design was adopted for the study. 120 respondents were purposively selected for the study. Questionnaire served as the instrument for data collection. Retrieved questionnaire copies were analyzed using inferential statistic. Inferential statistics was performed on the age groupings to determine the strength on the utilization rate. Result of analysis showed that, 35 years and above have a strong influence on utilization rate but lesser as compared to age group within 15-19years (OR = 0.12, 95% CI = 0.03 – 0.48). Age group 35 years and above were 88% less likely to utilize ITNs as compared to age group 15-19. The results further revealed that the use of ITNs was high among pregnant women of northern tribes as compared to other groups. The findings of Deladem (2013) confirmed that age is predictor of pregnant women utilization of ITNs. The study recommended that public health nurses and disease control officers should intensify sensitization on the importance and misconception of the use of ITNs during outreach clinics as well as local radio presentations. Age was found as a predictor of ownership of ITNs in a research conducted in Ethiopia. The study revealed that age of respondents between 26 and 40 and 41-60 were 3.3 – 3.4 times more likely to own long lasting insecticidal treated bed nets compared to those respondents whose age was either 26 or over 60 years.

Educational status of pregnant women and utilization of insecticide treated nets

The issue of educational qualification of pregnant women cannot be over looked when discussing the pregnant women utilization of ITNs. This is because through education, knowledge is acquired, awareness is created and ignorance is removed. Awareness, perceptions, attitudes and beliefs on prevention of malaria are areas that have been researched on to find out how they affect utilization of ITNs. According to WHO (2016), insecticide treated nets have been recommended as the main malaria control and preventing malaria morbidity and mortality in a range of epidemiological settings, as they reduce densities and infectivity of malaria vectors, thus overall transmission protecting all individuals within a community to ensure equality of access, WHO (2016) further recommends that ITNs be provided free of charge for all at risk (Universal coverage); this is to be coupled with effective behaviourchange, communication to increase usage and proper maintenance. ITNs have thus been advocated for as the most preventive tools against malaria.

Jammison (2016) investigated the factors relevant for participatory malaria control in Rusunga Island. An exploratory survey research design was adopted for the study. Accidental sampling technique was used to select 305 respondents in the study area. Questionnaire served as the instrument for data collection. Retrieved questionnaire copies were analyzed using logistic model. Result of analysis revealed that factors such as areas f residence, malaria transmission knowledge, a child having had fever for two weeks to the survey, age, gender, and occupation of household head and the household size were identified as significant determinants of ITNs use.

Ugwu, Ezechukwu, Obi, Ugwu and Okeke (2013) investigated the use of insecticide treated nets (ITNs) and other anti-vector measures among pregnant women in an area hyper-endemic for malaria in Enugu State. The aim of the study was to determine the use of insecticide treated Nets (ITNs) and other anti-vector measures among pregnant women. The study adopted the descriptive survey research design. A cross-section of 832 pregnant women attending anti-natal care in three hospitals in Enugu State were selected using stratified and purposive sampling techniques. Questionnaire were used to elicit data from respondents. Data collected were analyzed using descriptive and inferential statistics by means of the statistical package for social sciences (SPSS) version 16. p-value of less than 0.05 was considered statistically significant. The result of the finding revealed that 19.3% of respondents had tertiary education, 53.1% had secondary education, 22.2% had primary education and 4.8% had no formal education. Hence, educational status of pregnant women had strong association with the use of ITNs ($p > 0.0001$). Women who used ITNs were significantly less likely to have acute malaria, anaemia and babies with low birth weight than women who did not use ITNs ($p < 0.05$). The study concluded that the use of ITNs is poor among pregnant women in Enugu, but associated with favourable material and feto-neonatal outcome. The study recommended among others that future measures to increase its use should consider improvement in educational level.

Angeles (2015) noted that education, exposure cum awareness could serve as a channel for understanding and proper utilization of insecticide treated net in preventing malaria among pregnant women. Education and awareness of proper utilization of ITNs has a range of benefits to the individual, husband, family and the entire society as a whole to curb the spread of malaria. Although these methods have been poorly used by pregnant women because of some factors, the goal of roll back malaria partnership is to achieve universal coverage for all population at risk using appropriate interventions for prevention and case management.

Beekle and Mccabe (2016) carried out a study to investigate educational status of pregnant women and their partners as determinants of utilization of ITNs in Jimma, Ethiopia. Descriptive survey research design was used for the study. The study involved a total of 260 pregnant women and their partners using simple random sampling technique. Questionnaire served as instrument for data collection. Retrieved questionnaire copies were analyzed using descriptive statistics comprising of simple percentage, frequency counts and bar chart. Findings of the study revealed that educational status of both pregnant women and their partners to be very significant factors in the utilization of insecticide

treated net. The study also revealed that pregnant women and their partners with formal education were more likely to utilize insecticide treated nets, unlike pregnant women and their partners with no formal education. A similar relationship was established for their partners. Literate women were more likely discuss usage of ITNs with their partners than those who were illiterate.

Odiagbe (2015) undertook a study on gender, educational status and ITNs utilization among the Esan people of Nigeria. The aim of the study was to investigate the relationship between gender and educational status and how this relationship influences ITNs utilization among the Esan people. Survey research design was adopted for the study. 280 respondents were selected using multistage sampling technique. Questionnaire was used in gathering data for the study. Simple regression analysis was used in analyzing data for the study. The study found that though educational attainment, especially, female education, was inversely related to ITNs utilization, it did not automatically translate into lower usage by illiterate women. Female education was found to encourage usage of ITNs in a household. The study recommended that while encouraging educational attainment for the girl-child at all levels, men should be integrated into activities geared towards utilization of ITNs since they play active role in family life decision.

A study conducted by Ezire (2015) to identify facilitators and inhibitors for the use of ITN/long-lasting insecticidal net (LLIN) among pregnant women in Nigeria. Survey research design was adopted for the study. Data were obtained from the 2011 state specific HIV & AIDs, reproductive and child health survey conducted in 18 states of Nigeria. The survey was a population-based study among men and women of reproductive age living in households in rural and urban areas of Nigeria. Multi-stage cluster sampling technique was used to select eligible respondents. The sample size per state was 960 respondents. Data were collected between October and November 2011. The analysis was done using statistical package for Social Sciences (SPSS) version 20. The result of the finding revealed that a total of 11.5% of the respondents were pregnant at the time of the survey of which 73.2% lived in rural location and approximately 70% were either not educated or attained at most a primary school education. The finding of the study revealed a significant association between educational status of pregnant women and utilization of insecticide-treated bed net.

