

## **Towards Effective Utilization of Insecticide Treated Bed Nets Among Rural Dwellers in Ebonyi State.**

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### **Abstract**

This study is towards effective utilization of insecticide treated bed nets among the rural dwellers in Ebonyi State. However, the specific objectives of this study are: To determine the extent of knowledge and awareness of insecticide treated bed nets use among the rural dwellers in selected communities of Ebonyi State; to verify the extent enlightenment campaign can improve the acceptance and proper usage of insecticide treated bed nets in Ebonyi State rural communities. and also to use To assess the socio-cultural beliefs regarding insecticide treated bed nets and the beliefs that affect insecticide treated bed net acceptance and usage in rural communities of Ebonyi State. The sample of the study was 392 respondents randomly drawn from the population of the study. Instrument of data collection was structured questionnaire which were administered to selected six communities in three senatorial zones of Ebonyi State. Data generated were analyzed using descriptive and inferential statistics. The study found that knowledge and awareness of insecticide treated bed nets use among the rural dwellers in the Ebonyi State is poor. It is the conclusion of this study that majority of rural dwellers still have low knowledge of insecticide treated bed nets usage. Similarly, socio-cultural belief is clamping down on the gospel of insecticide treated bed nets acceptance and usage. The study recommends that Government is encouraged to deepen the knowledge and awareness of insecticide treated bed nets use among the rural dwellers in the Ebonyi State through improved community enlightenment campaign on the importance of proper use of insecticide treated bed nets. Provision of insecticide treated bed nets stand to hang the net for families that have no bed is also recommended. The implication of the study is that increase in knowledge and awareness in the utilization of insecticide treated bed nets in rural communities in Ebonyi State will improve healthy living.

**Keywords:** Knowledge and Awareness, Social-Cultural Beliefs, Proper Use, Community Enlightenment Campaign, Insecticide Treated Bed Nets.

## Introduction

Insecticide treated bed nets in Sub-Sahara Africa, including Nigeria rural communities where there is high incidence of malaria are used for vector control and prevention (Ezeigbo, Osuagwu, Ibegbulem & Agomoh, 2015). RBM/WHO, (2012) report indicate that about 90% of Nigerian population mostly rural dwellers stand the risk of having malaria. An estimated 100 million cases and 300,000 deaths traceable to malaria occur every year in the country (US Embassy in Nigeria, 2011) in (Lois, Ignatius, Chihurumnuanya, 2015). Similarly the report seems not to be different in Ebonyi State based on environmental configuration. The disease is, therefore, a barrier to economic and social development of communities. It is, therefore, obvious that the disease imposes substantial cost on households, business, health systems and government budgets, as well as a major cause of poor economic performance and persistent poverty among rural dwellers in Ebonyi State (Ifeoma, Chinomnso & Nene, 2013). In February 2011, the Ebonyi State Government in collaboration with Roll Back Malaria took proactive steps to reduce the spread of malaria in the state. The direct benefit to the individual, therefore, is that insecticide treated bed nets use offers a protective benefit for the entire community. Increased insecticide treated bed nets use throughout the community reduces transmission and thus has a more powerful impact in saving lives in the state (Teklehaimonot, Sachs, & Curtis, 2007).

Furthermore, the use of insecticide treated bed nets for malaria vector control is one of the key elements currently employed by Roll Back Malaria in Nigeria (Policy for the Implementation of Insecticides Treated Mosquito Nets in Nigeria, 2012). Interestingly, inadequate knowledge and awareness created a gap thereby leading to misuse of insecticide treated bed nets among rural dwellers in Ebonyi State. Based on the highlighted issues, significant percentage of the people in the rural communities collect the nets and misuse it for plant/crop protection, widow blind and fishing (Gatachew, Mulualem & Molla, 2015; Maxwell, Rwegoshora, Magesa, & Curtis, 2006; Opiyo, Mukabana, Kiche, Mathenge, Killen, & Fillinger, 2007; Nwokeukwu, Emma, Inya-Agha & Iwuoha, 2014). Consequently, some groups of people after collection of the insecticide treated bed nets avoid using the net because of the associated heat (Nwokeukwu, Emma, Inya-Agha & Iwuoha, 2014).

Studies by Gatachew, Mulualem & Molla, (2015); Nwokeukwu, Emma, Inya-Agha & Iwuoha, (2014) indicate misuse of insecticide treated bed nets. In addition, the treated bed nets are believed in some communities to cause heat or suffocation (Nwokeukwu, Emma, Inya-Agha & Iwuoha, 2014; Awaga & Charest, 2004). There is need for adequate awareness which to a reasonable extent may close the knowledge gap concerning use and misuse of the treated bed nets in the communities. Similarly, relevant stakeholders, especially in the health sector may formulate active policy framework on the use and misuse of insecticide treated bed nets that will be more proactive in contending the spread of malaria (Arinze, Ugwoke, Aguwa, Modebe, Nwobodo & Ilika, 2014).

Misuse of insecticide treated bed nets is attributable to poor knowledge of the rural dwellers with regard to the link between mosquito and malaria. It is believed that even when knowledge is a determinant to insecticide treated bed nets use; it may not assure protection from malaria unless there is proper use and strong adherence. Relatedly, socio-cultural factors and myths about the insecticide treated bed net provide room for misuse among the rural dwellers. The colour of the nets and chemical content of the insecticide treated bed nets to a reasonable extent affect the proper usage. Colour preferences vary between and within cultures such that white nets have traditionally been the most commonly available and used. Green nets are accepted in 128 - 147 entries. Another groups, believe that insecticide treated nets resemble a structure used to cover dead bodies during burials (Arinze, Ugwoke, Aguwa, Modebe, Nwobodo & Ilika, 2014). Another group believes that the insecticide treated nets distributed are used for family planning (birth control) in the rural communities.

Similarly, cultural belief has left the rural dwellers, to adopt alternative products such as coils and sprays (which are more affordable on daily basis) and maybe hazardous to inhale

(Nsirim, Edwin-Wosu, S, Okiwelu & Aline, 2013). Good health is a fundamental foundation for social and economic growth in a given country. Knowledge, however, is a central element in health improvement and the education of a disease burdened communities on the ways of disease prevention to the attainment of free endemic communities. It is the thrust of the study to increase knowledge and awareness needed for effective utilization of insecticide treated bed nets among the rural dwellers in Ebonyi State. National health policies, strategies and plans play an essential role in defining a country's vision, policy direction and strategies in ensuring the health of its population. The development of national health policies, strategies and plans is a complex and dynamic process. Its precise nature varies from state to state, even in implementation, due to political, historical and socio-economic situation prevailing in that society.

