

**INSECTICIDE TREATED NETS: PERCEPTION AND PRACTICE AMONG  
PREGNANT WOMEN ACCESSING ANTENATAL SERVICES AT A TERTIARY  
HOSPITAL IN AWKA, NIGERIA**

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**Abstract**

Malaria is an endemic disease in Nigeria with its greatest adverse effects on pregnant women and under-five children. Use of insecticide treated net (ITN) is one of the measures for combating malaria. The aim of this study was to determine the knowledge, attitude and use of ITNs among pregnant women who attend the antenatal clinic at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, Nigeria. The respondents were selected using a systematic sampling technique and a total of 230 pregnant women were interviewed using a semi-structured questionnaire. Information was collected on socio-demographic characteristics, knowledge, attitude and use of ITNs. The results obtained showed that 99.1% were aware of ITN, 80.4% own a net and 49.6% of the respondents slept inside ITN the previous night. The results obtained showed that there was a high rate of awareness about ITNs and its importance, there was good attitude towards ITN but the use was poor. We recommended that further studies be carried out to find out the reasons for poor usage of ITN after which appropriate interventions will be carried out.

**Keywords:** Insecticide treated nets, perception, practice, antenatal attendees.

## 1. INTRODUCTION

The use of ITNs impregnated with insecticides such as *permethrin* or *deltamethrin* has been shown to be an extremely effective method of malaria prevention. ITNs protect people sleeping under them and simultaneously kill mosquitoes that contact the nets. Some protection is provided to others by this method, including people sleeping in the same room but not under the net. <sup>[1]</sup>

Malaria is a mosquito-borne infectious disease of humans and other animals caused by parasitic *protozoans* belonging to the genus *Plasmodium* (*Phylum Apicomplexa*). The disease is most commonly transmitted by an infected female Anopheles mosquito. Only female mosquitoes feed on blood; male mosquitoes feed on plant nectar, and do not transmit the disease. The female of the Anopheles genus of mosquito prefer to feed at night.

Five species of Plasmodium can infect and be spread by humans; *P.falciparum*, *P.vivax*, *P.ovale*, *P.malariae*, and the simian parasite *P.knowlesi*. <sup>[3]</sup>

Malaria is the second most common cause of infectious disease-related deaths in the world, after tuberculosis. It is estimated to affect between 350 to 500 million people annually and accounts for 1 to 3 million deaths per year. Sub-Saharan Africa has the largest burden of malarial disease, with over 90% of the world's malaria-related deaths occurring in this region. Twenty-five million pregnant women are currently at risk for malaria, and according to WHO, malaria accounts for over 10,000 maternal and 200,000 neonatal deaths per year. <sup>[4]</sup> Although malaria is known to affect all ages and sexes, its morbidity and mortality is believed to be significant in pregnant women and children less than five years of age. Pregnant women are more susceptible than the general population to malaria: they are more likely to become infected, have a recurrence, develop severe complications and to die from the disease. Malaria contributes very significantly to maternal and *fetal* mortality. Malaria in pregnancy is different from the disease in the non-pregnant state. The severity of malaria in pregnancy is thought to be due to general impaired immunity plus a *diminution* of acquired immunity to malaria in endemic areas. Placental malaria occurs where *P.falciparum* infected erythrocytes accumulate in the *intervillous* space of the placenta but may be rare or absent in the peripheral circulation. Treatment can be more difficult due to restrictions on anti-malarial agents. Many are unlicensed in pregnancy, due to lack of clinical trials involving this important population, for fear of damaging the fetus. With

regard to chemoprophylaxis, recent WHO recommendations and a large meta-analysis support the use of intermittent prophylactic treatment during the second and third trimester. Atypical presentation of malaria is common in pregnancy, particularly in the second and third trimesters, so a high index of suspicion should be maintained in susceptible pregnant mothers. The outcome of pregnancy is affected by malaria. Pyrexia from acute attack of malaria may lead to spontaneous abortion or premature labour by producing uterine contractions. Abortions may also result from asymptomatic but intense *parasitemia* especially in the first trimester. Hyperpyrexia may also cause intrauterine death of the fetus. Malaria produces *haemolysis* when parasitized red cells rupture, also parasitized cells are constantly removed from the circulation by the spleen. This may result in anemia in pregnancy. Increased *parasitemia* is accompanied by marked cellular reaction in the placenta. This in turn interferes with circulation of maternal blood through the *intervillous* spaces leading to impairment of oxygenation to the fetus and subsequent intrauterine growth restriction. Thus the weight of babies born to mothers with marked placental *parasitisation* is less than those without placenta *parasitisation*. Preventing and treating malaria in pregnancy is a key intervention to improving maternal, fetal and child health globally. This study was carried out to assess the knowledge, attitude and use of ITNs among pregnant women attending antenatal clinic at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), Awka, Anambra State, Nigeria.