Babalola and Fatusi (2009) opined that educational status of women and their partners, socio-economic level type of residence area, access to media, knowledge about malaria preventive measures, age, migration status, wealth equity, parity, experience of abortion and child death, religious beliefs, ethnic affiliations were some of the individual background characteristics that were associated with the use of insecticide treated Nets (ITNs).A study by Eshetu (2014) also revealed that women educational status is largely considered as the significant determinant of ITNs utilization. The study adopted a 2011 Ethiopian Demographic and Health Survey (DHS) report and showed that insecticide treated net utilization of women with educational status of more than secondary (67.8 percent) was three times greater than those of women without any education (22.2 percent). In addition, the disparity between illiterate women and women with more than

secondary level of education in terms of reproductive health related issues (like total fertility rate, infant mortality rate, child mortality rate, birth spacing, delivery in health facilities, vaccination, antenatal care by doctors, first age at marriage and first birth, teenage pregnancy, ideal number of children) is by far pronounced than the disparity observed on rural-urban (place of residence) and wealth quintile.

Izale, Govender, Fina and Tumbo (2014) investigated the factors that influence malaria preventive measures amongst women of child bearing age in the Vanga District of the Democratic Republic of Congo using cross-sectional survey and interviewer administered questionnaires. The result of the findings revealed that out of the 384 women recruited, the majority (46.1 percent) were in the 31-40 year age group: 52 percent had reached primary school and 88 percent did not have formal employment. One hundred and forty of the participants reported current use of ITNs. 36.1 percent of them had begun using ITNs before the age of 20; and the most common methods were use of pills and injection, each accounting for 22.9percent of the participants, 20.7 percent had been using ITNs for more than two years. Seventy-seven (31.5percent) of the women reported they did not use ITNs because of fear of side effects. About 18 percent reported that they were unable to afford malaria preventive methods. 15.6 percent had husbands who disapproved of ITNs usage, 10.6 percent had a fear of resultant illness, 7.4 percent had religious and cultural beliefs that did not allow them to ITNs and 4.9 percent of the women did not use ITNs because it was unavailable to them. The study concluded that barriers to the ITNs in the study area were fears of side effects, cost, male partners´ objection, unavailability of ITNs and religious beliefs.

Speizer (2009) also identified significant gaps and potential determinants of ITNs utilization to be poor educational status of women; poor socio-economic status; unavailability/availability of limited choice of ITNs, gender based barriers, fear or experience of side-effects; cultural or religious opposition; myths and misconception associated with ITNs use, poor quality of available ITNs, accessibility and availability of the ITNs, opposition from husband; lack of involvement of male partners; in adequate counseling and incompetent health care provider. If these factors are addressed by programme managers and health care providers, a noticeable reduction in unmet need can be achieved.

Michelle, Mahamadou and Ogobara (2005) investigated the use of insecticide-treated nets (ITNs) following a malaria education intervention in Piron, Mali: a control trial with systematic allocation of households. Survey research design was adopted for the study. The population of the study consisted of 1000 households, with 300 adults. Stratified and simple random sampling technique was used in selecting 133 respondents for the study. Structured questionnaire and interview method served as instrument for data collection. Simple percentage was used in analyzing data for the study. Result of analysis revealed a 25% reduction in all-cause mortality for children one to nine years of age was detected during the first year of National Bed-net Programme, 33% reduction in mortality and a 44% reduction in hospital admissions for severe malaria were also found. The result also revealed that ten of 73 households stated that they had previously treated their bed nets

and had seen the benefits of ITNs but were not re-treating their nets, because there were no net treatment services available in close proximity to their households. Based on the findings, the researcher recommended that ITNs impregnation service should be installed within the study area. It was also recommended that an antecedent household-level educational programme that promotes ITNs by relating use with malaria prevention should also be implemented in the study area.

Despite the efforts made to scale up ITNs distribution so that universal coverage can be attained, coverage remains low. Increasing coverage and putting in place a mechanism to replace torn nets will go a long way to reduce the prevalence of malaria parasitemia. Charles, Tobias, Apinjon and Eric (2019) opined that insecticide treated nets (ITNs) are a widely used tool that has been proven to be effective in the prevention and control of malaria in malaria endemic countries. However, usage varies among households and can greatly affects the benefits of ITNs as a control tool for malaria transmission.

RESEARCH METHODOLOGY

Research Design

The research design that was adopted for this study is the survey research design. According to Isangedighi, Joshua, Asim and Ekuri (2004), the survey design involves the collection of data to accurately and objectively describe existing phenomena. The survey design is an approach that is adopted when a study is concerned with obtaining data on and determining the nature of a situation as it exists at the time of investigation. Also, the survey study depends basically on questionnaire, telephone calls, mails and interviews as means of data collection. The design was considered appropriate for this study because it allowed the researcher to make inferences about the population by studying a sample that reflected the population parameter.

Population of the Study

The population of the study consisted of all pregnant women in Southern Cross River State. The statistics from the Cross River NPHCDA revealed that there are eighty-eight thousand six hundred (88,600) pregnant women who participated in antenatal care in the 360 government public health centers and hospitals in the seven Local Government Areas in the study area in 2021. The pregnant women were studied because of their perceived beneficiaries of usage of ITNs in their different households. Therefore, they were in the best position to give authentic and useful responses on their utilization of ITNs. The distribution of the population of the study is presented in Table 1.

Sampling Techniques

Stratified random sampling technique was adopted in selecting the health centres/hospitals. All the Local Government Areas were selected for the study. To select the health centres/hospitals and the respondents in each of the selected Local Government Area, simple random sampling technique was adopted. This type of probability sampling was used because it helped the researcher to randomly select a subset of participants (the

pregnant women) from the population. Each member of the population has an equal chance of being selected.

