

Malaria Prevalence and Insecticide Treated Nets Usage in Argungu (North Western Nigeria)

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ABSTRACT: Insecticide treated net (ITNs) is known to have a major impact on malaria control if properly used. The study was carried out to ascertain the impact of insecticide treated nets (ITNs) on malaria prevalence in Argungu, Northwestern Nigeria a decade after free distribution of ITNs. Questionnaires were administered to obtain relevant information such as: age, occupation, and ownership and use or otherwise of ITNs. Capillary blood samples obtained using sterile lancet were used in making thick blood films which were stained using Giemsa staining technique. The stained thick films were all examined microscopically for malaria parasites. Of the 300 household studied 226(75%) possessed at least one ITNs. Possession of ITNs is significantly associated with occupation ($P<0.05$). Eighty nine percent of the civil servants had at least one ITNs, and only 40% of the unemployed household had at least one ITNs. Not all these ITNs are being put into use. Only 113(57%) out of the 199 pregnant women used ITNs the night before the survey. Malaria prevalence is more among non ITNs users with proportionate decrease with increase in age among pregnant women. Impact of insecticide treated nets on preventing malaria may be minimized if they are not used properly most especially by the vulnerable populations.

KEYWORDS: Malaria, Insecticide treated nets, prevalence, Argungu.

1 INTRODUCTION

Malaria is a vector-borne disease caused by a pathogen that is transmitted by female mosquitoes of several species from the genus *Anopheles*. It is one of the oldest diseases of mankind, with human adapted species appearing to have evolved along with us [1]. Malarial disease in humans is caused by 4 different species of Plasmodium parasites, namely *P. falciparum*, *P. vivax*, *P. ovale* and *P. malariae*. By far the most pathogenic of these, *P. falciparum* is mainly prevalent in sub-Saharan Africa, Papua New Guinea and Haiti. *P. vivax* accounts for most other cases of malaria in humans and is most common in Central and South America, North Africa, the Middle East and the Indian subcontinent, *P. ovale* is mainly found in West Africa and *P. malariae* is widely distributed but mainly found in Africa [2].

Malaria has remained a huge public health problem in this part of the world with very devastating impacts on the vulnerable groups in the population. World Health Organization [3] reported that over forty percent of the world population lives in areas where malaria transmission occurs. It is estimated that 216 million episodes of malaria occur each year worldwide resulting in 655,000 deaths. It occurs mostly in poor tropical and subtropical regions of the world. This is due to the combination of factors such as the presence of mosquito vectors, predominant parasite species and socio-economic

instability [4]. Eighty one percent of globally estimated cases of malaria occurs in Africa, with children under-five years of age and pregnant women being most severely affected [3].

In Nigeria, malaria is highly endemic and remains one of the most leading causes of morbidity and mortality which poses a major challenge to socio-economic development. It currently accounts for nearly 110million clinically diagnosed cases per year, 60% of outpatient visits and 30% hospitalizations, an estimated 300,000 children die of malaria each year and up to 11% of maternal mortality. In addition to the direct health impact of malaria, there is also a severe social and economic burden on country with about N132billion lost to malaria annually in form of treatment costs, prevention, lost of man's hour [5].

Despite the fact that strong attempts to eradicate malaria have been made, the disease burden is still on the rise and some estimate that the number of cases could double in the next twenty years without the development of new methods for control [6]. This situation calls for a global concerted efforts towards management and control of the disease.

At the historic Role Back Malaria (RBM) summit hosted by Nigeria in 2000, African Heads of States made a declaration to halve the burden of malaria by the year 2010, by way of primary prevention through vector control or use of personal preventive methods such as bed-nets, mosquito repellants, chemo-prophylaxis and finally, through effective case management and medication [7].

