PREVALENCE AND TREND PATTERN DISTRIBUTION OF MALARIA AMONG PREGNANT WOMEN IN IREWOLE LOCAL GOVERNMENT AREA OF OSUN STATE, NIGERIA

Abstract

The endemic nature of malaria poses a significant threat, particularly impacting vulnerable populations such as children under five and pregnant women, with substantial mortality rates, especially in developing countries. This study focuses on assessing the prevalence and distribution patterns of malaria among pregnant women in Irewole Local Government Area, Osun State. The researcher collected records spanning four years from health centers, revealing malaria distribution among pregnant women. Two hundred pregnant women undergoing antenatal care participated in the study, providing socio-demographic details, malaria incidence, management protocols, recovery patterns, and survival rates through questionnaires. One hundred participants underwent parasitemia testing to determine parasite density, along with an assessment of hematological parameters. Comparative samples were collected from ten non-pregnant women. The analysis exposed distribution trends, current status, and malaria's impact on pregnant women in the study area. This research seeks to contribute to reducing malaria endemicity among pregnant women, not only in Irewole Local Government Area but across Nigeria. The findings aim to inform targeted interventions and policies for better maternal health outcomes in malaria-endemic regions.

Keywords: Malaria, Parasitemia, pregnant women, endemic, prevalence, Pandemic

Introduction

Malaria remains a persistent and life-threatening disease, annually affecting millions and significantly impacting mortality rates, particularly among children under five and pregnant women, contributing to nearly 30% of recorded deaths in hospitals and health centers (Akinyele et al., 2019)[1]. The global significance of malaria persists, notably in endemic countries such as Nigeria, where 588 million people are at risk (World Malaria Report, 2021)[2]. Caused by five Plasmodium species, with Plasmodium falciparum being the most lethal, malaria continues to pose a significant public health challenge, prevalent in numerous African countries (World Malaria Report, 2021)[2]. Recent findings underscore Nigeria and the Democratic Republic of the Congo's substantial contribution, accounting for over 40% of the estimated total deaths due to malaria (WHO | World Malaria Report, 2021)[2].

Globally, malaria remains a devastating international health concern, with nearly 600 million new infections and 3 million deaths reported annually. The impact is particularly severe among children under five and pregnant women in sub-Saharan Africa, where almost 30% of the annual mortality in this population is attributed to malaria (Akinyele et al., 2019)[1].

Pregnant women residing in malaria-endemic regions pose a significant concern due to their reduced immunity during pregnancy. Moreover, in areas characterized by stable malaria transmission, a substantial number of malaria cases during pregnancy exhibit no symptoms (Anorlu et al., 2019)[3]. The absence of symptoms in pregnant women is attributed to acquired immunity from previous exposures to malarial infections (Staalsoe et al., 2020)[4].

Regrettably, malaria poses a dual threat to both the expectant mother and the developing fetus. Various regions in Nigeria have reported divergent prevalence rates of malaria in pregnancy, ranging from 19.7% to 72.0% (Uneke et al., 2020)[5]. Malaria can lead to adverse maternal

outcomes such as anemia, hypoglycemia, and, in severe cases, maternal death. Sub-Saharan Africa alone witnesses an estimated 10,000 maternal deaths annually due to malaria-related anemia (Desai et al., 2021)[6]. Furthermore, malaria significantly contributes to low birth weight in infants due to compromised nutrient delivery to the placenta (Newman et al., 2019)[7].

Malaria holds the top position among the seven diseases initially targeted for global control or eradication by the World Health Organization's Tropical Disease Research (TDR)[8]. This prioritization is due to the disease's significant morbidity, mortality rates, diagnostic challenges, the absence of ideal drugs and effective vaccines, and other behaviors exhibited by its vector.

The impact of malaria extends beyond individual health, adversely affecting the physical, mental, and social well-being of communities, along with impeding the economic development of nations. Studies reveal that households spend up to one thousand, one hundred and twelve naira monthly on malaria treatment, presenting a considerable financial burden, particularly given the economic status of the population (Onwujekwe et al., 2023)[9].

Despite efforts such as the Roll Back Malaria program, some reports suggest that government-led malaria control initiatives may face challenges. While certain African countries experienced a 50% reduction in malaria incidence and deaths between 2000 and 2006 due to high intervention coverage and effective surveillance (WHO World Malaria Report 2008), Nigeria, especially concerning malaria in pregnancy, has not shown similar progress. The minimal impact in Nigeria is attributed to resource constraints (Roll Back Malaria).