Generally, comprehensive health policies, strategies and plans seeks to: -

- Respond to the growing path for strengthening of health systems and the renewal of primary health care, universal coverage, people-centered care and emphasis on public health;
- Serve to guide and steer the entire pluralist health sector and
- Go beyond boundaries of health systems, addressing the social-cultural determinants of health and the interaction between the health sector and other sectors in the society.

Health-related policy and its implementation is complex. Health policy should be understood as more than a national law. Knowledge, education and socio-cultural belief are necessary for successful implementation of any policy or program. The roll back malaria program is not left out as these afore mentioned issues comes into play in Ebonyi state rural communities.

An effort by successive governments, both at the local and international level to reduce infant and adult mortality caused by malaria has increased over the years. These increases seem not to have impacted on the knowledge, usage and the socio-cultural practices and beliefs of the people, especially among the rural dwellers. Attempts to prevent malaria through anti-malarial medications and insecticides are currently threatened by the emergence and spread of dry resistant malaria parasites and insecticides resistant vector mosquitoes. Similarly, the crusade against infant mortality through the use of insecticide treated bed nets seems also to have been whittled down by the level of knowledge / awareness; level of enlightenment campaign; and the socio-cultural belief with regards to the use of insecticide treated bed nets among the rural dwellers.

The level of understanding and compliance in the use of ITBN is generally poor in the rural areas compared to the urban communities. The acquisition of ITBN is one thing and proper usages is another. This, together with the increasing incidence of malaria has heightened the need for more effective and thorough means of controlling the spread. The use of ITBN has been recognized as an effective measure in the prevention of malaria but acquisition is different from proper usage.

Usage of ITBN in the rural communities still remains a major problem in Ebonyi state. Nkechi (2013) reported that the overwhelming majority of the in-patients among adults and children are rural dwellers. Case management and general efforts made against malaria is inefficient in the presence of abuse of insecticide treated bed nets. A preventive strategy largely depends on the vector control in such settings. Abuse of ITBN are rampant in rural communities of Ebonyi state. Some of the rural dwellers have resorted to using it to protect their crops or as a fishing net. In Ebonyi state rural communities, emphasis by program managers is on proper use through awareness campaign, but many prefer traditional malarial control strategies, including drinking of herbs and avoiding sweets, oil, groundnut etc which have no direct effect in controlling or preventing malaria. Nkechi (2013) asserted that over 36% of rural dwellers in Ebonyi state still prefer traditional malaria drugs.

A good number of rural dwellers erroneously attribute high mortality of infant and adult to recent introduction of ITBN. They believe that anyone sleeping under it is already caged spiritually and will die soon, while some believe also that any man sleeping under the ITBN will be impotent. Despite the measures adopted to curb malaria, the disease still remains one of the leading causes of death, especially in the rural areas in Ebonyi state.

### **Objectives of the Study**

The objective of the study was to systematically increase knowledge and awareness needed for effective utilization of insecticide treated bed nets among the rural dwellers in Ebonyi State. However, the specific objectives are:

- (i) To determine the extent of knowledge and awareness of insecticide treated bed nets use among the rural dwellers in selected communities of Ebonyi State.
- (ii) To verify the extent enlightenment campaign can improve the acceptance and proper usage of insecticide treated bed nets in Ebonyi State rural communities.
- (iii) To assess the socio-cultural beliefs regarding insecticide treated bed nets and the beliefs that affect insecticide treated bed net acceptance and usage in rural communities of Ebonyi State.

### **Literature Review**

#### **Knowledge and awareness of insecticide treated bed nets use among rural dwellers**

It is pertinent to assess the extent of knowledge, attitudes and practices about malaria and the effective use of insecticide treated bed nets among rural dweller in Ebonyi State, Nigeria and contribute immensely to effective use of the nets provided. Abuja declaration targets agreed upon by African heads of state in 2000 aims to provide at least 80% of pregnant women with insecticide treated bed nets by the year 2005, only insignificant pregnant women make use of an insecticide treated bed nets in Nigeria which hampered the effectiveness of nets.

Sibhatu, Ayalu & Haji (2012) asserted that poor knowledge with regard to the link between mosquitoes and malaria as well as proper utilization of insecticide treated bed nets may be yet to be achieved especially in the rural areas within the country. Another study carried by Aina & Ayeni (2011) has it that there is a wide difference between the level of awareness and the rate of use of insecticide treated bed nets by pregnant women in rural communities that exist within the state. Knowledge of the use of mosquitoes bed nets as a preventive measure against malaria had no significant effect on actual use of the net by the study population. It is suggested that government should increase its efforts at improving the awareness of the benefits of insecticide treated bed nets use and ensure free distribution accompanied by participatory approach. Sibhatu, Ayalu & Haji (2012) in their study found that there is low usage of insecticide treated bed net ownership and utilization among the households in various communities in Ethiopia. They suggested that intensive health education and community mobilization effort should be employed to increase the possession and proper utilization of insecticide treated bed nets.

Auta, Stephen, Olagunju, Vasantha, Champion & Thangeswaran (2017) posits that the knowledge on causes and predisposing factors to malaria was significantly high, (93.3%) while the knowledge on malaria preventive measures was moderate (55%) Further findings revealed that, there was no significant association between knowledge of malaria and the utilization of its preventive measures. Furthermore, there was a significant association between knowledge of malaria and the education status. Inadequate knowledge about malaria and its preventive measures, but the utilization of these measures was poor. It is worth to note that higher education was identified as the determining factor for utilization of insecticide treated bed nets and some cases lack of awareness on how to install it and its importance to prevent malaria affects usage.

The researchers further posited that pregnant women's overall knowledge and attitude about malaria and insecticide treated bed nets in Shashogo Woreda was relatively good whereas their insecticide treated bed nets ownership and utilization was noticeably poor. In addition, the study shows that poor socio-economic factors including limited access to services due to poor/limited availability and Policy for the Implementation of Insecticides Treated Mosquito Nets. Study of Lengele, (2004) showed that majority was aware of the existence of ITNs, but the awareness did not reflect into utilization of the ITNs since only 35.3% of respondents were sleeping under ITNs. This low usage of ITNs is consistent with other findings from other part of the Nigeria and developing countries.