TABLE 1
Population distribution table of pregnant women in public health centres/hospital in the southern zone of Cross River State

S/N	LGA	No. of health center/hospital	Population
1.	Akamkpa	45	11,275
2.	Akpabuyo	40	20,248
3.	Bakassi	35	2,416
4.	Biase	58	12,622
5.	Calabar Municipality	83	13,384
6.	Calabar South	48	14,297
7.	Odukpani	51	14,358
	TOTAL	360	88,600

Source: Cross River State Primary Health DevelopmentAgency (2021)

By doing this, the researcher wrote the names of the 360 healthcare centres according to the various Local Government Areas on pieces of paper and folded them into paper-balls. The researcher randomly selected 10% of health centres in each Local Government Area used for the study by way of randomizationin the study area. By doing this, the researcher obtained the list of registered pregnant women and every twentieth name was selected for the study. These names constituted the sample for the study.

Sample
The sample for the study consisted of seven hundred and forty-one pregnant women that were selected from thirty six (36) health centres inSouthern Zone of Cross River State. Accidental sampling technique was used in selecting the sample. The sample distribution for the study is presented in Table 2.

Instrumentation
The instrument used for data collection in the study was a structured questionnaire tagged Socio-demographic variables and Utilization of Insecticide Treated Net Questionnaire (SEIUITNQ) and divided into two sections. Section A contained items on respondents' Socio-demographic variables including age, educational status, family size and income level of pregnant women. Section B was designed using four point scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). It contained ten items measuring belief on ITNs and the utilization of insecticide treated nets.

TABLE 2

Sample distribution by Local Government Areas

S/N	LGA	Sampled health center/hospital(10%)	Sample (5%)sample
1.	Akamkpa	5	125
2.	Akpabuyo	4	101
3.	Bakassi	3	35
4.	Biase	6	109
5.	Calabar Municipality	8	81
6.	Calabar South	5	149
7.	Odukpani	5	141
	TOTAL	36	741

Source: Field survey, 2021

Validity of the Instrument

Validity is the extent to which an instrument measures what it is supposed to measure. To ensure validity, draft copies of the instrument was given to my supervisor and two other experts in Measurement and Evaluation in the Faculty of FoundationsStudies in University of Calabar for an assessment of its validity. This was done to ensure the instrument's items meet the expectation of this study's purpose and also, for a determination of the extent to which the items are related to the conceptual context of the investigated variables. The experts scrutinized the research instrument, eliminate vague and ambiguous sentences and replaced them with more appropriate ones. One of such eliminations was the removal of items which focused on religion which was not part of the variables under consideration. This procedure was adopted to ensure that irrelevant items are eliminated, the University of Calabar standard maintained and to see that the instrument covered a reasonable ground for the study. All their suggestions and correction were effected and the corrected version presented and used in the study.

Reliability of the instrument

A trial test was conducted to establish the reliability of this instrument. The reliability of the instrument was established using Cronbach alpha method. The instrument was administered to a group of 40 respondents who were not part of the main study. Only items in section B of the instrument were subjected to reliability because items in Section A were constant and do not require reliability. The collected scores were analyzed and the reliability coefficient obtained was ranged between 0.72 to 0.78 respectively. This indicated that the instrument is good enough to be used for data collection for the study. The result is presented in Table 3.

TABLE 3
Result of Cronbach alpha reliability of the research instrument

Variables	No. of item	$\overline{X}$	SD	∝
Belief in ITNs	5	14.31	3.26	.72
Utilization of ITNs among pregnant women	10	25.23	4.87	.78

Coefficient range = .72 - .78

Procedure for Data Collection

Data for the study were obtained directly from respondents through the questionnaire developed for data collection. The researcher first-visited the health centres/hospital, with a letter of introduction from the Department, seeking for permission. On the assigned days for ante-natal care, the researcher and trained research assistant briefed the pregnant women of the purpose of the visit. The researcher explained further to them on the need to provide honest information with regards to the subject matter under investigation. Seven hundred and forty one(741) copies of the questionnaire were administered to the subjects. Out of this number, only seven hundred and thirty four(734) copies of the instrument were properly completed by the respondents. The exercise lasted for three weeks. (9^{th} to 31^{st} December, 2021).

Procedure for Data Preparation

Data obtained in the study were assigned numerical scores to enable the researcher analyze the responses provided by respondents. Items in Section A of the questionnaire were categorized and scored in ascending order. Items in Section B of the questionnaire were scored differently. For positively worded items, Strongly Agree (SA) was scored 4. Agree (A) 3. Disagree (D) 2 and Strongly Disagree (SD) 1. For negatively worded items, the reverse scoring was applied. The coding schedule is presented in Table 4.

TABLE 4
Coding schedule for the instrument

S/N	Variables		Code	Column
1.	Age	15-25 years	1	1
		26 – 35 years	2	
		36-45 years	3	
		46 years and above	4	
2.	Educational qualification	FSLC	1	2
		SSCE	2	
		OND/NCE	3	
		HND/B.Sc/B.Ed	4	

	M.Sc. and Ph.D		5
.	Utilization of ITN	Add sum of scores of items 1 – 10 in Section B of the instrument	6

Procedure for Data Analysis
The hypotheses formulated to guide the study are restated in this section, the independent and dependent variables were identified as well as the most suitable statistical tool for data analysis.

Hypothesis one
Age of pregnant women has no significant influence on utilization of insecticide treated Nets (ITNs) in Southern Zone of Cross River State, Nigeria.
Independent variable: Age of pregnant women
Dependent variable: Utilization of insecticide treated net
Statistical technique: One-way analysis of variable (ANOVA)

Hypotheses two
Educational qualification of pregnant women has no significant influence on utilization of insecticide treated Nets (ITNs) in Southern Zone of Cross River State, Nigeria.
Independent variable: Educational status of pregnant women
Dependent variable: Utilization of insecticide treated net
Statistical technique: One-way analysis of variable (ANOVA)

RESULTS AND DISCUSSION

General Description of the Data
This section presents the means and standard deviations for the main variables in the study. The main independent variable in the study is socio-demographic variables, which are broken down into the following;Age, Educational qualification

The dependent variable in the study is utilization of insecticide treated nets among pregnant women in Southern Cross River State. A sample of seven hundred and thirty four (734) respondents was utilized for the study. The computation of the results obtained for the means and standard deviations for the main variables in the study is presented in Table 5.

