INFLUENCE OF HEALTH EDUCATION ON UPTAKE AND USE OF FREELY DISTRIBUTED INSECTICIDE TREATED NETS AMONG PREGNANT WOMEN IN AKINYELE LOCAL GOVERNMENT AREA, NIGERIA

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CERTIFICATION

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DEDICATION

This project is dedicated first to the Almighty God and to my loving and caring parents; Elder and Mrs. Smart Wilson Udomisoh.

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ABSTRACT

In Nigeria, malaria remains a threat to pregnancy outcomes. Despite the demonstrated effectiveness of Insecticide Treated Nets (ITN) in reducing malaria burden in pregnancy, its use among Nigerian pregnant women is still low. This study was designed to assess the effect of free ITN distribution and health education on its uptake and use among pregnant women attending Primary Health Care (PHC) centres in Akinyele Local Government Area (LGA), Oyo state.

A quasi-experimental study was carried out among pregnant women attending the four urban PHC centres in Akinyele LGA, Ibadan. A pretested semi-structured questionnaire was administered pre- and post-intervention to seek information on knowledge of malaria, willingness to own and use ITN from 364 consenting pregnant women out of the 416 attending antenatal care in the PHC centres between May and August 2009. Knowledge of malaria was scored on a 18-point scale; a score of ≥ 9 was classified as good and lesser score as poor. Respondents willing to own ITN were given collection slips. Four sessions of health education talks were held with respondents at the health facilities. In order to ascertain hanging and actual use, 142 respondents (calculated based on the NDHS 2008 ITN use prevalence of 1.3% among pregnant women in southwest zone) were selected by balloting and observed at home twice over a period of three months, using an observational checklist. Post-intervention, Focus Group Discussions (FGDs) were also held to explore perceived benefits and limitations of ITN use. Data analysis was done using descriptive statistics, Chi-square and logistic regression. Thematic approach was used for FGD analysis.

Mean age of respondents was 27.0 ± 5.1years, 58.8% had secondary education and 44.8% were engaged in business/trading. Mean gestational age at first antenatal care visit was 15.7 ± 5.7 weeks. All the respondents signified willingness to own and they collected ITN (100% uptake). Before intervention, 68.0% of the respondents had good knowledge of malaria and 87.9%, post-intervention. The number of pregnant women that used ITN increased significantly from 3.6% at baseline to 83.2% post-intervention ($p<0.05$) while 0.3% used untreated bednet pre and post-intervention. Being civil servant (OR: 5.56, 95% CI: 1.30, 23.72) and in third trimester of pregnancy (OR: 1.15, 95% CI: 1.00, 1.24) were significantly associated with the use of ITN pre and post-intervention respectively. Pre-intervention, 11(84.6%) out of 13 respondents who

owned ITN mentioned they slept under the net prior to survey, while 303 (83.2%) out of 364 did so post-intervention. At first observation visit 50.0% hung and 4.2% slept under their nets, while at second visit 45.8% and 22.5% did so respectively. Perceived benefits of ITN mentioned during FGD included, reduction of mosquito bites and episodes of malaria. Limitations to ITN use included the heat experienced while sleeping under the net, inadequate space for hanging and movement during sleep.

Uptake of insecticide treated net was high among pregnant women. However, free distribution did not influence use as only a few slept under the net. Health education and production of less heat conserving nets stand to improve use.

Keywords: Insecticide Treated Net use, Pregnant women, Health education effect.
Words Count: 500

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ANC: Antenatal Care

ACT: Artemisinin-Based Combination Therapy

CDC: Centre For Disease Control And Prevention

FMoH: Federal Ministry of Health

HIV: Human Immunodeficiency Virus

IPT: Intermittent Preventive Treatment

IRS: Indoor Residual Spraying

ITNs: Insecticide Treated Nets

IPTp: Intermittent Preventive Treatment In Pregnancy

LLIN: Long-Lasting Insecticide Treated Nets

RBM: Roll Back Malaria

WHO: World Health Organization

CHAPTER ONE

INTRODUCTION

1.1. Background

Malaria in pregnancy continues to be a major public health problem in sub-Saharan Africa. Pregnant women are a specific risk group for *Plasmodium falciparum* infection, and related consequences (Mockenhaupt, George, Christiane et al., 2006). Prevention is the best control measure for malaria. It includes individual protection, such as the use of insecticide-treated bed nets (ITN), mosquito repellants and drug prophylaxis for pregnant women; community measures, such as the control of mosquito breeding sites and insecticide spraying (Owusu-Agyei, Awini, Anto et al., 2007). The parasite that causes malaria is spread by bites from the female anopheles mosquito. They mostly bite during the hours of darkness, so sleeping under a mosquito net provides some protection. A very much higher level of protection is obtained, however, by sleeping under a mosquito net that has been impregnated with insecticide. The insecticides used are of extremely low toxicity for humans. (Abdisalan, Abdinasir, Willis et al., 2007).

Malaria during pregnancy causes severe anaemia and low birth weight at delivery as well as contributes to maternal deaths in malaria-endemic areas (Gimnig, Vulule, Lo, et al., 2003 in Baume and Marin 2008). Around 60% of the cases of clinical malaria and over 80% of the deaths occur in Africa south of the Sahara (Owusu-Agyei, Awini, Anto et al., 2007). In April 2000, RBM and African heads of state established the "Abuja targets," which include insecticide treated net (ITN) use by ≥ 60% of pregnant women and under-five in Africa by 2005. However cost and logistic difficulties inherent to mass ITN distribution have prevented widespread use. Many believe such coverage will be impossible unless nets are provided free of charge, especially to under-five and pregnant women (Blackburn, Abel, Habila et al., 2006).

Malaria contributes to poverty in the developing world affecting primarily the rural poor. It accounts for 9.0% of the disease burden in Africa and also discourages private sector investment in the continent. It causes substantial disability, including loss of work and anaemia. The

estimated annual direct and indirect cost of malaria in sub-Saharan Africa alone exceeds $2000 million (Adongo, Kirkwood, and Kendall, 2005).

1.2. Statement of problem

Over 90% of the malaria burden occurs in sub- Saharan Africa (Adongo, Kirkwood, and Keodall, 2005). In countries with a heavy malaria burden, the disease accounts for as much as 40% of public health expenditure, 30–50% of inpatient admissions, and up to 50% of outpatient visits (RBM, 2003). Malaria during pregnancy is a recognized risk factor for low birth weight and probably decreases the survival of offspring, particularly during their first month of life (Haghdoosta, Neal and Tom, 2007). Malaria not only poses a high risk to health, but the clinical consequences of repeated infection in endemic areas during early life and adulthood and outbreaks in epidemic prone areas place a burden on households, on the health services and the economic growth of communities and the nation (Tyagi, Roy, and Malhotra, 2005).

Malaria during pregnancy is a serious problem in sub-Saharan Africa, affecting an estimated 24 million pregnant women. Pregnancies in women living in malaria endemic regions are associated with a high frequency and density of Plasmodium falciparum parasitaemia, resulting in high rates of maternal morbidity including fever, severe anaemia, abortion, stillbirth, and high rates of placental malaria (Steketee. Wirima and Campbell, 2001 in Uneke, Adeoye, Iyare et al., 2007). In sub-Saharan Africa malaria infection is estimated to cause 400,000 cases of severe maternal anaemia which contributes significantly to maternal mortality – causing an estimated 10,000 deaths per year (Malaria Consortium, 2008).

Though it seems intuitive that households with pregnant women would be more likely to own ITNs, it has been found that presence of a pregnant woman is not necessarily indicative or associated with ITN ownership. As pregnant women are in the target population, it is necessary to create avenues through which this specific population can achieve adequate coverage (Brentlinger, Chadeque, Chinhacata et al.; 2007). Distribution through ANCs is not without complications or flaws. Oftentimes, women report that they were not provided with accurate information surrounding ITN use (Alexis, 2011). Erhun Erhun, Agbani and Adesanya (2005) reported an uptake of 0% mainly due to lack of awareness among their study population in the South Eastern Part of Nigeria (Adeneye, Jegede, Mafe, Nwokocha et al 2007) among the same

group in the country also reported that 43.3% of the respondents had not heard about ITNs before the study and they recommended that information about ITNs should be improved upon.

Malaria is endemic in Nigeria with stable transmission over the year. High prevalence of asymptomatic malaria has been reported in pregnant women in this region (Onyenekwe, Ukibe, Meludu et al., 2008). Pregnant women are one of the key biological risk groups for malaria in sub-Saharan Africa and are especially vulnerable if also infected with HIV. Ill effects are most apparent in the first and second malaria-exposed pregnancies.

In Nigeria Demographic and Health Survey, it was reported that ownership of mosquito nets is not widespread in Nigeria (NPC, 2003). Only 12% of households reported that they own at least one net while 2% of households reported that they own an ITN. Bed net use among pregnant women is low (Mbonye, Stella, and Pascal, 2006).

1.3. Justification

Malaria remains a major public health problem in sub- Saharan Africa. Though all segments of society are afflicted, pregnant women and children under 5 years of age suffer most of the morbidity and mortality (Blackburn, Abel, Habila et al., 2006). Studies have shown that infection rates are highest in first and second parity women with lower rates in later pregnancies. Although insecticide-treated materials are socially desirable and readily acceptable in many communities, programmes are still battling with getting people to acquire, maintain and correctly use them. Several social and cultural factors influence the acceptance and use of ITNs in the community (Adongo, Kirkwood, and Kendall, 2005). Majority of the women did not own ITNs. This is because they were unable to access the material through the free ITNs distribution programme. This is not a good development and it therefore requires attention. (Aluko and Oluwatosin, 2012). In addition, knowledge and level of awareness on the use of ITN could influence the uptake and use. Low level of awareness especially on the safety of the insecticide which the net is impregnated with, knowledge of how to hang and care for the nets have been found to hinder uptake and use (Mbonye, Stella, and Pascal, 2006). Effective health education stands to bring about positive change in knowledge and attitude/behaviour towards use of ITN especially among pregnant women.

People's perceptions and understandings about the perceived cause and transmission of malaria have strong implications on the preventive measures such as the current scale-up ITNs implementation. Therefore, public health education interventions should always be designed to cover the existing knowledge and should be implemented for a sufficient length of time for it to be effective (Nuwaha, 2002 in James, Kitara, and Orach; 2011).

Pregnant women are vulnerable because their natural immunity is reduced, thus they are four times more likely to suffer from complications of malaria than non-pregnant women (NPC, 2003). While measuring the impact of bed net distribution in terms of household ownership has been relatively easy, measuring use has been difficult and sometimes controversial. While it may be relatively easy to conduct surveys showing how many people kept the net that was given to them, it proves much more difficult to know how many people actually use it every night and if the people sleeping under it are the most vulnerable to malaria (World Malaria Report, 2009).

A number of studies also reveal that misconceptions concerning malaria still exist and that practices for the control of malaria such as ITN have been unsatisfactory, pregnant women have not demonstrated a better understanding of the cause of malaria (James, Kitara, and Orach; 2011). Although ITN has been shown to be effective in the control of malaria in pregnant women its use among pregnant women in a part of the southwest Nigeria is very low (Yusuf, Dada-Adegbola, Ajayi et al., 2008).

Non adherence could be responsible for the morbidity and mortality reported in pregnant women as a result of malaria. This study helped to determine the use of ITN and recommend useful measures as well as provide valuable information to guide policy planning of an intervention to improve the use of ITN among pregnant women.

1.4. Aims and Objectives of the Study

1.4.1. General Objective

To determine the influence of health education on insecticide treated net uptake and use among pregnant women.

1.4.2. Specific Objectives

1. to assess the knowledge of malaria and prevention practices among pregnant women
2. describe the pattern of malaria prevention practices among pregnant women
3. identify factors that influence malaria prevention practices
4. to determine the uptake and use of ITN distributed to pregnant women
5. to determine factors that influence ITN uptake and use

1.5. Hypothesis

Ho I – There is no significant difference between the uptake and use of insecticide treated net by pregnant women before and after intervention.

1.6. Limitations

The study was conducted in one local government area; hence findings may not be generalizable to the state.

1.7. Significance of the Study: At the end of the findings, this study stands to provide information for policy makers in the development and successful implementation of programmes to improve the use of Insecticide Treated Nets by pregnant women.

CHAPTER TWO

LITERATURE REVIEW

2.1. Epidemiology of Malaria

2.1.1. Burden of Malaria in General

Worldwide, an estimated 300–500 million people contract malaria each year (Trampuz, Matjaz, Igor et al., 2003). More than 90 % of the deaths associated with this disease are found in Africa and the victims are mainly those with low inunune responses such as children and pregnant women (Djouaka, Bakare, Bankole et al., 2007). Forty percent of the world's population lives in areas with malaria risk. Plasmodium vivax has the widest geographical range; it is prevalent in many temperate zones, but also in the subtropics and tropics. *Plasmodium falciparum* is the commonest species throughout the tropics and subtropics. Plasmodium malariae is patchily present in the same areas as *Plasmodium falciparum*, but much less common. Plasmodium ovale is found mainly in tropical Africa, but also occasionally in West Pacific (RBM, 2002). At least 50 per cent of the population of Nigeria suffers from at least one episode of malaria each year and malaria accounts for over 45 per cent of all out-patient visits (Jimoh, Oluyemi, Amos et al., 2007)

2.1.2. Economic Burdens

The economic burden of malaria to the country, the family and the individual is immense. It has been estimated that it causes a reduction of 1.3% in the annual per capita economic growth rate of malaria endemic countries and the long term impact of this is a reduction of the gross national profit by more than a half. The economic effects of malaria are especially noticeable in rural areas where malaria strikes at the time of the year when there is greatest need for agricultural work. Furthermore, the disease is a common cause of school absenteeism, reaching as high as 28% in some areas (WHO, 2005). The disease accounts for 25 per cent of infant mortality and 30 per cent of childhood mortality in Nigeria. Therefore, it imposes great burden on the country in terms of pains and trauma suffered by its victims as well as loss in outputs and cost of treatments (Onwujekwe, Hanson, and Fox-Rushby, 2004).

2.1.3. Burden in Pregnant Women

In Nigeria, one in every five women has malaria (maternal and/or placental) parasitemia at delivery (Mokuolu, Falade, Orogade et al., 2009). Malaria during pregnancy causes up to 10,000 maternal deaths each year and contributes to high rates of maternal morbidity including fever and severe anemia, especially in first time mothers (Ekejindu, Udigwe, Chijioke et al., 2006 in Akinleye, Falade, and Ajayi, 2009). In areas where malaria is endemic, about 19% of low birth weight infants are due to malaria and 6% of infant deaths are due to low birth weight caused by malaria. These estimates imply that around 100 000 infant deaths each year could be due to low birth weight caused by malaria during pregnancy in areas of malaria endemicity in Africa (Guyatt and Snow, 2004).

2.2. Transmission and Endemicity

The transmission of malaria in Nigeria occurs in the entire country. But this transmission is all year round in some parts of the South of the country. In the remaining parts (East, West and North) of the country, the duration of the transmission is 3-10 months, from February to December (Malaria country profiles, 2001).

Depending on the intensity of transmission, malaria can be stable or unstable, reflecting differing epidemiological scenarios. Stable malaria implies the overall balanced presence of malaria in certain community with persistently high prevalence of infection, insensitive to environmental changes. Under stable endemic conditions, variation of malaria transmission from year to year is minimal, although seasonal fluctuations may take place (RBM, 2002). Stable transmission predominates in Africa south of the Sahara; consequently this area bears the greatest burden of malaria infection during pregnancy. In this areas of stable malaria transmission; the ill effect are particularly apparent in the first and second malaria-exposed pregnancies (WHO, 2005). Despite the higher prevalence of parasitemia and higher parasite density in pregnant women than non-pregnant women, *p.falciparum* infection in pregnant women in this area is usually asymptomatic. In setting of stable malaria infection, maternal mortality due solely to malaria is uncommon (WHO, 2005).

Unstable malaria implies a great variability of malaria rates in space and time. The background immunity in the community is low, and therefore there is a high risk of malaria epidemic.

Periods when malaria incidence is low alternate irregularly with times of high incidence. Unstable malaria is very specific for Plasmodium vivax, although sharp outbreaks may also occur with *Plasmodium falciparum* (RBM, 2002).

The infection is transmitted by the bite of an infected female mosquito – Anopheles. The mosquito usually bites during dawn & dust time. The mosquito becomes infected by biting a patient with malaria infection. When a mosquito bites an infected individual, it sucks the gametocytes, the sexual forms of the parasite, along with blood. These gametocytes continue the sexual phase of the cycle and the sporozoites fill the salivary glands of the infested mosquito. Once the mosquito becomes infected, it remains so for life. The female mosquitoes can survive upto 4 weeks under normal temperature i.e. 28°C to 30°C and humidity i.e. 60 to 80%. When this female mosquito bites the man for a blood meal, which it needs to nourish its eggs, it inoculates the sporozoites into human blood stream, thus spreading the infection (CDC,2004).

2.2.1. Other Modes of Transmission

Rarely malaria can spread by the inoculation of blood from an infected person to a healthy person. In this type of malaria, asexual forms are directly inoculated into the blood and pre-erythrocytic development of the parasite in the liver does not occur. Therefore, this type of malaria has a shorter incubation period and relapses do not occur (CDC, 2004).

2.2.1.1. Blood Transfusion (Transfusion Malaria)

This is fairly common in endemic areas. Following an attack of malaria, the donor may remain infective for years (1–3 years in P. falciparum, 3–4 years in P. vivax, and 15–50 years in P. malariae). Most infections occur in cases of transfusion of blood stored for less than 5 days and it is rare in transfusions of blood stored for more than 2 weeks. Frozen plasma is not known to transmit malaria. The clinical features of transfusion malaria occur earlier and any patient who has received a transfusion three months prior to the febrile illness should be suspected to have malaria (RBM, 2002).

2.2.1.2. Mother to the growing Fetus (Congenital Malaria)

Intrauterine transmission of infection from mother to child is well documented. Placenta becomes heavily infested with the parasites. Congenital malaria is more common in first pregnancy, among non – immune populations (CDC, 2004).

2.2.1.3. Needle Stick Injury

Accidental transmission can occur among drug addicts who share syringes and needles.

2.3. Factors that determine the Occurrence of Malaria

The occurrence of malaria is determined by the following factors discussed below;

2.3.1. Agent

Malaria parasites are micro-organisms that belong to the genus *Plasmodium*. Only four species of *Plasmodium* infect humans, they are:

Plasmodium falciparum, which is found worldwide in tropical and subtropical areas. It is the only species that can cause severe, potentially fatal malaria. It is estimated that every year 700,000 to 2.7 million people are killed by *Plasmodium falciparum*, especially in Africa where this species predominates. *Plasmodium falciparum* can cause severe malaria because it multiplies rapidly in the blood, and can thus cause severe blood loss resulting in anaemia. In addition, the infected parasites can clog small blood vessels. When this occurs in the brain, cerebral malaria results, a complication that can be fatal (CDC, 2004).

Plasmodium vivax is found mostly in Asia, Latin America, and in some parts of Africa. Because of the population densities especially in Asia it is probably the most prevalent human malaria parasite. While Plasmodium vivax only exceptionally causes death, most often due to rupture of an enlarged spleen, it can cause symptoms that are incapacitating. Thus, Plasmodium vivax contributes substantially to the disease burden (morbidity) of malaria, with a resulting social and economic impact. Plasmodium vivax as well as Plasmodium ovale has dormant liver stages (hypnozoite) that can activate and invade the blood (relapse) several months or years after the infecting mosquito bite (CDC, 2004).

Plasmodium ovale is found mostly in Africa (especially West Africa) and the islands of the western Pacific. It is biologically and morphologically very similar to Plasmodium vivax. However, it is different from Plasmodium vivax, in that it can infect individuals who are negative for the Duffy blood group, which is the case for many residents of sub saharan Africa. This explains the greater prevalence of plasmodium ovale rather than plasmodium vivax in most of Africa.

Plasmodium malariae, found worldwide is the only human malaria parasite species that has a quartan cycle (three-day cycle). The three other species have a tertian, (two-day cycle). Plasmodium malariae causes a long-lasting, chronic infection that in some cases can last a lifetime (CDC, 2004). It is normally associated with low parasitemia and an uncomplicated clinical course (Cox-Singh, Timothy, Lee et al., 2008).

2.3.1.1. Life Cycle of Plasmodium

Malaria is transmitted by the bite of a female anopheles mosquito in which hundreds of sporozoites are released into the vertebrate host's bloodstream. The parasites eventually migrate to the liver--passing through some cell types such as Kupfer cells—and form parasitophorous vacuoles in hepatocytes. At this stage they can either remain dormant as a hypnozoite form (*P. vivax* or *P. ovale*), or initiate development that results in the production of thousands of merozoites. The parasites then induce detachment of the infected hepatocyte, allowing it to migrate to the liver sinusoid where budding of parasite-filled vesicles called merosomes occurs. The new merozoites quickly invade erythrocytes where they replicate, sometimes synchronously, in a cycle that may correspond to the cycle of fever and chills in malaria. In response to a cue that is not well understood, some parasites differentiate into male and female gametocytes, which are the forms taken up by the mosquito and which can live quiescently in the bloodstream for weeks. Once they enter the mosquito via a blood meal they rapidly undergo transition into activated male and female gametes. The motile and short-lived diploid parasite form, the ookinete, migrates out of the blood meal, across the peritrophic matrix to the mid-gut wall where an oocyst is formed. After a meiotic reduction in chromosome number sporozoites are formed within the oocyst. Eventually the ooeyst ruptures and the sporozoites migrate to the salivary gland where they await transfer to the vertebrate host (Lasonder, Janse, Geert-Jan et al., 2008). The malaria cycle is shown in figure 2.1 below.

Life cycle of Plasmodium

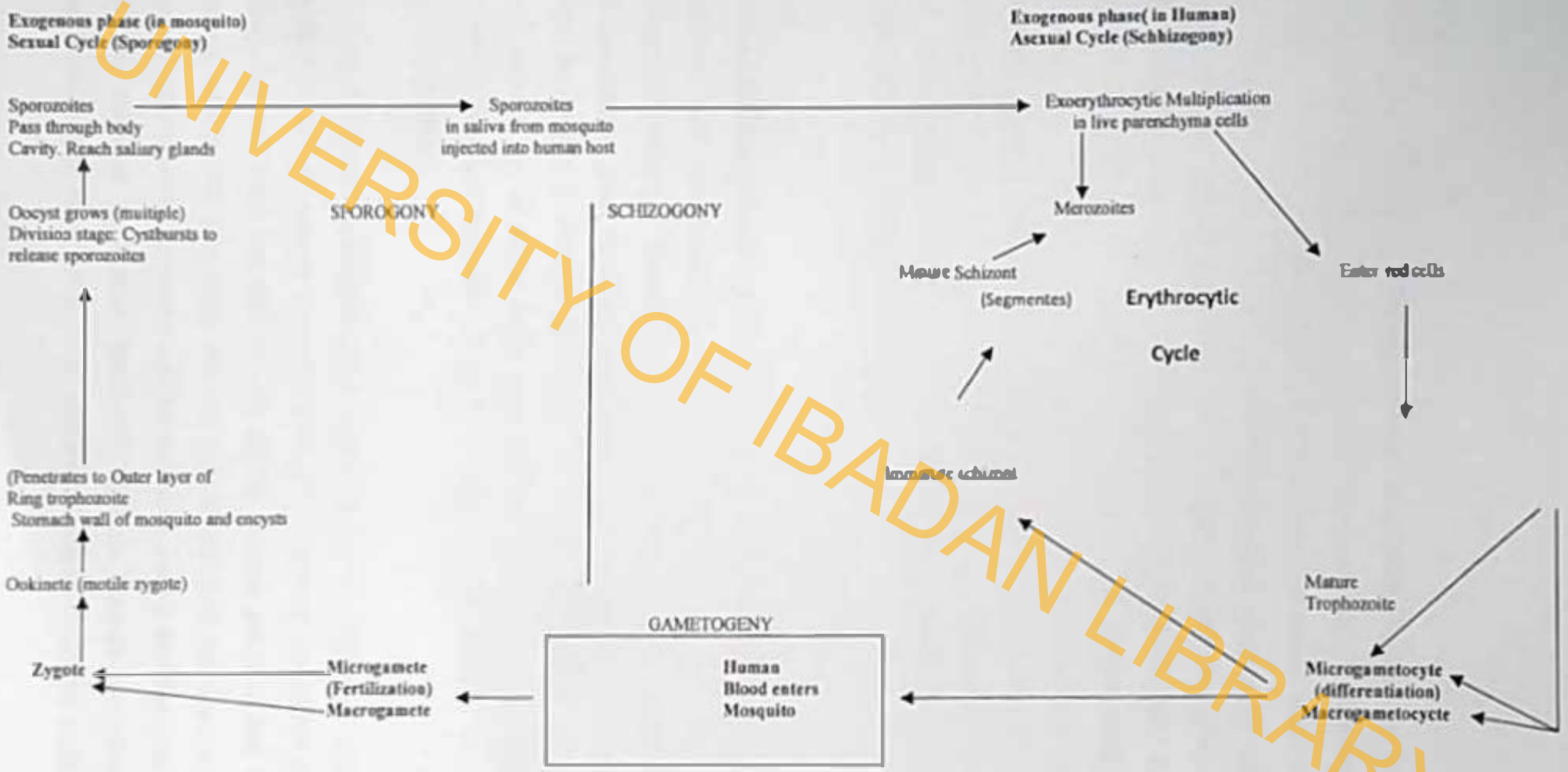

Fig 2.1. A diagram illustrating life cycle of Plasmodium *Falciparum (Parks, 2005)*

2.3.2. Vector

Over 40 species of anopheles mosquito have been identified in Nigeria, but the major vectors of human are anopheles Gambia sensu stricto (s.s). A. arabiensis, A. funetus, and A. melas. A. arabiensis are the most dominant in the savannah areas and cities while A. gambiae (s.s) are highly dense in the forest area. A. funetus have an even distribution and the salt water forms of A. melas are essentially coastal species (Ajayi, Falade, Bamgboye et al., 2008). There are four developmental stages in the life cycle of mosquitoes; they are eggs, larvae, pupa and adult stage (Parks, 2005). Malarial vectors in the Anopheles gambiae complex are known to use diverse small water bodies as larval habitats. These habitats differ in physical as well as biological characteristics, which directly influence the distribution and abundance of larval mosquito populations in nature (Adam, Khami and Elbashir, 2005). Anopheles gambiae is a highly anthropophilic mosquito, with a tendency to blood feed and rest inside houses (Njiru, Wolfgang, Willem et al., 2006).