Malaria is a formidable global public health challenge, particularly in African countries where 40% of the world's population resides in endemic regions. Approximately 25 million pregnancies occur annually in malaria-endemic areas of sub-Saharan Africa, with notably high prevalence among pregnant women and children under five. In Nigeria, 48% of pregnant women were diagnosed with malaria according to the Federal Ministry of Health in 2005, underscoring the severity of the issue (Federal Ministry of Health, 2005)[10].

In the southwestern region of Nigeria, previous studies have documented malaria parasite prevalence rates ranging from 60% to 72% among pregnant women. Malaria during pregnancy has been identified as a significant contributor to maternal mortality, causing up to 10,000 deaths

annually. Additionally, it leads to elevated rates of maternal morbidity, characterized by symptoms such as fever and severe anemia, particularly affecting first-time mothers. The impact extends to adverse outcomes such as low birth weight and placental parasitemia, with an estimated 75,000 to 200,000 infant deaths attributed to malaria infection during pregnancy each year. The detrimental effects of malaria are most pronounced in the first and second pregnancies of women residing in areas of relatively stable transmission. The temporary depression of immunity, facilitating the development of the allograft (fetus), is cited as one of the reasons for the heightened susceptibility of pregnant women to malaria (Adebayo et al., 2021)[11].

In response to this public health challenge, Heads of Government and International Agencies at the African Summit on Roll Back Malaria (RBM) in Abuja in the year 2000 declared a commitment to reducing the malaria burden by at least 50% by 2010. A widely accepted measure in this endeavor involves the utilization of Insecticide-Treated Nets (ITNs), especially in malaria-endemic regions. Consequently, there has been the free distribution of ITNs, donated by the Roll Back Malaria initiative, targeting children under five and pregnant women. Despite decades of research, malaria in pregnancy (MiP) remains a significant public health challenge that has proven challenging to address. Numerous studies from regions with diverse malaria transmission patterns have explored the impact of MiP on both maternal health and birth outcomes. While the predominant consequence of MiP on maternal health is often characterized by anemia, there is a scarcity of data concerning malaria-related maternal mortality. Regarding the fetus, the most frequently observed adverse effect of MiP is an elevated risk of low birth weight (LBW), a critical factor associated with impaired development and increased infant mortality. However, many of these studies rely on single measurement points, typically from cross-sectional surveys or during delivery, failing to capture the multifaceted factors that influence MiP over an extended period.

Accurately assessing MiP is crucial for understanding its effects on birth outcomes and infant health, but it poses challenges due to the involvement of various factors that are sometimes difficult to fully capture. The continuity or intermittency of MiP depends on factors such as a woman's exposure to vectors, her level of immunity, potential co-infections (e.g., other malaria species, HIV, or helminths), and the efficacy of available treatment and prevention interventions.

Achieving a comprehensive understanding of MiP necessitates considering these diverse factors that play a role over an extended timeframe (Beaudrap et al., 2019)[12].

2. **MATERIALS AND METHODS**

2.1 STUDY LOCATION

This study was conducted among women attending antenatal care at four distinct hospitals in Ikire, Irewole Local Government Area of Osun State. The primary objective was to broaden our understanding and collect pertinent data essential for the study within Irewole Local Government. Established in 1976 through the Local Government Reform, Irewole Local Government has its headquarters in Ikire. Subsequently, Ayedaade Local Government and Isokan Local Government areas were created in 1989 and 1996, respectively, from the original Irewole Local Government. Irewole Local Government shares boundaries with Ayedaade Local Government in the East, Ife-North Local Government in the Southeast, and Egbeda Local Government of Oyo state in the West. Isokan Local Government is located in the southwestern part of Osun State, with altitudes ranging between 121.92 meters and 298.704 meters above sea level. Covering an area of approximately 978.67 square kilometers, Irewole Local Government comprises over 300 villages and hamlets.

Based on the provisional headcount figure from 1991, Irewole Local Government is estimated to have a population of approximately 77,884. The study aimed to leverage the diverse healthcare settings within the local government to enrich our research experience and acquire pertinent data for the specified investigation.

2.2 **STUDY POPULATION**

The target population for this study encompassed women of childbearing age who have had or are currently experiencing pregnancy within the specified Local Government. The study focused

on women actively seeking healthcare services during both ante- and post-natal periods at hospitals or clinics.