Nkechi, (2013) asserted that the people had poor knowledge of malaria and mosquito bites, which resulted in wrong perception and misuse of the nets as door and window blinds to "protect entire household" since only two nets were given per household. The use of community structures (traditional leaders/village heads, youths, churches, and mosques) was suggested to ensure effective distribution of nets, sensitize, and monitor net-use in the communities. Health education would dispel misconceptions that ITNs could kill, curtail human fertility, and that local gin (Kai-Kai) would induce sleep and make one oblivious of mosquito nuisance. In realization of the effectiveness of insecticide treated bed net against malaria, there have been improvements in the production of ITNs. Between 2008 and 2010, a cumulative total of 289 million ITNs were delivered to sub-Saharan Africa, enough to cover 76% of the 765 million persons at risk. However, the use of ITN in Nigeria falls short of global targets (Nkechi, 2013; Sanjay & Rupashree, 2013). The 2008 Nigeria Demographic and Health Survey (NDHS) results indicate that 17% of households in Nigeria own a mosquito-net (treated or untreated), and 8% of households own more than one mosquito-net. Sixteen percent of households own at least one ever-treated mosquito-net, and 7% own more than one ever-treated mosquito-net. The average number of ITNs per house-hold was less than one, which could be attributed to a weak supply and distribution mechanism. Net distribution in recent years has been epileptic, with only a few Local Government Areas (LGAs) targeted in various states. This has made it impossible to attain full saturation in any one area. The approach since 2009 has been to start afresh a coordinated strategy to deliver 2 nets to every house-hold across the country through a series of stand-alone campaigns to achieve universal coverage.

Similar, study conducted in Zambia according to Sanjay & Rupashree, (2013) posits that continuous sleeping under an insecticide-treated bed net has been shown to decrease all-cause child mortality by 17 % and the frequency of severe malaria by 45 %. According to Helen and Snow, (2002) insists that the use of bed nets against a mosquito bites was proposed more than 70 years ago before the role of mosquito in the malaria disease transmission was recognized. The use of ITNs come to mind of the public health experts 20 years back when they tried to evaluate the effect of pyrethroid insecticides on reduction of mosquito in Africa and Asia (Jenny, & Mark. 2006 ). In 2008-2010 more than 254 million of insecticide treated bed nets were distributed to malaria epidemic countries of Africa, which results in a significant reduction in morbidity and mortality rate associated to malaria disease (Jean-Philippe, Hanafy, Alexia, & Mark. 2013). A research report in Kenya indicates that insecticide treated bed nets have been distributed mainly to pregnant women and children under five and use of insectic 128 - 147 ed nets was increased from 7% in 2004 to 67% in 2006, and hence significantly reduced the malaria death by 44 % (Hitoshi, Gabriel, Kazunori, Osamu, Shinji, Takashi, George, Yoshihide, Cassian, Sammy, Charles, Noboru, Masahiro, 2011; Fegan, Noor, Akhwale, Cousens, Snow, 2007).

In Kenya insecticide treated bed nets user children show a significant reduction in mortality rate (11.3 per-1000 person-year) than non-user of insecticide treated bed nets children of same age (17.9 per-1000 person-year) (Fegan, Noor, Akhwale, Cousens & Snow, 2007). Result in Gambia also indicated that children sleep under bed net got fewer malaria cases (Helen and Snow, 2002). Similarly in Papua New Guinea (PNG) use of bed net

significantly protect against *Plasmodium falciparum*. Another research report indicated that Japanese soldier stationed in Taiwan one battalion sleep with bed nets and other battalion without, 259 malaria cases were observed in those sleep without bed nets (Helen & Snow, 2002). In India two malaria endemic districts (Malkangiril, and Koraput) to evaluate the benefits of bed net use, the result showed that the insecticide treated bed nets users were finding fewer mosquitoes inside their house at night and reduced malaria and undisturbed sleep at night (Gunasekaran, Sahu, Vijayakumar, & Jambulingam, 2009).

The use of insecticide treated bed nets is one of the best ways to reduce the malaria burden in Africa. Proper and regular use of insecticide treated bed nets can reduce the mortality rate in children aged below five by 20% (Misra, Webber, Lines, Jaffar and Bradlely. 1999). In India (malaria endemic district) to evaluate the efficacy of the chemical (deltamethrin) as insecticide treated bed nets and IRS for malaria control the result indicated that higher reduction of malaria cases in insecticide treated bed nets than IRS. The incidence rate was 61.5% for control, 43.3% for spray and 28.1% per 1000-person-year (Misra, Webber, Lines, Jaffar and Bradlely, 1999). In sub-Saharan Africa, Latin America, Thailand, Pakistan, and Iran a research report indicated that use of insecticide treated bed nets reduced malaria cases by 50% both *P.falciparum* and *P. vivax* infection (Jenny, & Mark, 2006).

A survey carried out by the National malaria control programme in 2005 revealed that utilization of insecticide treated bed nets by children under-five was only 1.7% (WHO, 2000). Ensuring that the poor and vulnerable population benefit from malaria control interventions remains a challenge for malaria endemic communities. In Nigeria, free insecticide treated bed nets were distributed to children aged below five years in 2006 through immunization, antenatal care and mass campaigns. High and equitable coverage were reported after the campaign in some districts, although national level coverage remained low, suggesting that understanding barriers to access remains important (Ibor, 2010).

Guyat and Snow (2002) noted that the ability of communities to pay for insecticide treated bed net is dependent upon income of the population. A major constraint in the ownership and use of insecticide treated bed net sare the inability of the public and private sectors to deliver insecticide treated bed nets to remote rural populations. The coverage of the formal health service is very low and private sector involvement has made insecticide treated bed nets over the years unaffordable in the public market (Tulu, 2004). The infrastructure of distribution, including roads and communication is also inadequate. The distance people travel to obtain insecticide treated bed nets has also hindered access and utilization of this commodity as many people do not have the means of overcoming distance.

Although, the distribution and ownership of insecticide treated bed nets is improving through time, the access and utilization among households is not well known. Besides, data on proper utilization coverage of insecticide treated bed nets among priority and high risk people are grossly inadequate. There is also serious lack of information and knowledge about current levels of insecticide treated bed nets coverage by households.