2.3.3. Host

Biologic characteristics present from birth can protect against certain types of malaria. Two genetic factors, both associated with human red blood cells, have been shown to be epidemiologically important. Persons who have the sickle cell trait (heterozygotes for the abnormal hemoglobin gene HbS) are relatively protected against *plasmodium falciparum* malaria and thus enjoy a biologic advantage. Since the majority of Africans are Duffy negative, *P. vivax* is rare in Africa south of the Sahara, especially West Africa. In that area, the niche of *P. vivax* has been taken over by *P. ovale*, a very similar parasite that infect Duffy-negative persons.

Acquired immunity greatly influences how malaria affects an individual and a community. After repeated attacks of malaria a person develops a partially protective immunity. Such semi-immune persons often can still be infected by malaria parasites but do not develop severe disease, and, in fact, frequently lack any typical malaria symptoms. In areas with high *P. falciparum* transmission, newborns will be protected during the first few months of life presumably by maternal antibodies transferred to them through the placenta. As these antibodies decrease with time, these young children become vulnerable to disease and death

by malaria. If they survive to an older age (2-5 years) they will have reached a protective semi-immune status. Thus, in high transmission areas, young children is a major risk group and are targeted preferentially by malaria control interventions. In areas with lower transmission (such as Asia and Latin America), infections are less frequent and a larger proportion of the older children and adults have no protective immunity. In such areas, malaria disease can be found in all age groups, and epidemics can occur. Pregnancy decreases immunity against many infectious diseases. Women who have developed protective immunity against *P. falciparum* tend to lose this protection when they become pregnant especially during the first and second pregnancies. Human behavior, often dictated by social and economic reasons, can influence the risk of malaria for individuals and communities (CDC, 2004).

2.3.3.1. Incubation Period

In non-immune individuals with Plasmodium falciparum infection, the median pre-patent period (time from sporozoite inoculation to detectable parasitemia) is 10 days (range 5–10 days), and the median incubation period (time from sporozoite inoculation to development of symptoms) is 11 days (range 6–14 days). The incubation period may be significantly prolonged by the level of immunity acquired through previous exposures, by antimalarial prophylaxis, or by prior partial treatment, which may mitigate, but not prevent the disease (Taylor and Strickland, 2000 in Trampuz, Matjaz, Igor et al., 2003).

2.3.4. Environmental Factors that determine Malaria Occurrence

Malaria transmission may be influenced by various factors including climate, local ecology, and existing control measures. Temperature affects development of both the vector and the parasite. Temperature, required for parasite sporogony inside mosquito, predicts how soon the mosquito becomes infective after taking a blood meal, and it varies in between malaria species Optimum temperature for sporogony is between 25^0C and 30^0C. It stops below 16^0C. At 25^0C duration of sporogonic development is 10 days for Plasmodium vivax, 12 days for P.falciparum, 16 days for Plasmodium ovale, and 28 days for Plasmodium malariae.

Altitude is correlated with the temperature and thus also affects malaria transmission. Anopheles mosquitoes are not found at altitude above 2000 – 2500m due to unfavourable

climatic condition. The amount of precipitation during the transmission season is another potential environmental factor that together with the temperature influences malaria transmission. Man made environmental changes such as dams, water reservoirs, irrigation systems deforestation may greatly increase the breeding sites of mosquito, thereby triggering epidemic. Another factors affecting malaria transmission include population migration, urbanization and other socio-economic phenomena along with personal mosquito protection, residual spraying, and use of antimalarials (RBM, 2002). The atmospheric humidity has a direct effect on the length of life of the mosquito, although it has no effect on parasite. A relative humidity of 60% is considered necessary for mosquitoes to live their normal span of life. When the relative humidity is high, mosquitoes are more active and they feed more voraciously. If the humidity is low mosquitoes do not live long. Rainfall in general provides opportunity for the breeding of mosquitoes and may give rise to epidemics of malaria. Rain increases the atmospheric humidity which is necessary for the survival of mosquitoes. However, heavy rain may have an adverse effect in flushing out the breeding places (Parks, 2005).

2.4. Knowledge of Malaria and Pattern of Prevention Practices among Pregnant Women

It has been revealed that malaria is perceived as a common health problem among pregnant women attending health care facilities, and that knowledge, attitude and practice of its management is poor. Efforts should be made to improve anti-malarial intervention during pregnancy, to ensure that the goals of the Roll Back Malaria Initiative are achieved in Nigeria (Enato, Okhamafe, and Okpere; 2007). There is need for more public health education about the cause of malaria among pregnant women to minimise misconceptions about the cause of malaria. Also, there is need for more awareness creation so that malaria signs and symptoms are well understood by pregnant women to promote early treatment for malaria as well as preventive and control efforts such as ITN in the community (James, Kitara and Orach, 2011). Pregnant women who knew that ITNs prevent against malaria were more likely to use bednets compared with those who did not. Similarly women who held no misconceptions about malaria prevention were more likely to use ITNs (Ankomah, Adebayo, Arogundade et al.; 2012).

2.5. Determinants of Uptake and use of ITN among Pregnant Women

In southwest Nigeria, mothers use anti-vector measures for malaria prevention. These include window screens 78.9%, insecticides spray 69.9%, mosquito coils 25.3%, untreated bednets 2.5%, and insecticide-treated nets 1.1% (Yusuf, Dada-Adegbola, Ajayi et al., 2008). The need for expanded health education campaign on the use of the net in all endemic communities is seriously advocated because it is believed that the use of ITN increases with health promotional campaigns. Health authorities at the Local level should be compelled to incorporate ITN promotional talks in antenatal clinics, immunization programmes and infant welfare health clinics (Iwu, Ijioma, Egeruoh et al.; 2010). Adeyemi, Adekunle, Akinola, (2007) found low awareness and low prevalence in the use of ITN among pregnant women in Southern Nigeria. Thus, knowledge or awareness of ITN does not translate to possession of ITN among the pregnant women. The reason, given for the low patronage of ITN despite knowing about it, are as follows; non-belief in its efficacy, not comfortable to be used especially during heat, non-availability of the net and the high cost of the net (Anosike, Nwoke Chikere et al., 2004).

Several factors determining the use of ITNs by pregoant women in Nigeria have been identified to include; education, place of residence (locality) and access to antenatal care services (Eisele, Keating, Littrell et al.; 2009). It has been reported that pregnant women in rural areas were more likely to own ITNs (apparently as a result of mass community level distribution), in terms of use, pregnant women in urban areas are likely to use. This seems to suggest that a higher proportion of women in rural areas who own bednets do not use them. When one considers that a higher proportion of pregnant women in Nigeria live in rural areas, the enormity of the task becomes clearer to malaria prevention health promotion professionals. Another key finding is that while registration at antenatal clinic is a key predictor for ITN ownership, when it comes to ITN use, there is no difference between pregnant women who have registered at antenatal clinics (and presumably have been given free bednets) compared with those who have not registered. (Ankomah, Adebayo, Aroguodadeet al.; 2012).

2.6. Use of Malaria Control Strategies

The problem of malaria in Africa has so far defiled all attempts at its solution, and rather than improving, the situation appears to be worsening at least in some of the countries of the continent (FMoH, 2000 in Ajayi, Falade, Bamgboye et al., 2008).

2.6.1. Prevention in General

In 2005, the global malaria community committed itself to the goal of reducing the global malaria burden by at least 50% by 2010. To achieve this target of > 80% coverage are four main malaria control tools: long-lasting insecticide treated bed nets (LLIN), indoor residual spraying (IRS), intermittent presumptive treatment of pregnant women (IPT), and case treatment with effective medicines, principally artemisinin-based combination therapy (ACT) (Otten, Aregawi, Were, Karema et al., 2009).

There are a few vector control strategies. Indoor spraying of insecticides, personal protection measures, larval control and environmental control. Indoor residual spraying has been relied on as a vector control strategy in the past, and showed clearly that if properly implemented can give very good results. It faces constraints due to sustainability and cost-effectiveness, but it can still be a good choice under certain circumstances, like in high-mortality endemic areas and in drug-resistant areas. So it is a matter of being quite selective, having a very good target and understanding where to apply the method (Touré, 2001). Larval control, given the nature of the vectors, which tend basically to breed everywhere in a small amount of water on the surface of the ground, this approach can be acceptable only under suitable mapping and characterization of breeding sites, and will work mainly in urban and peri-urban areas. Larval control can be attained through environmental management, large space coverage, and community participation, and can be done through chemical or biological control. Environmental control is used to prevent breeding, nesting, and feeding of vectors by source reduction and even through better housing, windows/doors screening. Environmental changes from road, dam, or pipeline construction, deforestation, agriculture, and irrigation can generate larval breeding sites. Environmental control can mostly be used in urban and peri-urban areas, and mostly require community participation and intersectoral collaboration (Touré, 2001).

Vector control remains the most generally effective measures to prevent malaria transmission, and as such it is one of the four basic technical elements of the Global Malaria Control Strategy. Early diagnosis and prompt treatment are the basic elements of malaria control (WHO, 2005). Early and effective treatment of malaria disease will shorten its duration and prevent the development of complications and the great majority of deaths from malaria. Access to disease management should be seen not only as a component of malaria control but a fundamental right of all populations at risk. As a response to the antimalarial drug resistance situation, WHO now recommends that treatment policies for falciparum malaria in all countries experiencing resistance to monotherapies, such as chloroquine, sulfadoxine/pyrimethamine (SP) and amodiaquine, should be combination therapies, preferably those containing an artemisinin derivative, ACT - artemisinin-based combination therapy (WHO, 2005).

2.6.1.1. Insecticide Treated Net

One of the most effective tools for malaria prevention is the insecticide-treated net (ITN). Consistent use of ITNs can reduce malaria transmission by up to 90% (Gimnig,Vulule, Lo, et al, 2003 in Baume and Marin 2008). About 1.3% of pregnant women in Nigeria use ITN (NDHS, 2003). Insecticide treated mosquito nets have had significant impact in reducing morbidity and mortality particularly among children under five years old and pregnant women where ITNs have been appropriately and extensively used in malaria endemic areas. It is reported that insecticide treated materials can reduce childhood mortality by 17-33%. Treatment of mosquito nets with insecticides in the group called synthetic pyrethroids has been found to be effective and safe. ITNs have the advantage of providing personal protection from mosquito bites. It is effective against other insects including bed bugs, flies and cockroaches (FMOH, 2005). The use of mosquito nets plays a crucial role in malaria control (Pawar, Bansal, Kumar et al., 2008). Within ITN-owning households, many children and pregnant women are still not using them (Eisele, Keating, Littrell et al., 2009). The effectiveness of ITNs is dependent on behavioural change (WHO, 2005). ITNs are approximately twice as effective as untreated nets (Baume and Mario 2008).

2.6.1.2. Barriers to ITN Use

The barriers to ITN use include; acceptability, availability and affordability. Size, colour and shape of ITNs have been shown to be major access barriers (Chuma, Okungu, Ntwiga et al., 2010). Cultural and social barriers can also prevent the correct use of the nets. There is evidence that some families who own only one net will have the head of the family sleep under it instead of the most vulnerable members of the household: children under the age of 5 years and pregnant mothers. Children also often sleep in kitchens or a common room, which necessitates removing and re-hanging the net daily, something that does not necessarily happen every night. Yet, nightly use of the mosquito net, provision of an improved supply of affordable ITNs to the majority of rural populations; the need to regularly treat nets every 6-12 months with insecticide is key as one mosquito bite can be enough to get malaria (World Malaria Report, 2009). Although there is so far no evidence that insecticide resistance has reduced the effectiveness of ITNs for malaria prevention, this is a subject of growing concern (WHO, 2005). A barrier to ITN use may be lack of knowledge regarding malaria transmission and prevention (Rhee, Sissoko, Petty et al., 2005).

2.6.2. Prevention in Pregnant Women

Pregnant women are at higher risk of *Plasmodium falciparum* infection and disease. Infections during pregnancy need to be eliminated with effective anti-malarials to reduce the burden of disease in mothers and their children (Matovu, Goodman, Wiseman, et al., 2009). The use of ITNs can be extremely beneficial as a preventive measure for pregnant women living in all areas where malaria is transmitted. The use of an ITN by a pregnant woman benefits the woman as well as her family. All pregnant women in stable transmission areas of malaria should receive at least two doses of the recommended antimalarial drug, currently SP, at the first and second regularly scheduled antenatal clinic visit after quickening (WHO, 2004).

2.6.2.1. Cost-effectiveness of Prevention for Intervention of Malaria

Malaria imposes a heavy economic burden on individuals and entire economies. Malaria prevention during pregnancy using a package consisting of IPT and ITNs can be highly cost-effective. IPT with either SP or CQ has been estimated to cost in the range of $12 to $21 per

disability-adjusted life year prevented a very favourable cost (WHO, 2005). A transparent evidence base on the costs and cost-effectiveness of malaria control interventions is provided, to inform resource allocation by international and domestic financers of health programmes, and the selection of optimal packages of interventions for malaria control programme managers. The median financial cost per ITN distributed was $7.03 (range $2.97-$19.20), $3.91 (range $1.11-$12.87) per household for IRS, $0.10 (range $0.08-$0.18) for IPT in infants, $4.03 (range $1.25-$11.80) for IPT in children, and $2.06 (range $0.47-$3.36) for IPT in pregnant women. The median financial cost of diagnosing a case of malaria was $4.32 (range £0.34-$9.34). The median financial cost of treating an episode of uncomplicated malaria was $5.84 (range $2.36-$23.65) and the median financial cost of treating an episode of severe malaria was $30.26 (range $15.64$137.87). The wide ranges in the estimates of unit costs represent different durations of protection, and are a consequence of the wide variation in the type of costing study reviewed (Michael, Lesong, Richard et al., 2011).

2.7. Clinical Manifestations in General

Malaria is characterized clinically by fever. Other symptoms may include headache, chills or rigors, general weakness, vomiting, loss of appetite and profuse sweating. The clinical features of malaria vary from the asymptomatic to mild and severe disease. Malaria infection may present as uncomplicated malaria or severe malaria (FMOH, 2005). The lack of a "gold standard" definition for severe malaria has been a longstanding problem for both clinicians and researchers. The definitions currently used comprise a set of clinical and laboratory parameters associated with an increased risk of death, combined with the presence of *Plasmodium falciparum* parasitemia (Anstey and Price, 2007). In general, in settings where the risk of malaria is low (that is, in areas of low endemicity or where malaria is seasonal during the low-transmission season, clinical diagnosis of uncomplicated malaria should be based on a history of fever alone, and in settings where the risk of malaria is high (that is in areas where malaria transmission is stable or during the high transmission season of seasonal malaria), the accepted criteria for the treatment of malaria disease in young children and pregnant women should be a history of fever or the presence of detectable anaemia, for which pallor of the palms appears to be the most reliable sign in young children. In older children, adult males and non-pregnant women, the sole criterion is a history of fever (WHO, 2005).

2.8. Malaria in Pregnancy

Malaria in pregnancy is an immense public health problem with at least 50 million pregnant women living in malaria endemic area. Maternal HIV infection is associated with increased P. falciparum prevalence and delays clearance of parasitaemia in multigravidae (Brabin, Wasame, Uddenfeldt-Wort et al., 2008). Placental malaria is one of the major features of malaria during pregnancy nod has been widely used as a standard indicator to characterize malaria infection in epidemiologic investigations. Although pathogenesis of placental malaria is only partially understood, placental sequestration of Plasmodium falciparum results in the accumulation of parasitized erythrocytes in the intervillous space, infiltration by inflammatory cells, and release of pro-inflammatory mediators, which cause pathologic alterations that could impair materno-fetal exchanges, often resulting in adverse pregnancy outcome (Belay and Deressa, 2008). The presentation of malaria during pregnancy varies according to the pre-existing immunity of the mother. Women living in areas of low transmission have little immunity to malaria which can cause severe syndromes, such as cerebral malaria and pulmonary oedema. In contrast, those who live in areas of stable malaria transmission enjoy greater immunity and experience fewer symptoms during episodes of malaria (Adam, Khamis and Elbashir, 2005). *P. falciparum* parasite has been shown to be more common in pregnant than non-pregnant women (Guyatt, and Snow, 2004).

2.9. Drug Resistance Challenges

Rising drug resistance levels to conventional monotherapy has resulted in strong arguments for a move to combination treatment for all malaria in Africa, especially artemisinin-based combination therapies (ACTs) (Matovu, Goodman, Wiseman et al., 2009). Existing data suggest that management of malaria is becoming increasingly controversial as multiple drug resistance emerges. An important feature in all these changing pattern of resistance is that it also affects drugs used in pregnancy for prophylaxis and treatment of clinical malaria. It has therefore become imperative in view of the development of resistance to the various classes of drugs, that treatment guidelines be reviewed and/or formulated where one does not exist. The latest Nigerian National Antimalarial Guidelines and Treatment Policy were released in February 2005 by the Federal Ministry of Health. This guideline recommends Intermittent Preventive Therapy (IPT) with sulfadoxine/pyrimethamine as the mode of prophylaxis in

pregnancy, and for treatment of clinical infection quinine is recommended as first line agent in all trimesters while artemisinin based combinations is considered safe second line agents in second and third trimesters. However, in the first trimester the artemisinin based combinations can be used where there are no suitable alternatives (Jimoh, Oluyemi, and Amos, 2007). The malaria situation is changing for the worse due to problems of parasite resistance to drugs in endemic areas. The worsening problem of drug resistance has led to difficulties for development of antimalarial drug policies and, in turn, provision of adequate disease management in many malarious parts of the world. Although amodiaquine is generally more effective than chloroquine against chloroquine-resistant strains of P. falciparum, there is cross resistance (WHO, 2005). Chloroquine resistance is now common in all endemic countries. In recent years, Multidrug-resistant P. falciparum malaria is highly prevalent in the Thai-Cambodian and Thai-Myanmar border areas (WHO, 2007). There is a decline in the therapeutic efficacy of sulphadoxine-pyrimethamine (Chanda, Masiye, Chitah et al., 2007).

2.10. The Role of Health Education in Malaria Control and Use of ITN

Health education communication is one of the key components in malaria control and prevention. Serious obstacles in most disease control strategies include lack of effective health information, education, and communication programs. Community and health providers need to understand the problem in all its relevant aspects, as well as be aware of the options available for improvement. This means it is important for health providers and communities to appreciate the epidemiologic and technical dimensions of the malaria problem as well as the factors that affect whether particular control options will be feasible, technically possible, socially acceptable, environmentally friendly, and politically advantageous. For individuals and households, effective health communication can help raise awareness of health risks and solutions to provide the motivation and skill needed to reduce these risks, help them find support from other people in similar situations, and affect or reinforce attitudes positively (Mboera, Rumisha, Senkoro et al., 2007 in Leonard, Mboera, Emmanueli et al., 2007).

CHAPTER THREE

METHODOLOGY

3.1. Study Area

Akinyele is one of the 33 Local Government Areas (LGAs) in Oyo state, South-West of Nigeria and one of the five L.G.As that make up Ibadan the capitnl city of Oyo State. Ibadan is the largest indigenous city in Africa and South of the Sahara. It is located in the rain forest belt of Nigeria with an undulating topography. It lies between latitude 7 and 9.3 east of the prime meridian. The major occupation of the people is farming. The LGA has a total population of about 211,359, out of which females are 105,726 and males are 105,633 (2006 census), and comprises of 12 wards namely; Mele, Olanla, Aroro, Onidundu, Moniya, Akinyele, Iwokoto, Ojoo, Ikereku, Alabata, Ijaiye, Iroko. There are 23 health facilities namely; Ojoo, Shasha, Ajibode, Orogun, Moniya, Iroko, Akinyele, Onidundu, Ikereku,Adegbite cottage hospital Aroro, Ijaye, Alabata, Olorisa Oko. Olorisa, Iwure, Jarija, Mele, Pade model, Elekure, Oretu, Alade, Lebu and Iwoko , out of which 18 are offering ante-natal care (ANC) services once every week. The Matrons-in-charge man the various clinics. The services offered at the ANC includes vaccination, counselling, and IPTp amongst others.

3.2. Study design

This is a quasi-experimental study. This study was conducted over a period of four months.

3.3. Study Population

This comprised pregnant women attending primary health care centres in Akinyele Local Government Area.

Inclusion criteria

- All pregnant women registered and attending ANC in the primary health centres

Exclusion criteria

- Pregnant women brought in as emergency
- Pregnant women with disabilities that disallowed responses to questionnaire
- Pregnant women refusing to take part in the study

3.4. Baseline Study

3.4.1. Sample Size determination for Survey

The prevalence for use of IPTp, Window/door screen, Insecticide spray, Mosquito coil, Burning of herbs/leaves, Repellents and ITN prevention methods were used in the calculation of the sample size and the value obtained by IPTp was used because, it had the highest value among all the various prevention practices. Values obtained were; IPTp = 331 (At 31.4%, prevalence of pregnant women that used IPT in Nigeria, NDHS 2008), ITN = 20, Window/door screen = 256, Insecticide spray = 323, Mosquito coil = 290, Burning of herbs/leaves = 97, Repellents = 8. The prevalence of Window/door screen = 78.9%, Insecticide spray = 69.9%, Mosquito coil = 25.3%, Burning of herbs/leaves = 6.6%, Repellents = 0.5%, were got from (Yusuf, Dada-Adegbola, Ajayi et al., 2008 Malaria prevention practices among mothers delivering in an urban hospital in southwest Nigeria).

The minimum sample size used for this study was determined using the Kish and Leslie 1965 formula for single proportions.

$N = Z^2pq/d^2$

N = minimum sample size

Z = standard normal deviate, set at 1.96 which corresponds to 95% CI

P = prevalence of IPTp use 31.4 %

(NDHS 2008, prevalence of pregnant women who used IPTp)

$q = 1 - p$

d = degree of accuracy desired set at 0.05

$N = (1.96)^2 * 0.314 * 0.686/0.05^2$

= 331

To create allowance for questionnaires that may not be properly filled using a rate of 10% the minimum sample size increased to 364.

3.4.2 Sampling Procedure

A multistage sampling procedure was used.

- First stage selection: this involved the selection of a L.G.A by balloting out of the 33 available L.G.A. in the state.
- Second stage selection: involved selection of two wards out of the twelve wards in the local government by balloting.
- Third stage selection: All the pregnant women attending antenatal care in all the primary health care centres in the two wards were studied.

3.4.3. Pre- test

The research instruments were pre tested in an LGA that has not been selected for the study but has similar characteristics to that being studied to ascertain the instruments' suitability, identify difficult questions, omissions and repetitions.

