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Research Article

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The Knowledge, Attitude and Prevalence of Malaria in Pregnancy Among Antenatal Care Attendees Using Insecticide-Treated Bed Nets in Imo State, Nigeria

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Abstract
In sub-Saharan Africa, malaria continues to be a serious public health concern and a major cause of maternal and neonatal morbidity and mortality. Pregnancy-related immune changes make pregnant women especially vulnerable. An effective and affordable method for preventing malaria during pregnancy is the use of insecticide-treated bed nets (ITBNs). The knowledge, attitudes, and prevalence of malaria among pregnant women using insecticide-treated bed nets in antenatal care (ANC) clinics at Imo State University Teaching Hospital (IMSUTH), Orlu, and Federal Medical Center (FMC), Owerri, were evaluated in this study. A multistage sample strategy was used to identify 422 pregnant women for a descriptive cross-sectional study. Self-administered and interviewer-administered structured questionnaires were used to gather data. Tally sheets, basic computations, and descriptive statistics were used to analyze the data, and the findings were displayed in tables and charts. 396 of the 422 questionnaires that were issued were accurately filled out and examined, yielding a 93.8% response rate. 367 (92.6%) of the respondents were aware of insecticide-treated bed nets, indicating a high level of ITBN knowledge. Of them, 141 (35.6%) did not utilize ITBNs, whereas 244 (61.6%) reported using them frequently. 56.0% of respondents (222/396) had malaria, whilst 33.8% (134/396) said they had not had malaria while pregnant. Malaria prevalence is still high among pregnant women receiving ANC at IMSUTH Orlu and FMC Owerri, despite their high awareness and limited use of ITBNs. The perceived harshness of insecticides and discomfort from the heat were the main obstacles to regular use. To strengthen efforts to prevent malaria during pregnancy, more community sensitization, more physician participation in malaria prevention counseling, and improved health education are advised.

Keywords: Imo State, knowledge, attitude, prevalence, antenatal care, insecticide-treated bed nets, and malaria in pregnancy.

INTRODUCTION

Malaria is one of the most deadly infectious diseases in the world, and it is still the second biggest cause of mortality from infectious diseases, after tuberculosis. Malaria is still a key cause of the high maternal death rate in sub-Saharan Africa. Nigeria is responsible for a large part of the world's malaria burden [1]. Pregnancy makes you far more likely to have malaria because of changes in your body and immune system that happen throughout pregnancy. At least six million pregnant women around the world are thought to be at risk of getting malaria each year. This leads to about 10,000 maternal fatalities and more than 200,000 newborn deaths each year. When a woman is pregnant and has malaria, it can cause major problems for her and her baby, such as maternal anaemia, spontaneous miscarriage, intrauterine development restriction, stillbirth, preterm, low birth weight, foetal distress, and congenital malaria [2].

The pathophysiology of malaria during pregnancy has been thoroughly investigated. Plasmodium falciparum-infected erythrocytes preferentially concentrate in the placental intervillous gaps by adhering to chondroitin sulphate A molecules produced on placental syncytiotrophoblasts. In areas where malaria is common, the prevalence of placental parasitaemia has been reported to range between 10% and 45%. The risk of infection rises as pregnancy progresses, especially during the second trimester and continuing into the immediate postpartum period. The illness burden is greater in primigravidae and secundigravidae compared to multigravidae [3].

Pregnancy also makes mosquitoes more appealing. Pregnant women attract roughly twice as many Anopheles mosquitoes than non-pregnant women, presumably because they breathe out more carbon dioxide, have higher skin temperatures, and their skin gives off different volatile chemicals. Pregnancy-related increases in circulating corticosteroids, especially cortisol, inhibit cellular immunity, hence heightening vulnerability to malaria [4].

Due to the high number of cases of malaria during pregnancy, global efforts like the World Health Organization-led Roll Back Malaria (RBM) program have focused on three main strategies: using insecticide-treated bed nets (ITBNs), intermittent preventive treatment in pregnancy (IPTp), and quick diagnosis and good case management of malaria [5].Long-lasting insecticidal nets (LLINs) and other insecticide-treated bed nets have been shown to lower the risk of malaria transmission, placental parasitaemia, low birth weight, stillbirths, and spontaneous abortions. Despite its demonstrated advantages, usage remains low in many high-burden nations, such as Nigeria, because of misunderstandings, discomfort, environmental issues, and a lack of health education [6].