### **Community enlightenment campaigns on use of ITNs**

The 2015 goals of the World Health Organization's (WHO's) Roll Back Malaria Partnership are to reduce global malaria cases by 75% and to reduce malaria deaths to near zero through universal coverage by effective prevention and treatment interventions. Among other preventive interventions, WHO recommends the use of insecticide treated nets (ITNs), particularly Long-Lasting Insecticide Nets, which have been shown to be cost-effective, to reduce malaria episodes among children under 5 years of age by approximately 50% and all-cause mortality by 17%. Universal coverage with ITNs is defined as use by > 80% of individuals in populations at risk.

The use of ITNs is largely affected by the knowledge of people. Behavioral patterns of people-utilization of the ITN are dependent on their knowledge on the consequence of

nonuse. Researchers give varied indications on the use of the ITN and peoples level of knowledge. Research Yadav, Kalundha & Sharma (2007) reported that despite evidence that the use of ITNs decreases malaria-related morbidity and mortality, the use of ITNs in Africa remains relatively low. Estimates suggest that in 2005, only 3% of children under five years of age slept under ITNs, while up to ten times as many are thought to sleep under any bed net. This shows that the fact that ITNs are very effective in malaria prevention does not necessarily mean that people will use them after they have received them. While the evidence based on the effectiveness of ITNs in reducing malaria transmission has grown rapidly in recent years, utilisation rates of ITNs in most African countries have been very low.

However, there are growing interests in using insecticide treated bet nets as one of the leading strategies for prevention of malaria. Different trials have shown a promising result that insecticide treated bet nets or curtains reduce all-causes of childhood mortality by 14-33% in rural sub-Saharan Africa. However, inhabitants had poor ownership and use of ITNs due to lack of availability and affordability. Low socio-economic status was the main key factor affecting malaria control interventions in Nigeria. Researchers like Yadav, Kalundha & Sharma (2007) in their study found that that level of education, type of occupation and economic status were responsible for giving the environment for transmission of malaria in their setting. It is believed that national strategies aimed at reducing malaria transmission and spread may therefore need to incorporate socio-economic determinants operating at community level in order to produce positive outcomes in populations at risk and encourage effective usage.

To promote use and uptake of these malaria prevention strategies, mass media campaigns have been initiated to sensitise the general public, particularly pregnant women, on the effectiveness and long term benefits of correct and consistent use of the ITNs during pregnancy. The mass media campaign messages were aired on national radio and television stations in English, Pidgin English, and the three main local languages in Nigeria. Also billboards with clear messages about the link between mosquitoes and malaria prevention were placed at strategic locations in major cities in Nigeria to further improve access to correct information. The messages on the billboards were reproduced into posters and handbills that were widely distributed across the country. This evaluation is focused only on the mass media campaign via the radio. Very few nationwide health interventions are evaluated. The literature exposed the impact of exposure to these campaigns on uptake of the malaria prevention strategies in pregnancy Policy for the Implementation of Insecticides Treated Mosquito Nets (ITNs) (2012).

Andrew, Samantha, Uwem, Audu & Perpetua (2019) in their study posited that significant predictors were household size, head of household education level, household wealth quintile, and place of residence. The CHAID gain index results identified households in the South West, North

Central and South Central regions with low ITN ownership, and the general population in the South South, South East and North Central regions with low ITN use. Previous studies like Sibhatu, Ayalu & Haji (2012) 128 - 147 in (2016) have explored apparent gap between net ownership and use. The researchers further established potential determinants of ITN use previously identified include: demographic characteristics; an individual's knowledge and beliefs related to malaria and bed nets; dwelling construction, family size/composition and sleeping arrangements; physical characteristics of bed nets; environmental factors; community and cultural characteristics; and household net density. However, programmatic implications of these findings are not always obvious given that the direction and magnitude of reported associations vary by geographic location, epidemiological setting and method of analysis.

The health workers are of-ten in a hurry to share the nets without taking time to educate the people on appropriate net-usage. The people are left to speculate on the nets

(Nkechi, 2013). These findings largely corroborate results from similar studies conducted in other African countries (Dunn, Mare, Makungu, 2011; Nkechi, 2013). The involvement of community leadership structure and local organizations, like churches, community heads, and the youths, was strongly advocated to promote acceptance and compliance. The community resource persons can also educate the people on proper use, monitor, and encourage ITNs. The study suggested that communities should be involved in all the processes of prevention that are built on net-use. Access to nets alone does not translate into effective net-use. Community members are better positioned to dispel misconceptions about ITNs, assist in net installation, and monitor usage (Nkechi, 2013).

### **Socio-cultural beliefs regarding ITNs Use.**

Previous research in the field of malaria prevention and control from various countries indicated that there are many factors influencing bed net use, taking into consideration, age and gender (Sanjay & Rupashree, 2013; Ng'ang'a, Jayasinghe, Kimani, Shililu, Kabutha, Kabuage, Githure, Mutero 2009), education, occupation/livelihood (Dunn, Mare, Makungu, 2011), malaria knowledge, beliefs and risk perceptions (Chuma, Okungu, Ntwiga, Molyneux, 2010; Dye, Apondi, Lugada, Kahn, Smith, Othoro, 2010), perceived benefits and disadvantages of nets (Dye, Apondi, Lugada, Kahn, Smith, Othoro, 2010), knowledge of appropriate net use/care practices, and net-hanging skills (Widmar, Nagel, Ho, Benziger, Hennig 2009), household size and composition (Wiseman, Scott, McElroy, Conteh, Stevens, 2007), household structure and space (Sanjay & Rupashree, 2013), use of other vector control measures (Wiseman, Scott, McElroy, Conteh, Stevens, 2007; Edelu, Ikefuna, Emodi, Adimora, 2010; Nsirim, Edwin-Wosu, S, Okiwelu & Aline, 2013), social norms and values (Dunn, Mare, Makungu, 2011), and cultural beliefs and practices (Chuma, Okungu, Ntwiga, Molyneux, 2010; Dunn, Mare, Makungu, 2011) cited in Sanjay & Rupashree, (2013), all have the potential to influence net use by individuals and within households.