In Nigeria the use of ITNs is currently considered one of the most cost effective methods of malaria control. Regular use of ITNs by all those at risk of malaria infection is a key component of the national control programme. Over a decade since the introduction of RBM initiative in Africa, there is therefore the need to assess the impact of the programme. The aim of this study was to assess the impact of Insecticide Treated Nets on malaria prevalence in Argungu local government area, Kebbi state, Nigeria

2 MATERIALS AND METHODS

2.1 STUDY AREA

Kebbi State is located in the north western part of Nigeria and lies between latitude 10^o 8` and 13^o 15` North and longitude 3^o 30` and 6^o 02` East of the Meridian. It occupies a landmass of about 36,800km², which is about 4.0% of the country's landmass. The State is transverse by two major rivers namely; River Niger and River Rima. Agriculture is the main occupation of the people especially in rural areas. Crops produce are mainly grains, which include millet, guinea corn, rice and maize. Other crops produce include; cassava, beans, onions among others. Animal rearing and fishing are also common among the people living close to the river banks [8].

The State lies within the tropical region, with mean annual rainfall of 800mm in the North and 1000mm in the South. The wettest months are August and September. Temperature is generally high with mean annual of about 26^oC in all location.

2.2 ETHICAL CONSIDERATION

A detailed explanation of the purpose, nature and all the processes involved in the research was made to the heads of the participating households. They were informed that their participation along with their wives was voluntary and that they were free to decline from participating or to withdraw from partaking at any stage of the research, and their identities would remain anonymous. They were also informed that all those infected with malaria parasites would be treated in accordance to the National Malaria Control Treatment Guidelines free of charge. Only households that gave informed verbal consent were recruited for the research.

2.3 RESEARCH DESIGN

The study was a cross sectional and three hundred households were randomly selected in the study area and structured questionnaires were then administered to the head of the selected households. The questionnaire was designed to collect information on population characteristics, net ownership, use of nets, and present of pregnant women in the households. To diagnosed malaria, one member and one pregnant woman in each household were randomly selected. Where there was more than one pregnant woman in a household, they were numbered and only one was selected by balloting. This was then followed by house to house visits to diagnose malaria among the selected members of the household under close supervision of the head of the households. At the point of blood collection, information on age, and use of ITNs last night was recorded for each pregnant woman.

2.4 MALARIA DIAGNOSIS

Thick blood film was prepared and stained with Giemsa stains for each subject as described by [9]. Stained slides were all examined under a microscope using x100 objective. The number of malaria parasites asexual parasitic forms on each slide were counted per 200 leucocytes and recorded in the record book. A slide was considered negative if no parasites were found after 100 microscopic fields were scanned.

2.5 STATISTICAL ANALYSIS

The data obtained in this research was analyzed and expressed in term of percentage. Differences in socio-demographic characteristics were assessed between households with ITNs and those without ITNs, pregnant women using ITNs and those not using it, and between under-five children with malaria and those without malaria using Chi-square tests.

3 RESULTS

Of the 300 households enrolled in this study, 226(75%) possessed at least one ITNs, 74(25%) are without ITNs. Possession of ITNs by Occupation is shown in Table 1. Civil servants had the higher number 128(89%). This was followed by other businesses households 16(76%), Farming households 80(61%), and unemployed households 2(40%) respectively. Possession by occupation is highly significant ($P < 0.05$).

Figure 1 depicts usage of ITNs among household and pregnant women in the households. Of the 300 households, only 173(58%) used ITNs the night before the survey, and out of the 199 pregnant women only 113(57%) used ITNs.

Table 2 shows the prevalence of malaria infection by age among subjects in the households. The overall prevalence was 37.3%. Prevalence according to age shows that those within the age bracket 18-29 years had the highest prevalence (40.5%). This was followed by those within the age group of 41-51 years (38.3%), 30-40 years (35.8%) and 52-56 years (34.1%) respectively. The difference was however not statistically significant ($P > 0.05$).

The prevalence of malaria infection among pregnant women by age is as shown in Table 3. Of the 199 samples examined 86(43.2%) had malaria parasite in their blood. Prevalence generally decreases with increase in age. Those within the age group 14-20 years had the highest prevalence (45.8%). This was followed by those within the age group 21-27years 44.9%), 28-34 years (41.7%), and 35-41 years (36.4%) respectively. The difference was however not statistically significant ($P > 0.05$).

Figure 2 depicts the prevalence of malaria infection by ITNs usage. The prevalence was significantly higher among households not using ITNs (54.3%) and low among those using ITNs (24.9%). Prevalence by ITNs usage among pregnant women also shows the same pattern as for the households. Pregnant women not using ITNs had a prevalence of 61.6%, and those using ITNs shows a prevalence of 29.2%.