Comprehending the knowledge, attitudes, and practices of pregnant women concerning malaria prevention is crucial for enhancing ITBN use and attaining malaria control objectives. This study evaluated the knowledge, attitudes, and prevalence of malaria among pregnant women attending prenatal clinics at two prominent tertiary health institutions in Imo State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Imo State, located in southeastern Nigeria. The state is bordered by Abia State to the east, the River Niger and Delta State to the west, Anambra State to the north, and Rivers State to the south. Imo State lies between latitudes 4°45′N and 7°15′N and longitudes 6°50′E and 7°25′E, covering an area of approximately 5,100 km². The study sites were Imo State University Teaching Hospital (IMSUTH), Orlu, and Federal Medical Centre (FMC), Owerri.

Study Design

This was a descriptive cross-sectional study assessing the knowledge, attitude, and prevalence of malaria among pregnant women using insecticide-treated bed nets and attending antenatal care clinics.

Study Population

The study population comprised pregnant women attending antenatal clinics at IMSUTH Orlu and FMC Owerri during the study period.

Eligibility Criteria

Inclusion criteria: Pregnant women attending ANC at the study sites.
Exclusion criteria: Non-pregnant women.

Sample Size Determination

The minimum sample size was calculated using the formula:

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

Where:
n = desired sample size
Z = standard normal deviation (1.96)
p = estimated proportion (0.5)
q = 1 − p
d = margin of error (0.05)

This yielded a minimum sample size of 384. A 10% attrition rate (38 respondents) was added, resulting in a final sample size of 422.

Ethical Considerations

Ethical approval was obtained from the Ethics Committees of IMSUTH Orlu and FMC Owerri. Informed consent was obtained from all participants, and confidentiality and anonymity were assured.

Data Collection

Data were collected using a structured questionnaire developed with expert input to ensure content validity. Both self-administered and interviewer-administered methods were used to accommodate literate and non-literate respondents.

Statistical Analysis

Data were analyzed using tally sheets and simple descriptive statistics. Results were presented using frequency tables, bar charts, histograms, and pie charts.

RESULT

A total of 396 of 422 questionnaires, were correctly filled, giving a response rate of 93.8%.

MRA = Multiple response allowed.

ANTENATAL CARE	FREQUENCY	PERCENTAGE (%)
IMSUTII	83	21.0
FMC	309	78.0
No response	4	1.0
Total	396	100

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No response	4	1.0
Total	396	100

EDUCATION	FREQUENCY	PERCENTAGE (%)
No formal education	1	0.2
Primary	9	2.3
Secondary	92	23.2
Tertiary	287	72.5
No response	7	1.8
Total	396	100

OCCUPATION	FREQUENCY	PERCENTAGE (%)
Self employed	203	51.2
Civil servant	117	29.7
Professional	38	9.6
Others	22	5.5
No response	16	4.0
Total	396	100

NO OF PREGNANCY	FREQUENCY	PERCENTAGE (%)
1	149	37.6
2	91	23.0
3	71	18.0
4	56	14.1
Others	24	6.0
No Response	5	1.3
Total	396	100

GESTA TATIONAL AGE	FREQUENCY	PERCENTAGE (%)
1-3	50	12.6
4-6	110	27.8
7-9	209	52.8
No Response	27	6.8
Total	396	100

The study showed that majority of the women were primigravidas within the age group 26 30 years their third trimester, and their highest level of education was tertiary.