Similar study carried out by Sibhatu, Ayalu & Haji (2012) asserted that the national malaria control strategy of Nigeria had emphasized the sale of ITNs on a user fee basis but, various social, behavioral, and economic barriers were identified including the lack of information about the benefits of ITNs, poor access to market for ITNs and insecticide treatment, cultural preferences, and low incomes. Franklin (2016) in his study on farmer's utilization of insecticide treated bed nets for Malaria prevention in local communities, established two major constraints in the utilization of the net in the area were inadequate information and poor design and inconvenience of hanging. The researcher suggested that in order to improve the rate of utilization of the net in the area, the study suggested enhanced information which will lead to a better education of the beneficiaries. A better design which will reduce the inconveniences associated with hanging of the nets is also required. Factors militating against the use of ITNs were identified as: Although there was a high level of awareness about ITNs, the use of ITNs was low. Socio-cultural practices such as traditional belief systems and use of un-herbal medicines were still practiced in spite of sufficient knowledge of malaria transmission and the use of ITN for malaria. The socio cultural factors that came up as affecting malaria control are the migration practices of the fishermen.

According to Nkechi, (2013) who has it that in 2010, the World Bank Booster-supported some states like (Kano, Jigawa, Bauchi, Gombe, Anambra, Akwa Ibom, and Rivers) and conducted net campaigns, and health workers distributed free nets to households. They discovered that knowledge of the cause of malaria was, however, mixed and appeared generally low. In Bauchi, like the situation in Rivers and Anambra states, the prevalence of malaria is attributed to environmental factors (Nkechi, 2013). It is also observed that insecticide treated bed nets characteristics, including shape, colour and whether or not the ITN was purchased, was associated with net deployment. However, ITNs in poor condition



are more likely to be observed hanging than ITNs in new or good condition. In recent years, anecdotal information suggests some people use ITNs for purposes other than malaria protection. These reports suggest that some ITNs may be used as fishing nets (Zambia Times 2008); for protection of seeds and fruits against insects, as used by adults who work seasonally away from home in mosquito-ridden areas or are being modified for personal protective gear and luxury items such as wedding veils (Zambia Times 2008).

## Methodology

### Study Area

The Study was carried out in Ebonyi State. Ebonyi State is in south eastern [Nigeria](#). It is inhabited and populated primarily by the [Igbo](#) with the city of [Abakaliki](#) as its capital and largest city. Other major townships include [Afikpo](#), [Onueke](#), Effium, Aba Omege, Ezzamgbo, [Edda](#), Amasiri, [Unwana](#), [Echara Ikwo](#), [Egu-Ubia](#), [Uburu](#), [Onicha](#). It was one of the six states created in 1996. The State of Ebonyi was created from parts of both [Enugu State](#) and [Abia State](#), which were the Abakaliki division from Enugu State and the Afikpo division from Abia State respectively. It has three senatorial zones, the Abakaliki division make up Ebonyi North and Ebonyi Central senatorial zones, while the Afikpo division make up the Ebonyi South senatorial zone. Ebonyi has thirteen local government areas as well as local development centres created by the state government. Ebonyi is primarily an agricultural region. It is a leading producer of rice, [yam](#), potatoes, maize, [beans](#), and [cassava](#) in Nigeria. Rice is predominantly cultivated in Ikwo, yams in Izzi, with other regions in the state such as Amasiri, Edda and Ezillo making notable contributions, and Effium and Ezzamgbo taking the top spots in cassava production. Ebonyi has several solid mineral resources, including lead, [crude oil](#), and natural gas, but few large-scale commercial mining mines. Ebonyi is called "the salt of the nation" for its huge salt deposit at the Okposi and Uburu Salt Lakes

### Population of the Study

The population of the study is predominantly rural and their major occupation include: Farming, hunting, pottery, petty trading with few public and civil servants. Over 60% of the population studied consists of able-bodied youth. Literacy level of the population studied is estimated at 75%. According to 2006 National Population Census, Ebonyi State has about 2,173,501 inhabitants. In each of the three senatorial zones in Ebonyi State, One Local Government Area was selected. In each of the local government selected, two autonomous communities were also randomly selected too. In total therefore, three local government areas and six communities were selected for the study. These communities are Afikpo North local government: (Ngodo, Amaozara); Ezza South local government (Amaezekwe, Amudo); and Abakaliki local government: (Nkaleke Echara and Enyigba). Decision on this sample size  $n = 128 - 147$  to the budget and time limitations of the study.

**Table: 1a: Population of the Communities**

S/N	LGA	COMMUNITY	POPULATION
1	Afikpo North	Ngodo	2,466
		Amaozara	1,151
2	Ezza South	Amaezekwe	3,763
		Amudo	6,531
3	Abakaliki	Nkaleke Echara	503
		Enyigba	5,041
		TOTAL	<b>19455</b>

Source: National Population Commission, 2006

## **Study Design**

Research design is an arrangement of conditions for data collections and analysis in a way that attempts to combine relevant data on the study topic (Du and Hak 2018). It is a general project pattern that specifies the kind of information to be collected, sources to be used and procedures to be employed. Descriptive research design was employed in this study. The descriptive design is a research design whereby quantitative data gathered and analyzed to illustrate the current trends in the given phenomenon (Green and Tull 1996). The choice of descriptive research was on the basis that it allows a researcher to determine the correlations among several variables (Cooper and Schindler 2003). The design enabled the researcher to survey and use sample of the total population to pursue and realize the objectives of the study. Descriptive survey design is the type of design which group of people or items considered to be representatives of the entire group. It uses the administration of a questionnaire to arrive at an answer to given research problems (K.N. Krishnaswamy, Appa I.S and M. Mathirajan 2006).

The study adopted descriptive design approach focusing on issues relating to knowledge and awareness, socio-cultural belief and myths as independent and dependent variables respectively. The essence was to ensure that the independent variables are properly correlated with the dependent variables. The population of the study is finite as the population of rural communities in Ebonyi State both indigene and non-indigenes. The sample size was determined by Taro Yamane (1964).