## 2. METHODOLOGY

**STUDY AREA:** Chukwuemeka Odumegwu Ojukwu University Teaching Hospital (COOUTH), formerly called Anambra State University Teaching Hospital (ANSUTH), is a tertiary health care institution located in Awka, Anambra State, Nigeria. Chukwuemeka Odumegwu Ojukwu University Teaching Hospital is owned by Anambra State Government. It is a teaching hospital for training of medical personnel and is affiliated to the Chukwuemeka Odumegwu Ojukwu University. It offers the full range of medical services and diagnostics expected of a typical teaching hospital, including provision of good antenatal care (ANC) services.

**STUDY DESIGN:** This was a descriptive cross-sectional survey

**STUDY POPULATION:** This consisted entirely of pregnant women who came for antenatal booking visits, which holds every Wednesdays, at Chukwuemeka Odumegwu Ojukwu University Teaching Hospital.

**SAMPLE SIZE DETERMINATION:** Using the formula for calculating minimum sample size for cross sectional studies.<sup>[31]</sup>

$$n = \frac{Z^2 pq}{d^2}$$

Where n = minimum sample size

z = standard normal deviate usually 1.96

p = proportion of respondents in Oshogbo, who had knowledge of ITNs <sup>[24]</sup> = 0.41

d = degree of precision taken as 5% = 0.05

q = 1-P = (1-0.41)

$$\therefore n = \frac{1.96^2 \times 0.41 \times (1-0.41)}{0.05^2} = 372$$

The sample size was approximated to 370

Since the population size is <10, 000, final sample estimate will be:

$$nf = \frac{n}{1 + \frac{(n)}{(N)}}$$

Where nf = the desired sample size when population is <10, 000

n = the desired sample size when population is >10, 000

N = the estimate of the population size = 600, as evidenced by the number of pregnant women who registered for ANC over the past three months.

$$\therefore nf = \frac{370}{1 + \frac{370}{600}}$$

$$= \frac{370}{1+0.6}$$

$$= \frac{370}{1.6}$$

$$= 231, \text{ approximated to } 230$$

The sample size was approximated to 230.

**SAMPLING TECHNIQUE:** A systematic random sampling technique was used. The antenatal clinic booking register showed that an average of 456 clients booked in 3 months which is the

duration of the study. The sampling interval was 2, determined by dividing 456 by 230 (sample size). The first client was chosen by simple random sampling after which every other client that booked was selected for the study until the sample size was achieved.

**ETHICAL CONSIDERATION:** Ethical approval was sought and obtained from Chukwuemeka Odumegwu Ojukwu University ethical review committee, through the department of Community Medicine. Informed verbal consent was obtained from research participants before administration of questionnaires. Participation was made voluntary. All data collected were strictly kept confidential.

**INCLUSION CRITERIA:** Clients who attend antenatal clinic at COOUTH. Clients who were stable enough to answer the questions. Clients who gave consent.

**EXCLUSION CRITERIA:** Pregnant women on admission.

**INSTRUMENTS FOR DATA COLLECTION:** Data were collected using a semi-structured interviewer administered questionnaire.

**DATA ANALYSIS:** Questionnaires were checked for errors and omissions at the end of each day. Data were entered into the computer and analyzed using SPSS version 20.0. Data errors were checked and corrected. Data were represented in tables, bar charts, pie-charts.