TABLE 2: KNOWLEDGE

DO YOU KNOW BOUT MALARIA?	FREQUENCY	PERCENTAGE (%)
YES	385	97.2
NO	4	1.0
NO RESPONSE	7	1.8
Total	396	100

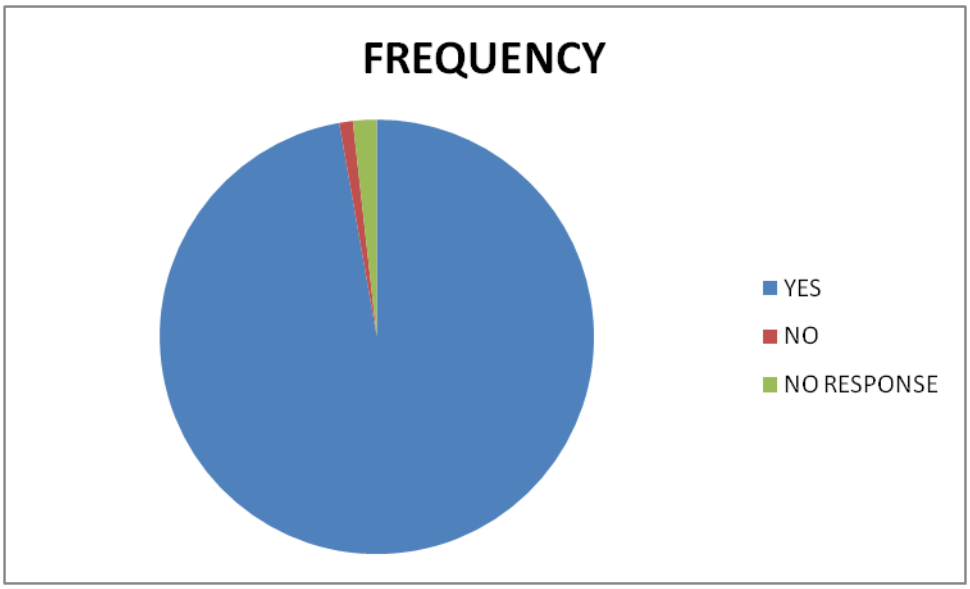

Figure 1: Showing percentage of pregnant women that know about malaria with respondent that having greater knowledge.

CAUSE OF MALARIA?	FREQUENCY	PERCENTAGE (%)
Mosquito	390	92.5
Bed bug	1	0.2
Rat	1	0.2
Too much eating of oil	19	4.5
Do not know	6	1.4
Others	3	0.7
No response	2	0.5
Total	396	100

CAN MALARIA BE	FREQUENCY	PERCENTAGE (%)
Yes	381	96.2
No	8	2.0
No response	7	1.8
Total	396	100

SIGNS AND SYMPT PTOMS OF MAL ALARIA?	FREQUENCY	PERCENTAGE (%)
Fever	330	39.8
Headache	180	21.7
Weakness	135	16.2
Sweating	57	6.9
Vomiting	90	10.8
Diarrhroea	28	3.4
No response	10	1.2
Total	830	100