TABLE 5

General description of variables

Variables		N	$\bar{X}$	SD
Age	15-25 years	144	25.5417	1.38360
	26-35 years	338	23.8876	1.46343
	36-45 years	188	22.1117	1.50694
	46 years and above	64	21.2969	1.20422
Educational qualification	FSLC	73	21.5753	1.50847
	SSCE	145	25.6621	1.17391
	OND/NCE	276	23.8261	1.61319
	HND/B.Sc	180	23.0000	1.41816
	M.Sc and Ph.D	60	21.0000	.00000

Hypothesis by hypothesis analysis of data and presentation of results

This section presents the results from analysis of data and testing of hypotheses in this research work. This followed by the interpretation of the results obtained. The hypotheses were all tested at 0.05 level of significance.

Hypothesis one

There is no significant influence of age on utilization of insecticide treated nets among pregnant women. Age is the independent variable in this hypothesis while utilization of insecticide treated nets among pregnant women is the dependent variable. One-way analysis of variance was the statistical tool used for data analysis. The obtained result is presented in Table 6. The result as presented in Table 6 shows that the calculated F-value of 213.035 is higher than the p.value of 0.000 at 0.05 level of significance with 3 and 730 degree of freedom. This implies that the null hypothesis is rejected. Therefore, there is a significant influence of age on utilization of insecticide treated nets among pregnant women in Southern Cross River State. Since the result of this analysis is significant, a Fisher's protected t-test was carried out to determine where the difference among the various age groups was highest in terms of mean difference. The result of the analysis is presented in Table 7.

Fisher's Least Significant Difference (LSD) was used to further identify where significant difference among the various age groups was highest in terms of mean difference. The result shows that the mean difference between pregnant women aged 15-25 years and 26-35 years was 1.65409. The mean difference between those aged 15-25 years and 36-45

years was 3.42996. The mean difference between pregnant women aged15-25 years and 46 years and above was 4.24479.

The mean difference between pregnant women aged 26-35 years and 36-45 years was 1.77587. The mean difference between 25-36 years and 46 years and above was 2.59070. The mean difference between pregnant women aged 36-45 tears and 46 years and above was .81483. From the result presented in Table 7, the mean difference is highest between pregnant women aged 15-25 years and 46 years and above (4.24479) while the least mean difference is between 36-45 years and 46 years and above age groups (.81483).

Hypothesis two
Educational qualification does not significantly influence utilization of insecticide treated nets among pregnant women. Educational qualification is the independent variable in this hypothesis while utilization of insecticide treated nets among women is the dependent variable. One-way analysis of variance is the statistical tool that was used for data analysis. The result that was obtained from the analysis of data is presented in Table 8. The result as presented in Table 8 shows that the calculated F-value 177.043 is higher than the p.value of 0.000 at 0.05 level of significance with 3 and 730 degree of freedom. This implies that the null hypothesis is rejected. Therefore, there is a significant influence of educational qualification on utilization of insecticide treated nets among pregnant women in Southern Cross River State. Since the result of this analysis is significant, a Fisher's protected t-test was carried out to determine where the difference among the various educational qualifications was highest in terms of mean difference. The result of the analysis is presented in Table 9.

Fisher's Least Significant Difference (LSD) was used to further identify where the significant difference among the various educational qualification with regards to utilization of insecticide treated nets was highest in terms of mean difference. The result shows that the mean difference between pregnant women with FSLC and SSCE was 4.08673. The mean difference between FSLC and OND/NCE was 2.25074. The mean difference between FSLC and B.Sc/HND was 1.42466. The mean difference between FSLC, M.Sc and Ph.D was .57534.

The mean difference between pregnant women with SSCE and OND/NCE was 1.83598. The mean difference between SSCE and B.Sc/HND was 2.66207. The mean difference between SSCE, M.Sc and Ph.D was 4.66207. The mean difference between OND/NCE and B.Sc/HND was .82609. The mean difference between OND/NCE and M.Sc and Ph.D was 2.82609. The mean difference between B.Sc/HND, M.Sc and Ph.D was 2.00000. From the result presented in Table 9, the mean difference is highest between SSCE, M.Sc and Ph.D (4.66207) while the least mean difference is between OND/NCE and B.Sc/HND (.82609) respectively.

TABLE 6
One-way analysis of variance of the influence of age on utilization of insecticide treated nets among pregnant women in CalabarEducation Cross River State

Age	N	$\overline{X}$	SD
15-25 years	144	25.5417	1.38360
26-35 years	398	23.8876	1.46343
36-45 years	198	22.1117	1.50694
46 years and above	12	21.5000	1.27356
Total	734	23.5313	1.96656

Source of variance	SS	Df	MS	F	P.value
Between groups	1323.288	3	441.096	213.035	0.000
Within groups	1511.491	730	2.071		
Total	2834.779	733			

**Significant at 0.05; df= 3 and 730*

TABLE 7

Fisher's protected t-test of the influence of age on utilization of insecticide treated nets among pregnant women in Southern Cross River State

Age	(J)	Mean Difference	Std. Error	Sig.
15-25 years	26-35 years	1.65409	.14319	.000
	36-45 years	3.42996	.15935	.000
	46 years and above	4.24479*	.21617	.000
26-35 years	15-25 years	-1.65409	.14319	.000
	36-45 years	1.77587	.13092	.000
	46 years and above	2.59070*	.19616	.000
36-45 years	15-25 years	-3.42996*	.15935	.000
	26-35 years	-1.77587	.13092	.000
	46 years and above	.81483	.20824	.000
46 years and above	15-25 years	-4.24479*	.21617	.000
	26-35 years	-2.59070	.19616	.000
	35-46 years	-.81483	.20824	.000

*The mean difference is significant at .05 level

European Journal of Biology and Medical Science Research
Vol.12, No.1, pp.,11-40, 2024
Print ISSN: ISSN 2053-406X,
Online ISSN: ISSN 2053-4078
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

TABLE 8
One-way analysis of variance of the influence of educational qualification on utilization of insecticide treated nets among pregnant women in Southern Cross River State

Educational qualification	N	$\bar{X}$	SD
FSLC	73	21.5753	1.50847
SSCE	145	25.6621	1.17391
OND/NCE	276	23.8261	1.61319
HND/B.Sc	180	23.0000	1.41816
M.Sc/Ph.D	60	21.0000	.00000
Total	734	23.5313	1.96656