Table 1. Possession of ITNs by occupation of head of the households in Argungu, North western, Nigeria

Occupation	ITNs No (%)	NO ITNs No. (%)	Total
Civil servants	128(89.0)	16(11.0)	144
Farmers	80(61.5)	50(38.5)	130
Unemployed	2(40.0)	3(60.0)	5
Others	16(76.0)	5(24.0)	21
Total	226(75.0)	74(25.0)	300

Key: ITNs = Household with ITNs, NO ITNs = Household without ITNs

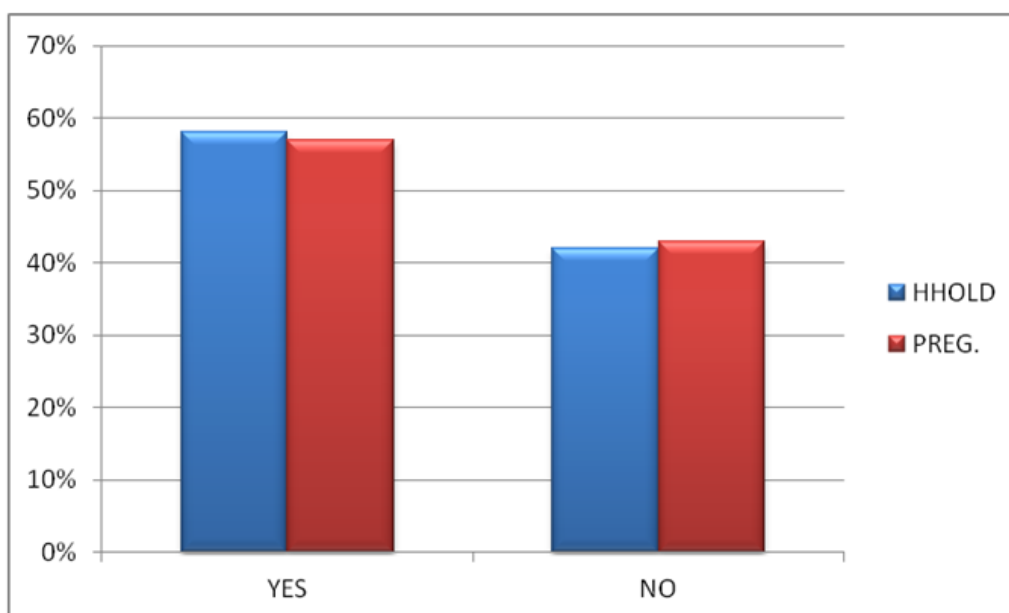


Figure 1. Insecticide Treated Nets usage among households and pregnant women in Argungu North western Nigeria

Key: HHOLD = Household, PREG = Pregnant women, YES = ITNs Usage, NO = Non ITNs Usage.

Table 2. Prevalence of malaria infection by age among subjects in the households in Argungu North western Nigeria.

Age(years)	No. Examined	No. Infected	Prevalence
18-29	79	32	40.5
30-40	120	43	35.3
41-51	60	23	38.3
52-62	41	14	34.1
Total	300	112	37.3

Table 3. Prevalence of malaria infection among pregnant women by age in Argungu, North western Nigeria.

Age (years)	No. Examined	No. Infected	Prevalence
14-20	48	22	45.8
21-27	69	31	44.9
28-34	60	25	41.7
35-41	22	8	36.4
Total	199	86	43.2