DO YOU KNOW ABOUT ITBNs?	FREQUENCY	PERCENTAGE (%)
YES	367	92.6
NO	9	2.3
NO RESPONSE	20	5.1
Total	830	100

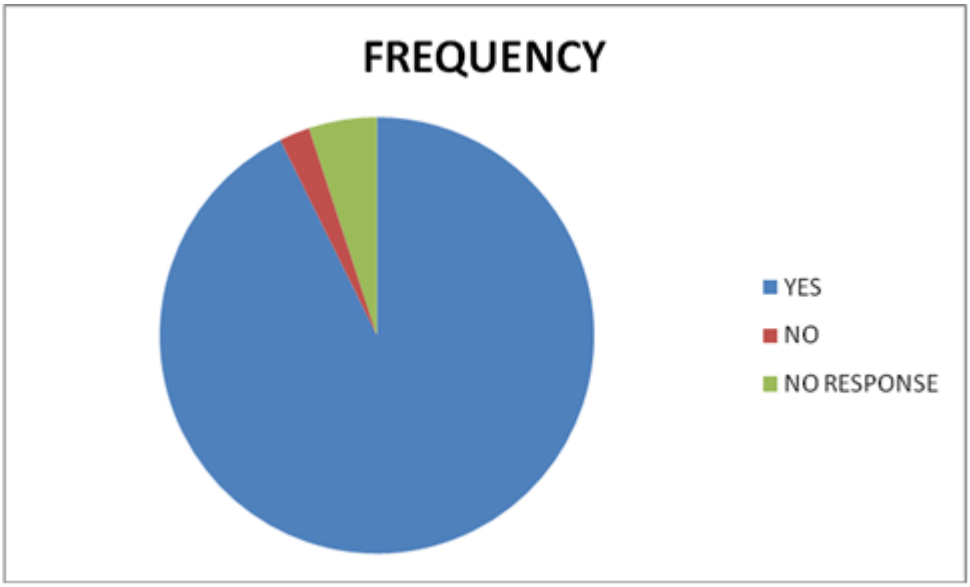

Figure 2: showing the percentage of respondents who know about ITBNs with most having good knowledge.

SOURCES OF INFORMATION	FREQUENCY	PERCENTAGE (%)
HOME/NEIGHBOUR	46	9.3
RADIO/TV	139	28.2
HOSPITAL	202	41.0
HEALTH WORKERS	88	17.9
OTHERS	8	1.6
No response	10	2.0
Total	493	100

TA TABLE 3: ATTITUDE

SOURCES OF INFORMATION	FREQUENCY	PERCENTAGE (%)
YES	244	61.6
NO	141	35.6
NO RESPONSE	11	2.8
Total	396	100

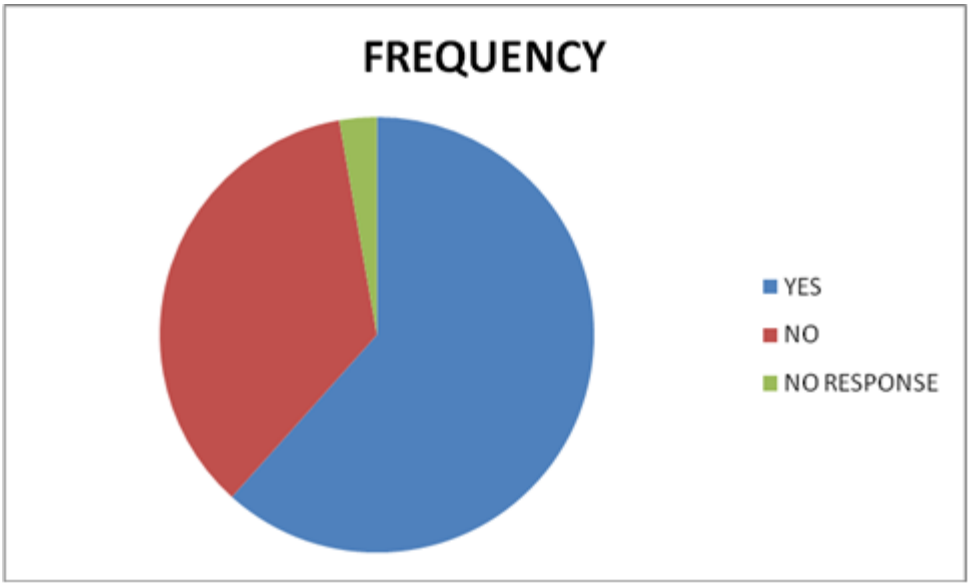

Figure 3: Showing percentage of attitude of pregnant women toward the use of ITBNs, most respondents use ITBNs but also a large number do not use it.

IF NO WHY?	FREQUENCY	PERCENTAGE (%)
no benefit See no	14	9.1
Have not received	37	24.3
Uncomfortable sleeping in it	48	31.3
Causes heat	38	24.8
Expensive	5	3.3
Destroyed	0	0.0
No response	11	7.2
Total	153	100