The Instruments were pre tested in Ibadan North Local Government Area. After the Pre test certain modifications were made which improved the clarity of questions. All the questions were well understood and the participants were comfortable with the questions. Some of the statements made by the respondent were used to re-draft the questionnaire. This was to test for validity of the instrument. Reliability of the instruments was determined using the research assistants who have been recruited on previous experience in similar works, they were trained for two days based on their competency and skills which include teaching, brainstorming and role play methods to update them on Data collection and other aspect of the research work. Also the analysis of the pre-test data was done using Cronbach's Alpha correlation co-efficient of the Statistical Package for Social Sciences (SPSS) version 15, a model of internal consistency, based on the average inter-item correlation. This was done to ascertain the properties of the instrument. In the measurement a result showing correlation coefficient greater than 0.05 is said to be reliable.

3.4.4. Training of Research assistants

One female and three male graduates were trained for two days as research assistants. Their training focused on the subject of research, interpersonal skills, interview techniques and ethical issues that were necessary to aid and ensure accurate collection and recording of data.

3.4.5. Methods and Instrument for Data Collection

This was carried out using both quantitative and qualitative methods.

3.4.6 Quantitative

A structured interviewer administered questionnaire was used to collect information from the respondents before and after the intervention. The questionnaire was translated into Yoruba (Appendix II) the native language of the study community by an Expert. This was back translated to English (Appendix I) to check for appropriateness and to ensure no information was lost during translation. It had five sections on topics related to malaria prevention practices and ITN use;

Section A. Questions on socio-demographic data such as age, occupation, level of education, etc.

Section B. Antenatal care during pregnancy.

Section C. Questions on knowledge of prevention practice of pregnant women towards malaria in pregnancy.

Section D. Questions on use of preventive measures such as ITN, IPTp, Insecticide sprays, burning of coil and Mosquito repellent.

Section E. Willingness to use ITN, cost and affordability.

3.4.6.1. Qualitative

The qualitative survey was carried out using a focus group discussion guide which consisted of questions concerning the following issues: benefits derived from using the nets, time of net use, who makes decisions on usage of nets at home, how many people sleep under net, size and colour preference and reasons for not using nets.

3.4.6.2. Data Collection Procedure

The investigator and research assistants collected information from pregnant women that were willing to take part in the study and anending ANC in the primary health care centers in the Local Government Area using a structured interviewer administered questionnaire. The data collection started with an introduction and overview of the research including the objectives of the study. At the end of each collection, questionnaires were reviewed and checked for completeness.

Focus Group Discussions (FGD) were held for the regular users, irregular users and non-users of the ITN at post-intervention to explore what influences the use of ITN. Two sessions were held for each category making it a total of 6 FGDs. The discussions were held in groups of eight respondents (Pic. 9). Four Research assistants were trained and used for data collection (Pic. 1). A focus group discussion guide was used. Sessions were held at the health centres and tape recorded which helped in obtaining the details of the sessions conducted.
The FGD involved a controlling moderator, a moderator translator and a note-taker. The controlling moderator with the help of a moderator translator used a question guide on general questions which was pre- prepared, which consist of an outline of major questions that were asked for facilitating the discussion sessions. The note-taker recorded key issues raised in the session and also helped in pointing out questions that were not well discussed. Snacks were given for refreshment.

3.5. Intervention

The interventions in this study were the free distribution of ITN and health education of the pregnant women on ITN and the use. Duration for distribution of ITNs' was one month while duration for follow up after ITN distribution was three months, which included house monitoring of pregnant women who collected the ITN.

3.5.1. ITN Distribution

Slips were given to respondents who indicated willingness to use ITNs during survey intervention. The slips were taken to the matrons-in-charge of the health facilities by the respondents to obtain a free ITN for use, from the stock at the primary health centres.

3.5.2 Health Education

Four sessions of health education talks on malaria and effective use of ITNs' were held in groups (Pic. 2) with respondents at the health facilities during clinic on different days. The content of the health education talk was grouped into two parts;

Part 1. Cause of malaria, implications in pregnancy, transmission, role of mosquito, symptoms and signs.

Part 2. Types of bednets, hanging of the ITN, use and effectiveness.

3.5.3. Follow up

3.5.3.1. Sample Size for follow up of Pregount Women who collected ITN

In other to determine the actual use of ITN, pregnant women were monitored in their homes. The number of pregnant women required to achieve this objective was calculated using sample size for two proportions. From the literature review about 1.3% of pregnant women use ITN (NDHS, 2008) to increase the proportion by 50% (1.3% to 2.0%) with C.I. of 95%, power of 90%. A minimum sample size of 128 pregnant women was required.

N= Sample

Z (1-α /2) =1.96 for significance at P<0.05(1- α)

Z (1- β) = 1.28(90% power)

P1 = Proportion

P2 = expected proportion

P1-P2 = Difference

P1 = 1.3

P2 = 1.95

Z (1-α/2) =1.96

Z (1-β) =1.28

$$n = \frac{[Z(1-\alpha/2)\sqrt{2P1(1-P1)} + Z(1-0)\sqrt{P1(1-P1) + P2(1-P2)}]}{(P1-P2)^2}$$

$$n = \frac{[1.96\sqrt{2.6(98.7)} + 1.28\sqrt{128.3 + 191.1}]}{0.422}$$

$$n = \frac{[1.96\sqrt{256.6} + 1.28\sqrt{319.4}]}{0.422}$$

$$= \frac{1.96\times16.0 + 1.28\times17.8}{0.422}$$

$$= \frac{31.36 + 22.7}{0.422}$$

$$= \frac{54.06}{0.422} = 128$$

To create allowance for checklists that are not properly filled using a rate of 10% N becomes 142 for the follow up group.

During the intervention there was house monitoring of the pregnant women to assess the actual use of the ITNs within the study period. This was carried out by four focal persons who were traditional birth attendants within the community using an observational checklist (Appendix III). Based on the list of the women who collected ITN, women were grouped according to residents and visited twice during the period of intervention to check for actual use of the nets. First visit was during first half of the intervention period and the second visit was during second half of the intervention period, and were unannounced. One hundred and forty two pregnant women were randomly selected, through simple balloting for follow up.

3.5.3.2 Selection Criteria for the Focal Person

1. Must be a married and well respected woman in the community
2. Acceptable to members in the community
3. Be a resident of the community
4. Be able to communicate in the language that the respondents understand

3.5.4. Observation Check Roles by the Focal Person

- If the net is hanging
- Actual sleeping under the hanging net

3.6. Data Analysis

Data entry and analysis was performed using SPSS for windows version.

Statistical analysis included the use of frequency tables, graphs, means, and standard deviations for data summarisation. Chi-square test was used to examine relationships between categorical variables. Students t-test was used to compare means of continuous variables such as age, parity and number of ITN owned. Logistics regression was used to determine the factors that influenced use of ITN most.

Knowledge of malaria was scored on an 18 points scale, a score ≥ 9 was classified as good; while lesser mark was scored poor.

3.7. Ethical Issues

Approval for the study was obtained from The Oyo State Ethical Review Committee (Appendix V). Written informed consent (Appendix IV) was obtained from each respondent before enrollment and serial number was used to identify completed questionnaire in other to maintain confidentiality.

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CHAPTER FOUR

RESULTS

The findings of the study are presented in three sections: the baseline, intervention and post-intervention.

Section: A

4.1 Baseline Study

4.1.1. The General characteristics of the respondents.

Three hundred and sixty four pregnant women were studied. The socio-demographic characteristics of the pregnant women summarised in Table 4.1. The mean age of the respondents was 27.0 ± 5.2 years. Majority of the respondents 88.2% were Yoruba, the Igbo were 4.9% and 2.7% were Hausa. Respondents with secondary level education were 58.8%. One hundred and fifty two 41.8% respondents had household size of two to three members. Many 44.8% of the respondents were engaged in business/trading.

Table 4. 1. Socio-demographic characteristics of the respondents

Variables	n (%)	N= 364
Age group (years)		
15-24	112 (30.8)	
25-34	217 (59.6)	
≥35	35 (9.6)	
Ethnic group		
Yoruba	321 (88.2)	
Igbo	18 (4.9)	
Hausa	10 (2.7)	
Others (Idoma, Efik, Ibibio)	15 (4.1)	
Level of Education		
No formal Educotion	19 (5.2)	
Primary	92 (25.3)	
Secondary	214 (58.8)	
Tertiary	39 (10.7)	
Occupation		
Others (Farming, Cleaner)	3 (0.8)	
Senior civil servants	11 (3.0)	
Junior civil servants	17 (4.7)	
Housewives	52 (14.3)	
Petty trading	118 (32.8)	
Business/trading	163 (0.8)	
Household size		
1	3 (0.8)	
2-3	152(41.8)	
4-5	135(37.1)	
≥6	74(20.3)	

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Household size	
1	3 (0.8)
2-3	152(41.8)
4-5	135(37.1)
≥6	74(20.3)

4. 2.2. Antenatal Care (ANC) History

The mean weeks of pregnancy at first ANC visit was 15.7 ± 5.7 weeks, while that of the gestational age at time of interview was 24.1± 5.6 weeks. Women who had been pregnant for the second to third time contributed a higher proportion 52.2% of the respondents.

4.1.2.1 Types of Services reportedly provided at ANC

Table 4.2 shows the list of services available at ANC to pregnant women. Many respondents claimed that IPTp (69.2%), vaccination (76.9%) and counseling (67.6%) were available while very few (1.9%) received bed net at ANC clinic.

Table 4. 2. Types of services provided at the ANC

	Available	Not available	Total
Services	n (%)	n (%)	N (%)
Vaccination	280 (76.9)	84 (23.1)	364 (100)
IPTp	252 (69.2)	112 (30.8)	364 (100)
Counseling	246 (67.6)	118 (32.4)	364 (100)
Bed net	7 (1.9)	357 (98.1)	364 (100)

4.1.3 Knowledge of Malaria and its Prevention

Table 4.3 shows the respondents' knowledge about malaria before intervention; all (100%) respondents said it was true that malaria affects all age groups including pregnant women. When asked if anaemia was an effect of malaria in pregnancy 82.4% answered true while (17.6%) said false. (2.2%) agreed to placental parasitemia being an effect while 97.8% said it was false. For stillbirth 25.2% said true to it, 74.8% did not, low birth weight (97.5%) agreed while (2.5%) disagreed. (97.0%) supported that abortion could an effect of malaria in pregnancy, (3.0%) disagreed, tuberculosis (3.0%) agreed while majority (96.0%) did not. For HIV a few (2.0%) agreed while (98.0%) disagreed.

Majority (98.6%) said it was true that dirty environment promotes malaria transmission while (1.4%) did not, all (364%) disagreed that clean environment could encourage malaria transmission. (89.6%) supported the fact that bushes around the house would encourage malaria transmission and (95.9%) said poodle water also does encourage the transmission of malaria while (10.4%) and (4.1%) disagreed, respectively.

Knowledge score was stratified into two groups; ≥ 9 =good knowledge while ≤ 9 = poor knowledge. The overall mean score was 12.2 and a majority (68.0%) had knowledge score of 9 and above.

Table 4.3. Respondents knowledge about malaria before intervention

Effects of malaria in pregnancy:	True n (%)	False n (%)	Total
Malaria affects all age groups	364 (100.0)*	0 (0.0)	364
Pregnant women do have malaria	364 (100.0)*	0 (0.0)	364
Anaemia	300 (82.4)*	64 (17.6)	364
Placental parasitemia	8 (2.2)*	356 (97.8)	364
Stillbirth	92 (25.2)*	272 (74.8)	364
Low birth weight of baby	155 (97.5)*	209 (2.5)	364
Abortion	153 (97.0)*	211 (3.0)	364
Tuberculosis	11 (3.0)	353 (96.0)*	364
HIV	7 (2.0)	357 (98.0)*	364
Factors that promote malaria transmission			
Dirty environment	359 (98.6)*	5 (1.4)	364
Clean houses	0 (0.0)	364(100.0)*	364
Bushes around the house	326 (89.6)*	38 (10.4)	364
Poodle water	349 (95.9)*	15 (4.1)	364

Knowledge score	Frequency	Percentage
0-8	116	32.0
9 and above	248	68.0
Total	364	100.0

*= correct responses

Table 4.4 shows the knowledge level of the respondents on issues relating to malaria and its prevention methods. About two-third (68.0%) of the respondents had good knowledge of malaria. Many respondents had poor knowledge of malaria prevention methods such as ITN (82.4%), IPTp (62.1%), Mosquito coil (55.5%), Window/door screen (97.5%) and Mosquito repellent (97.0%), more than half (55.2%) had good knowledge of insecticide spray.

Table 4.4. Respondents' knowledge about malaria and its prevention methods before intervention

	Good	Poor	
Koowledge of:	n (%)	n (%)	Total
Symtomps of Malaria	248 (68.0)	116 (32.0)	364
ITN	64 (17.6)	300 (82.4)	364
IPTp	226 (62.1)	138 (37.9)	364
Insecticide spray	201 (55.2)	163 (44.8)	364
Mosquito coil	202 (55.5)	162 (44.5)	364
Window/door screen	355 (97.5)	9 (2.5)	364
Mosquito repellent	353 (97.0)	11 (3.0)	364

Good knowledge = 50% and above, Poor knowledge = ≤ 49.9%

4.1.4. Current malaria prevention methods adopted

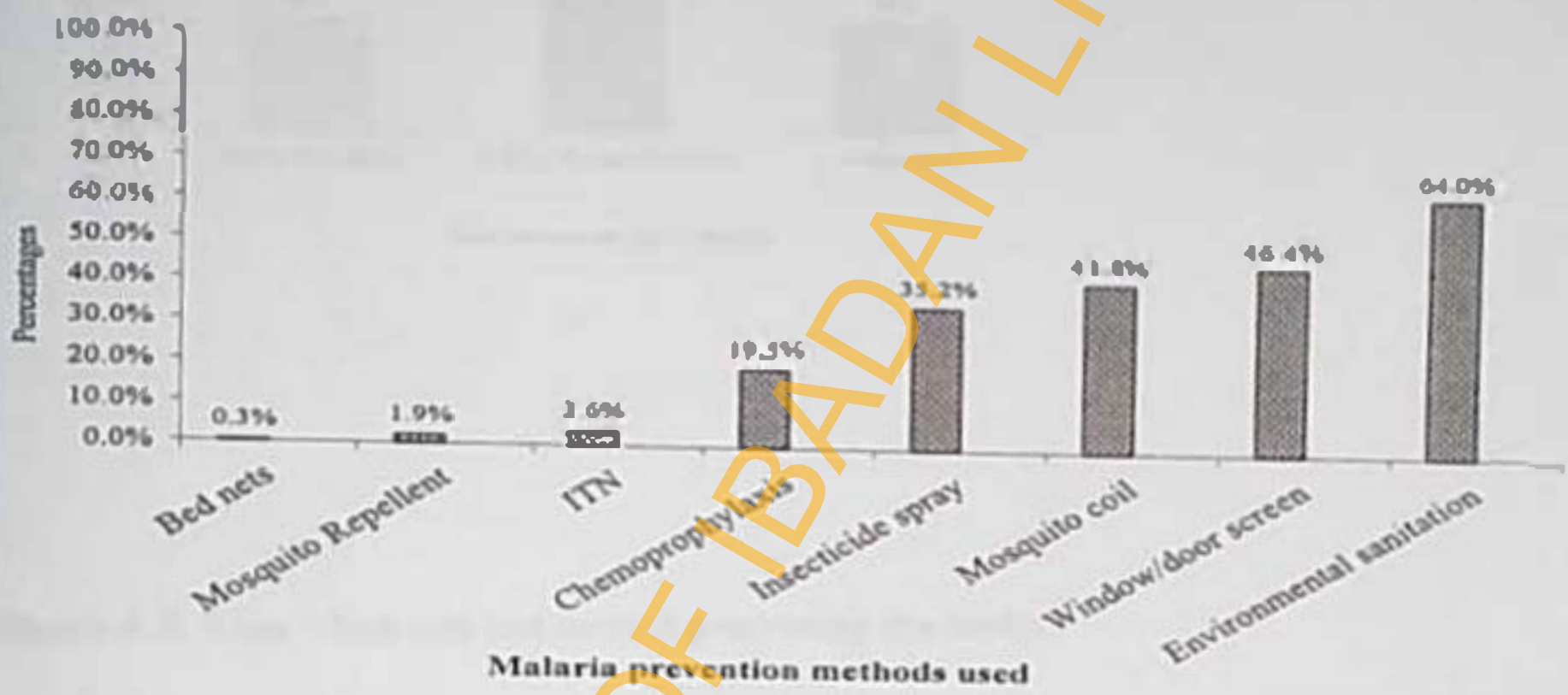


Figure 4.1. Malaria prevention methods used by pregnant women

Figure 4.1 shows the distribution of the respondents according to their current use of the itemized malaria prevention methods. Out of the 364 respondents, (0.3%) was currently using untreated bed net, (1.9%) were using mosquito repellent, (3.6%) ITN, (19.5%) chemoprophylaxis, (35.2%) insecticide spray, (41.8%) mosquito coil while (46.4%) had window/door screen and (64.0%) were practicing environmental sanitation.

Out of the 364 respondents, (3.6%) reported that they had ITN prior to intervention. Nine (69.2%) had long lasting ITN while four (30.8%) had retreated net.

N = 4

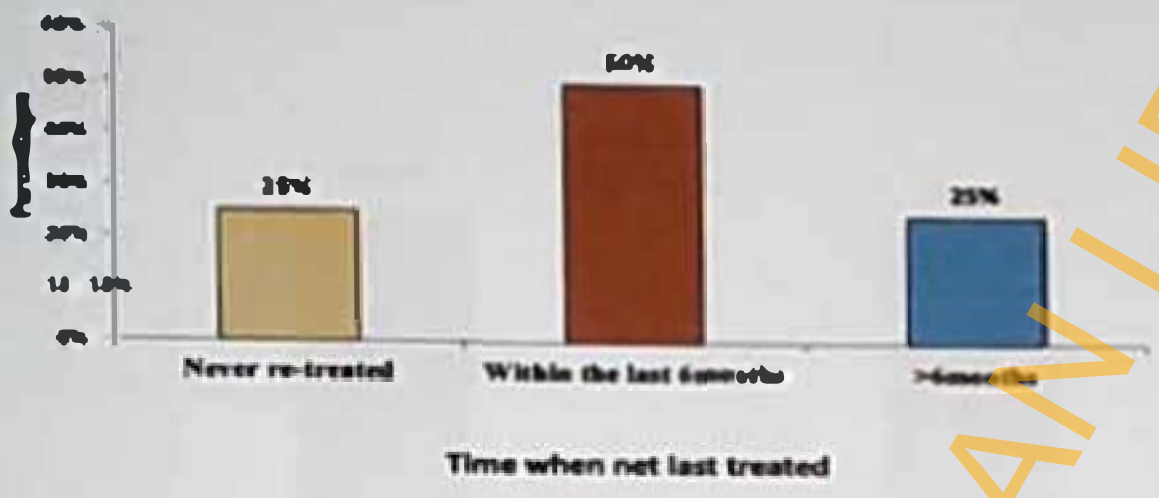


Figure 4. 2. Time when nets last treated preceeding the study.

Half of the respondents using re-treatable nets treated their nets within the last 6 months prior to survey while one-fourth re-treated theirs more than six months prior to intervention; 25% never re-treated their nets (Figure 4.2)

4.1.4.2 Use of ITN prior to pre-intervention phase

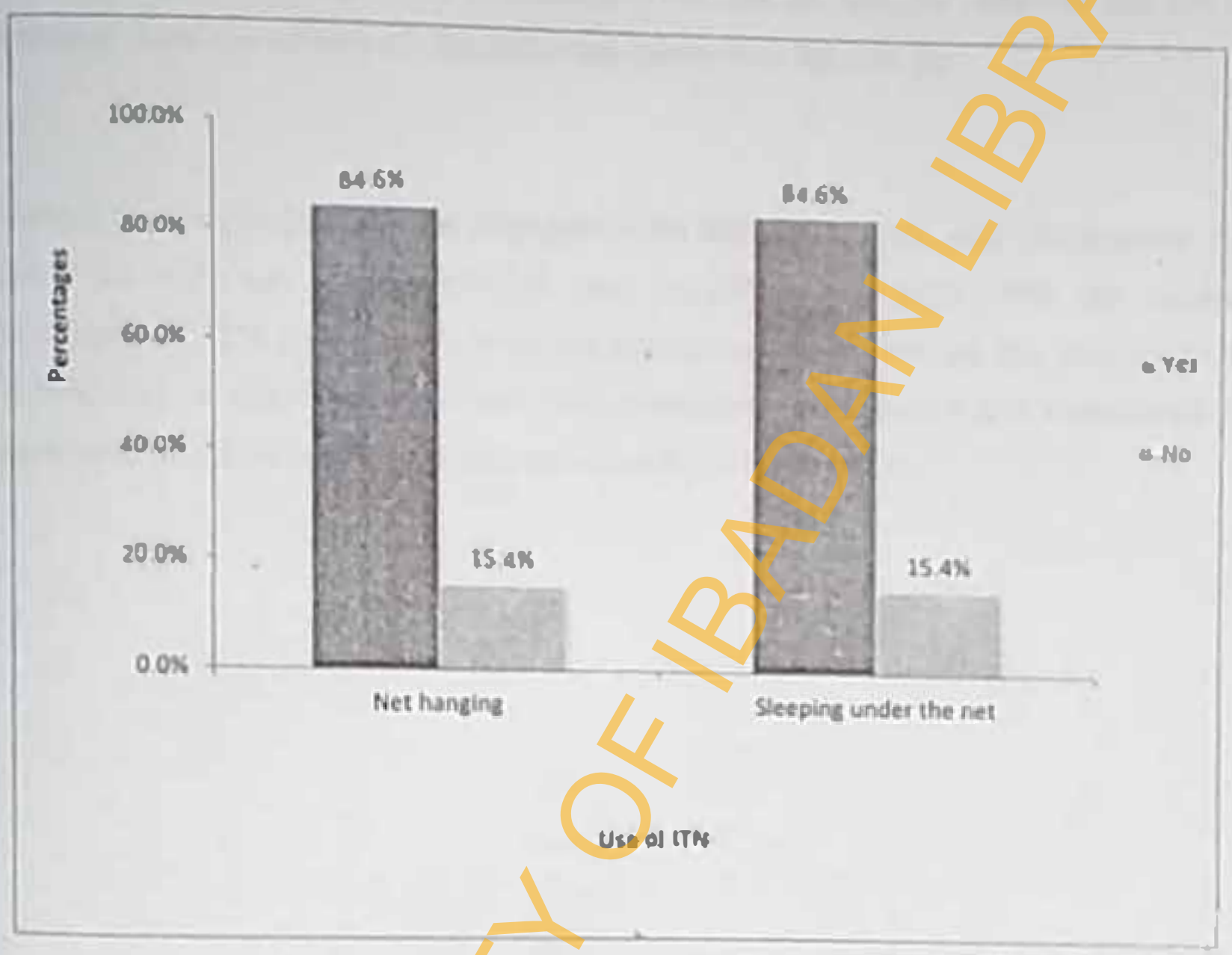


Figure 4.3 Correctness of use of ITN

Figure 4.3 shows the correctness of use of ITN (hanging and sleeping) by the respondents. Out of the 13 respondents who had ITN, (84.6%) reported that they hung and also slept under the nets. Among the respondents who reported that they slept under the nets, an average of 3±1 persons slept under the nets and among those who hung their nets, 10 out of 11 (99%) said they hung the nets at four points, with nets tucked under the bed, while only one person (1%) hung hers at 6 points over the bed.

Among the 11 respondents who slept under the nets, (91%) shared the same opinion that ITN was effective while only one person (9%) opined that it was not effective. The unanimous reason for admitting that the nets were effective is that the nets prevent mosquitoes, while the reason given by the respondent who claimed that the net was not effective was that the net does not cover the entire bed, thus allowing mosquitoes into the net.

Among the reasons given by the respondents for not having ITNs, only two reasons: "Cannot get it to buy" and "Not affordable" had significant association with the respondents' possession of ITN ($p<0.05$). None of the respondents who admitted that they could not get ITN to buy or afford to buy it had ITN, meanwhile significantly few respondents among those who could get it to buy (6.3%) or afford it (5.2%) had ITNs.