Source of variance	SS	Df	MS	F	P.value
Between groups	1396.850	4	349.213	177.043	.000
Within groups	1437.929	729	1.972		
Total	2834.779	733			

**Significant at 0.05; df= 3 and 730*

TABLE 9
Fisher's protected t-test of the influence of educational qualification on utilization of insecticide treated nets among pregnant women in Southern Education Zone, Cross River State

Education qualification	(J)	Mean Difference	Std. Error	Sig.
FSLC	SSCE	-4.08673*	.20155	.000
	OND'NCE	-2.25074	.18484	.000
	HND/B.Sc	-1.42466	.19488	.000
	M.Sc and Ph.D	.57534	.24473	.019
SSCE	FSLC	4.08673*	.20155	.000
	OND'NCE	1.83598	.14405	.000
	HND/B.Sc	2.66207	.15672	.000
	M.Sc and Ph.D	4.66207	.21559	.000
OND/NCE	FSLC	2.25074	.18484	.000
	SSCE	-1.83598	.14405	.000
	HND/B.Sc	.82609	.13455	.000
	M.Sc and Ph.D	2.82609*	.20005	.000
HND/B.Sc	FSLC	1.42466	.19488	.000
	SSCE	-2.66207*	.15672	.000
	OND/NCE	-.82609	.13455	.000
	M.Sc and Ph.D	2.00000	.20936	.000
M.Sc and Ph.D	FSLC	-.57534	.24473	.019
	SSCE	-4.66207*	.21559	.000

OND/NCE	-2.82609	.20005	.000
HND/B.Sc	-2.00000	.20936	.000

*The mean difference is significant at .05 level

DISCUSSION OF RESEARCH FINDINGS

This section of the study presents a hypothesis by hypothesis discussion of findings obtained from analysis of data

Age of pregnant women and utilization of insecticide treated nets
The result that was obtained from analysis of data and testing of hypothesis one in the study revealed that the null hypothesis was rejected.The finding of this result is that there is a significant influence of age on utilization of insecticide treated nets among pregnant women in Southern Cross River State. The reason for this finding could be that women across various age groups in the study area seem to understand the benefits of utilizing insecticide treated nets differently. As a result, age of pregnant women has been identified as a causal factor in the rate of utilization of insecticide treated nets in the study area.

This finding agrees with that of Kennedy (2019) who carried out a study on the utilization of insecticide treated net among pregnant Women in Hohoe Municipality of Ghana. The purpose of the study was to examine the utilization of ITNs among pregnant Women. Descriptive cross-sectional research design was adopted for the study. A multi stage sampling procedure was used to select a sample of 283 respondents from a population of 2883 household representatives in the study area. A questionnaire served as instrument used in collecting data from respondents.

Descriptive, inferential statistics and STATA Version 14 were adopted in analyzing and presentation of data. The results revealed that ownership of ITNs was higher (80.7%) than its utilization (41.7%). The age pregnant Women was strongly associated with the utilization of ITNs (AOR = 2.00,95%, CI = 0.00, 0.02, p <0.001). Pregnant Women aged 26-35 were less likely to use an ITNs as compared to those aged between 17 and 25 and the difference was statistically significant. The study recommended among others that in order to ensure a high ITNs coverage and utilization, there is the need for continuous distribution of ITNs to households. Households are to be sensitized to use the nets to prevent the continuous spread of malaria.

Educational qualification of pregnant women and utilization of Insecticide Treated Nets
The result that was obtained from analysis of data and testing of hypothesis two in the study revealed that the null hypothesis was rejected. The finding of this result is that there is a significant influence of educational qualification on utilization of insecticide treated nets among pregnant women in Southern Cross River State. The reason for this finding could be that the level of education attained by an individual can determine to a large extent her understanding of concepts and practices. The pregnant women who are educated to Masters and Ph.D must have acquired a lot of information on the need to frequently and effectively utilize insecticide treated nets. This might not be the same with pregnant

women who have First School Leaving Certificate or even Senior School Certificate. This could be the reason why educational qualification significantly influenced utilization of insecticide treated nets among pregnant women in the study area.

This finding agrees with that of WHO (2016) who reported that the issue of educational qualification of pregnant women cannot be over looked when discussing the pregnant women utilization of ITNs. This is because through education knowledge is acquired, awareness is created and ignorance is removed. Awareness, perceptions, attitudes and beliefs on prevention of malaria are areas that have been researched on to find out how they affect utilization of ITNs. According to WHO (2016), insecticide treated nets have been recommended as the main malaria control and preventing malaria morbidity and mortality in a range of epidemiological settings, as they reduce densities and infectivity of malaria vectors, thus overall transmission protecting all individuals within a community to ensure equality of access, WHO (2016) further recommends that ITNs be provided free of charge for all at risk (Universal coverage); this is to be coupled with effective behaviour change, communication to increase usage and proper maintenance. ITNs have thus been advocated for as the most preventive tools against malaria.

The finding of this study also supported that of Babalola and Fatusi (2009) who opined that educational status of women and their partners, socio-economic level type of residence area, access to media, knowledge about malaria preventive measures, age, migration status, wealth equity, parity, experience of abortion and child death, religious beliefs, ethnic affiliations were some of the individual background characteristics that were associated with the use of insecticide treated Nets (ITNs).A study by Eshetu (2014) also revealed that women educational status is largely considered as the significant determinant of ITNs utilization. The study adopted a 2011 Ethiopian Demographic and Health Survey (DHS) report and showed that insecticide treated net utilization of women with educational status of more than secondary (67.8 percent) was three times greater than those of women without any education (22.2 percent). In addition, the disparity between illiterate women and women with more than secondary level of education in terms of reproductive health related issues (like total fertility rate, infant mortality rate, child mortality rate, birth spacing, delivery in health facilities, vaccination, antenatal care by doctors, first age at marriage and first birth, teenage pregnancy, ideal number of children) is by far pronounced than the disparity observed on rural-urban (place of residence) and wealth quintile.