## **Participant Sampling Technique**

Stratified random sampling was used for selection of a total of 392 individual from six communities within the LGA in three senatorial zone in Ebonyi State. Decision on this sample size was made due to the budget and time limitations of the study

## **Research Techniques**

The research instrument was structured questionnaire. The questionnaire has two distinctive sections. The first section was designed to obtain personal information relating to the characteristics of the respondents with respect to demographics. The second part was focused on issues relating to knowledge and awareness, enlightenment and socio cultural beliefs. The questionnaires were designed using yes and no to avoid for easy understanding among rural dwellers. The validity of research instruments was determined through face and content validity test. The structured questionnaire vetted by team members severally. Corrections were affected, th 128 - 147 were fined tuned to measure exactly what it to measure. The researchers strictly adhered to the adjustment made and the instrument was considered valid for the study. The researchers also adopted test re-test technique by administering the structured questionnaire to a group of respondents differently from those in the study area and the result was processed and kept after about two weeks intervals the same instrument was re-administered to the same sample respondents and the results was also processed. Two results were collated and compared to determine whether they correlate. The result shows that there is significant relationship between first and second responses. The instrument was therefore, was considered reliable for the study.

## **Analytical Method**

To properly analyze the data collected, the study was analyzed using descriptive and inferential statistics to establish the degree of knowledge/awareness and usage. The study was analyzed using frequency tables and simple percentages.

### Ethical Considerations

Ethical clearance was acquired from Ebonyi State University of Science and Technology through the office Directorate of Research, Innovation and Commercialization (DRIC). Formal permission for the study was obtained from the community leaders. A written informed consent was obtained from all participants. The participants were assured that findings from the study will be treated confidentially and no information generated will be traced to them.

### 4.0 Results

The results obtained from data analysis with their interpretations were presented in this chapter. Out of the three hundred and ninety-two (392) copies of questionnaire administered, three hundred and eighty of them returned were properly filled and fitted for analysis giving response rate of 96.9%. The age range of the respondents was 18–51years with mean and standard deviation of  $31.8 \pm 7.4$  years.

### Demographic Characteristics of the Respondents

Descriptive statistics involving frequencies and their percentages were used to analyze data on demographic profiles of the respondents. The results of the analysis were presented in Table 1 below.

**Table1b: Demographic Characteristics of the Respondents**

N=380		
Demographic Characteristics	No of Respondents	Percentage
<b>LGA</b>		
Abakaliki	134	35.3%
Afikpo North	127	33.4%
Ezza South	119	31.3%
<b>Age Group (years)</b>		
18 – 30	122	32.1%
31 – 40	163	42.9%
Above 40	95	22.5%
Mean (SD)	31.8 (7.4)	
<b>Level of Education</b>		
No formal education	76	20.0%
Primary education	103	27.1%
Secondary education	159	41.8%
Tertiary education	42	11.1%
<b>Occupation</b>		
Trading	136	35.8%
Farming	119	31.3%
Artisan	103	27.1%
Public/Civil Servant	22	5.8%
<b>No of person in your family</b>		
Less than 5	147	38.7%
5 – 10	103	27.1%
11 – 20	88	23.2%
More than 20	42	11.1%

Source: Researchers Field Work, 2019

The result in Table 1b shows the demographic characteristics of the respondents in the study. Most of the respondents 134(35.3%) were from Abakaliki LGA, while 127(33.4%) of them were from Afikpo North, and 119(31.3%) of them were from Ezza South. Also, most of the respondents 163(42.9%) were in age 31-40years, whereas only 122(32.1%) of them were in age 18-30 and 95(25.0%) of them were in age more than 40years. The level of education of the respondents showed that most of them 159(41.8%) had secondary education, 103(27.1%) of them had primary education, 42(11.1%) of them had tertiary education, while 76(20.0%) of them had no formal education. Most of the respondents 136(35.8%) were traders, while 119(31.3%) of them were famers, 103(27.1%) of them were artisans, 22(5.8%) of them were civil/ public servants. The number of person in the family showed that most of them 1474(38.7%) were less than 5, while 103(27.1%) of them were 5-10, 88(23.2%) of them were 11-20 and 42(11.1%) of them were more than 20.

**Table 2: Awareness of Insecticide Treated Bed Nets use among Rural dwellers in Ebonyi State**

s/n	Items	N=380	
		Response	
		Yes n(%)	No n(%)
1.	Are you aware of mosquito treated bed nets in your communities?	244(64.2%)	136(35.8%)
2.	Do you have bed nets for all household occupants?	155(40.8%)	225(59.2%)
3.	Are you always comfortable sleeping under mosquito treated bed net?	95 (25.0%)	285(75.0%)
4.	Does your household have any mosquito nets that can be used while sleeping?	132(34.7%)	248(65.3%)
5.	Are you living in a polygamous family?	91 (23.9%)	289(76.1%)
6.	Has your household received mosquito treated nets at health centres?	234(61.6%)	146(38.4%)

Source: Researchers Field Work, 2019

The awareness of insecticide treated bed nets use among the rural dwellers in selected communities of Ebonyi State was shown in table 2. Most of the respondents 244(64.2%) were aware of mosquito treated bed nets in their communities but a little below half of them 155(40.8%) had bed nets for all household occupants. Only on quarter of the respondents 95(25.0%) are always comfortable sleeping under mosquito treated bed net, while 132(34.7%) of them confirmed that their household have any mosquito nets that can be used while sleeping. Very few of the respondents 91(23.9%) were living in a polygamous family; however, most of the respondents 234(61.6%) confirmed that their household had received mosquito treated nets at health centres.

**Table 3: Extent of knowledge of Insecticide Treated Bed Net use among the Rural dwellers in Ebonyi State**

Extent of Knowledge	No of Respondents	Percentage
High knowledge	127	33.4%
Low knowledge	253	66.6%
Total	380	100%

Source: Researchers Field Work, 2019

The three questions on the extent of knowledge of insecticide treated bed nets use among the rural dwellers were scored (i.e. items 2, 3 and 4). A score of 1 was given to “Yes” response, while a score of 0 was given to “No” response in these three items. These scores

were all added together to find out the extent of knowledge of insecticide treated bed nets use among the rural dwellers. Total scores obtained of 2 and 3 were classified as high knowledge, while 1 and 0 were classified as low knowledge. The results showed that one-third of the respondents 127(33.4%) had high knowledge of insecticide treated bed nets use among the rural dwellers, while two-third of the respondents 253(66.6%) had low knowledge of insecticide treated bed nets use among the rural dwellers.