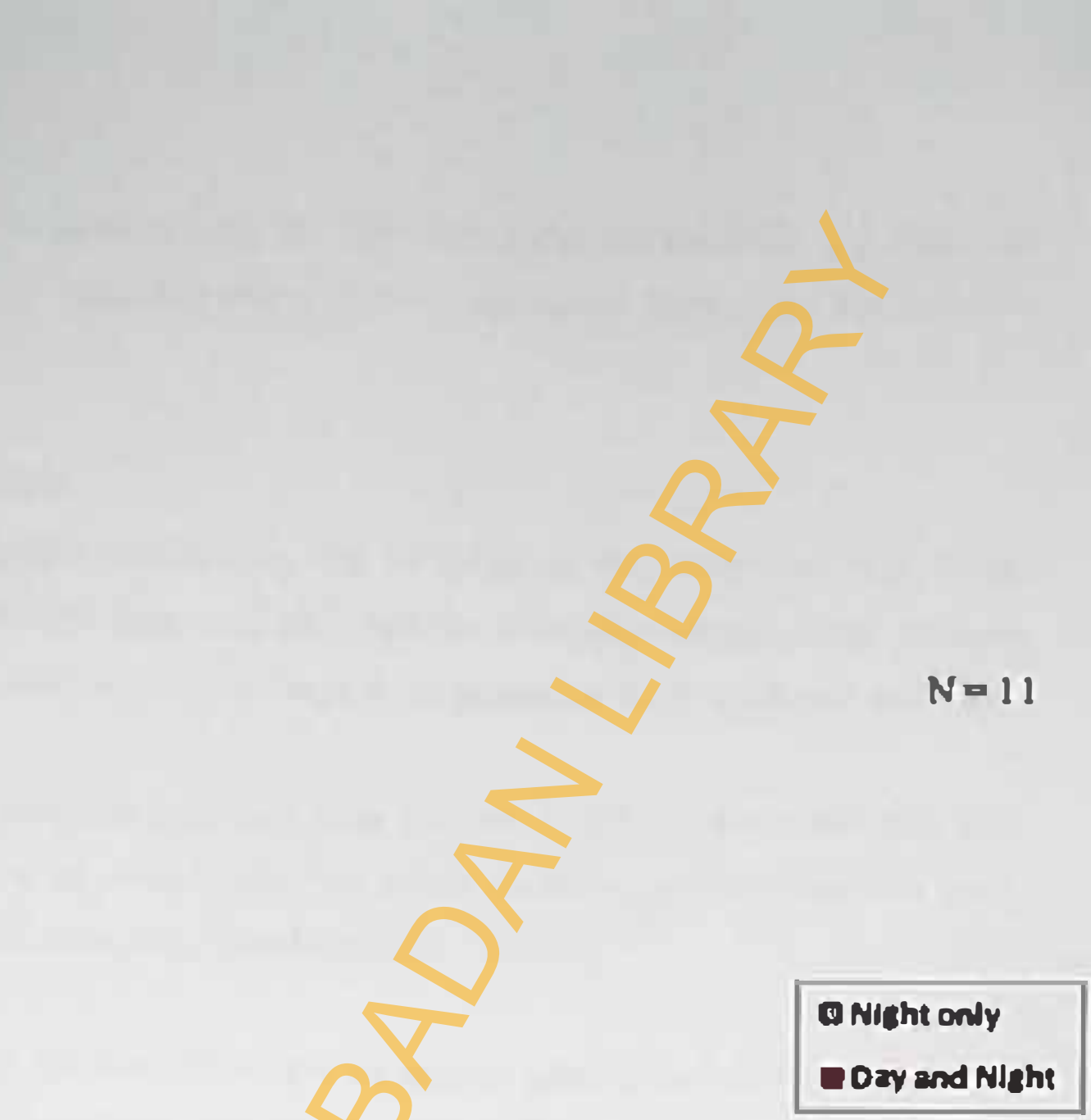


Figure 4.4 Time of ITN use

All the 11 respondents who reported using the ITN slept under the net daily. (45.5%) slept under their nets at night only while the other (54.5%) respondents slept under the nets both day and night.

Sources, Use and Cost of ITN

There were two main reasons reported by the respondents for using the nets. Many respondents, (81.8%) mentioned they used their nets because of protection from illnesses including malaria and (18.2%) used theirs because of protection from mosquito and other insects.

Eight (62%) respondents obtained their nets from Primary Health Care Centres and five (38%) purchased theirs. One purchased hers from patent medicine vendor, while two from pharmacies and the other two purchased from the market.

Eleven (85%) said that they got their ITNs over six months prior to survey while the other two respondents (15%) obtained theirs within the last six months preceding the survey.

Figure 4.5. Cost of ITNs

Among the respoodents that purchased the ITN, only one (20%) respondent obtained hers at a cost less than five hundred Naira, while the others, (80%) obtained theirs at cost of five hundred Naira or more.

Among those respondents that purchased the ITNs, (80%) claimed the nets were not affordable at the cost of purchase while one was of the opinion that it was affordable.
Fifty percent of respondents that purchase ITN said that between N500-N1000 is affordable, 25% said N200-N499 was affordable while 25% that said if it is less than N200 it's affordable.

4.1.4.4. Reasons for willing to own ITN prior to intervention

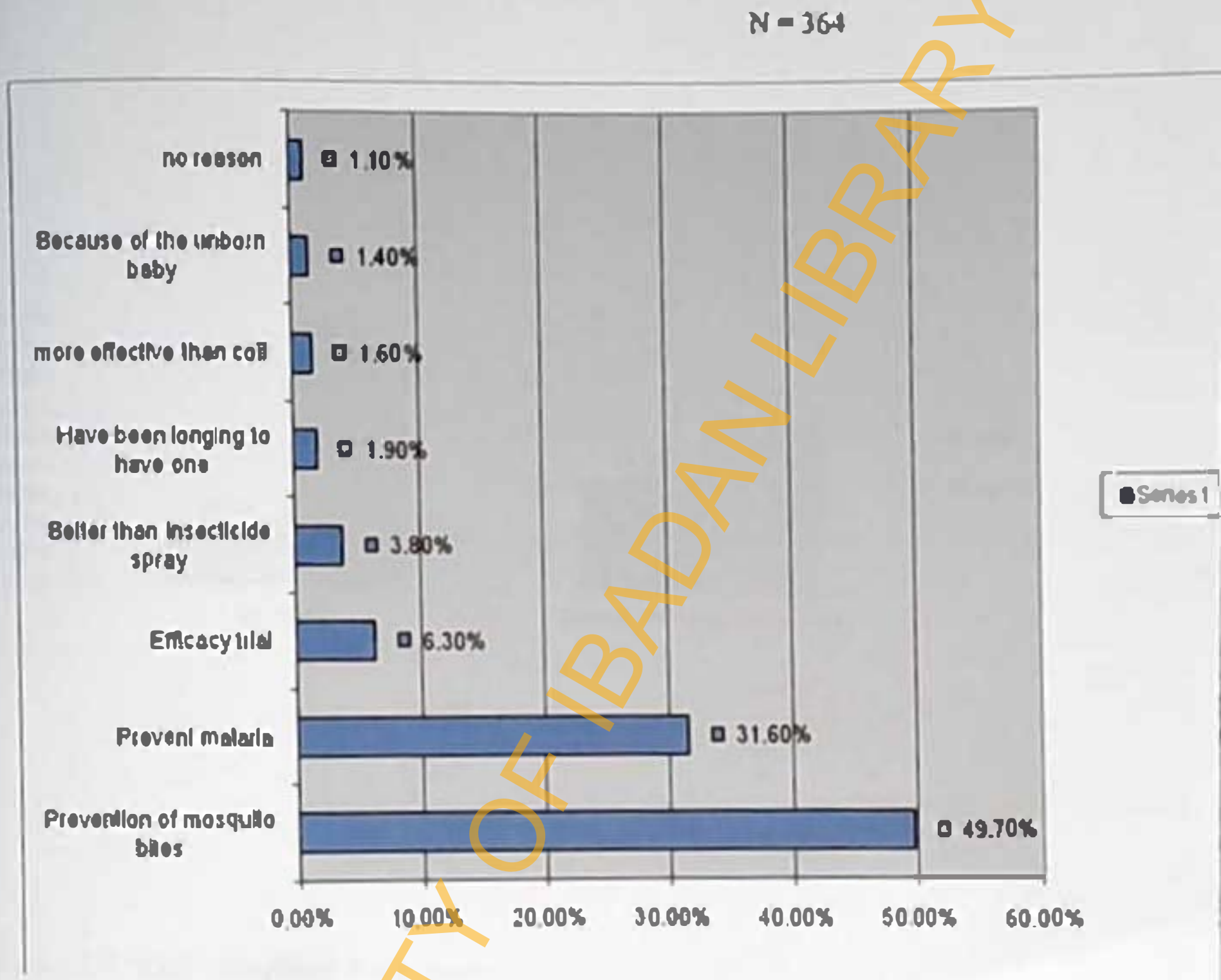


Figure 4.6. Reasons for willing to own an ITN

All the respondents expressed willingness to own an ITN. The various reasons for willing to own an ITN are summarized in Figure 4.6. Mosquito bites prevention accounted for almost half (49.7%) of the reasons and followed closely by prevention of malaria (31.6%).

4.1.4.5. Intermittent Preventive Treatment for Pregnant Women

Two-third (69.5%) of the respondents recalled taking drugs to prevent malaria during their index pregnancy while the others (30.5%) did not take any drug. Sulfadoxine-pyrimethamine was predominantly used for IPTp (87.4%) while few (12.6%) took Flansidar as chemoprophylaxis; none used chloroquine

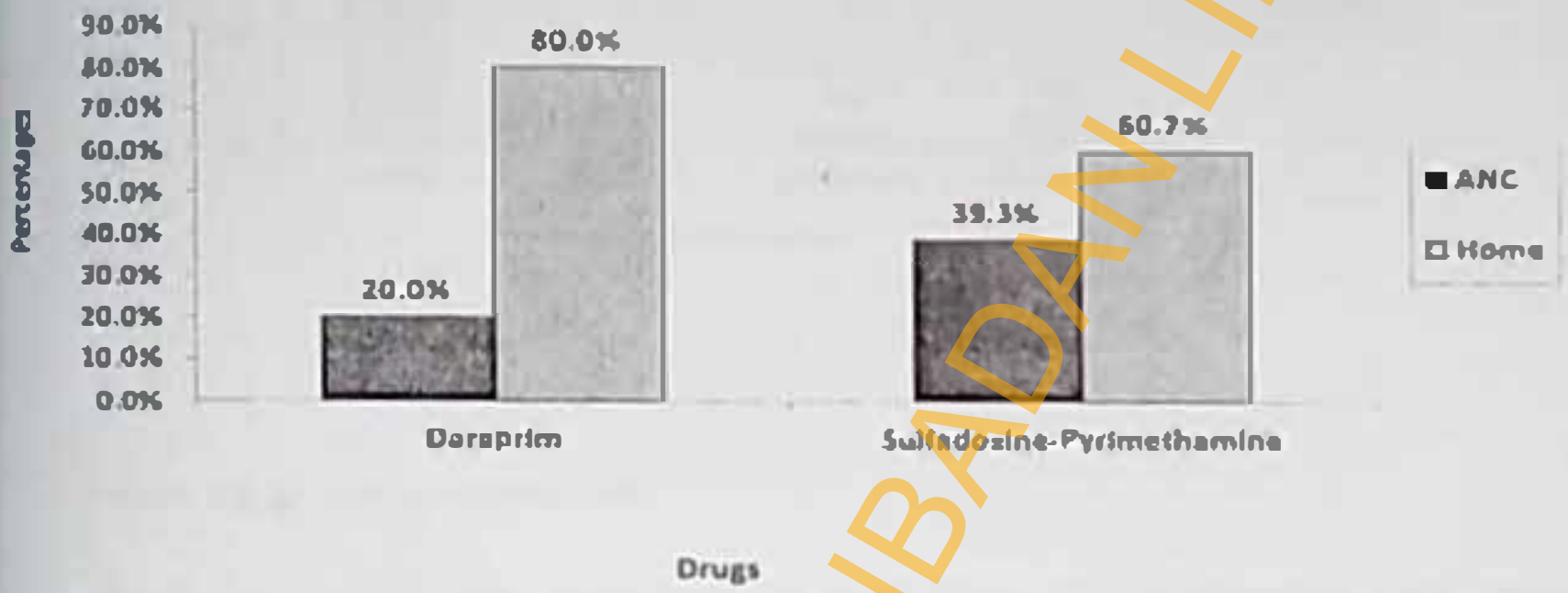


Figure 4.7. Where the drugs were taken

Figure 4.7. Shows the distribution of the respondents according to where they took their chemoprophylactic drugs. For both drugs, more respondents took their drugs at home than in the clinics.

4.1.4.6. Use of Insecticide Spray and Mosquito Coil

The type of insecticide used by over half (56.3%) of the respondents was insecticide spray. One hundred and fifty-eight (43.4%) said they don't use insecticide at all in their homes. Of the 364 respondents, about half (51.4%) were using mosquito coil and others were not

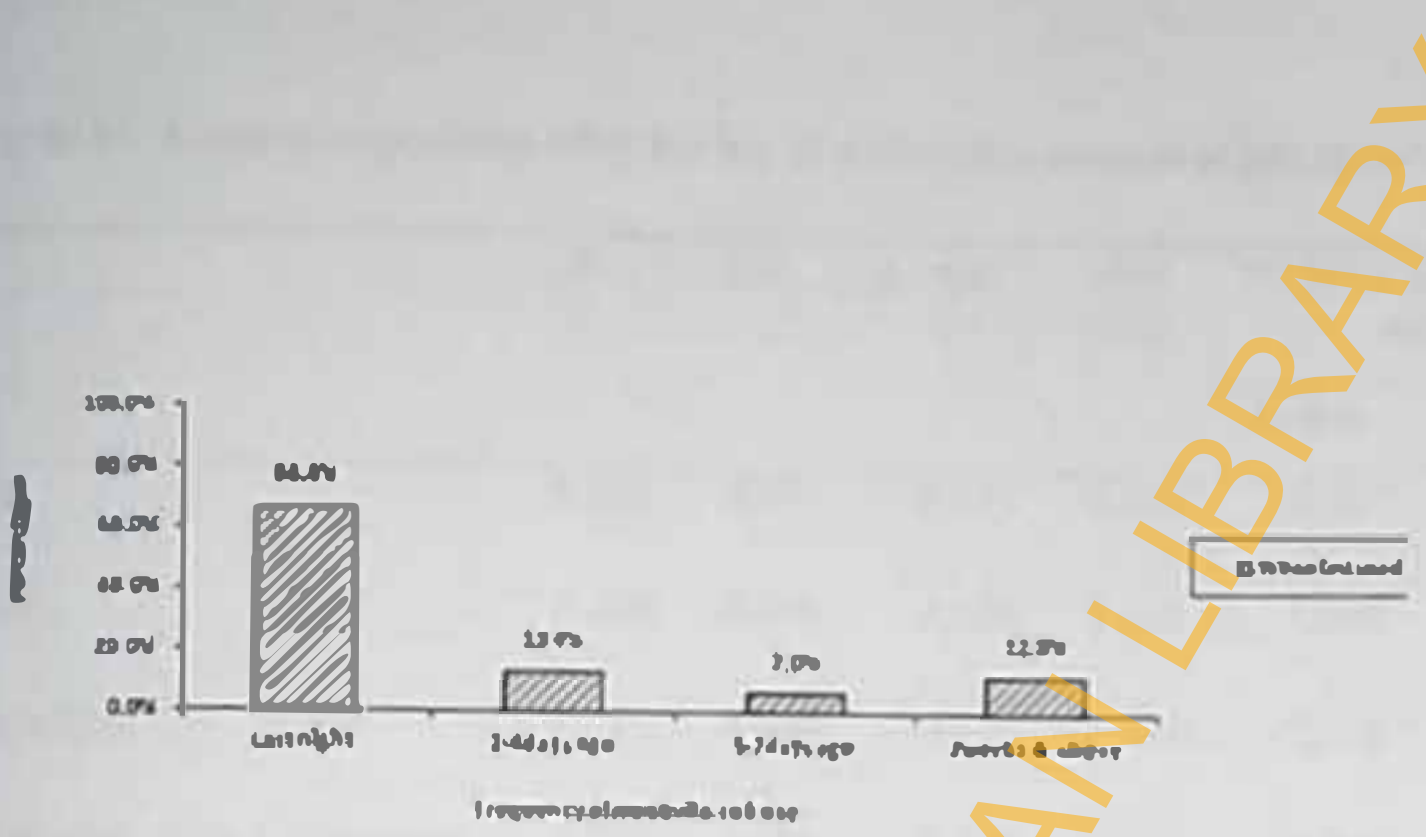


Figure 4.8. Use of mosquito coils

Among the 187 who were using mosquito coils, many, (66.8%) reportedly used mosquito coils a night before the interview (Figure 4.8).

4.1.4.7. Possession and use of Mosquito Repellent

Nine (2.5%) of the respondents had mosquito repellent. The predominant reason given by majority (99.4%) of the respondents who did not have the item was that it was not their choice, while the remaining few (0.6%) said it was not effective

4.1.4.8. Factors influencing Malaria prevention practices pre- intervention

Table 4.5 shows the logistic regression analysis for the use of malaria preventive measures by the respondents prior to the intervention. Among all the variables, parity (i.e. the number of pregnancies) was the only significant predictor of the use of malaria preventive measures among the respondents. The odds ratio of the association implies that respondents with higher parity were about four times (OR: 3.67, 95%CI: 1.07, 12.6) more likely to use malaria preventive measures.

Table 4.5. Logistic regression table for use of preventive measures pre-intervention

	B	S.E.	p value	odds ratio	95.0% C.I. for odds ratio	
					Lower	Upper
Age	-0.062	0.773	0.936	0.940	0.207	4.278
Parity	1.300	0.630	0.039	3.668	1.068	12.600*
Counseling	1.019	1.280	0.426	2.770	0.225	34.029
Satisfaction with Counseling	-2.145	1.336	0.108	0.117	0.009	1.606
Knowledge of insecticide spray	1.555	0.849	0.067	4.735	0.896	25.020
Knowledge of coil	1.603	0.847	0.058	4.966	0.944	26.119
Knowledge of malaria	0.032	0.715	0.964	1.032	0.254	4.194
Constant	-1.126	2.003	0.574	0.324		

*Significant

The use of ITN before the intervention was significantly associated with the respondents' occupation. Senior civil servants were more likely (OR: 5.56, 95% C.I: 1.30, 3.72) to sleep under the ITN. (Table 4.6)

Table 4.6. Logistic regression table for use of ITN pre-intervention

	B	S.E.	p value	odds ratio	95.0% C.I. for odds ratio	
					Lower	Upper
Occupation	1.72	0.74	0.020	5.56	1.30	3.72*
ANC Bed net service	-21.500	40192.58	1.000	0.00	0.00	.
Satisfaction with ANC bed net service	17.821	40192.58	1.000	5.49×10^{7}	0.00	.
Knowledge of insecticide spray	1.163	0.81	0.152	3.20	0.65	15.72
Constant	4.312	2.73	0.114	74.59		

* = significant

Section B: Intervention

4.2. Follow up

A total number of 364 reported to have collected ITN.

4.2.1. Spot-check observation of ITN use

A total of one hundred and forty two respondents were observed during intervention to monitor ITN utilisation. Two visits were made at different times. At the first visit, half of the respondents had their nets hung; however the frequency of net hanging reduced to (45.8%) at the 2nd visit. Unlike net hanging, the number of respondents that were found sleeping under the nets increased from (4.2%) at the 1st visit to (22.5%) at the 2nd visit (Table 4. 7).

Table 4.7. Utilisation of ITN

	1st visit			2nd visit		
	Yes	No	Total	Yes	No	Total
	n (%)	n (%)		n (%)	n (%)	
Hanging	71 (50.0)	71 (50.0)	142 (100)	65 (45.8)	77 (54.2)	142 (100)
Sleeping	6 (4.2)	136 (95.8)	142 (100)	32 (22.5)	110 (77.5)	142 (100)

The McNemar paired test looks at the significanee of the change in the proportion of utilisation between the first and the second visit during follow up at home. There was no significant difference in the proportion of net hanging between the first and the second visit. There was however, a significant improvement in the frequency of sleeping under the ITN between the first visit and the second visits ($p<0.001$).

The reasons given by those found not to hang the nets are summarized in Table 4.8. The major reasons include: fear that the nets could be damaged by children (21.1%); feeling hot under the nets (15.5%); and difficulty in hanging the nets (12.7%) amongst others.

Table 4.8. Reasons for net not hanging at the first visit

Reasons	n	%
It will be damaged by children	15	21.1
It takes up space	12	16.9
Feel heat under the net	11	15.5
Net difficult to hang	9	12.7
Husband does not allow it	6	8.5
It made the room look untidy	6	8.5
I travelled	2	2.8
Uses insecticide spray	2	2.8
Lack of time to hang it	1	1.4
Net was given out to relation	1	1.4
The roof is leaking	1	1.4
Total	71	100.0

The reasons given for not hanging the nets at the second visit are summarized in Table 4.9. Unlike at the first visit, the major reasons for not hanging the nets include: Feeling hot under the net mentioned by (23.4%) and that the nets could be damaged by children (13.0%)

Table 4.9. Reasons given for not hanging the net at the second visit

Reasons	n	%
Feel heat under the net	18	23.4
It will be damaged by children	10	13.0
Lack of space	8	10.4
It made the room look untidy	7	9.1
Husband does not allow it	6	7.8
It causes restrictions/occupies space	6	7.8
It will be damaged by children	5	6.5
Uses insecticide spray	2	2.6
I travelled	2	2.6
Net was given out to relation	1	1.3
The roof is leaking	1	1.3
Total	77	100.0

4.3. Section c: Post-intervention

4.3.1. Awareness of mosquito nets

N = 364

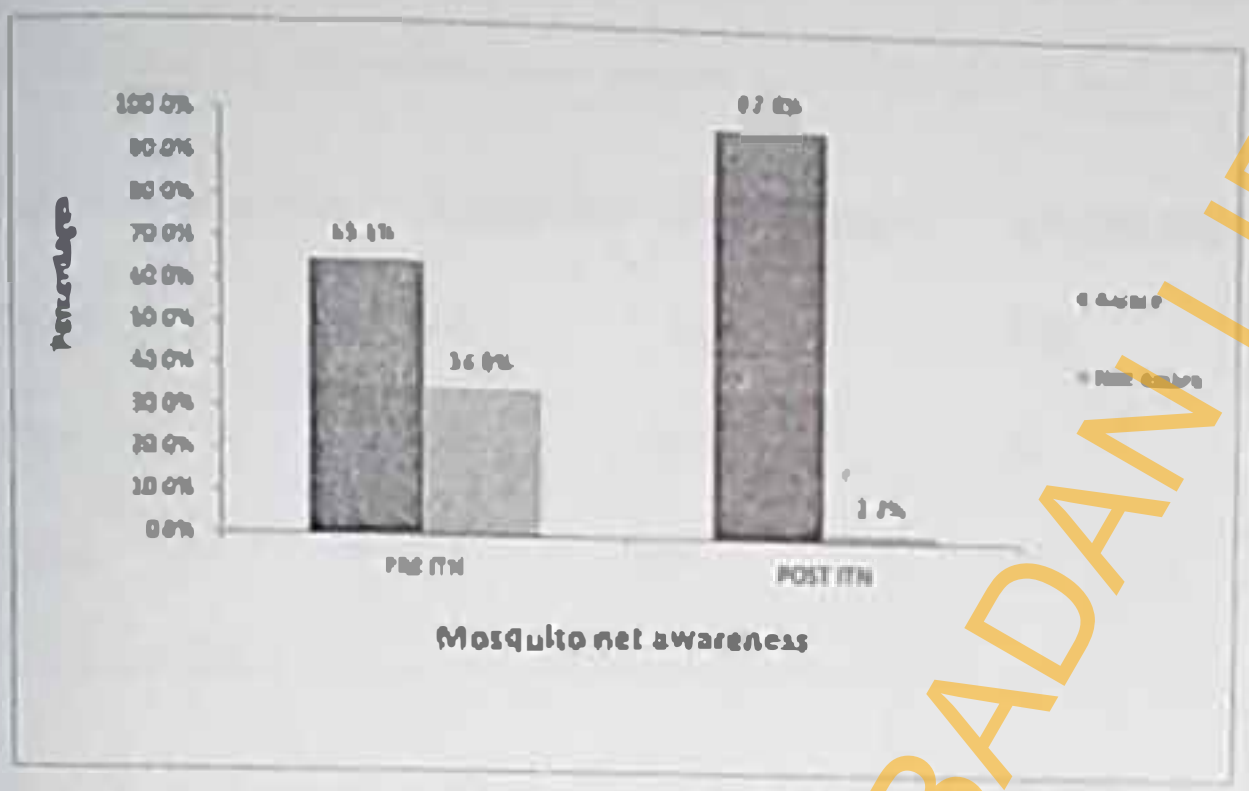


Figure 4.9. Post intervention awareness of mosquito nets

The level of awareness of mosquito nets among respondents at pre and post-intervention is summarized on Figure 4.9. Of the 364 respondents, (97.8%) were aware of ITNs while 8(2.2%) were unaware. At pre-intervention, (65.1%) respondents were aware of ITNs while (34.9%) were unaware.