Angeles (2015) who noted that education, exposure cum awareness could serve as a channel for understanding and proper utilization of insecticide treated net in preventing malaria among pregnant women. Education and awareness of proper utilization of ITNs has a range of benefits to the individual, husband, family and the entire society as a whole to curb the spread of malaria. Although these methods have been poorly used by pregnant women because of some factors, the goal of roll back malaria partnership is to achieve universal coverage for all population at risk using appropriate interventions for prevention and case management.

SUMMARY

Summary of the study

The study investigated socio-demographic variables and utilization of insecticide treated net among pregnant women in Southern Zone of Cross River State, Nigeria. For the purpose of this study to be achieved, five research questions were posed and converted into five null hypotheses, which were tested at 0.05 level of significance. There was a detailed review of related literature on the variables of the study. Survey research design was employed in the study. Accidental sampling technique was adopted in selecting the health facilities used for the study while the systematic random sampling technique was adopted in selecting the seven hundred and forty one respondents used for the study. A structured questionnaire was the instrument utilized for data collection. The instrument was subjected to validity by relevant experts. Cronbach alpha method was employed to establish the reliability of the research instrument.

To test the various hypotheses that were formulated for the study, one-way analysis of variance and Pearson product moment correlation statistics were utilized for analysis of data. The result obtained from data analysis and hypotheses testing in the study revealed that;

1. There is a significant influence of age on utilization of insecticide treated nets among pregnant women
2. Educational status significantly influences utilization of insecticide treated nets among pregnant women

Recommendations

From the findings obtained and conclusion drawn, the following recommendations are made;

1. Pregnant women across various groups especially the younger ones should be adequately sensitized on the need to effectively utilize insecticide treated nets in order to prevent the incidence of malaria during pregnancy
2. Pregnant women with low educational status should regularly and adequately informed on the benefits of utilizing insecticide treated net, so as to prevent malaria and stay healthy during pregnancy
3. Relevant authorities should continue to encourage pregnant women to increase and strengthen their belief in the use of insecticide treated net in order to avoid regular exposure to malaria parasite

REFERENCES

Abubakar, A. B. (2012). Anti-malarial prescribing practices: A challenge to malaria control. *Journal of Tropical Medicine and International Health,* 1(2), 137-144.

Abubakar, S. I. (2017). Factors influencing the utilization of insecticide-treated nets in the prevention and control of malaria among pregnant women in Nigeria. Master´s Thesis submitted to Department of Public health: Madonna University, Elele: Rivers State.

Adamu, Y. &Salihu, H. (2012) Barriers to the use of antenatal and obstetric care services in rural Kano, Nigeria. https://www.semanticscholar.org/paper/Barriers-to-the-use-of-antenatal-and-obstetric-care-Adamu-Salihu/6973f46e97bcc0d587b09e97f3ce69c617c4fad4

Adjei, D. (2014). Predictors of contraceptive use in Ghana: Role of religion, religion of residence, ethnicity and education. *Journal of Advocacy, Research and Education,* 1(1), 1-6.

Afolabi, B. M. (2009). Household possession, use and non-use of treated or untreated mosquito nets in two ecologically diverse regions of Nigeria – Niger Delta and Sahel Savannah. *Research and Treatment Journal*, 15, 68-73.

Ajzen, I. (1988). Theory of Planned Behaviour (TPB). USA. Boston.

Alaii, J. A. (2003). Factors affecting use of permethrin-treated bed nets during a randomized controlled trail in western Kenya, *American Journal of Tropical Medicine Hygiene,* 68(4), 137-141.

Alonso, P; Brown, G. & Arevalo-Heirera, M. (2011). A research agenda to under pin malaria eradication. http://doi:10.1371/*Journal.PMED.*1000406. Retrieved-October 10, 2021.

Aluko, O. (2012). Determinants of insecticide treated nets ownership and use. *Journal Human Health,* 4(2), 262-269

Andersen, N. E. (2008). Burden of malaria in Ethiopia between 2000-2016: Findings from the Global Health Estimates. *Tropical Diversity Travel Medical Vaccines. 5*(11), 123-133.

Andersen, O. S. & Davidson, F. K. (2001). Location, location, location: environmental factors better predict malaria-positive individuals during reactive case detection than index case demographics in Southern Province, Zambia. *Malaria Journal. 16*(1):1–9.

Andersen, R. I., Pauela, P. A. & Baumeister, I. S. (2015). Awareness and use of Insecticide-Treated Mosquito Bed Nets (ITNs) among students in the second cycle institutions in the Tamale Metropolis of Northern Region of Ghana.*Journal of Educational Health, 2*(3), 10-20.

Angeles, G. (2015). Effects of education and family planning programmes of fertility in Indonesia. *Journal of Development and Cultural Change*, 54(1), 165-201.

Azeb, A. S., Habtanu, O. F. &Yitayal, A. (2018). Poor maternal and child health care utilization in Nigeria: Does partners´ age difference matter? *Ife Social Sciences Review*, 25(1), 1-12.

Azeb, E. N., Habtanu, D. S. & Yitayal, W. M. (2018). Why it is difficult to eradicate malaria in Sub-Sahara Africa. *Perspect Global Development Technology. 18*(3), 269–285.

Azeb, E. Y; Hobtamu, D. E; &Yitayal, A. G. (2018). Utilization and associated factors of insecticide treated bed net among pregnant women attending antenatal clinic of Addiszemen Hospital, North Western Ethiopia: An Institutional Based Study. *Malaria Research and Treatment Journal*,18, 28-42.

Babalola, S. &Fatusi, A. (2009). Determinants of use of maternal health services in Nigeria – looking beyond individual and household factors. *BMC Pregnancy and Childbirth,* 9(2), 43-56.

Beekle, C. M. &Mecabe, D. O. (2016). *Identifying factors of influence on family planning practices among rural Haitian Women*. Haiti: Slippery Rock University.

Biadgilign, R. C. (2012). Determinants of ownership and utilization of insecticide treated nets for malaria control in Eastern Ethiopia.*Journal of Educational Health and Practice, 3*(5), 90-100.

Biadigartian, C. A. (2012). Factors associated with use or non-use of mosquito nets owned in Oromia and Amhara regional states, Ethiopia. *Malaria Journal,* 8-26.