### 3. RESEARCH RESULTS

**TABLE 1: Socio-demographic Characteristics of Respondents**

| VARIABLES             | FREQUENCY (N=230) | PERCENTAGE (%)    |
|-----------------------|-------------------|-------------------|
| <b>Age (Years)</b>    | <b>Frequency</b>  | <b>Percentage</b> |
| 25-31                 | 56                | 24.3              |
| 32-38                 | 120               | 52.2              |
| 39-45                 | 54                | 23.5              |
|                       |                   |                   |
| <b>Marital Status</b> |                   |                   |
| Single                | 6                 | 2.6               |
| Married               | 219               | 95.2              |
| Widowed               | 5                 | 2.2               |

|  |      |       |
|--|------|-------|
|  |      |       |
| <b>Occupation</b>                        |      |       |
| Civil Servant                            | 73   | 31.7  |
| Traders/business owner                   | 66   | 28.7  |
| House wives                              | 24   | 10.4  |
| Clergy                                   | 4    | 1.7   |
| Artisan                                  | 23   | 10.0  |
| Self employed professional               | 40   | 17.4  |
|  |      |       |
| <b>Highest Educational Qualification</b> |      |       |
| No formal education                      | 7    | 3.0   |
| Primary school completed                 | 6    | 2.6   |
| Secondary school completed               | 76   | 33.0  |
| Tertiary                                 | 141  | 61.3  |
|  |      |       |
| <b>Parity</b>                            |      |       |
| 0  | 89   | 38.7  |
| 1  | 44   | 19.1  |
| 2  | 48   | 20.9  |
| 3  | 34   | 14.8  |
| 4  | 9    | 3.9   |
| 5  | 5    | 2.2   |
| 7  | 1    | 0.4   |
| Mean parity                              | 1.35 | ±1.39 |

Table 1 shows the socio-demographic characteristics of the respondents. The commonest age group was the 32-38 years age group which made up 52.2% of all the respondents. Majority of

the respondents were married (95.2%). The commonest occupation was civil service (31.7%). The commonest educational level was tertiary education (61.3%).

**Table 2: Respondents’ knowledge regarding ITN and malaria in pregnancy**

| <b>Variable</b>                                       | <b>Frequency</b> | <b>%</b> |
|---|------------------|----------|
| <b>Awareness regarding Malaria in pregnancy</b>       |                  |          |
| Yes   | 226              | 98.3     |
| No  | 4                | 1.7      |
| <b>Respondents’ awareness regarding ITN</b>           |                  |          |
| Yes   | 228              | 99.1     |
| No  | 2                | 0.9      |
| <b>Source of awareness of Malaria in pregnancy</b>    |                  |          |
| Hospital  | 180              | 79.6     |
| Church  | 21               | 9.3      |
| Relatives and Friends                                 | 60               | 26.5     |
| Mass Media  | 91               | 40.3     |
| Others  | 7                | 3.1      |
| <b>Respondents’ source of knowledge regarding ITN</b> |                  |          |
| Hospital  | 179              | 50.7     |
| Church  | 18               | 5.1      |
| Relatives/friends                                     | 51               | 14.4     |
| Mass media  | 97               | 27.5     |
| Others  | 8                | 2.3      |
| <b>Respondents’ knowledge of the cause of malaria</b> |                  |          |
| Mosquito bites  | 223              | 77.4     |

|   |     |      |
|---|-----|------|
| Oily foods  | 23  | 8.0  |
| Pear fruit  | 41  | 14.2 |
| Others  | 1   | 0.3  |
|   |     |      |
| <b>Respondents' knowledge that malaria is dangerous in pregnancy</b>    |     |      |
| Yes   | 193 | 83.9 |
| No  | 37  | 16.1 |
|   |     |      |
| <b>Respondents' awareness of free provision of ITN in Anambra State</b> |     |      |
| Yes   | 206 | 89.6 |
| No  | 24  | 10.4 |

Table 2 shows the knowledge of the respondents regarding ITN and Malaria in pregnancy. Majority (98.3%) were aware of malaria in pregnancy, also majority (99.1%) of the respondents are aware of ITN. Majority (77.4%) of the respondents knew that Malaria is transmitted through mosquito bites. Majority (83.9%) of the respondents knew that malaria in pregnancy is dangerous, also 89.6% of the respondents knew that ITNs were distributed free in Anambra State.

**Table 3: Respondents' attitude towards ITN**

| Variable                                 | Frequency | %    |
|--|-----------|------|
| <b>Respondents' attitude towards ITN</b> |           |      |
| Feel ITN is useful                       | 226       | 98.3 |
| Feel ITN is not useful                   | 4         | 1.7  |
|  |           |      |
| <b>Willing to buy ITN</b>                |           |      |
| Yes                                      | 187       | 81.3 |
| No                                       | 43        | 18.7 |

Table 3 shows the attitude of the respondents towards ITNs. Majority (98.3%) of the respondents considered ITNs as useful, also majority (81.3%) of the respondents were willing to buy ITN.