All the 364 respondents had bed/mosquito nets; however, (90.7%) knew the type of net they had to be ITN, while the other (9.3%) did not know. An average of 3±1 persons slept regularly under any bed/mosquito net. Meanwhile, more persons slept regularly under ITN (3±1 persons) than under the unidentified nets (2±0 persons) collected from the same distribution points as that of the ITN (t-test=4.78, df=16.6, p<0.001)

Table 4.10. Effect of intervention on ITN knowledge of the respondents

	Pre-intervention		Post-intervention	
Knowledge status	**Frequency**	**Percentages**	**Frequency**	**Percentages**
Good	64	17.6	212	58.2
Poor	300	82.4	152	41.8
Total	364	100	364	100

Few 64 (17.6%) respondents had good knowledge of ITN prior to intervention. At post intervention, the proportion of respondents with good knowledge increased significantly to 58.2 % (X^2 =22.93, df = 1, p=0.000).

N = 330

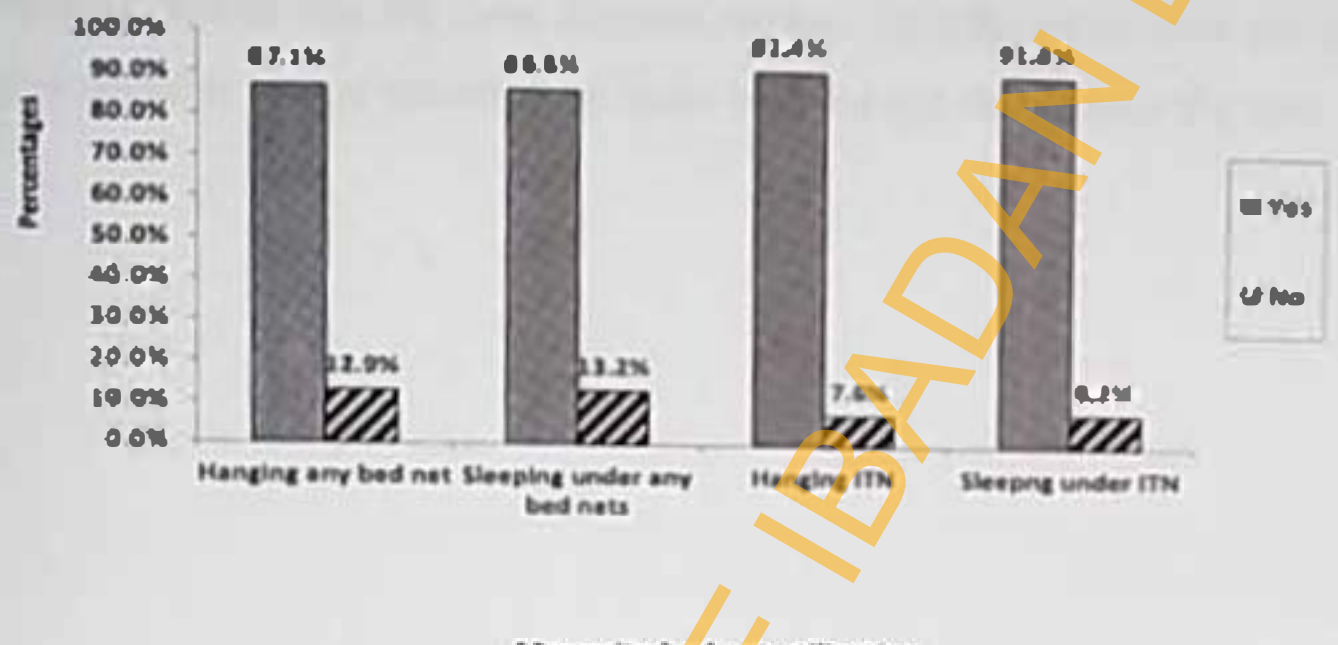


Figure 4.10. Post intervention utilisation of mosquito bednets

All the respondents had mosquito bed nets and majority reported they hung (87.1%) and slept (86.8%) under their nets regularly. In addition, out of the 330 respondents with known ITN, (92.4%) reported they hung theirs and (91.8%) respondents slept under their nets regularly (Figure 4.10).

To test the significant influence of the respoodents' knowledge of the type of nets they were using on their utilisation. Fisher exact test was used and significantly more ($p<0.001$) of the respondents that knew that they were using ITN hung and slept under their nets (91.8% and 92.4%) more than those (who did not know the type of nets they were using (35.3% and 38.2%) respectively. However, knowledge of the use of ITN had no significant association with frequency at which the respondents were sleeping under the nets ($p=0.177$).

Among the reasons stated for sleeping under the nets at post-intervention are; "protection from illness" which was the most frequent reasons (68.0%) while "Net not comfortable" was the most frequent reason specified by those who did not sleep under the nets.

N = 364

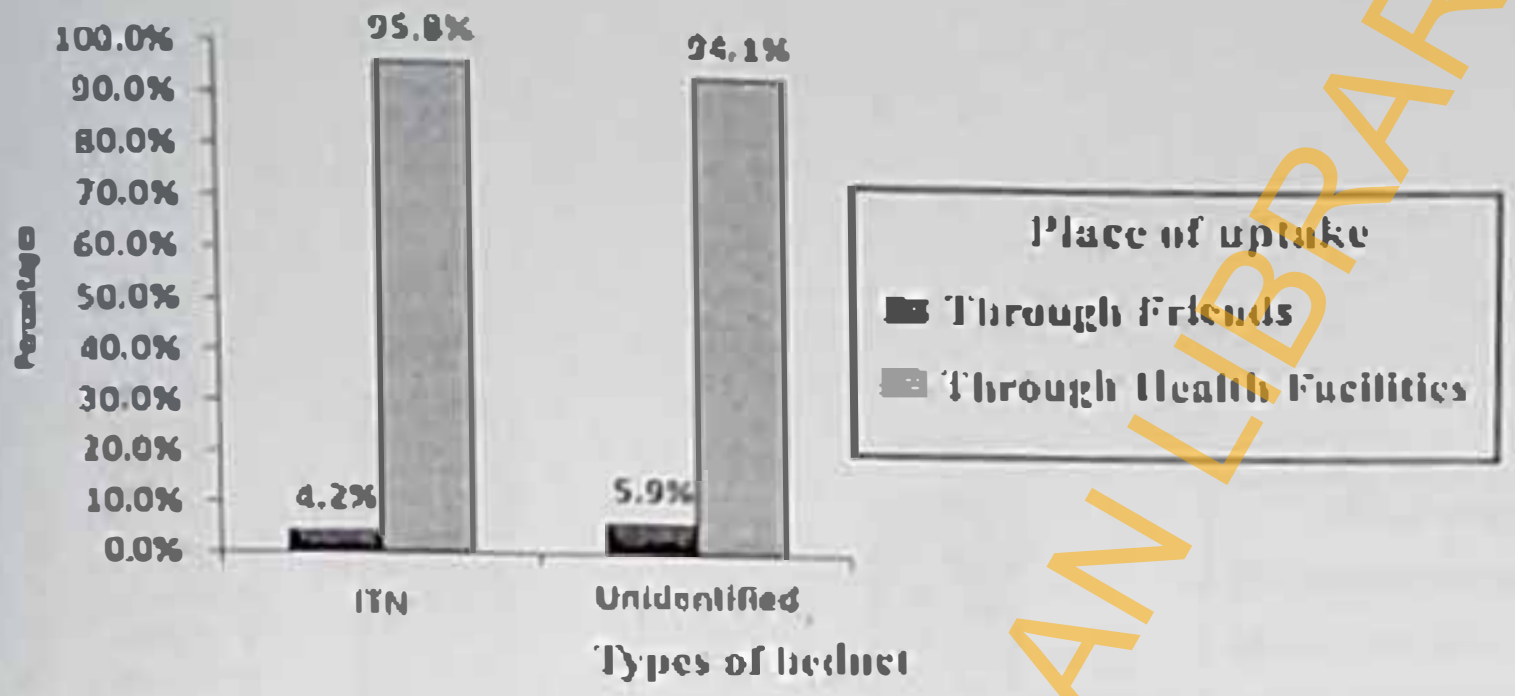
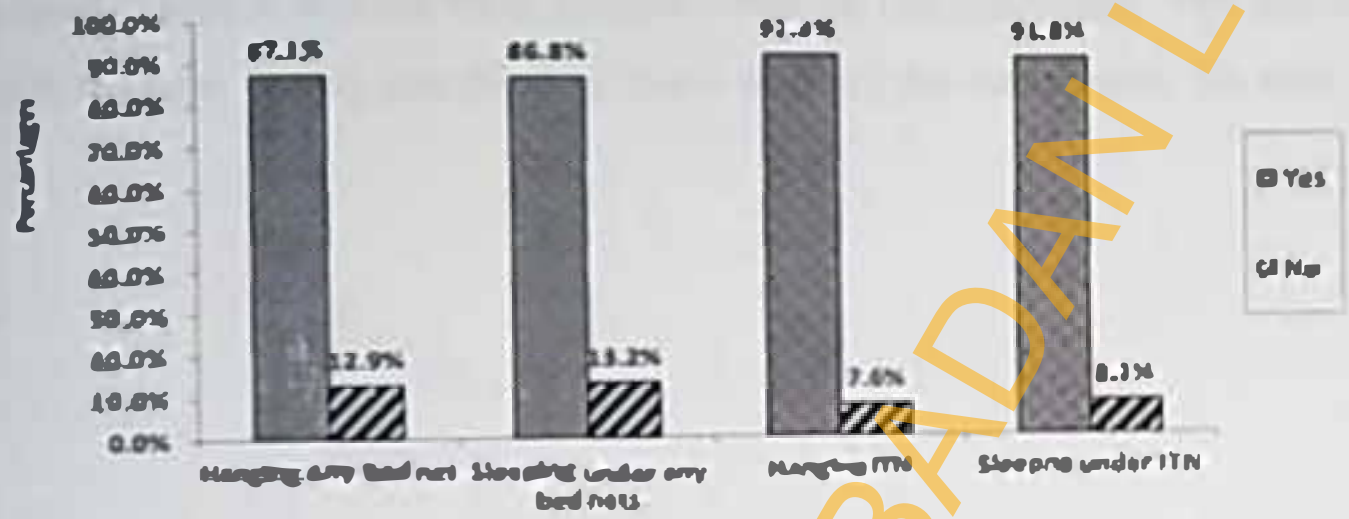


Figure 4.11. Place of uptake of mosquito net

The two types of nets (ITN and unidentified bed net) shared similar pattern with place of uptake (Fisher exact test p=0.653). Both were collected from the health facilities by majority.



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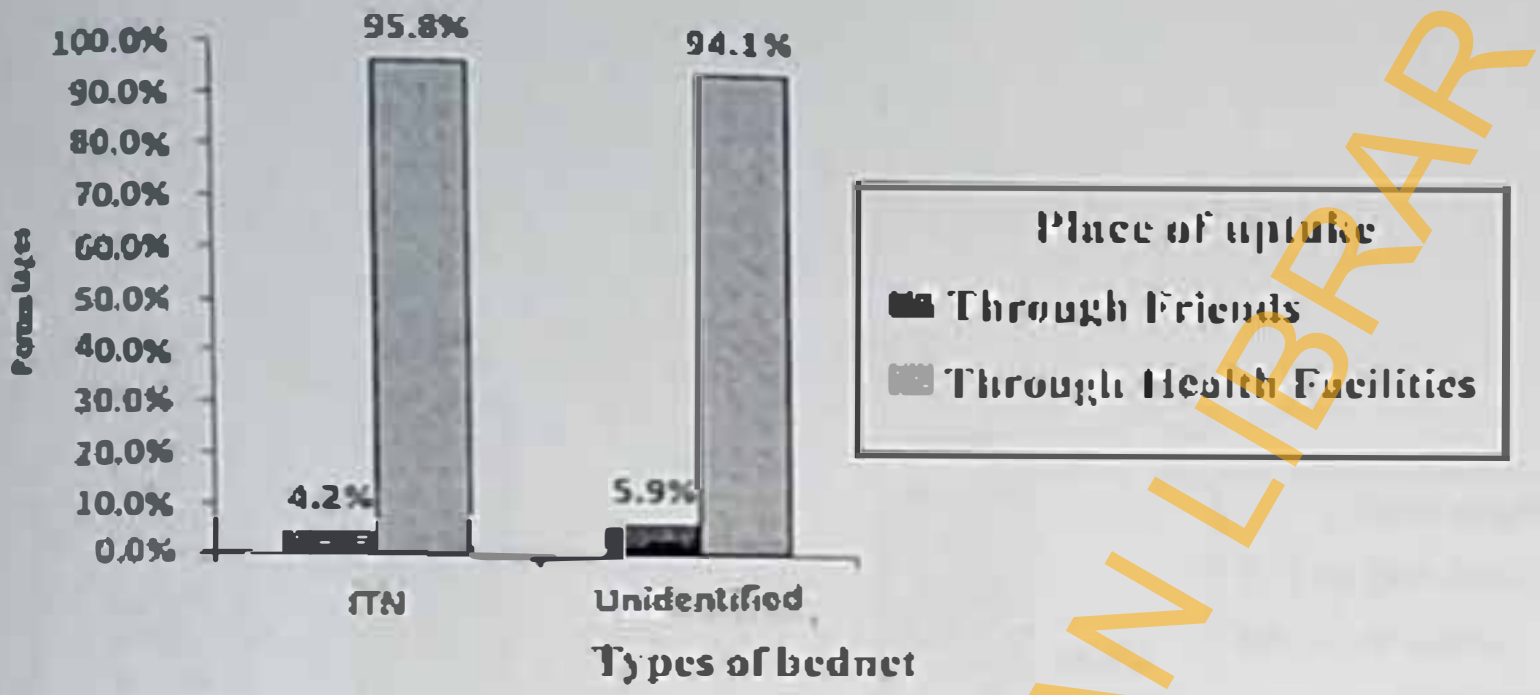

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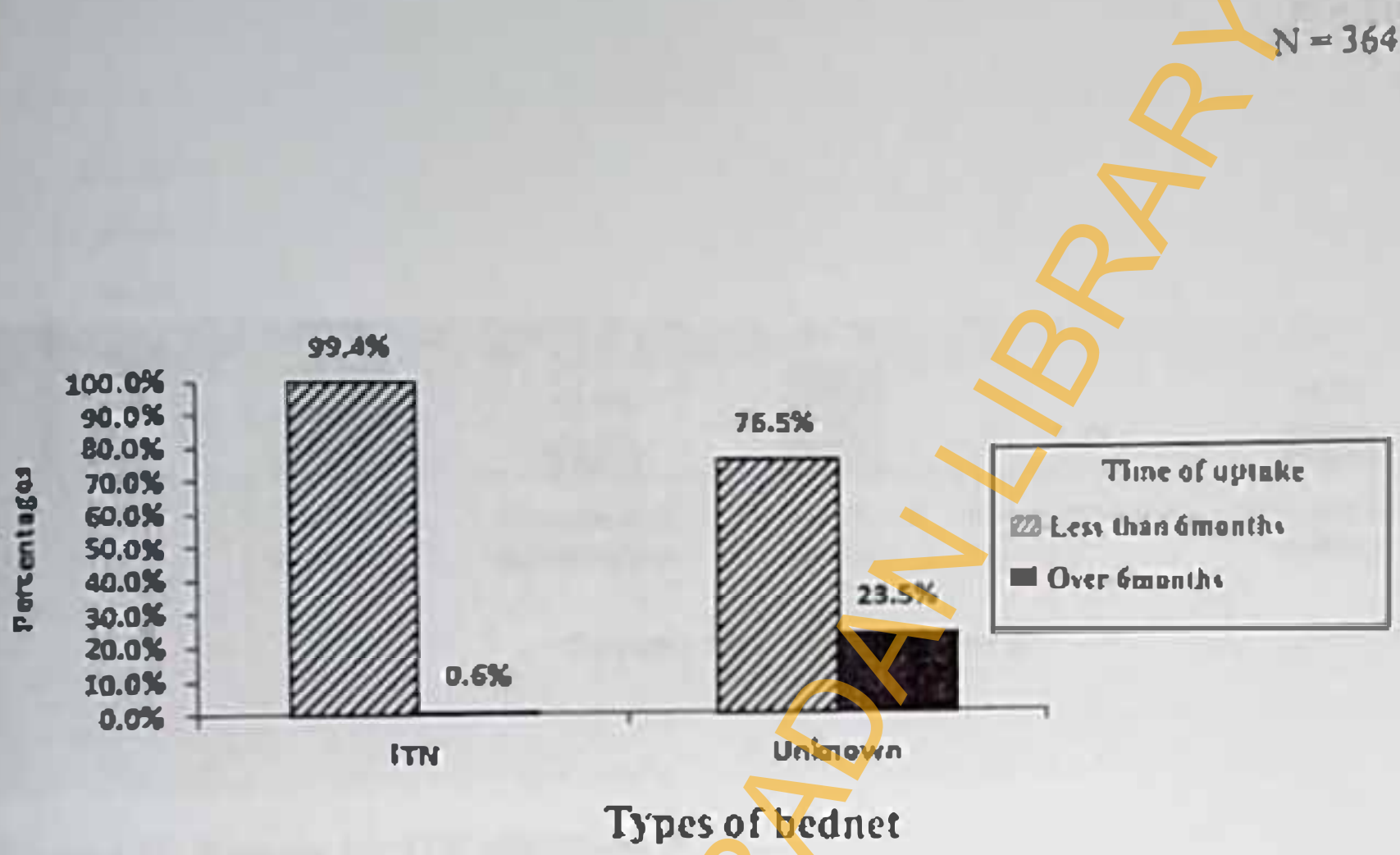

Figure 4.12. Time of Uptake of mosquito nets

Almost all of the respoodents having ITNs 328 (99.4%) recalled obtaining the nets less than 6 months before the post intervention interview, while significantly fewer numbers, 26 (76.5%) with unidentified nets obtained theirs in the same period prior to the post-intervention interview (Fisher exact test $p<0.001$).

Out of the 316 respondents who slept under the nets, 314 (99.4%) attested to the effectiveness of ITN for mosquito and malaria prevention

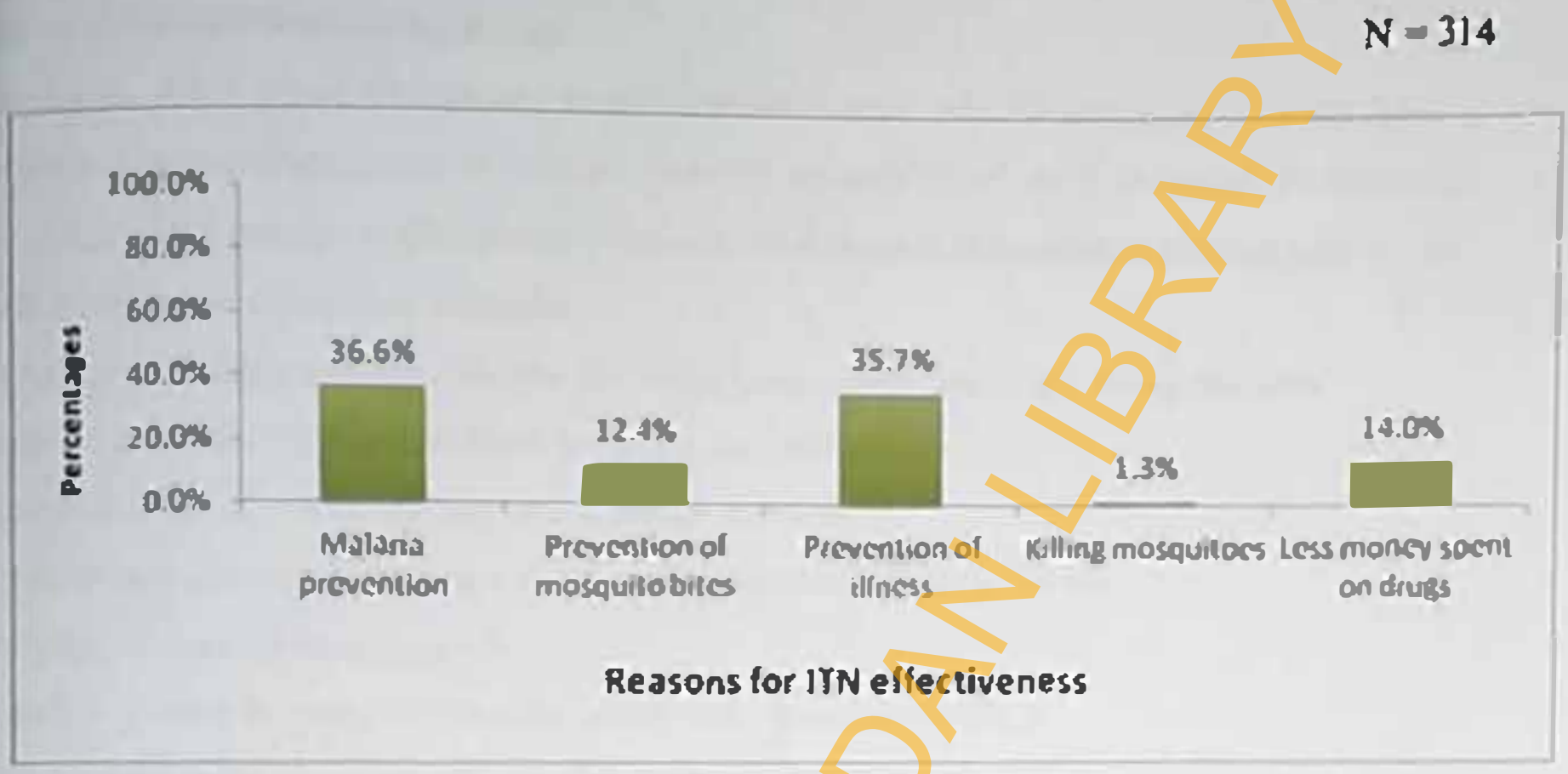

Figure 4.13. Reasons for ITN effectiveness

The reasons given for ITN effectiveness by the respondents who slept regularly under the nets include; malaria prevention (36.6%) and illness prevention (35.7%), figure 4.13.

Regular Users

Benefits derived from using the net

During the focus group discussions most pregnant women said "*It prevents mosquito bites*", while a few mentioned that it prevents having malaria "Iba" as it is called in the local language of the peolpe, it kills mosquitoes and other insects that come in contact with it, one saidit makes the room look beautiful.

What do you think are the reasons for other pregnant women not using the nets

Reasons given for pregnant women not using the net includes;

(1) Husbands don't allow usage because it causes restrictions

(2) Other insecticides are being used and therefore no need of using the net

(3) Pregnant women cannot hang net

(4) Carefree attitude by pregnant women could make them not to use it

(5) Pre-assumption by pregnant women that it doesn't work

(6) It causes heat.

Net washing

Most pregnant women mentioned that they do not wash their nets, while one said "*I washed my net after two months of usage*".

Net preference

Pregnant women preferred a family bed size with a blue colour, a family bed size with a white colour and four and half bed size with a blue colour.

Advice by pregnant women to those not using the ITN

The advices given by pregnant women to those not using includes the following, use the net so as to prevent mosquito ("*Efon*" as mostly referred to by the women) bite, to prevent malaria and also that they could spend less money on the purchase of insecticide spray. A few also adviced the women that their husbands don't allow them use to persuade their husbands to allow usage.

Steps to ensure ITN usage by pregnant women

Majority of the pregnant women said health education should be given on net use during antenatal care and collapsible nets should be provided, others mentioned that the health workers at the health centre should always check on the pregnant women at home to ensure

that they are using it and the government should do more advertisement on the radio and television on ITN use.