Bisi-Onyemaechi, A. C; Obionu, C. N; Chikani, U. N; Ogbonna, I. F &Ayuk, A C. (2017). Determinants of use of insecticide treated nets among caregivers of under-five children in Enugu, South East Nigeria. *Malaria Journal,*10, 179-193.

Charles, N; Tobiase, O; Apinjoh, E; & Eric, A. (2019). Coverage and usage of insecticide treated nets (ITNS) within households: associated factors and effect on the prevalence of malaria parasitemia in the mount Cameroon area. *Journal of BMC Public Health,* 19, 12-19.

Chinwe, N. J. (2018). A review of the literature on insecticide treated bad net use, Anaemia and malaria parasitaemia in under five children. *American Journal of Pediatrics,* 6(2), 12-21.

Clara, L. E. (2015). Contextual factors influencing modern contraceptive use in Nigeria. *Demographic and Health Surveys,* 120, 121-132.

Clara, M. (2015). To Recognize World Malaria Day, Clara Menéndez Talks Malaria in Pregnancy. https://www.mhtf.org/2015/04/24/to-recognize-world-malaria-day-clara-menendez-talks-malaria-in-pregnancy/

Coleman, M. (2008). Evaluation of an operational malaria outbreak identification and response system in Mpumalanga Province, South Africa. https://malariajournal.biomedcentral.com/articles/10.1186/1475-2875-7-69

David, C. (2018). Social and cultural aspects of 'malaria' and its control in central Côte d'Ivoire. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2588631/

Deladem, S. P. (2013). Use of long lasting insecticide bed net among pregnant women in Ga East municipality of the greater Accra region. [Ghana, Greater Accra]: University of Ghana.

Eisele, T. P. (2009). Protective efficacy of interventions for preventing malaria mortality in children in plasmodium falciparum endemic areas. *International Journal of Epidemiol,* 3(3), 39-88.

Eshetu, A. A. (2014). Does women education matters in family planning? Empirical evidences from Ethiopia. *Wudpecker Journal of Education Research,* 3(2), 10-22.

Ezire, J. C. (2015). Transition of son preference: Child gender and parental inputs. *Journal of international economic and Law,* 13(16), 10-17.

Gabriel, U. P., Iloh, A. N., Amadi, O; & Godwin, O. C. (2011). Family biosocial variables influencing the use of insecticide treated nets for children in Eastern Nigeria. *Journal of Family & Community Medicine*. 6, 156-172.

Gamble, C. L; Ekwaru, J. P; &Kuile, F. O. (2009). Insecticide treated nets for preventing malaria in pregnancy. *Cochrane Database system,38(1), 36-43.*

Guerra, M., de Sousa, B., Ndong-Mabale, N. Berzosa, P. & Paula A. (2018). Malaria determining risk factors at the household level in two rural villages of mainland Equatorial Guinea. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5960103/

Guyatt, T. M. (2002). Health related quality of life in children and adolescents and associated factors. *Journal of Cognitive and Behavioural Psycho Therapies,* 9(1), 33-45.

Harvey, S. A. (2008). Determining the characteristics of a culturally appropriate bed net among Mestizo communities of the Peruvian Amazon. *American Journal of Tropical Medical Hygiene*, 79(6), 834-838.

Ibor, U. W., Aigbe, G. O., Iwara, A. I., Okongor, O. E &Okino, I. I. (2012). Ownership and utilization of insecticide treated nets in Cross River State, Nigeria. *Journal of Medical Sciences*, 12(7), 198-206.

Isangedighi, A. J., Joshua, M. T., Asim A. E. &Ekuri E. E. (2004). Fundamentals of research and statistics in social sciences. Calabar: University of Calabar Press.

Izale, K., Govender, I., Fina, J. P., &Tumbo, J. (2014). Factors that influence contraceptive use amongst women in Vanga Health District, Democratic Republic of Congo. *African Journal of Primary Health Care Family Medicine*, 6(1), 1-7.

Jamison, D. T. (2016). *Disease control priorities in developing countries*. New York: Oxford University Press. 417-423.

Jammison, U. S. (2016). The factors relevant for participatory malaria control in Rusunga Island: Prevalence, intensity and risk factors. *Malaria Journal. 17*(1):1–13.

Janz, J. & Marshall, C. (1994). Child abuse and neglect: part I – redefining the issues. Trends & issues in crime and criminal justice. *Ocean Journal of Applied Science* 3(2), 146, 1-11.

Kennedy (2019), a study on the utilization of insecticide treated net among caregivers of children under-five years in Hohoe Municipality of Ghana.

Kim, E. (2002). The relationship between parental involvement and children´s educational achievement in the Korean Immigrant Family. *Journal of Comparative Family Studies,33*(4), 529-543.

Koenker, Z. S. (2011). Review of delivery strategies for insecticide treated mosquito nets: are we ready for the next phase of malaria control efforts? *Tropika.Net, 1*(1),78-99.

Kolaczinski, J. & Hanson, K. (2016). Costing the distribution of insecticide-treated nets; A review of cost and cost-effectiveness studies to provide guidance on standardization of costing methodology. *Malaria Journal, 20*(16), 25-37.

Korenromp, Z. J. (2003). Long-term transmission patterns and public health policies leading to malaria elimination in Panamá. *Malaria Journal. 19*(1):1–16.

Macintrye, K. (2006). Assessment of insecticide-treated Bed net used among children and pregnant women across 15 Countries using Standardized National Surveys. *American Journal of Tropical Medicine Hygiene,8*(2), 209-214.

Mardiana, B; San, O. P. &Khatijah, C. U. (2015). Knowledge, attitude and practice about malaria, the mosquito and anti-malarial drugs in a rural community. *Ethiopian Journal of Health Development*, 17(2), 99-104.

Mardiana, I. V., San, U. A. & Khatijah, E. R. (2015). Impact of a malaria intervention package in schools on Plasmodium infection, anaemia and cognitive function in schoolchildren in Mali: a pragmatic cluster-randomised trial. *Broad Spectrum Medical Journal. 2*(2), 182-193.

Mardiana, M., San, S. &Khatijah, L. (2015). Prevalence of family planning practices among women influenced by husband's socio demography and decision making. http://eprints.unisza.edu.my/5209/1/FH02-FP-18-12687.pdf

Marsland, R. (2006). Mosquito net challenge tradition in Tanzania. Department of Anthropology, School of Oriental and African Studies, University of London. Throntaugh Street, London.