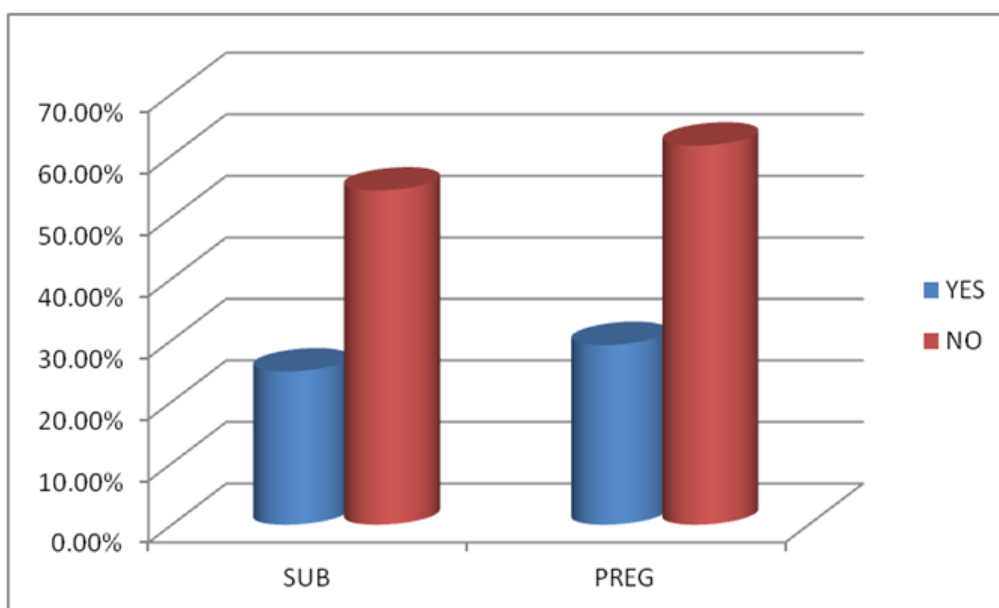


Figure 2. Prevalence of malaria infection by ITNs usage in Argungu North western Nigeria

Key: SUB = Subject, PREG = Pregnant women, YES = ITNs users, NO = Non ITNs users.

4 DISCUSSION

In this study, an equitable distribution of Insecticide treated nets was observed among the study population. Two-third of the sampled households had ITNs (75%). This finding is consistent with other findings carried out by researchers like [10], who reported nets ownership in Kano to be 70%.

Possession and appropriate utilization of ITNs do not automatically go hand in hand. In this study, only 58% ITNs were utilized, 42% of the distributed ITNs have not been put into use. Variable like occupation of the household appeared to be directly associated with ITNs utilization.

Impact of insecticide treated nets on preventing malaria may be minimized if they are not used by vulnerable population. Proportion of pregnant women who slept under ITNs the preceding night is one of the key RBM indicator used to investigate the strengths and weaknesses of monitoring malaria control. In this study, usage among pregnant women was investigated. Only 57% of the pregnant women used ITNs. This result corroborated evidence from other research conducted in Ethiopia by [11], who reported that 57% of pregnant women utilized ITNs. The report however, was higher compared to report of [12] who documented 22.7% usage among pregnant women in Otukpo.

Overall prevalence was generally low among those households using ITNs, but higher in those not using ITNs. This is attributable to the protective effect of the ITNs when used properly. Prevalence was highest among age group of 18-29 years (40.5%) and lowest among those within the age bracket 52-62 years.

Data obtained in this study have also, shown low prevalence among pregnant women who uses ITNs, compared to their counterpart that do not utilized. Both prevalence decreases with increase in age. Infection rates have been consistently demonstrated to be higher in women in their first and second pregnancies, with lower rates in later pregnancies [13]. This is understandable as pregnancy is naturally accompanied by general immune suppression which may cause loss of acquired immunity to malaria most especially among primigravidae.

5 CONCLUSION

The coverage of ITNs in the study area was higher than the 60% target of the Roll Back malaria initiative. However, not all ITNs owned by the households in the area were being used by under-five children and pregnant women. An appreciable number of the vulnerable groups are not protected from malaria using ITNs. This is linked to the lack of strong educational component on the distribution programmes that explain and promote the benefit of ITNs use. Awareness and knowledge of

benefits and proper use of ITNs will lead to the most consistent and correct use, consequently increasing coverage and community wide benefits. While mass distribution campaign is able to rapidly achieve high and equitable ITNs ownership, it is unable to provide continuous coverage for a population at risk for malaria as it only occurs every few years.

Having ITNs doesn't confirm protection from malaria unless there is proper use and strong adherence. Malaria prevalence of 43.2% is still a major public health problem among people in the study area. It is critical that ITN ownership and use be sustained to keep the disease burden low and potentially move towards eradication and elimination. Well designed ITNs distribution programme will not only prevent and control malaria transmission, but also enhance the overall condition of the country and subsequently the quality of life.

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