**Table 4: Enlistment Campaign Impact on proper usage of Insecticide Treated Bed Net among Rural Dwellers in Ebonyi State**

s/n	Items	Response	
		Yes n(%)	No n(%)
7.	Households in your community use mosquito treated bed net as window blind and to cover their crops against pests.	262(68.9%)	118(31.1%)
8.	Do you know that sleeping under mosquito treated bed net prevent malaria?	110(28.9%)	270(71.1%)
9.	Is true that mosquitoes can still bite through treated bed nets?	154(40.5%)	226(59.5%)
10.	Does your household find it stressful to spread the bed before going to bed?	286(75.3%)	94 (24.7%
11.	Is there enough sensitization on the use of mosquito treated bed net in your community?	292(76.8%)	88 (23.2%)
12.	Has your household received health education on the usage of mosquito bed net?	264(69.5%)	116(30.5%)
13.	Do you know how long the net is supposed to take to be re-treated?	294(77.4%)	86 (22.6%)

Source: Researchers Field Work, 2019

Use of community enlightenment campaign to improve the acceptance and proper usage of ITNs in Ebonyi State were shown in table 4. Most of the respondents 262(68.9%) noted that the households in their community use mosquito treated bed net as window blind and to cover their crops against pests. Very few of the respondents 110(28.9%) knew that sleeping under mosquito treated bed net prevent malaria, while close to half of the respondents 154(40.5%) believed that mc 128 - 147 1 still bite through treated bed nets. Most of the respondents 286(75.3%) agreed that their household find it stressful to spread the bed before going to bed; however, most of them 292(76.8%) confirmed that there is enough sensitization on the use of mosquito treated bed net in their community. Most of the respondents 264(69.5%) accepted that their household received health education on the usage of mosquito bed net; and also more than three-quarter of them 294(77.4%) knew how long the net is supposed to take to be re-treated.

**Table 5: Socio-cultural beliefs and Insecticide treated Bed Net Usage in Ebonyi State Rural Communities**

s/n	Items	N=380 Response	
		Yes n(%)	No n(%)
14.	Do you believe that sleeping under mosquito treated bed net is a means of birth control?	145(38.2%)	235(61.8%)
15.	Do you believe that Mosquito treated bed nets inflict rashes	254(66.8%)	126(33.2%)

	on the body?		
16.	Is it true that mosquito treated bed net is used to cover corpse?	268(70.5%)	112(29.5%)
17.	Do you believe that anyone who sleeps under the mosquito bed treated net die young?	296(77.9%)	84 (22.1%)
18.	You hang mosquito treated bed net on the wall.	274(72.1%)	106(27.9%)
19.	Is your bed net already factory-treated with an insecticide to kill or repel mosquitoes?	228(60.0%)	152(40.0%)

Source: Researchers Field Work, 2019

The socio-cultural beliefs regarding ITNs and the beliefs affect ITN acceptance and usage in target community in Ebonyi State were shown in table 5. Few of the respondents 145(38.2%) believe that sleeping under mosquito treated bed net is a means of birth control. However, most of them 254(66.8%) believed that mosquito treated bed nets inflict rashes on the body; and also 268(70.5%) of them accepted that mosquito treated bed net is used to cover corpse. It is noteworthy that most of the respondents 296(77.9%) believed that anyone who sleeps under the mosquito bed treated net die young. Most of the respondents 274(72.1%) hanged mosquito treated bed net on the wall; and most of them 228(60.0%) confirmed that their bed net is already factory-treated with an insecticide to kill or repel mosquitoes.

### Discussion On Findings

This study provides, probably for the first time, data on effective utilization of insecticide treated bed nets among rural dwellers in Ebonyi State. This is an area where malaria is known to be endemic. Knowledge, awareness of possession of these nets and its usage are important guides for policy makers and decision-making in malaria control programmes and ultimate control of devastating effects of the disease on the population.

The study showed that the awareness of insecticide treated bed nets use among the rural dwellers in selected communities of Ebonyi State was shown in table 2. Most of the respondents 244(64.2%) were aware of mosquito treated bed nets in their communities but a little below half of them 155(40.8%) had bed nets for all household occupants. However, it was observed that there is low usage among the rural dwellers in Ebonyi State. This finding was consistent with a study conducted by Sibhatu, Ayalu & Haji (2012) which established that poor knowledge with re 128 - 147 link between mosquitoes and malaria as well as proper utilization of insecticide treated bed nets may be yet to be achieved especially in the rural areas within the country. There is discrepancy in the reported and the observed utilization of bed nets by the community.

Aina & Ayeni (2011) reported a wide difference between the level of awareness and the rate of use of insecticide treated bed nets among people in rural communities that exist within Rivers State. On the other hand, half of the bed nets in the community were tucked under the mattress, and other places where other insects were. Sibhatu, Ayalu & Haji (2012) corroborated the study that there is low usage of insecticide treated bed net ownership and effective utilization among the households in various communities in Ethiopia. The awareness of insecticide treated bed nets use among the rural dwellers in selected communities of Ebonyi State was shown in table 2. Similar study carried out by Auta, Stephen, Olagunju, Vasantha, Champion & Thangeswaran (2017) supported the findings of the present study that there was a significant association between knowledge of malaria and the education status.

Inadequate knowledge about malaria and its preventive measures, but the utilization of these measures was poor. It is worth to note that higher education was identified as the determining factor for utilization of insecticide treated bed nets and some cases lack of

awareness on how to install it and its importance to prevent malaria affects usage. Study of Lengele, (2004) showed that majority was aware of the existence of insecticide treated bed nets, but the awareness did not reflect into utilization of the insecticide treated bed nets since only 35.3% of respondents were sleeping under insecticide treated bed nets. This low usage of insecticide treated bed nets is consistent with other findings from other part of Nigeria and developing countries. It is observed that general knowledge and awareness of the disease, its transmission, and control and preventive measures were generally found to be lacking amongst both the general public and healthcare professionals. In addition, the study shows that poor socio-economic factors affect access and usage. Nkechi, (2013) asserted that the people had poor knowledge of malaria and mosquito bites, which resulted in wrong perception and misuse of the nets as door and window blinds to “protect entire household” since only two nets were given per household. The use of community structures (traditional leaders/village heads, youths, churches, and mosques) was suggested to ensure effective distribution of nets, sensitize, and monitor net-use in the communities.