Mbonye, A. K, Neemaro, S., & Magnussen, P. (2016). Preventing malaria in pregnancy: *A study of perceptions and policy plan*, *21*(1), 17-26.

Mclanahan, S. & Wilson, P. (2009). Fragile Families and the Reproduction of Poverty. https://journals.sagepub.com/doi/10.1177/0002716208324862

Michelle, R., Mahamadou, S., &Ogobara, S. (2005). Use of insecticide-treated nets (ITNs). Following a malaria education intervention in Piron, Mali: A Control trial with systematic allocation of households. *Malaria Journal,* 4, 35-47.

Ministry of Health (2003). *Policy and strategy for insecticide treated nets: Malaria Control Programme.* Uganda: Ministry of Health, Uganda.

Ministry of Health, Uganda malaria Indicator survey 2014-2015 (2014 – 15 Umls) available at micro data.worldbank.org/index.php/catalog/2520/download/36646.

Mohammad, O. E. &Aliyu, F. K. (2018). Impact of health education intervention on insecticide treated nets uptake among nursing mothers in rural communities in Nigeria. *Academic Research Journal,* 4(3), 382-491.

Noor, A. M. (2009). Insecticide-treated net coverage in Africa: Mapping progress in 2000-07. *Lancet*, 373, 58-67.

Odiagbe, M. (2015). Utilization of insecticide-treated nets by under-five children in Nigeria: Assessing progress towards the Abuja targets. *Malaria Journal*, 7, 145-158.

Olaitan, O. (2011). Prevalence of malaria and treatment procurement in three local government areas of Ekiti State, Nigeria. *International Journal of Scientific World*, 5(2):145

Oluwakeni, E. (2011). Knowledge, perception and practice of malaria management among non-medical students of higher institutions in Osun State Nigeria. *American Journal of Biotechnology and Medical Researche*, 1 (1), 5-9.

Opiyo, W. R. (2013). An explorating study of community factors relevant for participatory malaria control on Rusinga Island, Western Kenya, *Malaria Journal,* 6(68), 36-44.

Polrat, W. (2017). Use of insecticide-treated mosquito net among pregnant women and guardians of children under five in the Democratic Republic of the Congo. *Malaria Journal*, 16(1), 85-96.

Praise, Z. K. (2011). A study on knowledge, attitude and practice about malaria awareness and bed net use. *Journal of Bhutan Studies*, 14, 135-146.

Pulford, L. C. (2011). *Insecticide treated bed nets and curtains for preventing malaria* (Cochrane Review). The Cochrane Library. Oxford: Update software.

Sharma, M. A. (2012). Impact of parent´s occupation and family income on children´s academic performance. *Secondary Education Journal*, 2(1), 53-59.

Simon, J. L. (2002). How will the reduction of tariffs and taxes on insecticide- treated bednets affect household purchases? *Bulletin of the World Health Organisation*, 80(11):892-899.

Sonia, S. & Robert, M. (2018). The effects of education, poverty and resources on family planning in developing countries. *Journal of Clinics in mother and child health,* 15(1), 298-308.

Speizer, S. L. (2009). Relationship characteristics and contraceptive use among couples in urban Kenya. *International Perspective on Sexual and Reproductive Health,* 4(3), 6-19.

Speizer, S. L. (2014). Relationship characteristics and contraceptive use among couples in urban Kenya. *International Perspectives on Sexual and Reproductive Health,* 40(1), 11-20.

Takyi, L. N. & Addai, H. C. (2016). Assessment of knowledge, attitude and practice about malaria and ITNs utilization among pregnant women in Shashogo District, Southern Ethiopia. *Malaria Journal. 14*(1), 235-240.

Tassew, A. Hopkins, C. &Deressa, M. (2017). Use and Misuse of a discount voucher scheme as a subsidy for insecticide treated nets for malaria control. *Health Policy Journal*. 14(2), 1-9.

Taylor, O. N. (2000). Estimating hospital catchments from in-patient admission records: A spatial statistical approach applied to malaria. *Scientific Representations. 10*(1):1–11.

Ugwu, E. O., Ezechukwu, P. C., Obi, S. N., Ugwu, A. O., &Okeke, T. C. (2013). Utilization of insecticide treated nets among pregnant women in Enugu, South Eastern Nigeria. *Nigeria Journal of Health Science,* 4(3), 67-76.

Ujiro, I. (2012). Poverty and family planning practices of married women. *International Journal of Academic Research*, 3(2), 575-583.

UNICEF. (2005). Family background and literacy performance. Retrieved Nov. 17th 2021 from http://www.oecd.org/dataoecd/33/9/336905591.

Winch, P. (2017). Vector control at household level: An analysis of its impact on women. *Actatrop*, 54, 4, 327-339.

Wiseman, V. (2007). Determinants of bed net use in the Gambia: implications for malaria control. https://pubmed.ncbi.nlm.nih.gov/17488900/

World Health Organization (2000). *World malaria report*. Switzerland: World Health Organization.

World Health Organization (2012). *The malaria report*: Geneva: WHO, 2012.

World Health Organization (2015). *The world malaria report*. Washington DC: World Health Organization

World Health Organization (2016). *World malaria report*. Geneva: World Health Organization.

World Health Organization (2017). *World malaria report*. Geneva. World Health Organization Press.

World Health organization (2019). Malaria vector control and personal protection: Report of a WHO study group, Geneva.

Yitayew, A. E; Enyew, H. D. &Goshu, Y. A. (2018). Utilization and associated factors of insecticide treated bed net among pregnant women attending Antenatal clinic of AdfdisZamen Hospital, North-Western Ethiopia: An Institutional Based Study.

Yusuf, F. R. &Falade, M. A. (2008). The effects of family income on test-anxiety and academic achievement among Iranian high school students. *Asian Journal of Social Science*, 6(6), 89-93.

Zelacem, T., Aymere, A., Yadeta, D., &Fitsum, W. (2015). Ownership and utilization of insecticide treated nets (ITNs) for malaria control in Harari National regional State, Eastern Ethiopia. *Pan African Medical Journal*. 21, 36-52.