**Table 4: Practice regarding ITN**

| Variable  | Frequency | %    |
|---|-----------|------|
| <b>Respondents ownership of ITN</b>                               |           |      |
| Yes   | 185       | 80.4 |
| No  | 45        | 19.6 |
|   |           |      |
| <b>Respondents who slept inside their ITNs the previous night</b> |           |      |
| Yes   | 114       | 49.6 |
| No  | 116       | 50.4 |

Table 4 shows the practice regarding ITN among the respondents. Majority of the respondents (80.4%) owned ITN, but only 49.6% slept inside their nets the previous night.

#### **4. DISCUSSION**

This study was done among 250 women accessing antenatal services at the antenatal clinic of Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, Anambra State, Nigeria. The commonest age group was the 32-38 years age group which made up 52.2% of all the respondents. Majority of the respondents were married (95.2%). The commonest occupation was civil service (31.7%) and the commonest educational level was tertiary education (61.3%) unlike the finding among pregnant women in 21 states of Nigeria which reported that majority of the women were house wives (37.4%) and the commonest educational level of the pregnant women studied was secondary education (35.6%).<sup>103</sup> The status of tertiary education being the commonest in our study and civil service being the commonest occupation may be because our study area is an urban area located in the south-eastern part of Nigeria which has a high literacy level, unlike the other study which was conducted in both urban and rural areas in 21 different states scattered across the 6 geopolitical zones of Nigeria.

Majority (98.3%) of the respondents were aware of malaria in pregnancy, also majority (99.1%) of the respondents were aware of ITN unlike in Kwara State, Nigeria where only 36% of the pregnant women studied were aware of ITN.<sup>104</sup> Similarly in Kilifi district of Kenya, it was reported that 86.9% of pregnant women studied were aware of ITNs.<sup>23</sup> Majority (77.4%) of the respondents knew that Malaria is transmitted through mosquito bite, similarly in Northern Ethiopia 90.2% of the pregnant women knew that malaria is transmitted through mosquito bite.<sup>13</sup> Majority (83.9%) of the respondents knew that malaria in pregnancy is dangerous, also 89.6% of the respondents knew that ITNs were distributed free in Anambra State. Majority (98.3%) of the respondents considered ITNs useful, also majority (81.3%) of the respondents were willing to buy ITN. This shows that the respondents have a good attitude towards ITN. Majority of the respondents (80.4%) owned ITN and this is similar to what was reported in a study done by Belay M. et al in Northern Ethiopia<sup>13</sup> which showed that the ownership of insecticide treated nets among pregnant women in Northern Ethiopia was 59%. A study reported that in 15 Sub-Saharan African countries the ownership of ITN ranged from 3.3% to 44.4%.<sup>101</sup>

In our study only 49.6% of the pregnant women slept inside their nets the previous night. This is higher than the finding of Nigerian Demographic and Health Survey 2013 (NDHS 3013) which reported that 18% of the pregnant women surveyed slept inside a mosquito net the prior night.<sup>106</sup> A study reported that in 15 Sub-Saharan African countries studied, 1.1% to 19.7% of pregnant women studied slept inside ITN the previous night.<sup>101</sup> In Kenya only 5% of the pregnant women studied slept inside ITN the previous night<sup>102</sup> but in Northern Ethiopia it was reported that 58.4% of the pregnant women slept inside ITN the previous night.<sup>13</sup> This higher percentage in our study may be because the pregnant women were urban dwellers and majority of the women were educated. It is likely that educated women value the importance of ITN more than the uneducated as reported in a study done at Ethiopia.<sup>13</sup>

## **5. CONCLUSION AND RECOMMENDATION**

In this study the knowledge regarding ITNs was high, the attitude regarding ITNs was good but the practice was poor. We therefore recommend as follows: Government should conduct studies to determine the reason for the poor usage of ITNs. Based on their findings interventions (including Behavioural Change interventions) should be instituted to improve usage of ITNs.

**LIMITATION OF THE STUDY:** The reasons for not using ITNs were not explored in the study. Also factors affecting the practice regarding ITNs were not studied.

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