Other ways of preventing malaria in pregnancy

The preventing measure mentioned by most of the pregnant women were; burning of mosquito coil, use of insecticide spray, while two stated *"Burning of herbs helps to repel mosquitoes thereby preventing malaria"*

Time Net Use

All but one of the women mentioned that they slept under the net only at night, while one explicitly stated *"I use mine both day and night"*.

Decision making concerning net usage at home

Most pregnant women said their husbands made decisions on the net use while a few said they made the decisions.

Number of people in the household that sleeps under the net

Pregnant women gave different numbers according to how many slept under the net in their various house holds, this ranges between two to three.

Non Regular Users

Benefits derived from using the net

The benefits mentioned by pregnant women are as follows;

(1) It kills mosquitoes

(2) It prevents mosquito bites

(3) Less money is spent on insecticide spray

(4) It prevents one from having malaria

Reasons for not using nets regularly

Pregnant women did not use their nets regularly because of the following reasons;

(1) It causes heat

(2) It causes peppery sensation on face and eyes

(3) Tiredness, having to hang the net every night before sleeping under it

(4) Forgetfulness

(5) The children will damage

(6) The room was small and tight

What do you think are the Reasons for other pregnant women not using the nets

Majority of respondents said people are not using the bed net because it causes heat, husband does not allow, while a few mentioned that other forms of insecticides are being used, causes peppery sensation in the eyes and that it makes the room untidy.

Net washing

Half of the respondents mentioned that they had washed their nets once within the first three months of use while the other half said theyhad not washed theirs.

Net preference

The size and colour preferred are; a family bed size and a blue colour, and a family bed size with a white colour.

Advice by pregnant women to those not using the ITN

Most pregnant women mentioned that they should start using so as to prevent mosquito bites, they should use so as to spend less money on malaria treatment, a few said they should use so as to prevent falling ill with malaria and less money would be spent on the purchase of insecticides.

Time of Net Use

Pregnant women use their bed nets three to four times in a week at night, twice a week at night, once a week at night, and twice o week both day and night.

Decision making on net usage at home

Most pregnant women said they made decision on the net use at home, while a few said their husbands made decision on the net use.

Perception about the net use

Pregnant women perceived that the net kills mosquitoes, prevents mosquito bites, prevents malaria, and kills kills all insects that comes close to it

Number of people that sleep under the Net

The number of people that slept under the nets in various households mages between one and four.

Steps to ensure ITN usage by pregnant women

Suggestions given to ensure usage of ITN by pregnant women includes that health workers should counsel pregnant women during antenatal care services, there should be a constant house monitoring by health workers, there should be more advertisements on radio and

television concerning the use and importance, a penalty should be placed on those not using and it should be given to every pregnant woman free.

Non Users

What discourages you from using the ITN?

When pregnant women were asked about what discourages them from using the net, they gave responses such as;

- The rooms were small
- it causes heat,
- Husband does not allow usage
- Makes the room untidy
- The net is uncomfortable
- The use of insecticide spray

What will encourage you to use the ITN?

Reasons that would encourage non-users to start using the net includes; if their husbands allow them to, by getting a different shape and collapsible other than the rectangular shape, when the weather is cold, when she does not use insecticide spray and moving to a bigger apartment will encourage use.

What is your perception of the net, despite the fact that you are not using it?

Similar statements were given by all the respondents. An example: *"The net can prevent mosquito bites"*.

If you were using the net, what colour and size would you preferred?

Majority mentioned that they would prefer family bed size with a blue colour, while a few said they would prefer a family bed size with a white colour

What do you want to do with the net now?

They all mentioned that they were going to keep it for future use.

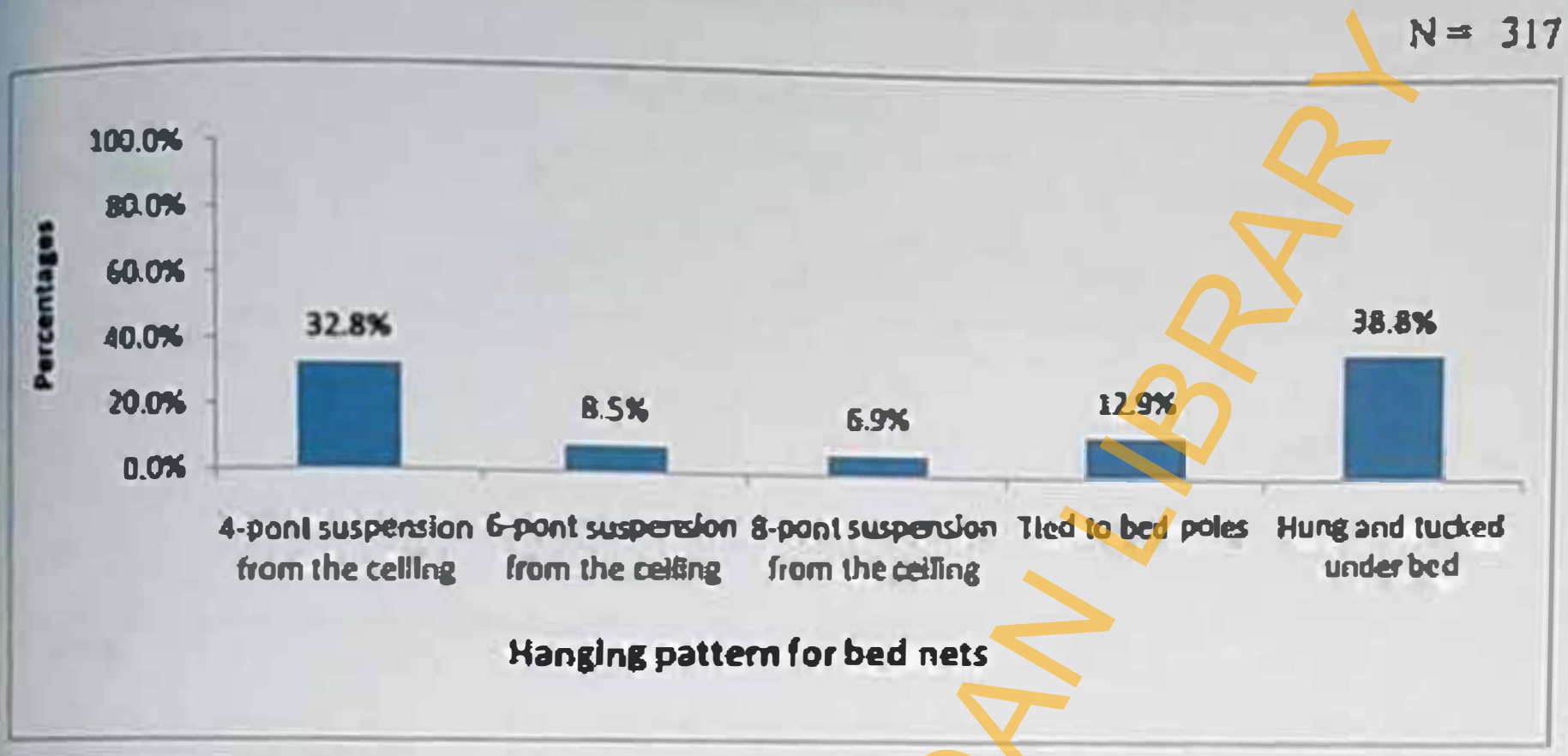

Figure 4.14. Hanging pattern for the bed nets

A total of 317 respondents mentioned that they hung their nets, out of which those who hung theirs and tucked under the mattress were (38.8%) and those suspending theirs from the ceiling at four points were (32.8%).

The use of mosquito nets among the respondents based on net hanging and sleeping under the nets before and after intervention is shown in Table 4.11. The McNemar chi-square test for paired observation shows that there was significant improvement in net utilization after intervention as more respondents hung and slept under their nets after the intervention ($p<0.001$).

Table 4.11. The use of mosquito nets (Hanging and Sleeping) pre and post intervention

Pre-intervention	Post intervention			
	Yes	No		McNemar p value
	n (%)	n (%)	Total	
Net hanging				
Yes	10	1	11	<0.001
No	307	46	353	
Total	**317**	**47**	**364**	
Sleeping under the net				
Yes	10	1	11	<0.001
No	306	47	353	
Total	**316**	**48**	**364**	

43.1.1. FACTORS INFLUENCING MALARIA PREVENTION PRACTICES, POST- INTERVENTION

Table 4.12 shows the factors that significantly predict hanging of mosquito net after distributing bed nets. Respondents with good pre-intervention knowledge of mosquito repellent and good post-intervention knowledge of ITN were respectively about four (OR: 3.83, 95%CI: 1.05-14.01) and two (OR: 2.25, 95%CI: 1.12-4.51) times more likely to hang their mosquito nets than those with poor knowledge of these two items.

Table 4.12. Logistic regression table for post-intervention hanging of mosquito nets

	B	S.E.	p value	odds ratio	95.0% C.I.for odds ratio	
					Lower	Upper
Household size	-0.029	0.204	0.888	0.972	0.651	1.449
Pre intervention knowledge of mosquito repellent	1.344	0.661	0.042	3.833	1.049	14.009*
Post intervention Knowledge of ITN	0.811	0.355	0.023	2.249	1.121	4.513*
Constant	-4.578	1.035	0.000	0.010		

The significant determinants of sleeping under mosquito nets at post-intervention are contained in the logistic analysis shown in Table 4.13. Respondents with good pre-intervention knowledge of mosquito repellent and good post-intervention knowledge of ITN were found to be about four (OR: 3.94) and three (OR: 2.68) times more likely to sleep under mosquito nets respectively.

Table 4.13. Logistic regression model for post-intervention sleeping under mosquito nets

	B	S.E.	p value	odds ratio	95.0% C.I. for odds ratio	
					Lower	Upper
Household size	-0.189	0.206	0.360	0.828	0.553	1.240
Knowledge of mosquito repellent	1.370	0.669	0.041	3.936	1.060	14.612*
Post intervention Knowledge of ITN	0.985	0.364	0.007	2.677	1.312	5.462*
Constant	-4.443	1.045	0.000	0.012		

CHAPTER FIVE

DISCUSSION

This study was carried out to assess the influence of health education on the uptake and use of insecticide treated net among pregnant women attending primary health care centres in Akinyele Local Government Area, Oyo State, Nigeria. The findings are discussed in line with the objectives of the study.

5.1. Socio-demographic Characteristics of Respondents

The highest educational qualification was mainly secondary school (58.8%) while a few (5.2%) didn't go to school at all which could be a reflection of the literacy level in the area. Most of the respondents (44.8%) occupation was business/trading. Pregnant women cut across various ethnic groups Yoruba, Igbo, Hausa and other groups. The mean week of pregnancy at first ANC visit was 15.7 ± 5.7 weeks which corroborates with findings by Akinleye, Falade, and Ajayi (2009), also by Eijk, Bles, Odhiambo., et al., (2006) in their study carried out on use of antenatal services and delivery care among women in rural western Kenya, indicating that the respondents did not start ANC early.

5.2. Knowledge of Malaria and its prevention in pregnancy

A high percentage of respondents (68.0%) had good knowledge of malaria at pre and post intervention. The findings in this study corroborates that of Mubyazi, Bloch, Kamugisha et al. (2005) in a qualitative study on Intermittent preventive treatment of malaria during pregnancy carried out in in Korogwe District, North-Eastern Tanzania whereby the general level of knowledge about malaria was high among the participants. Many of the respondents in this study had poor knowledge of malaria prevention methods especially ITN which is similar to the study carried out by (Akinleye, Falade, and Ajayi, 2009, Sabin, Rizal, Brooks, 2010) that showed pregnant women had poor knowledge of malaria prevenuon practices, unlike what was reported in northern Ethiopia where knowledge about preventive measures of malaria among pregnant women was good (Belay and Deressa, 2008), this may be as a

result their literacy level. However this study has improved upon a study carried out by Abiniye, Falade, and Ajayi, 2009 on knowledge and utilisation of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria, by looking beyond IPTp into other preventive measures practiced by pregnant women and also creating an intervention by free distribution of ITN and health education.

In this study, pregnant women had good knowledge of the effects of malaria in pregnancy such as low birth weight, abortion, anaemia and stillbirth, but very few were able to identify placental parasitemia as an effect and this corrobotes a study carried out by James, Kitara, and Orach, 2011, in Northen Uganda on knowledge and misconceptions about malaria among ~~pregnant~~ women in Gulu district. Respondents also had a good knowledge of the factors that encouages malaria transmission such as dirty environments, bushes around the house and poodle water which is similar to a study carried out by Belay and Deressa, 2008 on the use of insecticide treated net by pregnant women and associated factors in a ~~predominantly~~ rural population in northern Ethiopia.

5.3. Malaria Prevention Practices

This study showed that all the pregnant women were willing to obtain an ITN for use, this is similar to a study by (Claudia, Manuela and Mamadou, 2008) which stated that Free ITN distribution through ANC services to pregnant women was highly appreciated as all willingly obtained it from nurses at the ANC clinic. Majority of pregnant women attending ANC used chemoprophylaxis and/or anti-vector measures such as window screens, insecticide sprays, mosquito coils, untreated bednets and ITNs for prevention of malaria during pregnancy with a large proportion combining both methods. However ITN use in the pre-intervention phase among the pregnant women was low (3.6%).This finding is consistent with other reports from rural southwest Nigeria carried out by Yusuf, DadaAdegbola, Ajayi et al., (2008) on malaria prevention practices among mothers delivering in an urban hospital in southwest Nigeria, and Salaudeen, Jimoh, Musa. (2009) on awareness and use of insecticide treated net among women attending antenatal clinic in a northern state of Nigeria. The type of ITN commonly available among the respondents were the long lasting ITN this is unlike the study carried out by Matovu, Goodman, Wiseman et al. (2009) on how equitable is bednet

ownership and utilization in Tanzania which reported a high number of untreated nets in use. Majority (91%) shared the same opinion that ITN was effective. The unanimous reason for admitting that the nets were effective is that the nets prevent mosquito bites, which is consistent with a report by WHO in position statement on ITNs, WHO Global Malaria Programme. The WHO expects 80% of all pregnant women living in areas of high transmission to receive IPTp during pregnancy by 2010 (WHO, 2005).

The predominantly used chemopropbylic antimalarial drug by respondents was Sulphadoxine/pyrimethamine (83.4%), this is similar to the study done by Busari (2009) on prevalence and preventive practice of malaria among pregnant women attending antenatal clinic in Nigeria Navy reference Hospital, Lagos State. More respondents 60.7% took their drugs at home than at the clinics which is consistent with a study carried out by Akinleye, 2007, on Intermittent preventive treatment use among pregnant women attending antenatal clinics of primary health care centers which reported that the compliance with the recommendation that IPT drug be given by DOT was very low with, only 36.8% of the respondents who received IPT drug used it in the clinic,and also in a study study carried out by Donath, 2007. This could be an indication that there was no close supervision by the health workers to make sure that pregnant women took their drugs in their presence, and this could lead to respondents throwing their drugs away instead of taking it which makes compliance uncertain aod undermines the essence of IPTp (Akinleye, Folade, and Ajayi, 2009). The observation that pregnant women occasionally throw away their SP tablets after leaving the ANC clinics justifies the need for measures to improve the implementation of the DOT approach for IPTp (Mubyazi, Bloch, Kamugisha, 2005).

5.4. Effect of Health Education and free ITN distribution on use by pregnant women

In line with the Global Malaria Strategy and with the substantial increase in funding support for malaria prevention and control programmes, countries across sub-Saharan Africa are dramatically increasing their ITN coverage. However, ITN ownership will have little impact on the burden of malaria unless people sleep under them (WHO 2005). Many large-scale programmes have encountered challenges in ITN acceptance, and consistent use. Although an increasing number of studies have documented ITN ownership, including in Nigeria, few

ownership and utilization in Tanzania which reported a high number of untreated nets in use. Majority (91%) shared the same opinion that ITN was effective. The unanimous reason for admitting that the nets were effective is that the nets prevent mosquito bites, which is consistent with a report by WHO in position statement on ITNs, WHO Global Malaria Programme. The WHO expects 80% of all pregnant women living in areas of high transmission to receive IPTp during pregnancy by 2010 (WHO, 2005).

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studies have systematically investigated ITN use (Belay and Deressa, 2008). ITN ownership at the pre-intervention phase by pregnant women in this study was low 3.6%. However, all the respondents expressed willingness to own ITN. The main factor for ITN uptake and acceptability identified by this study was its ability to prevent mosquito bites and malaria. ITN were described as being used primarily because respondents perceived malaria as a significant threat to their health or their families which corrobotes findings of a qualitative study carried out by Atkinson, Bobogare, Fitzgerald et al. (2009) on the acceptability and preference of three types of long-lasting insecticide-treated bed net.

At pre-intervention pregnant women's use of malaria preventive measures showed that they favored the use of door and window nets, keeping their environment clean, mosquito coils and use of insecticide sprays above the use of insecticide treated nets which corrobotes a study carried out by Aina and Ayeni (2011) on knowledge and use of insecticide treated nets as a malaria preventive tool among pregnant women. However, the free distribution of ITNs to pregnant women accompanied by health education in this study improved ITN household ownership. Almost all the respondents having ITN (99.4%) recalled obtaining the nets less than 6 months before the post intervention interview. The finding that ITNs less than six months old were used than those over a year old is logical in that new ITNs were distributed to the pregnant women who were willing to own one in this study.

At follow up where a total of 142 respondents were observed to assess ITN utilization, half of the respondents at 1st visit were hanging the nets; however proportion of those who hung their nets reduced to 45.8% at the 2nd visit. The reasons for the percentage drop for not hanging the nets were associated with: feeling hot under the net and the fear that the nets would be damaged by children, which corroborate findings of the focus group discussions carried out in this study. In the FGD sessions, it was emphasized that the net caused heat. Other reasons included use of other forms of prevention methods such as insecticides and not being able to hang nets. Unlike the net hanging, (4.2%) of pregnant women were found sleeping under the net at 1st visit and, at the second visit it increased to (22.5%). This is to say that the effect of health education and freely distributed ITN had just a little impact on usage, as majority were not using it. The results of this study are comparable to several surveys in

Nigeria and other countries in Africa, which showed similarities to a study in Botswana where by only 3.8% of pregnant women used freely distributed Insecticide Treated Net (ITN) to protect themselves from Malaria (UNICEF, 2012). In Tanzania, based on the Tanzania HIV and Malaria Indicator Survey, it was reported that only 26% of pregnant women were sleeping under ITNs on the Mainland (USAID, 2011). Amoran, Lawal, Jemilusi et al., 2012 stated that majority of the pregnant women were not using ITN regularly despite a lot of emphasis being placed on its use and free distribution to pregnant women at health care centers in a study on determinants of Uptake of Insecticide Treated Nets among Pregnant Women. In a study on Awareness and use of Insecticide Treated Nets among women attending ante-natal clinic in a Northern state of Nigeria, Salaudeen, Jimoh, and Musa, 2009 reported that utilization of ITN among pregnant women and their household members is still low despite Government policy of free ITN for vulnerable groups.

Among pregnant women who used ITN in this study, senior civil servants were more likely to use which is unlike a survey carried out in Libera by Brieger, 2010 which reported that among pregnant women in houses with nets more women without education used them, but similar to that of Senegal which reported that it was women with secondary or higher education who were more likely to use nets.

In the FGD sessions, participants knew that ITN is a useful preventive measure against malaria, and that pregnant women were supposed to sleep under nets since they are one of the most vulnerable groups. However some pregnant women mentioned that their husbands did not allow them to use the net which corroborates the findings of Mbonye, Stella, and Pascal, 2006 in a study on preventing malaria in pregnancy: a study of perceptions and policy implications in Mukono district, Uganda. The study showed that there is the perception that men do not care for the health of their spouses and do not prioritize health issues

5.5. Effect of Health Education on the Knowledge of ITN

In this study health education had a positive effect on respondents as knowledge increased from 17.6% prior to intervention to 58.2 % at post intervention. This corresponds to the study carried out by (Envuladu, Banwat, Lar et al., 2012) on effect of community based intervention on awareness and utilization of the long lasting insecticidal which reported that

the knowledge of ITN increased as a result of health education given to pregnant women, this is vital to the achievement of the malaria control in the country.

5.6. Conclusion

From the findings of this study it was concluded that the freely distributed ITN intervention improved usage among pregnant women attending primary health centers in Akinyele Local Government Area, Oyo State from the 3.6% at baseline to 22.5% at follow up. The improved access by providing information of where it is available is an impetus to owning a net in this study. It is therefore not surprising that all the respondents had mosquito bed nets and majority reported they hung (87.1%) and slept (86.8%) under their nets regularly at post-intervention; this suggest that the health education provided was effective. Knowledge of ITN by the respondents prior to intervention was poor, but this increased significantly after intervention as impact of the health education provided. Factors that were found to influence the use of ITN included; net kills mosquitoes, prevents mosquito bites, prevents malaria, kills all insects that comes close to it and less money spent on drugs. This together with the perception that the ITN was effective in malaria prevention serves as a point to build upon in scaling up use of ITN.

All the respondents were willing to own an ITN however the barriers to the use from this study include, rooms being small, net causes heat, husbands does not allow usage, makes the room untidy, net causes restrictions and using of other forms of malaria prevention practices such as the use of insecticide spray, burning of mosquito coils, repellants, window/door nets and environmental sanitation. This is similar to a study carried out by Salaudeen and Jimoh, 2009 in Northern Nigeria on Awareness and use of Insecticide Treated Nets among women attending ante-natal clinic. Insecticide treated net provides personal protection for pregnant women and their unborn babies and also reduces the intensity of malaria transmission

Prevention against malaria in pregnancy is a sure safeguard against maternal morbidity and mortality and should be encouraged. Although, the discomfort associated with the use of ITN during pregnancy and combined protection could affect compliance, this could be overcomed by continuing health education and improved technology to design a more comfortable bednet. In addition, heightened attention by policy makers and increased availability of resources for malaria prevention and control from a variety of sectors, more pregnant women

and their babies will be sleeping under ITNs, and the number of mothers receiving effective prevention from malaria will increase.

Although the level of use of insecticide bed nets is low, many pregnant women believe that the bed nets are effective, creating an easy focal point for the promotion of usage of the nets. Some pregnant women who participated in the FGD were also able to identify other methods of control besides the use of insecticide treated materials such as burning of herbs. This corroborates findings of a study by Tongo, Orimadegun and Akinyinka (2011) on utilisation of malaria preventive measures during pregnancy and birth outcomes in Ibadan, Nigeria which reported the use of traditional herbal medications solely or in combination with ITN for malaria preveotion by pregnant women.

5.7. Recommendations

1) There should be increase in public awareness of ITN usage through advertisements on the television, radio, posters in all health facilities in the Local Government Area.
2) There should be an appropriate Information Education Communication package to; sensitise on the benefit of ITN use in the prevention of malaria and demystify the negative opinion on the design of the net while effort is being made to improve the technology to address concerns on use such as heat and space to enhance the use further.
3) There should be provision of free or highly subsidized ITNs through health centres coupled with health education, to ensure that pregnant women develop the knowledge, attitudes and skills necessary to sleep under ITNs and reduce their malaria risk.
4) Production and mass distribution of collapsible ITNs accompanied with education for behaviour change may improve compliance with their use.
5) Education will need to be tailored to engage men in participating in malaria prevention activities because men are in most cases the household heads and takes most decisions that concern the family.

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APPENDIX I

INFLUENCE OF HEALTH EDUCATION ON UPTAKE AND USE OF FREELY DISTRIBUTED INSECTICIDE TREATED NETS AMONG PREGNANT WOMEN IN AKINYELE LOCAL GOVERNMENT AREA, NIGERIA

Dear respondents,

This is a health survey questionnaire to study malaria prevention practices among pregnant women. All information would be treated confidentially. I wish to kindly request your voluntary participation. Please kindly ensure that you answer all questions honestly and correctly as this would increase the quality of the findings.

Thanks for your cooperation

Date .....

A. SOCIO-DEMOGRAPHIC DATA

1. Serial no:.....

2. Age:.....

3. Education: (1) None ☐ (2) Primary ☐ (3) Secondary ☐ (4) Tertiary ☐

4. Occupation: (1) senior civil servant ☐ (2) junior civil servant ☐

(3) Business/Trading ☐ (4) Petty Trading ☐ (5) Housewife ☐

5. No of pregnancies had, other than index pregnancy

(1) 0 – 1 ☐ (2) 2 -3 ☐ (3) 4 – 5 ☐ (4) 6 and above ☐

6. Ethnic group: (1) Yoruba ☐ (2) Igbo ☐ (3) Hausa ☐

(4) Other specify .....

