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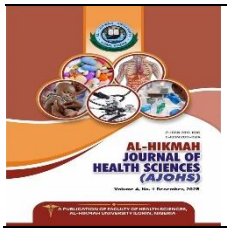

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Original Article

Assessment of Insecticide-Treated Nets Utilization and Perceived Effectiveness in Reducing Malaria Prevalence Among Community Members in Ilorin Metropolis

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ABSTRACT

Background: Malaria remains a major public health challenge in Nigeria despite widespread distribution of insecticide-treated nets (ITNs).

Objective: This study assessed the availability, utilization, perceived effectiveness, and barriers to the use of insecticide-treated nets among community members in Ilorin Metropolis, Kwara State.

Methods: A descriptive cross-sectional survey design was adopted. Four hundred respondents were selected using a multistage sampling technique. Data were collected using a structured questionnaire and analyzed using descriptive statistics and Chi-square tests at $p < 0.05$.

Results: ITN ownership was reported by 37.5% of respondents, while only 35.0% slept under an ITN the night preceding the survey. Although 70.0% perceived ITNs as effective, 42.5% reported self-reported malaria episodes despite ITN use. Heat, discomfort, and inadequate household coverage were the most commonly reported barriers.

Conclusion: ITN utilization in Ilorin Metropolis remains suboptimal despite moderate awareness. Addressing behavioral and household-level barriers is essential for improving malaria prevention outcomes.

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Introduction

Malaria remains one of the most significant public health challenges in sub-Saharan Africa, particularly in Nigeria, where it is a leading cause of morbidity and mortality (WHO, 2023). The disease, caused by Plasmodium parasites and transmitted through the bites of female Anopheles mosquitoes, disproportionately affects vulnerable populations such as children under five and pregnant women (Okonofua et al., 2020).

Global malaria statistics reveal that in 2020, Nigeria accounted for 27 percent of global malaria cases, as well as nearly a quarter of global malaria deaths (Mohamed NS, 2024).

Insecticide-treated nets (ITNs) remain a cornerstone of malaria prevention strategies, particularly in highly endemic regions such as Nigeria (WHO, 2023). Therefore, this study seeks to fill the evidence gap by assessing the availability, utilization, and perceived effectiveness and barriers hindering consistent use of

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ITNs in Ilorin Metropolis. The findings are expected to inform policy and guide targeted interventions aimed at increasing ITN usage and ultimately reducing the burden of malaria in the region.

The study addressed the following research questions: (i) What is the level of ITN availability and ownership? (ii) To what extent are ITNs utilized? (iii) How are ITNs perceived in terms of effectiveness? (iv) What barriers limit consistent utilization? (v) Is there an association between perceived effectiveness and utilization? It was hypothesized that the perceived effectiveness of ITNs is significantly associated with their utilization.

Methodology

Study Design

A descriptive cross-sectional survey design was employed to assess the availability, utilization, and perceived effectiveness of insecticide-treated nets (ITNs) among community members in Ilorin Metropolis, Kwara State. This design enabled the collection of data at a single point in time to examine prevailing practices and perceptions related to ITN use.

Study Area and Population

This study was conducted in Ilorin Metropolis, the capital of Kwara State, Nigeria. Ilorin Metropolis is made up of three Local Government Areas (LGAs): Ilorin East, Ilorin West, and Ilorin South. The study population comprised adult residents aged 18 years and above, particularly household heads or individuals responsible for health-related decisions.

Sample Size and Sampling Technique

A sample size of 400 respondents was determined using the Taro Yamane formula. A multistage sampling technique was employed, involving the selection of local government areas, systematic selection of households, and random selection of one eligible respondent per household.

Data Collection

Data were collected using a structured questionnaire covering socio-demographic characteristics, ITN availability, utilization, perceived effectiveness, and barriers to use. Questionnaires were administered through face-to-face interviews by trained research assistants. The questionnaire consisted of sections on socio-demographic characteristics, ITN ownership, utilization patterns, perceived effectiveness, and barriers to use. The instrument was pretested among 10% of the study population in a similar community outside the study area.

Validity and Reliability

The validity of the instrument was ensured through expert review by specialists in public health and malaria control, who examined the questionnaire for content accuracy, relevance, and alignment with the study objectives. Reliability testing using Cronbach's alpha yielded a coefficient of 0.82, indicating high internal consistency.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize variables, while Chi-square tests were conducted to examine associations between variables. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical principles were upheld at the Kwara State Ministry of Health with approval ID: ERC/MOH/2025/11/532. Participation was voluntary, informed consent was obtained, confidentiality was ensured, and respondents retained the right to withdraw at any time.

Data Analysis and Results

This chapter presents the results obtained from the administered questionnaires. The data were analyzed and presented in tabular form for clarity.