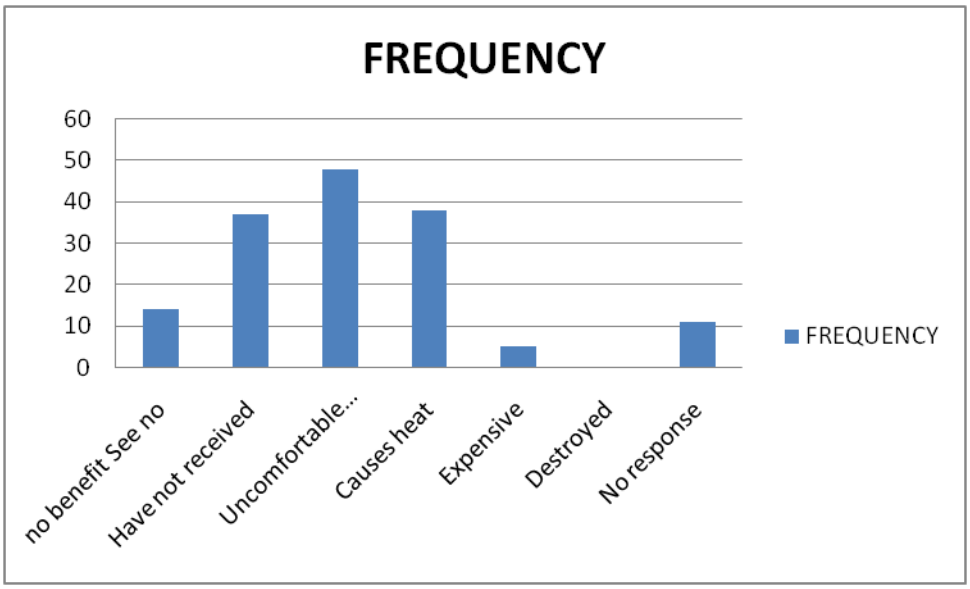

Figure 4: Showing the attitude toward the lack of use of ITBNs and their major reason being that they feel uncomfortable sleeping under it.

IF YES WHEN DO YOU FIX IT?	FREQUENCY	PERCENTAGE (%)
Morning	3	1.2
Afternoon	0	0.0
Evening	36	14.8
At bed time	163	66.8
Always	34	13.9
No response	8	3.3
Total	153	100

WHERE DID YOU GET YOUR ITBNS?	FREQUENCY	PERCENTAGE (%)
Hospital	162	60.6
Neighbor	5	2.0
Market	11	4.1
Government	82	30.7
No response	7	2.6
Total	267	100

HOW DID YOU GET IT?	FREQUENCY	PERCENTAGE (%)
Paid	20	7.4
FREE	243	87.6
No response	8	3.0
Total	271	100

HOW LONG HAVE YOU BEEN USING TTBNS?	FREQUENCY	PERCENTAGE (%)
0-6 months	77	31.6
7-12 months	41	16.8
>1 year	107	43.8
No response	19	7.8
Total	244	100

TABLE 4: PREVALENCE

HAVE YOU HAD FREQUENCY MALARIA IN THIS PREGNANCY?	FREQUENCY	PERCENTAGE (%)
YES	222.	56.1
NO	134	33.8
No response	19	10.1
Total	396	100

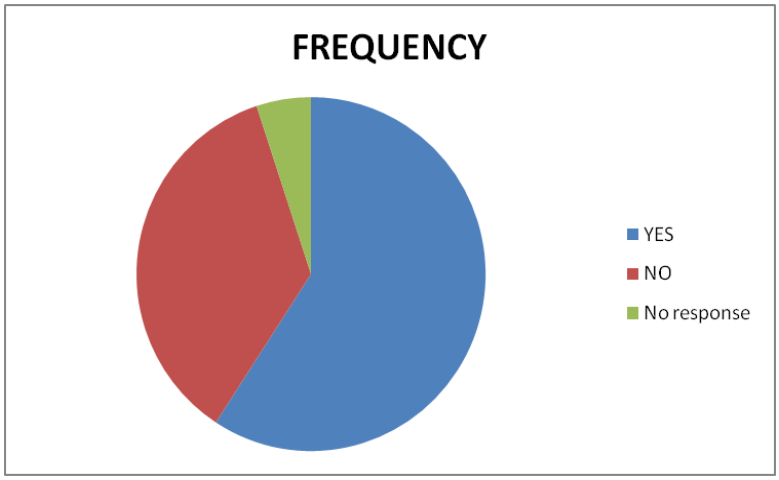

Figure 5: Showing percentage of the prevalence of malaria in pregnancy which has a higher rate despite the use of ITBNs.