Prior to obtaining consent, the purpose of the research was thoroughly explained to each participant. It was emphasized that participation was entirely voluntary, and individuals had the right to decline or withdraw from the study at any stage, even after providing initial consent. Importantly, patients who opted not to participate were assured that their decision would not affect their access to routine care available at the facility.

The study included a cohort of 200 pregnant women regularly attending the antenatal clinic at the hospital. The age range of the participants spanned from 16 to 45 years. Exclusions from the study comprised women currently on any form of malaria chemoprophylaxis, those testing positive for human immunodeficiency virus (HIV), and individuals with sickle-cell disease. These exclusions were made to ensure a more focused and homogenous study population.

2.3 DESIGN AND ADMINSTRATION OF QUESTIONNAIRE

Two hundred (200) self-administered semi-structured questionnaires were meticulously designed and then distributed to pregnant women to assess the impact of malaria. The questionnaires sought information on various aspects, including socio-demographic characteristics, the distribution pattern, and prevalence of malaria fever among pregnant women. Additionally, the survey delved into environmental factors contributing to the spread of malaria, the socio-economic status of the mothers, and the public health management of malaria. This comprehensive approach in questionnaire development aimed to capture a broad spectrum of data, enabling a thorough analysis of the multifaceted factors related to malaria among pregnant women.

2.4 DATA COLLECTION AND SAMPLING TECHNIQUES

2.4.1 Primary Data

To bolster the reliability of the research and achieve its objectives, the study employed pre-coded and semi-structured questionnaires. These instruments were administered to a sample of 200 pregnant women attending antenatal care. The collected information encompassed various domains, including socio-demographic characteristics, the distribution pattern, and prevalence of

malaria fever among pregnant women. Additionally, the questionnaires delved into environmental factors contributing to the spread of malaria, the socio-economic status of the mothers, and the public health management of malaria. The use of structured questionnaires ensured a systematic and standardized approach to data collection, facilitating a comprehensive analysis of factors related to malaria among pregnant women.

2.4.2 Secondary Data

In addition to the questionnaire-based data collection, information was gathered by visiting multiple Health Centers in the study area. This involved procuring records of malaria distribution in pregnant women over the past four years (2019-2022). By including this retrospective data, the study aimed to provide a more comprehensive understanding of the trends and patterns of malaria prevalence among pregnant women in the specified timeframe. This dual approach, combining current survey data with historical health center records, contributes to a more nuanced analysis and interpretation of the factors influencing malaria distribution in the study area.

2.5 SAMPLE SELECTION

The sample selection for this research was conducted through a random process among pregnant women registered for antenatal care at the selected hospitals. Specifically, every third woman attending the antenatal clinic, occurring every other day, was chosen to participate in the study. Selected individuals were provided with detailed information about the research, including its purpose, and their consent for participation was obtained before any sample collection took place. This approach to sample selection ensures a degree of randomness and representation among the pregnant women participating in the study, enhancing the reliability and validity of the research findings. Additionally, the informed consent process upheld ethical standards by clearly communicating the study's objectives and obtaining voluntary agreement from the selected participants.

2.6 Validity and Reliability of the Questionnaire/Instrument

Content Validity: The questionnaire was carefully designed to ensure content validity. Experts in the field of public health and malaria research reviewed the questions to confirm that they effectively addressed the intended variables. This process enhances the content validity, ensuring that the instrument accurately measures the desired constructs.

Face Validity:Before distribution, a pilot test involving a small group of pregnant women was conducted to assess the clarity and appropriateness of the questions. Adjustments were made based on their feedback, contributing to face validity by confirming that the instrument appeared relevant and understandable to the target population.

Construct Validity: The questionnaire aimed to measure a variety of constructs related to malaria, including socio-demographic factors, prevalence, environmental contributors, socio-economic status, and public health management. This comprehensive coverage enhances the construct validity, ensuring that the questionnaire effectively measures the intended variables.

Reliability: To ensure reliability, the questionnaire incorporated consistency checks and clear instructions. Test-retest reliability was assessed by administering the questionnaire to a subset of participants on two occasions, ensuring that responses remained stable over time.

2.7 Control of Confounding Variables

Randomization:The distribution of questionnaires was randomized to minimize the impact of unknown or unmeasured confounding variables. This approach helps ensure that any confounding factors are equally distributed across the study population.

Statistical Control: During data analysis, advanced statistical methods, such as multivariate analysis. This allows for a more accurate assessment of the relationship between the studied variables.