7. How many people are in your household? (1) 0 – 1 ☐ (2) 2 -3 ☐ (3) 4 – 5 ☐

(4) 6 and above ☐

B. ANTENATAL CARE DURING PREGNANCY

8 Are you attending ANC clinic for this pregnancy?

(1) Yes ☐ (2) No ☐

9 If No, why? (1) Long distance ☐ (2) No transport fare ☐ (3) Services Expensive ☐

(4) Waiting time ☐

(5) Others (please specify).....

10. If yes to question 7 how old (week) was this pregnancy when you first registered in the Clinic? .....

11. What is your present gestational age?.....

12. What type of services were you provided at the ANC Clinic?

(1)IPTp ☐ (2) Vaccination ☐ (3)Bed nets ☐ (4) Counseling ☐

13. Were you satisfied with the services?

Services	(1)Yes	(2) No
IPTp		
Vaccination		
Bed nets		
Counseling		

14. If No, why not .....

15. Are you taking any specific actions to prevent malaria? (1) Yes ☐ (2) No ☐

16. Any health education talks in the clinic on malaria? (1)Yes ☐ (2) No ☐

C. KNOWLEDGE, ATTITUDE AND PRACTICE OF PREGNANT WOMEN TOWARDS MALARIA IN PREGNANCY.

KNOWLEDGE OF MALARIA:

17. How is malaria transmitted? (1) Mosquito bites☐ (2) Houseflies (3) Termites☐

(4) Cockroaches☐ (5) Others, please specify.....

18.

Effects	(1)Agree	(2)Disagree	(3)Strongly Disagree	(4)Don't know
Malaria affects all age groups?				
Pregnant women do not have malaria?				

19. Effects of malaria in pregnancy include;

Effects	(1)Agree	(2)Disagree	(3)Strongly Disagree	(4)Don't know
Malaria Anemia				
Placental parasitemia				
Stillbirth				
Low birth weight of baby				
Abortion				
Tuberculosis				
HIV				

20 What are the factors that encourages malaria transmission

Factors	(1)Agree	(2)Disagree	(3)Strongly disagree	(4)Don't now
Dirty environment				
Clean houses				
Bushes around the house				
Poodle water				

21 Mention any 2 danger signs /symptoms of severe malaria?

i.....

ii.....

22. What are the activities/methods that can be used to prevent malaria in pregnancy?

Do not prompt; you may tick more than one option

Methods	(1)Yes	(2) No
Insecticide Treated Nets		
Intermittent Preventive Therapy		
Window/Door Screens		
Aerosol		
Mosquito Coil		

Others (please specify).....

KNOWLEDGE OF PREVENTIVE MEASURES.

INSECTICIDE TREATED NET (ITN)

23. What are the types of mosquito bed nets you are aware of?

(1) Insecticide treated net ☐ (2) Untreated net ☐

(3) Others (please specify) .....

24. Who benefits from ITN? (1) Father ☐ (2) Mother ☐ (3) Children ☐

(4) Everybody ☐

25. Who are the most important people that must have ITN?

(1) Under-5 Children ☐ (2) Pregnant Women ☐ (3)Father ☐

Others (please specify).....

26. During what hours is ITN use most appropriate?

(1) 7pm – 7am ☐ (2)8am – 12noon ☐ (3) 1pm – 6pm ☐ (4) Don't know ☐

27. What are the types of ITN that you know?

(1)Long lasting ☐ (2) Short-acting ☐ (3) Re-treated ☐

INTERMITTENT PREVENTIVE THERAPY (IPT)

28. Have you ever heard of intermittent preventive treatment of malaria in pregnancy?

(1)Yes ☐ (2) No ☐

29. If yes, what is IPT?.....

30. What drug is recommended for IPT use?

Drug	(1)Agree	(2)Disagree	(3)Don't know
Chloroquine			
Fansidar			
Phensic			
Amular			

31. How many times during pregnancy is this drug used? (1)Once ☐ (2)Twice ☐ (3)Thrice ☐ (4) Four times and above ☐

INSECTICIDE METHOD

32. In what ways can insecticides be used in the prevention of mosquito bites?

Ways	(1) Agree	(2)Disagree	(3)Strongly disagree	(4)Don't know
Spraying				
Washing of the walls with it				
Treating materials				
Taking our bath with it				

33. What are the types of insecticides you know? (1) short-acting ☐ (2) long-lasting ☐

(3) Don't know ☐ (4) Others (please specify) .....

34. Are all insecticide sprays irritable? (1) Agree ☐ (2) disagree ☐

(3) Strongly disagree ☐ (4) Don't know ☐

BURNING COIL

35. Does burning of coil prevent mosquito bites? (1) Agree ☐ (2) disagree ☐

(3) Strongly disagree ☐ (4) don't know ☐

36. Mosquito coils are to be put on during sleep? (1) Agree ☐ (2) disagree ☐

(3) Strongly disagree ☐ (4) Don't know ☐

37. These are the likely effects of not using effectively?

Effects	(1) Agree	(2)Disagree	(3)Strongly disagree	(4)Don't know
Inhalation				
Cancer				
Choking				
Good sleeping				

WINDOW/DOOR SCREEN

38. What are the types of window/door screens you know about? (*You may tick more than one option*)

(1) Curtain ☐ (2) steel ☐ (3) Nets ☐

(4) Others (please specify) .....

39. Curtains could be treated with insecticides and used as screens? (1) Agree ☐

(2) Disagree ☐ (3) Strongly disagree ☐ (4) Don't know ☐

MOSQUITO REPELLENT

40. Have you ever heard of mosquito repellent? (1) Yes ☐ (2) No ☐

41. If yes, what are they? .....

42. The following can be used as repellents

Repellent	(1) Agree	(2)Disagree	(3)Strongly disagree	(4)Don't know
Lotion				
Burning of leaves/herbs				
Treated materials e.g mats				
chemoprpphylaxis				

D. MALARIA PREVENTION PRACTICES

43 Are you currently taking any preventive measures against malaria?

(1)Yes ☐ (2) No ☐

44. If yes, tick the one you are using currently from the list below (multiple questions)

Preventive measures	(1)Yes	(2)No
Bed nets		
Insecticide treated net		
Insecticide spray		
Repellents, such as body cream, burning of herbs		
Mosquito coil		
Window/Door screens		
Environmental sanitation. such as clearing of bush, stagnant water		
chemoprophylaxis		

Others (please specify).....

INSECTICIDE TREATED NET (ITN)

If ITN is not used skip to question 63

45. Do you have a bed net? (1)Yes ☐ (2) No ☐

If No. skip to question 45

46. If yes, what type of bed net do you have? (1) ITN ☐

(2) Untreated net ☐ (3) Retreated ☐ (4) Don't know ☐

47. If ITN, when last did you treat the bed nets?

(1)Less than six months ☐ (2) More than six months ☐ (3) Never treated ☐

(4) I use long-lasting insecticide net ☐

48. Is the net hanging? (1) Yes ☐ (2) No ☐

SLEEPING UNDER THE NET

49. Do you sleep under the net at all? (1)Yes ☐ (2) No ☐

How often do you sleep under the net		Tick
Weekly		
3 - 4 times in a week		
Twice in a week		
Daily	Day only	
	Night only	
	Day & night	

50. If yes to question 49, what encourages you to sleep under the net?

(1) Protection from illness including malaria ☐

(2) Protection from mosquitoes and other insects ☐ (3) Less money is spent on drugs ☐

(4) Others (please specify).....

51. If no to question 49, what discourage you from sleeping under the net?

(1) Net is uncomfortable (hot, lacks ventilation, makes you feel restricted) ☐

(2) Not having enough money/Expensive ☐

(3) Others (please specify).....

52. Where did you obtain the net? (1) Given by a friend ☐

(2) Given at the health facility ☐ (3) Purchased ☐

(4) Others (please specify).....

53. If purchased, from where? (1) Patent medicine vendor (PMV) ☐

(2) Pharmacy store ☐ (3) Market ☐

(4) Others (please specify).....

54. When was the net obtained/purchased?

(1) Less than six months ☐ (2) Over six months ☐

(4) Others (please specify).....

55. If purchased how much? (1) Less than N500 ☐ (2) N500-999 ☐

(3) N1000 and above ☐

56. Is the cost affordable? (1) Yes ☐ (2) No ☐

57. If No, how much would you like to pay? (1) < N200 ☐ (2) N200 – 499 ☐

(3) N500 – 1000 ☐ (3) >N1000 ☐ (4) Nothing ☐

58. If you have being sleeping under the net do you think it's effective?

(1) Yes ☐ (2) No ☐ (3) Don't know ☐

59. If yes, what made you think it is effective?.....

60. If no, what made you think it's not effective.....

61. How many people in your house sleep under the net? .....

62. Describe briefly where and how you hung the bed net in your house.

.....

.....

63. For those who do not have ITN

Tick the appropriate reason for not owning/using an ITN? *Do not prompt, you may tick more than one option*

Reason	Tick
Cannot get to buy	
Are unnecessary if other insect control are used	
Cannot afford it	
Are inconvenient	
Are hot/lack air	
Do not protect the whole family	
Mosquitoes can still bite through the net	
Are hard to use around children because of potential for damage to the net	
Are outdated	

Others (please specify).....

INTERMITTENT PREVENTIVE THERAPY (IPT)

If IPTp is not used skip to question 74

64. Did you take any drug specifically to prevent malaria in pregnancy?

(1)Yes ☐ (2) No ☐

65. If yes indicate the drug and frequency:

Drug Used	How Did You Use The Drug	Where Obtained?	Any Adverse Effects
Daraprin			
Chloroquine			
SP (Laridox, Fansidar, Amalar et.c.			
Others (specify)			

66. Where did you take the drug? (1) Clinic ☐ (2) At home ☐

(3) Others (please specify) .....

67. If in the clinic, did you take it in the presence of the health worker? (1) Yes ☐ (2) No ☐

68. If yes, why? .....

69. If no, why? .....

70. How many tablets of IPT drugs is being used at once as a dose?

(1)1 tablets ☐ (2) 2 tablets ☐ (3)3 tablets ☐ (4) 4 tablet ☐

(5) 5 tablets ☐

71. Intermittent preventive therapy can be given to?

	Agree	Disagree	Strongly disagree	Don't know
Men				
Pregnant women				
Aged people				

72. Did you take (swallow) any of the medicine in the presence of the health workers?

(1) Yes ☐ (2) No ☐

73. What would you suggest to improve IPT use in the clinics.....

INSECTICIDE METHOD

If insecticide method is not used skip to question 82

74. What type of insecticide do you use? (1) Spray ☐ (2) paste on the wall ☐

(3) Others (plense specify).....

75. Do you have any insecticide spray at home currently?

(1) Yes ☐ (2) No ☐

76. Is insecticide spray your most preferable method? (1) Yes ☐ (2) No ☐

77. If yes, why? *Do not prompt, you may tick more than one option*

(1)Because they kill mosquitoes (and other insects) faster ☐ (2) Easy to use ☐

(3)Accessible ☐ (4) It is cheap ☐

(5)Others(please specify).....

78. If no to 76, why? *Do not prompt; you may tick more than one option*

(1) Expensive ☐ (2) Has Side-effect ☐ (3) It is not convenient ☐

(4) Bad odour ☐ (5) Not accessible ☐

(6)Others (please specify).....

79. Is insecticide spray effective? (1) Yes ☐ (2) No ☐

80. If yes, what made you think it is effective?.....

81. If no to question 79, what made you think it's not effective .....

BURNING COIL

If not used skip to question 90

82. Do you use mosquito coil? (1)Yes ☐ (2) No ☐

83. When last did you use coil? (1) Last night ☐ (2)2 – 4 days ago ☐

(3) 5 – 7 days ago ☐ (4) 2 weeks and above ☐

84. Is this your most preferable method? (1) Yes ☐ (2) No ☐

85. If yes, why do you prefer coil? Do not prompt; you may tick more *than one option*

(1)Because they kill mosquitoes faster ☐ (2) Easy to use ☐

(3)It is cheap ☐ (4) Accessible ☐

(5)Others (please specify).....

86. If No to 84, why? *Do not prompt; you may tick more than one option*

(1)Expensive ☐ (2) Side-effect ☐ (3) It is not convenient ☐ (4) Bad odour ☐

(5)Not accessible ☐ (6) A fire hazard ☐

(7)Others (please specify).....

78. If no to 76, why? *Do not prompt; you may tick more than one option*

(1) Expensive ☐ (2) Has Side-effect ☐ (3) It is not convenient ☐

(4) Bad odour ☐ (5) Not accessible ☐

(6)Others (please specify).....

79. Is insecticide spray effective? (1) Yes ☐ (2) No ☐

80. If yes, what made you think it is effective?.....

81. If no to question 79, what made you think it's not effective .....

BURNING COIL

If not used skip to question 90

82. Do you use mosquito coil? (1)Yes ☐ (2) No ☐

83. When last did you use coil? (1) Last night ☐ (2)2 – 4 days ag☐

(3) 5 – 7 days ago ☐ (4) 2 weeks and above ☐

84. Is this your most preferable method? (1)Yes ☐ (2) No ☐

85. If yes, why do you prefer coil? Do not prompt; you may tick more *than one option*

(1)Because they kill mosquitoes faster ☐ (2) Easy to use ☐

(3)It is cheap ☐ (4) Accessible ☐

(5)Others (please specify).....

86. If No to 84, why? *Do not prompt; you may tick more than one option*

(1)Expensive ☐ (2) Side-effect ☐ (3) It is not convenient ☐ (4) Bad odour ☐

(5)Not accessible ☐ (6) A fire hazard ☐

(7)Others (please specify).....

87. When you use it, is it effective? (1) Yes ☐ (2) No ☐

88. If yes, what made you think it is effective? .....

89. If no, what made you think it's not effective? .....

MOSQUITO REPELLENT

If mosquito repellent is not used skip to question section E

90. Do you have an insect repellent at home currently? *Do not prompt*

(1)Yes ☐ (2) No ☐

91. If No, why? (1) Not effective ☐ (2) Side-effect (skin allergy) ☐

(3) It is not my choice ☐ (4) Others (Please specify).....

92. Is this your most preferred prevention method? (1) Yes ☐ (2) No ☐

93. If yes, why do you prefer mosquito repellent? *Do not prompt, you may tick more than one option*

(1)Because it prevent mosquito bites ☐ (2) Easy to use ☐ (3) Accessible ☐

(4) It is cheap ☐ (5) Convenient to travel ☐

(6)Others (please specify).....

94. If No, to question 92. what are the reasons for not using mosquito repellant?

Do not prompt, you may tick more than one option

(1)Expensive ☐ (2) Side-effect (skin allergy) ☐

(3) Bad odour ☐ (4) Not Accessible ☐

(5)Others (please specify).....

95. Is this preventive method effective (1) Yes ☐ (2) No ☐

96. If yes, what made you think that it is effective?.....

97. If no, what made you think that it is not effective?.....

E. WILLINGNESS SLIP ON THE UPTAKE OF ITN

Insecticide treated nets (ITNs) will be available at the health facilities nearer to you.

1. Are you willing to own/have an ITN now? Yes ☐ No ☐

2. If yes why.....

3. If no why .....

4. Do you have an ITN at home? Yes ☐ No ☐

.....

Interviewer should please detach this slip and give to respondent willing to obtain an ITN, to take to the matron in charge and acquire one for use.

RESPONDENTS SERIAL NO .....

RESPONDENTS PHONE NO .....

HOME ADDRESS (With description or landmarks) .....

.....

.....

.....

.....

.....

Date.....

APPENDIX 2

AWON IGBESE TO NDENA ARUN IBA, GBIGBA ATI LILO APO EFON TI ATI RE SINU OGUN EFON LAARUN AWON ALABOYUN TI WON WA FUN ITOJU AWON ILE ETO ILERA ALABODE NI IJOBA IBILE AKINYELE, IPINLE NIJERIA.

Eyin Olugbo,

Awon ibeere ti afe biyin je iwadi nipa awon igbese didena arun iba laarin awon aboyun. Ao se ipamo gbogbo awon idahun yin. Mo royin pe kie sinu sindo kopa ninu iwadi yii. Ejowo, eri wipe edahun gbogbo ibeere ni tooto ati gegebi oba seri nitori wipe eyi ni yio mu ki iwadi wa koju osuwon.

A) Ibeere nipa ara yin

i. Onko

2. Ojo ori yin

3. Eko ti eti ka
   a. mio kawe rara
   b. ile iwe alako bere
   c. iwe mewa
   d. ile iwe giga

4. Ise ti e hun se
   a. oga agba lenu ise ijoba
   b. osise ijoba onipo kekere
   c. onisowo / ontaja
   d. ontaja wewewe
   e. iyawo ile

5. Iye oyun ti eti ni
   a. odo – eyo kan
   b. meji – meta
   c. merin – marun
   d. mefa – ati jubelo

6. Eya wo ni eyin je
   a. Yoruba
   b. Igbo
   c. Hausa
   d. Omiran (so nipato)

7. Eniyan melo lowa ninu ebi / ile yin?
   a. odo – eyo kan
   b. meji – mela
   c. merin – marun
   d. mefa – ati jubelo

B) Itoju alaboyun nigba to wa ninu oyun

8. Njee nlo fun itoju awon alaboyun ni ile iwosan fun oyun yi? a. Beeni b. Beeko

9. Ti oba je beeko, kilode?
   a. onajin
   b. kosi owo oko
   c. owo ti won ngba poju
   d. asiko teyan afi duro ma npe
   e. iyoku (ejowo e so ni pato)

10. To ba je beeni si ibeere kejo, ose melo ni eti wa ninu oyun yii ki eto lo fi oniko sile ni ile iwosan? .....

11. Osu ati ojo melo ni oyun yi? .....

12. Awon nko wo ni won pese fun yin nibi itoju alaboyun
   a. IPT ☐ b. abere ajesara ☐ c. apo neti ti ama nsun sinu re ☐
   d. igbani ni imoran ☐

13. Nje o te yin lorun? Beeni ☐ Beeko ☐

IPT

Abere ajesaro

Apo neti ti ama nsun sinu re

Igbani ni imoran

14 Ti obaje beeko, kilode

15. Nje engbe awon igbese kan ni pato lati dena iba? a. beeni ☐ b. beeko ☐

16. Nje won ma nbayin soro lori arun iba ni ile iwosan? a. Beeni ☐ b. Beeko ☐

C. Into iba ati iscsi awon aboyun nipa arun iba ninu oyun

17. Bawo ni arun iba se ma nwankale? a. nipase kefon jeyan ☐

b. esinsin ☐

c. ikan ☐

d. ayan ☐

e. omiran, (so nipato).....

18.

Ayorisi Gbogbo olori jori Ni arun iba Nba linra	1. Mo fara mo	2. Mi o fara mo	3. Mi o fara mo rara	4. Mi o mo
Awon alaboyun Kini arun iba				

19. Ara ayonisi arun iba ninu oyun ni

Ayonisi	Mo fara mo	Mi o fara mo	Mi o fara mo rara	Mi o mo
Aito eje				
Bibi omo to ti ku				
Bibi omo ti ogbe won				
Sise oyun				
Iko awugbe				
Kokoro HIV				

20. Awon nkan wo lo ma nran titankale arun iba lowo?

Awon nkan na	Mo fara mo	Mi o fara mo	Mi o fara mo rara	Mi o mo
Ayika to doti				
Ile tomo				
Ki igbo po yi ka ile				
Omi ti ko san				

21. Dariko nkan meji ti yio ma sele ninu ago ara to nse apeere iba lile

i. .....

ii. .....

22. Kini awon ona lati li dena arun iba ninu oyun?

Ona	1. Beeni	2. Beeko
Apo efon tati re sinu ogun		
Lilo ogun fun alaboyun ni awon asiko totele ra		
Fifi neti soju feresc ati ilekun		
Ogun apa kokoro (aerosol)		
Ogun efon ti ama ntan na si (coil)		

Omiran (ejowo eso nipato)

.....

D. Imo nipa ona lati dena iba

Apo efon ti ati re sinu ogun apefon

23. Iru apo efon wo ni eyin mo?

a. apo efon ti a re sinu ogun efon ☐

b. apo efon ti ako re ☐

c. Omiran (ejowo eso nipato)

.....

24. Talo mon nje arifani apo efon ti ati re si nu ogun to npa efon?

a. baba ☐

b. iya ☐

c. awon omo ☐

d. gbogbo eniyan ☐

25. Awon wo lose Pataki fun lati ni apo efon ti ati re sinu ogun efon?

a. awon omo ti koti pe odun marun ☐

b. awon alaboyun ☐

c. baba ☐

d. awon yoku (jowo so nipato)

.....

26. Wakati wo ni otona lati lo apo efon ti a re sinu ogun efon?

a. meje ale si meje aro ☐

b. mejo aro si mejila osan ☐

c. ago kan osan si mefa irole ☐

d. mio mo ☐

27. Iru awon apo efon ti are sinu ogun efon wo le mo?

a. eyi ti yio pejo ☐

b. eyi ti koni pe ☐

c. eyi ti a tun gbodo pada re ☐

E. Lilo ogun ni akoko to tele ra

28. Nje eti gbo nipa lilo ogun lakoko to telera lati fi wo aisan iba ninu oyun?

a. Beeni ☐ b. Beeko ☐

29. Ti o ba je beeni, kini lilo ogun li akoko to tele ra .....

30.Awon ogun wo ni won ni keyan ma lo ni akoko to tekra

Ogun	mo fara mo	mi o fara mo	mi o mo
Chloroquine			
Fansidar			
Phensic			
Amalar			

31.Emelo ninu oyun ni ogun gbodo je lilo?

a. ekan ☐ b. emeji ☐ c. emeta ☐ d.emerin ati jubelo ☐

Ona lilo ogun efon

32. Ona wo lafi le gba lo ogun efon lati dena kefon jeni?

Ona	Mo fara mo	Mi o fara mo	Mi o fara mo rara	Mi o mo
Fifi ogun efon so ogiri				
Rire awon okan sinu ogun efon				
Fifi ogun efon we				

33. Awon ogun efon wo le mo?

a. eyi ti agbara re kii pe ☐

b. eyi ti agbara re ma npe ☐

c. mi o mo ☐

d. iyoku (jowo so ni pato) .....

34. Gbogbo ogun efon ti amaa nfin ni kii bani laramu?

a. beeni ☐ b.becko ☐ c.mi o fara mo ☐ c. mi o mo ☐

Ogun efon to ma nle efon nigbato ba njo

35. Ki ogun efon ma jo ma dena kefon jeyan?

a. mo fara mo ☐ b. mi o fara mo ☐

c. mi o fara mo rara ☐ d. mi o mo ☐

36. O ye ki ogun efon si ma jo lo nigbati aba nsun?

a. mo fara mo ☐ b. mi o fara mo ☐

c. mi o fara mo rara d. mi o mo ☐

37. Ayorisi ki eniyan maa lo ogun efon to ma njo ni ona ti koto ni wonyi...

Ayorisi mo fara mo mi o fara mo mi o fara mo rara mi o mo

fifa si mu
jejere
ko sapani lori
orun didun
Sise idena senu ferese abi ilekun

38. Awon nkan to ndena efon ni oju ferese tabi ni ilekun wo ni eyio mo (eleenu ju eyo kan lo)

a. aso ti aroa n dabo ferese/ilekun (kotini) ☐ b. irin ☐

c. apo aceti ☐

d. iyoku (jowo so ni soki) .....