Use of community enlightenment campaign to improve the acceptance and proper usage of insecticide treated bed nets in Ebonyi State were shown in table 5. Most of the respondents 262(68.9%) noted that the households in their community use mosquito treated bed net as window blind and to cover their crops against pests. It is observed from the survey that 286 respondents representing 75.3% of the entire population agreed that their households find it stressful to spread the bed net before going to bed; however, a total of number of 292 respondents representing 76.8% maintained that there is enough sensitization of the use of insecticide treated bed nets. Available studies corroborated the present findings that the uses of insecticide treated bed net are largely affected by the knowledge of people (Chinomso & Nene, 2013). Behavioural patterns of people-utilization of the insecticide treated bed nets are dependent on their knowledge on the consequence of non-use. Researchers give varied indications on the use of the insecticide treated bed nets and peoples level of knowledge (Ifeoma, Chinomso & Nene, 2013). It is observed that WHO (2015) lunched Roll Back Malaria Partnership to reduce global malaria cases by 75% and to reduce malaria deaths to near zero through universal coverage by effective prevention and treatment interventions with insecticide treated bed nets is defined as use by > 80% of individuals in populations at risk.

Apparently, a study carried out by Yadav, Kalundha & Sharma (2007) reported that despite evidence that the use of insecticide treated bed nets decreases malaria-related morbidity and mortality, the use of insecticide treated bed nets in Africa remains relatively low. This shows that insecticide treated bed nets are very effective in malaria prevention does not necessarily mean that people will use them after they have received them. While the evidence based on the effectiveness of insecticide treated bed nets in reducing malaria transmission has grown rapidly in recent years, utilisation rates of insecticide treated bed nets in most African countries have been very low. However, inhabitants rarely access and use insecticide treated bed nets due to lack of availability and affordability. Low socio-economic status was the main key factor affecting malaria control interventions in Nigeria. Research carried out by Yadav, Kalundha & Sharma (2007) found that the level of education, type of occupation and economic status were responsible for the prevalence of malaria especially in rural communities.

Andrew, Samantha, Uwem, Audu & Perpetua (2019) in their study posited that significant factors include: household size, head of household education level, household wealth quintile, and place of residence. The CHAID gain index results identified households in the South West, North Central and South Central regions with low insecticide treated bed nets ownership, and the general population in the South South, South East and North Central regions with low insecticide treated bed nets use. Previous studies carried out by Sibhatu,

Ayalu & Haji (2012) and Franklin (2016) supported the present findings that there is gap between net ownership and effective usage.

Researchers further established potential determinants of insecticide treated bed net use previously identified include: demographic characteristics; an individual's knowledge and beliefs related to malaria and bed nets; dwelling construction, family size/composition and sleeping arrangements; physical characteristics of bed nets; environmental factors; community and cultural characteristics; and household net density. However, programmatic implications of these findings are not always obvious given that the direction and magnitude of reported associations vary by geographic location, epidemiological setting and method of analysis (Nsirim, Edwin-Wosu, Okiwelu, & Aline, 2013)

The results of socio-cultural beliefs regarding insecticide treated bed nets acceptance and usage in rural communities of Ebonyi State were shown in table 5. Few of the respondents 145(38.2%) believe that sleeping under mosquito treated bed net is a means of birth control measure adopted by government. However, most of them 254(66.8%) believed that mosquito treated bed nets inflict rashes on the body; and also 268(70.5%) of them accepted that mosquito treated bed net is used to cover corpse.

Similar study carried out by Sibhatu, Ayalu & Haji (2012) asserted that the national malaria control strategy of Nigeria had emphasized the sale of insecticide treated bed nets on a user free basis but, various social, behavioral, and economic barriers were identified including the lack of information about the benefits of insecticide treated bed nets, poor access to market for insecticide treated bed nets and insecticide treatment, cultural preferences, and low incomes. Franklin (2016) in his study on farmer's utilization of insecticide treated bed nets for Malaria prevention in local communities, established two major constraints in the utilization of the net in the area were inadequate information and poor design and inconvenience of hanging. Apparently, there are factors militating against the use of insecticide treated bed nets were identified as: awareness about insecticide treated bed nets, the use of insecticide treated bed nets was low. Experiences of excessive heat under the net, fear of the chemical used in treating the nets and suffocation are major constraints. Socio-cultural practices such as traditional belief systems and use of unconventional herbal medicines were still practiced in spite of sufficient knowledge of malaria transmission and the use of insecticide treated bed nets for malaria (Lois, Ignatius, Chihurumnuanya, 2015).



## **Conclusion**

The outcome of the study clearly shows that knowledge and awareness, inadequate community enlightenment and socio-cultural beliefs combine to militate against effective utilization of insecticide treated bed nets among rural dwellers in Ebonyi State. There is gap in knowledge and awareness of insecticide treated bed nets use among the rural dwellers in selected communities in the State. Similarly, distribution and supervision of insecticide treated bed nets has been very poor in rural communities. Health education was found to be the most important tool to encourage effective utilization in the prevention and control of malaria in the study area. Moreover, better evaluation of existing insecticide treated bed nets guidelines in formal health facilities and strengthening community based awareness creation activities are very critical. Therefore, the government and other non-governmental organizations and relevant stakeholders in Ebonyi State rural communities should ensure that insecticide treated bed nets distribution and usage is not politicized.

## **Recommendations**

- 1) Government is encouraged to deepen the knowledge and awareness of insecticide treated bed nets use among the rural dwellers in the Ebonyi State through improved community knowledge on the importance of proper use of insecticide treated bed nets. The government can through her budgetary provisions secure a more robust and sustainable programme aimed at health education in schools and communities.
- 2) Government is encouraged to bridge the gap created by socio-cultural beliefs regarding insecticide treated bed nets and the beliefs that affect insecticide treated bed net acceptance and usage in rural communities in Ebonyi State. There should be advocacy planning involving traditional rulers, religious leaders and other stakeholders in the rural communities in Ebonyi State. This bottom-top approach to healthcare planning and implementation from (Communities) will encourage the rural dwellers to help bridge the socio-cultural barrier in the use of insecticide treated bed nets.
- 3) Government is encouraged to adopt community enlightenment campaigns to improve the acceptance and proper usage of insecticide treated bed nets in Ebonyi State. Also, Government/NGOs is encouraged to provide insecticide treated bed nets stand for families that have no bed.

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