Table 1: Availability And Ownership of Insecticide-Treated Nets (ITNs)

Ownership of ITNs		
Yes	150	37.5
No	250	62.5
Number of ITNs owned (n=150)		
1	60	40.0
2	50	33.3
3	25	16.7
4 and above	15	10.0
Main Source of ITNs		
Government campaign	70	46.7
Health facility	35	23.3
NGO	30	20.0
Purchased	15	10.0

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Table 2: Utilization of Insecticide-Treated Nets Among Respondents

Did you sleep under an ITN last night	Frequency	Percentage
Yes	140	35.0
No	260	65.0
Regular Household Use of ITNs		
Yes	63	15.8
No	337	84.2
Frequent use of ITNs		
Every night	95	23.8
Seasonally	105	26.2
Rarely	70	17.5
Never	130	32.5

Table 3: Perceived Effectiveness of ITNs and Self-Reported Malaria Experience

Variables	Frequency	Percentage (%)
Reported malaria despite ITN use		
Yes	170	42.5
No	230	57.5
Perceived effectiveness of ITNs		
Very effective	180	45.0
Moderately effective	140	35.0
Not effective	80	20.0

Table 4: Barriers To Utilization of ITNs (Multiple Responses)

Heat/discomfort	180	45.0
Difficult to hang	95	23.8
Causes skin irritation	60	15.0
Not enough for all household members	140	35.0
Cultural or religious beliefs	40	10.0
Fear of chemical exposure	85	21.3
Poor ventilation	100	25.0

Table 5: Summary of Significant Associations Between Selected Variables and ITN Utilization

Variables	Test	χ^2	df	p-value	Interpretation
Household size × ITN ownership	Chi-square	6.84	2	0.008	Significant
Perceived effectiveness × ITN utilization	Chi-square	15.27	3	<0.001	Significant

Note: Statistical significance set at $p < 0.05$.

Discussion

The findings suggest that while ITNs are present in Ilorin Metropolis, their availability remains inadequate in terms of both coverage and quality. This inadequacy reflects the broader ownership-utilization gap identified in earlier studies, the Nigeria Malaria Indicator Survey (NMIS, 2021). The implication is that without ensuring consistent and sufficient net distribution, alongside timely replacement, the full potential of ITNs in reducing malaria transmission in Ilorin Metropolis cannot be realized. The findings show that ITN utilization in Ilorin Metropolis is alarmingly low despite availability. The evidence underscores that ownership alone does not translate into effective protection. Consistent with earlier literature (Pulford *et al.,* 2011; Afolabi *et al.,* 2020), this study reaffirms the urgent need for behavioral interventions, education, and continuous advocacy to improve ITN utilization rates in Nigerian communities. While most respondents acknowledge ITNs as an effective tool against malaria, actual experiences of malaria infection, coupled with fears about chemical safety, continue to shape skepticism. These results reinforce the argument by Afolabi *et al.* (2023) that sustained health education, net replacement strategies, and reassurance about ITN safety are critical to enhancing community trust and promoting consistent utilization. the results show that barriers to ITN use are multifaceted but dominated by discomfort, shortage of nets, and practical challenges

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in installation. These findings reinforce the argument by Afolabi *et al. (*2023). This study relied on self-reported data, which may be subject to recall and reporting bias. Additionally, the cross-sectional design limits causal inference. Despite these limitations, the findings provide important insights for urban malaria programming, emphasizing the need for sustained behavior change communication, improved household coverage, and routine ITN replacement strategies.

Conclusion

This study concluded that ITN availability and utilization among residents of Ilorin Metropolis remain inadequate despite ongoing distribution campaigns. Ownership is low and often insufficient for household sizes, leading to selective usage. Utilization is further hindered by discomfort, poor installation, and skepticism about ITN effectiveness and chemical safety. Household size and community perceptions were found to be significant determinants of ownership and utilization. The findings therefore confirm that the fight against malaria cannot rely on distribution campaigns alone, but requires strategies that address household needs, perceptions, and behavioral barriers.

Recommendations

Based on the findings of this study, targeted and multi-level interventions are recommended to improve the availability, utilization, and effectiveness of insecticide-treated nets (ITNs) in Ilorin Metropolis. Government and malaria control agencies should strengthen routine and mass ITN distribution campaigns to ensure adequate household coverage, with particular emphasis on urban communities that may be underserved. Regular net replacement programs should be institutionalized to address the use of expired or damaged ITNs, while continuous community sensitization should be implemented to correct misconceptions, improve trust in ITN safety, and promote consistent year-round use.

Public Health Impact

The findings of this study highlight critical gaps between the availability and utilization of insecticide-treated nets (ITNs) in an urban Nigerian setting. Despite widespread awareness of ITNs as an effective malaria prevention strategy, inadequate household coverage, inconsistent utilization, and negative perceptions significantly limit their protective impact. These gaps underscore the need for malaria control programs to move beyond mass distribution strategies and prioritize sustained behavior change communication, routine net replacement, and community-based monitoring of ITN use. By addressing both structural and behavioral barriers to ITN utilization, public health interventions can enhance the effectiveness of ITNs, reduce malaria transmission, and contribute to improved health outcomes in Ilorin Metropolis and similar urban communities.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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