39. Oye ki a re kotini sinu ogun efon kawa ma lo gegebi ohun to ndena efon

a. mo fara mo ☐ b. mi o fara mo ☐

c. mi o fara mo rara ☐ d. mi o mo ☐

Nkan to ma nle efon sa

40. Nje eti gbo nipa nkan to ma nle efon sa? a. Beeni ☐ b. Beeko ☐

41. To ba je beeni, kini won? .....

42Awon nkan wonyi se e lo gegebi nkan to nle efon sa

Alefonsa	Nle fara mo	Nli o fara mo	Nli o fara mo rara	Nli o mo
Ipara				
Jijo ewe tabi egbo				
Rire awon nkan bi eni sinu ogun efon				
Lilo ogun lati dena arun iba				

D) Awon igbese to ode na arun iba

43. Nje e ngbe igbese lowolowo lati dena arun iba? a.Beeni ☐ b.Beeko ☐

44. Ti oba je beeni, ewo ninu awon nkan ta kosi isale le nlo (ele mu ju eyo kan lo)

Igbese lati dena iba	Beeni	Beeko
Sisun ninu apo efon		
Lilo nkan to mon nle efon sa bi ipara, jijo ewe		
Lilo apo efon ti a ti re sinu ogun efon		
Lilo ogun efon to ma njo		
Sise idena sara feresc / ilekun lati majeki efon wole		
Sise imo toto ayika bi gige oko gbigba adagun omi nu		
Lilo ogun lati dena iba		

Apo efon ti ati re sinu ogun efon

(ti oba lo apoefon ti ati re sinu ogun efon,losi ibere 63)

45. Nje oni apo neti ti o nsurtsi

a. beeni ☐ b. becko ☐

to ba je beeko, losi ibeere

46. To je beeni,iru apo efon wo loni?

(1) apo efon ti ati re ni ogun efon ☐ (2)apo efon ti a ko re ☐

(3)apo efon ti ati pada re ni ogun efon leyin ti aati koko re ☐ (4) mi o mo ☐

47. Ti oba je apo efon ti ati re, igba wo ni eti re seyin?

(1) kotito osu mefa ☐ (2) oti ju osu mefa lo ☐ (3) ako ti re rara ☐

(4) emi nlo apo efon ti agbara ogun tafi re je jojo ☐

48. Nje eso apo efon na ro? (1) beeni ☐ (2) becko ☐

Sisu sinu apo efon

49. Nje otile nsun sinu apo efon? (1) beeni ☐ (2) becko ☐

Emelo lo nsa nsun sinu apo efoo yii		Maki re
Lososo		
Emeta si emerin lose		
Emeji lose		
Ojojumo	Ni oojo nikan	
	Ni ale nikan	
	Oojo ali ale	

50 Ti o ba je beeni si ibeere 49.kini nkan toma nse iwuri fiuiyin lati sun sinu apo efon na?

(1) idabobo kuro lowo arun iba☐ (2) idabobo kuro lowo awon efon ☐

(3) owodie la nna lori ogun (4) iyoku (jowo so nipato).....

51. Ti oba je beeko si ibeere 49, kinni oma je kl e ma sun sinu apo efon?

(1) apo efon ko bami lara mu (o gbona, kije ki ategun kofe.kii je keyan le jupa juse☐

(2)ainito owo/ owon☐ (3) iyoku (jowo so nipato).....

52. Nibo ni oti gba apo efon naa?

(1) ore mi lo fun mi ☐(2) won funmi ni ile iwosan ☐ (3) mo ra a ☐

(4)iyoku (jowo so nipato).....

53. Ti oba je pe era nibo leti ra?(1) odo awon ataogun (chemist) ☐(2) shobu awon apogun☐yinbo (3) oja ☐ (4)iyoku (jowo, so nipato).....

54. Nigba wo ni egba/era apo efon yii?(1) kotito osu mefa☐ (2) oti ju osu mefa lo ☐

(3)iyoku jowo so nipato.....

55. Ti eba ra elo le ra (1) #500 ☐ (2) #500-#999 ☐ (3) #1000 ati jubelo ☐

56. Nje oye ti won taw a inni arowoto yin ? (1)beeni☐ (2) becko ☐

57. To je becko, elo ni e o fe fati san? (1) komoto #200 ☐ (2) #200-#499 ☐

(3)#500-#100 ☐ (4) komoto #100☐ (5) ofe.☐

58. Ti oba tin sun sinu apo efon, nje on sise bi (1) beeni ☐ (2) beeko ☐

(3) mi o mo ☐

59. To ba je beeni kilo mu yin ro pe onsise?.....

60. To ba je becko, kilo mu yin ro wipe ko sise? .....

61. Eyan melo nile yin lo nsun ninu apo efon? .....

62. Se apejuwe lerefe ibi oma nso apo efon yi ro mo ati bi ose ma nso ro ninu ile re.....

.....

63. Fun awon ti ko ni apo efon ti ati re sinu ogun efon,

E fala si idi ti eko fi ri tabi tabi lo apo efon ti ati re sinu ogun efon ele fala siju eyokan lo

Idi	fala
Mi orira	
Ko pandandan nigba ti eyan bati le gba onj mi lati dena efon	
Mi o lagbara ati ra	
Ko bami lara mu	
Afefe to gbona lo ma nfe ninu re/kisi afefe ninu re	
Ki i dabobo gbogbo ebi	
Efon si lee jeyan ninu apo efon naa	
Ole lati fun awon omode tori won le baje	
Ko bagbamu	

Iyoku, (so ni pato).....

Lilo ogun ati akoko to telera

Ti oko ba lo ogun iba nigba to telera,lo si ibeere 74

64. nje o lo ogun kan ni pato lati fi dena iba ninu oyun?

(1) beeni ☐ (2) beeko. ☐

65. Ti o ba je beeni, fala si iru ogun ati oye igba to lo

Ogun to lo	Bawo lose lo ogun na	Nibo lo ti gba	Nje o fa ipala si ara re
Daraprin			
Chloroquine			
Sp(lauidox,fansidar, amalar etc)			
Iyoku,(so ni pato)			

66. nibolo ti lo ogun na? (a)ile iwosan ☐ (b)ni ile ☐

(c) iyoku,(so nipato).....

67. Ti o ba je ni ile iwosan,nje o mu niseju osisse ilera to wa nibe

(a) beeni ☐ (b) beeko ☐

68. To ba je beeni, kilode? .....

69. To ba je beeko, kilode? .....

70. Tabileti ogun yi melo ni anlo ni lekansoso? (a) tabileti kan ☐ (b) tabileti meji ☐
(c) tabileti meta (4)tableti merin ☐ (5) tabileti marun ☐

71. Ogun iba ni akoko to teleta, a le fun?.....

72. Nje e nmu eyikeyi nimu awon ogun yi aiseju awon osise eleto ilera?

(a) beeni ☐ (b) beeko ☐

73.Kini imoran lori lilo ogun iba u akoko gberu si ni ile iwosan .....

Ogun efon

Ti o ko ba lo ogun efon lo si ibeere 82

74. Iru ogun efonwo le nlo?

(a) nto ma fon kakiri ☐ (b)nti won ma nle mo ara ogiri ☐

(c) iyoku, (so nipato).....

75. Nje oni ogun efon to ma nfon yika nile lowolowo.

(a) beeni ☐ (b) beeko ☐

76. Se fifon ogun efon kakiri ni onna to le olorun ju?

(a) beeni ☐ (b) beeko ☐

77. To ba je beeni,ki lo de(mase foro si won lenu) o le falasi ju eyokan lo

(a) tori wonma ntete pa efon pelu awon kokoro miran ☐ (b) ororun lati lo ☐

(c) ose tete ri ☐ (d) ko won ☐ (e) iyoku, (so nipato).....

78. Ti o ba je beeko siibeere 76, kilode.(ma foro si won lenu) ole falassi ju eyokan lo

(a) o won ☐ (b) o se akoba si ara ☐ (c)ko rorun ☐ (d) oorun re ko dara ☐

(e) ko se tete rira ☐ (f) iyoku, (so ni pato).....

79. Se ogun efon tia nfon kakiri nsise (a) beeni ☐ (b) beeko ☐

80. Ti oba je beni, kilo mu yin ro wipe onsise?

81. Ti o ba je beeko si ibeere 79,kilo mu yin ro wipe ko nsise.....

Ti lan ogun efon

Ti eko bama nlan ogun efon (coil) elo si ibeere 90

82. Nje eman nlan ogun efon coil? a. beeni ☐ b.beeko ☐

83. Nigbawo ni etan ogun efon seyin?

a. ale ana ☐ b. ojo meji seyin ☐

c. ojom marun si meje seyin ☐ d. ose meji au jubelo ☐

84. Se ona ti opeyin julo niyi? a. beeni ☐ b. beeko ☐

85. Ti o ba je beeni, kilode ti efi feran titan ogun efon (coil)? mafiorosi won lenu elefala si ju eyo kan lo

a. o ma nicle pa efon ☐ b.o roiun lati lo ☐ c. owo poku ni ☐

d. o roiun lati ri ☐ e. iyoku (jowo so ni pato) .....

86. Ti o ba je becko si ibere 84, kilode? (mase foro siwon leno) o le fala si ju eyo kan lo

a. o won ☐ b. o nse akoba fun ara ☐

c. ko roiu ☐ d. ororun re kodara ☐ c. ko see ri ☐

f. ole fa ki ina jole ☐ g. iyoku (jowo so ni pato) .....

87. Ti o ba lo nje onsise? a. beeni b. beeko

88. To ba je beeni, ki lo mu nyin ro wipe o nsise?.....

89.To baje beeko, ki lo mu nyin ro wipe ko sise?.....

Nkan to nle efon sa

Ti eko ba lo nkan to nle efon sa, e lo si abala E.

90. Nje eni nkan to nle efon sa ni ile yin lowolowo? a. beeni ☐ b. beek ☐

91. Ti o ba je beeko, kilode?

a. ki nsise ☐ b. o nse akoba fun awo ani ☐

c. kii se nkanti mo yan ☐ d. iyoku (jowo so ni pato).....

92. Se eyi je ona ti ope yin ju? a. beeui ☐ b.beeko ☐

93. Ti o ba je beeko, kilode ti efi feran nkan to nle efon se? (maforo siwon lenu) ole muju eyokan lo

a. o ma dena ki efon je eyan ☐ b. o rorun lati lo ☐

c. owo poku ni ☐ d. o rorun lati mulo irin ajo ☐

e. o seri ☐ f. iyoku (jowo so ni pato).....

94. Ti oba je beeko si ibeere 92, kini idi ti eko fi nlo nkan to nle efon se? (maforo siwon lenu) ole mu ju eyokan lo

a. o won ☐ b.o nswe akoba fun ara, papa julo awo ara. ☐

c. o rorun lati lo ☐ d. owo poku ni ☐

e. o rorun lati ri f. iyoku (jowo so ni pato).....

95. Nje ona tie fin gba dena efon si yi sise bi? a.☐ beeni b.beeko☐

96. To ba je beeni, ki lo mu nyin ro wipe o nsise? .....

97. To baje beeko, ki lo mu nyin ro wipe ko sise? .....

E.

Iwe pele be lati fihan wipe ese tan lati ma lo apo efon ti ati re sinu ogun efon

Apo efon ti ati re sinu ogun efon yio wa ni ile iwosan ti o sun mo yin

1. Nje eti setan nisinsinyi lati ni apo efon ti ati re sinu ogun efon? a.Beeni☐ b. Beeko☐

2. To baje beeni, kilode? .....

3. To baje beeko, kilode? .....

4. Nje eni apo efon ti ati re sinu ogun efon nile? a. beeni☐ b. beeko☐

Ki eniti onfi oro wani leau wo ya iwe pelebe yi, ki osi fun eniti o dahun ibeere yii ti osi setan lati ni epo efon ti ali re pelu ogun efon, ki omu lo ba matron (noosi agba) to se akoko lati lo gba eyi ti yio ma lo

oruko eniti odahun awon n ibeere yii.....

Nanba ibara eni soro eniti odahun awon ibeere yii .....

Adiresi ile (pelu apejuwe) .....

APPENDIX 3

INSECTICIDE TREATED NET UPTAKE AND USE AMONG PREGNANT WOMEN ATTENDING PRIMARY HEALTH CARE CENTRES IN AKINYELE L.G.A. OYO STATE.

1. Study No .....

2. Home Address (with description or landmark) .....

.....

.....

.....

A. FIRST MONITORING

1. Time of visit ..... Date .....

2. Net found hanging? (1) Yes ☐ (2) No ☐

3. If no, to question 2 why? .....

.....

4. Was she found sleeping under the net? (1) Yes ☐ (2) No ☐

B. SECOND MONITORING

1. Time of visit ..... Date .....

2. Net found hanging? (1) Yes ☐ (2) No ☐

3. If no, to question 2 why? .....

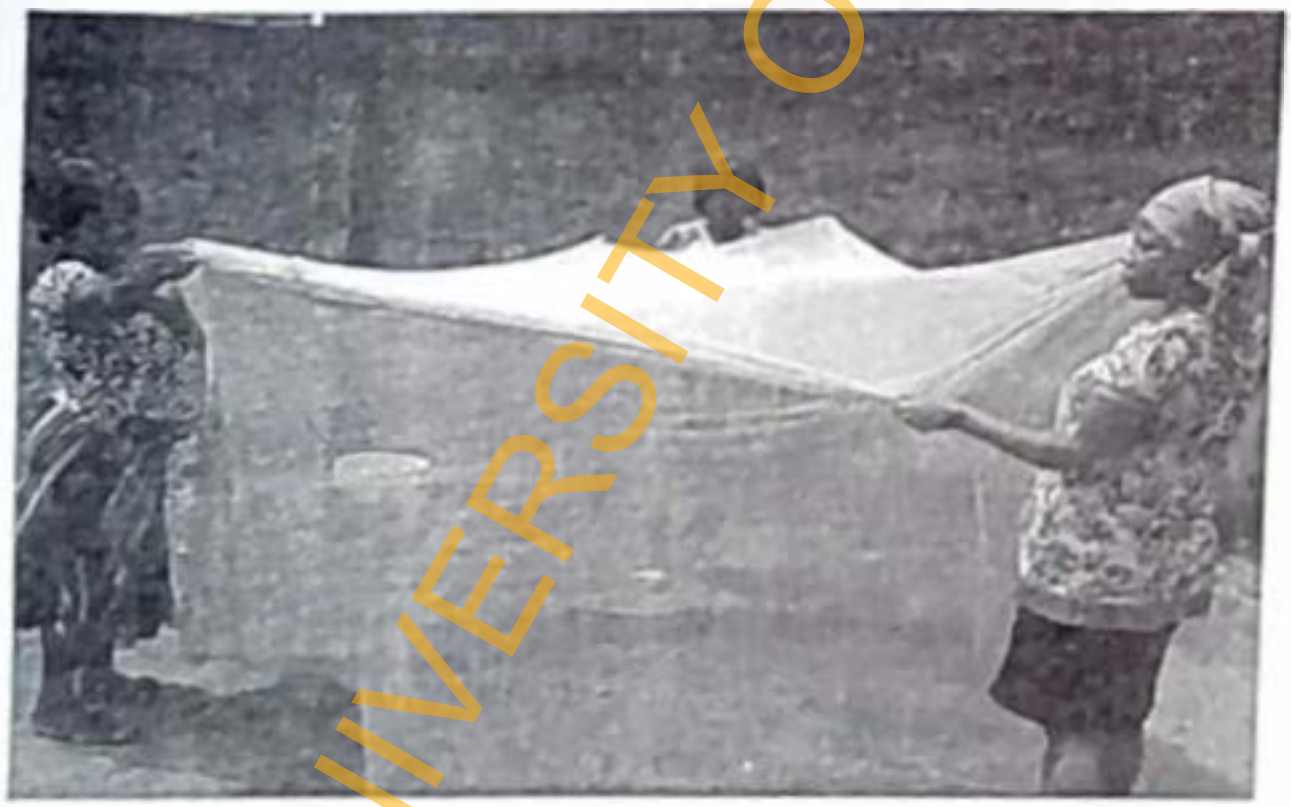
.....

4. Was she found sleeping under the net? (1) Yes ☐ (2) No ☐

APPENDIX 4

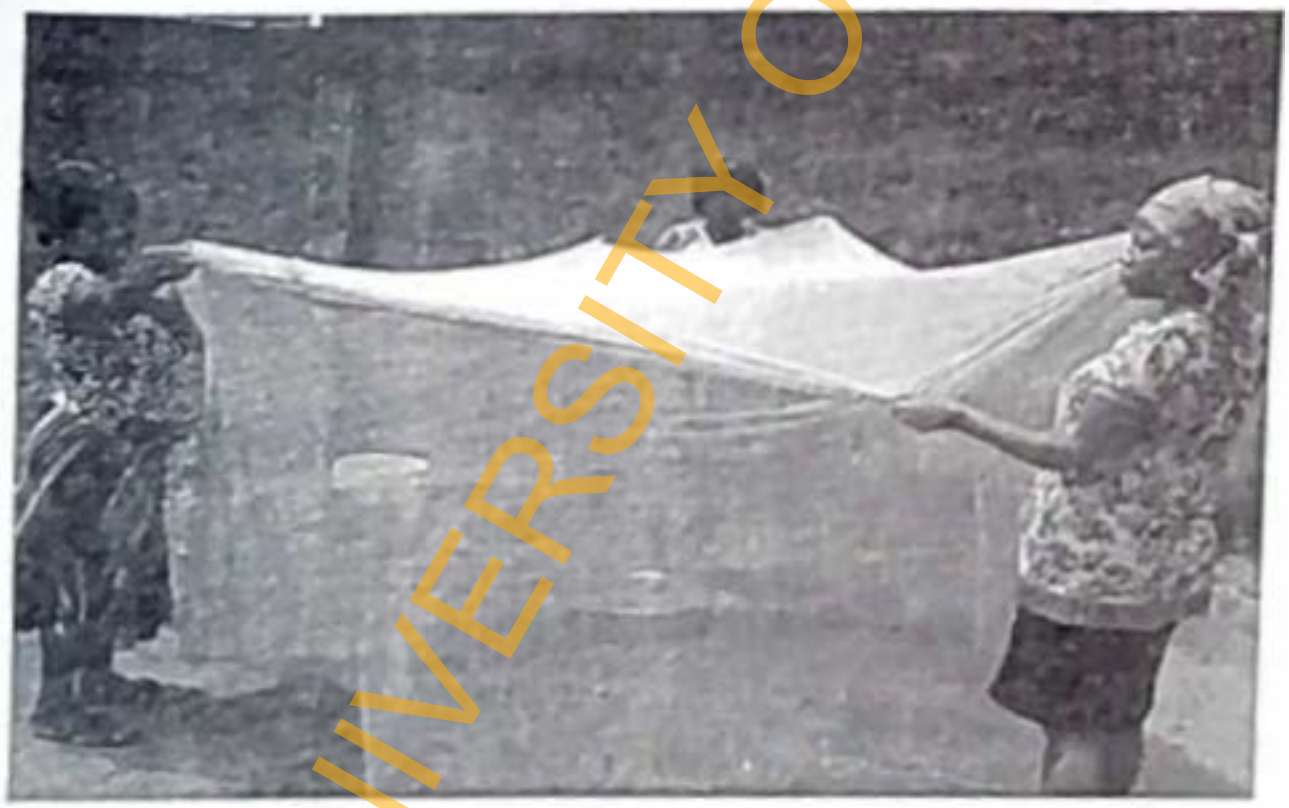
Picture 1: A cross section of research assistants during training

Picture 2: Health education session held with pregnant women in the ANC

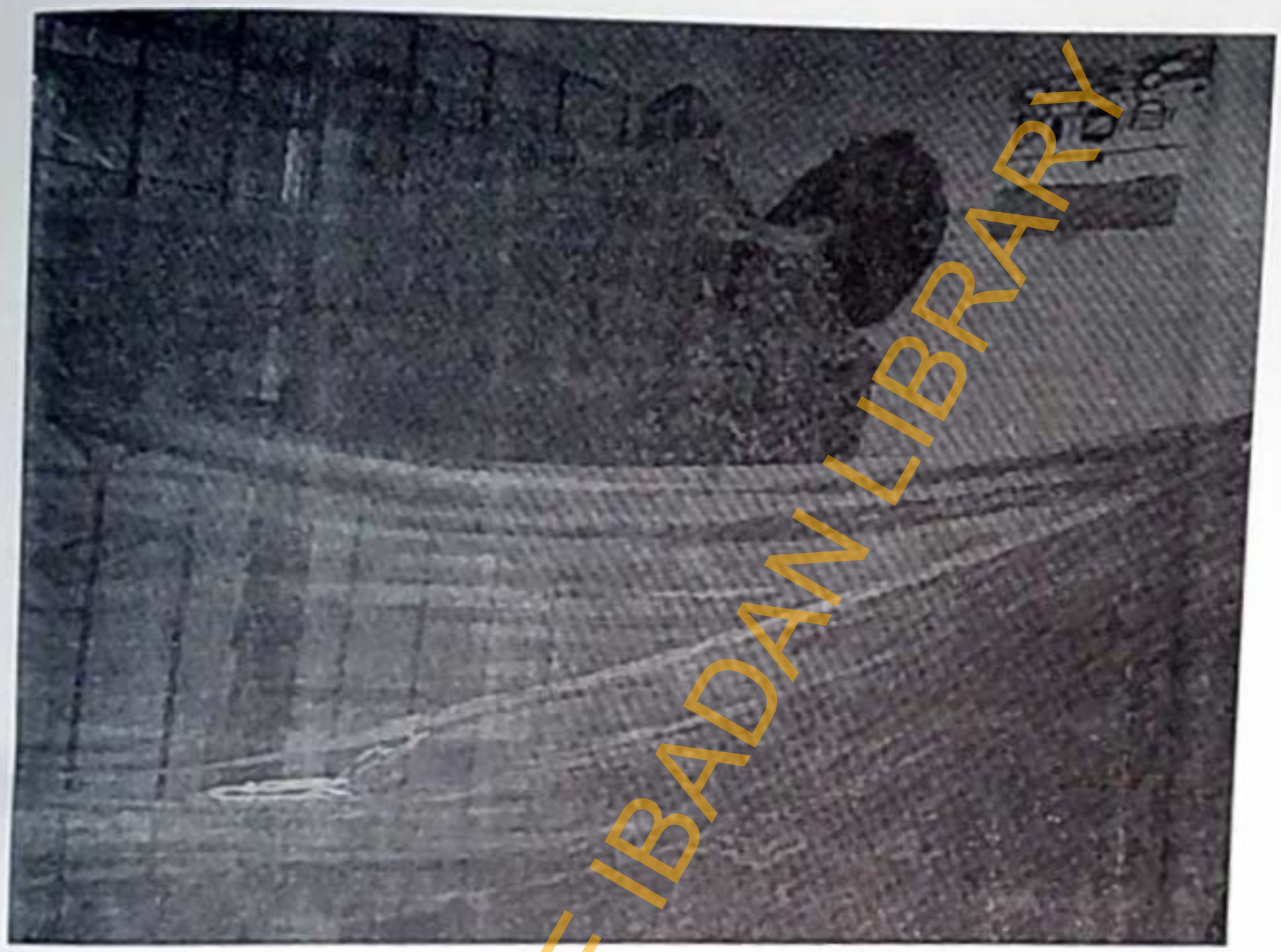


Picture 3: Insecticide treated net hanging demonstration

Picture 2: Health education session held with pregnant women in the ANC



Picture 3: Insecticide treated net hanging /demonstration



Picture 4: A pregnant woman hanging her net

Picture 4: A pregnant woman banging her net

Picture 5: A pregnant woman found sleeping under her net during one of the house visits at Ajibode community

Picture 6: A respondent's net found washed and hunged outside

Picture 5: A pregnant woman found sleeping under her net during one of the house visits at Ajibode community

Picture 6: A respondent's net found washed and hanged outside

Picture 7: Pregnant women posing with their Insecticide treated net

Picture 8: A cross section of pre-eclamptics during a focused group discussion at the ANC

APPENDIX 5

CONSENT FORM

I Ekikere Sman Udomisoh, an MPH student of the Department of Epidemiology, Medical Statistics and Environmental Health, Faculty of Public Health, University College Hospital, University of Ibadan, Ibadan, is undertaking a research on Influence of health education on insecticides Treated Net (ITN) uptake and use among pregnant women in Akinyele Local Government Area of Oyo State.

This research is to aid the improvement of Maternal and Child health. To implement this research, I am to let you know that pictures will be taken, and my team might also visit your personal resident at anytime in other to ensure the use of insecticides treated nets which will be given to you in the course of the research.

Information received will be treated with utmost confidentiality and only for research purposes. In agreement to the above, please kindly thumb print or append your signature below, if otherwise there is no penalty, it is voluntary. Thank you.

Signed
Researcher/Student

Name

Signed/Thumb Print
Witness

Signed/Thumb Print
Respondent

TELEGRAMS.....

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Our Ref. No. AD 13/479/96

Date: 10th December, 2009

The Principal Investigator
Department of Epidemiology, Medical Statistics
and Environmental Health,
University College Hospital Ibadan

Attention: Udoinoh Ekikere Smart

Re: [illegible] Research Ethics Review Committee -OYSRERC)

In response to your letter requesting for ethical approval for the implementation of your Research Proposal titled Insecticide treated net (ITN) Uptake and use among pregnant women attending primary health care centers in Akinyele L.G.A, Oyo State.

The Committee has noted your compliance with all ethical concerns raised in the first review. In the light of this, I am pleased to convey to you the approval of the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

Please, note that the committee will monitor, closely, and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as they will help in policy making in the health sector.

Wishing you all the best.

Mrs V.A. Adepoju
Director, Planning, Research & Statistics