DISCUSSION

This study evaluated the knowledge, attitudes, and prevalence of malaria in pregnancy among antenatal clinic attendees utilising insecticide-treated bed nets (ITBNs) at Imo State University Teaching Hospital (IMSUTH), Orlu, and Federal Medical Centre (FMC), Owerri, with a majority of respondents sourced from FMC Ow The results offer significant understanding of malaria prevention strategies among pregnant women in an endemic context [7].

Most of the people who answered were between the ages of 26 and 30, and most of them had completed higher education. This relatively high level of knowledge may help explain why people in this study generally knew a lot about malaria. Almost all of the people who answered the survey knew a lot about malaria; 97.2% had heard of the disease [8]. More than 90% of people knew that mosquito bites were the cause of malaria, which shows that they were also aware of the disease's cause. But a small number of people still had wrong ideas about malaria, saying it was caused by eating too much oil, having bedbugs or rats, or not knowing what caused it. This research shows that false beliefs are still common even if there is a lot of public health message [9].

Most people who answered the question knew that malaria could be prevented in a number of ways. Most people thought that using ITBNs was a good way to stop the disease from spreading. Other techniques that were cited were using door and window nets, cleaning up the environment by cutting bushes, spraying insecticides, and, to a lesser extent, using mosquito coils. These results show how long-term malaria control efforts in Nigeria have worked [10].

In line with the goals of the Roll Back Malaria (RBM) effort, this study found that most pregnant women got their ITBNs via health facilities and government agencies, and a large number of them got the nets for free. This means that Imo State is doing a good job of putting into place programs to eliminate malaria and giving away free ITBNs. Still, a small proportion of people who answered the survey got nets by buying them themselves or getting them from family and friends [11]. Even though ITBNs were widely available, they weren't used to their full potential. A significant percentage of respondents indicated non-utilization of ITBNs because to discomfort, high heat, and a perceived absence of benefit. These characteristics are often cited as obstacles to ITBN utilisation in tropical areas and persist in hindering malaria control initiatives. Hospitals, health workers, and the mass media were named as the main sources of knowledge about how to use ITBNs. This shows how important healthcare facilities are for teaching pregnant women about malaria. Most people who answered said they only fixed their ITBNs at night, while fewer said they fixed them in the evening or left them in place all the time. This method may make the nets less successful in keeping mosquitoes away, especially in places where mosquitoes bite earlier in the evening [12].

The study also showed that people didn't know enough about ITBN maintenance and didn't have the right mindset towards it. ITBNs should be retreated every six months, and long-lasting insecticidal nets (LLINs) can work for up to three years. However, many people said they had used their nets for more than a year without retreatment. Most people wanted to replace old nets instead of retreating them because they didn't know enough about how to do it. This lack of information could make ITBNs less successful at preventing malaria in the long run [13].

More than half of the people who answered said they had malaria during the index pregnancy, even though they used ITBN. This conclusion may be due to uneven or inappropriate application of ITBNs, the fact that pregnant women have weaker immune systems, and the fact that mosquitoes are more attracted to pregnant women. Higher amounts of steroid hormones, especially cortisol, during pregnancy weaken the immune system of cells. Changes in the body, like a rise in skin temperature and the amount of air breathed, also make pregnant women more attractive to mosquitoes. These factors may elucidate the persistent incidence of malaria despite prophylactic interventions [12].

CONCLUSION

This study demonstrates that pregnant women visiting prenatal clinics at IMSUTH Orlu and FMC Owerri possess a significant understanding of malaria and the preventive function of insecticide-treated bed nets. Most people got ITBNs for free from hospitals and government-supported programs, which shows that malaria control programs in Imo State are working.

But ITBNs didn't work as well as they could have because people were uncomfortable with the heat, thought the chemicals were too harsh, didn't take care of them properly, and didn't use them consistently. A substantial number of responders still contracted malaria during pregnancy; however, the reduced incidence among persistent users indicates that ITBNs have a significant role in malaria prevention.

To reduce malaria transmission and enhance maternal health outcomes, malaria prophylaxis during pregnancy should go beyond just giving out ITBNs. It should also include comprehensive health education, communication about changing behaviours, and other ways to manage vectors.

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