Stratification:Stratification involves analyzing and presenting data within subgroups, which helps identify and control for potential confounding variables. Stratified analysis allows for a more nuanced understanding of the relationships among variables.

By employing these strategies, the study aimed to enhance the validity and reliability of the questionnaire while minimizing the impact of confounding variables, thereby strengthening the overall robustness of the research findings.

3.0 RESULTS AND DISCUSSION

TABLE 1: Socio-demographic Characteristics of Respondents N=200

Variable	Frequency	Percentage
Level of Education		
BSc, MSc	18	10.3%
NCE/Dip.	34	19.2%
SSCE	48	27.1%
Primary Sch. Certificate	57	32.2%
Illiterate	20	11.2%
Age of Respondents		
15-25	43	24.2%
26-35	84	47.4%
36 and above	50	28.2%
Occupation		
Civil Servant	24	13.5%
Trader	81	45.7%
Students	54	10.1%
Farmers	18	30.5%
Religion		
Christian	57	32.2%
Muslim	91	51.4%
Others	29	16.3%
Marital Status		
Married	164	92.6%

Divorce	12	6.8%
Single	1	0.5%

Table 1 reveals that out of the total respondents, 18 (10.3%) held MSc/BSc degrees, 34 (19.2%) had NCE/Diploma qualifications, 48 (27.1%) were SSCE holders, 57 (32.2%) possessed Primary School certificates, and 20 (11.2%) were illiterate. The majority of respondents were found to be Primary School certificate holders.

Regarding age distribution, 43 (24.2%) fell within the 15–25 years range, 84 (47.4%) were aged between 26–35 years, and 50 (28.2%) were 36 years and above. The predominant age group among the respondents was 26–35 years.

Occupationally, 24 (13.5%) were civil servants, 81 (45.7%) engaged in trading, 18 (10.1%) were students, and 54 (30.5%) worked as farmers. The majority of respondents were engaged in trading.

Religiously, 91 (51.4%) identified as Muslim, 57 (32.2%) as Christian, and 29 (16.3%) as followers of other religions. The study predominantly included Muslim respondents.

In terms of marital status, a significant proportion, 164 (92.6%), were married, 12 (6.8%) were divorced, and 1 (0.5%) was single. This distribution indicates that the selected groups for the study align with the desired demographic criteria and are expected to yield meaningful results.

Table 2: Distribution Pattern and Prevalence of Malaria Among Pregnant Women in Irewole LGA, Osun State (N=200)

Statement	Yes (%)	No (%)
Malaria is an endemic disease?	177 (100)	0 (0)
Did you know infected female Anopheles is responsible for the transmission of malaria?	177 (100)	0 (0)
Have you ever had a malaria attack?	177 (100)	0 (0)
When were you last attacked by malaria?		
A week ago	50 (28.2)	0 (0)
A month ago	63 (35.6)	0 (0)
Last year	10 (5.6)	0 (0)
Cannot remember	54 (30.5)	0 (0)
Do you think malaria can be fatal if not treated?	165 (93.2)	12 (6.7)
Are you aware that high temperature/fever, headache, loss of appetite, and body pains are common signs of malaria infection?	165 (93.2)	12 (6.7)

Table 2 demonstrates a high level of awareness among the respondents regarding malaria. All participants (100%) were aware of malaria, understood that infected female Anopheles mosquitoes transmit the disease, and acknowledged having experienced a malaria attack.

Regarding the timing of the last malaria attack, 28.2% reported a week ago, 35.6% a month ago, 5.6% within the last year, and 30.5% could not remember.

The majority of respondents, 93.2%, recognized the potential fatality of untreated malaria, while 6.7% were not aware of this risk. Similarly, 93.2% acknowledged high temperature/fever, headache, loss of appetite, and body pains as common signs of malaria infection, while 6.7% were not familiar with these symptoms. Overall, the findings indicate a robust awareness and understanding of malaria among the surveyed pregnant women in Irewole LGA, Osun State

Table 3: Enabling Factors Facilitating the Spread of Malaria Among Pregnant Women

Questions	Yes (%)	No (%)
Poor sanitation favors breeding of mosquitoes?	119 (67.2)	58 (32.8)
swampy zones encourage the widespread of mosquitoes?	167 (94.4)	10 (5.6)
paddy fields give a wide opportunity for breeding mosquitoes?	142 (80.2)	35 (19.8)
overgrown weeds around shelters give a favorable condition for mosquito breeding?	160 (90.4)	17 (9.6)
water-filled toilets are an excellent environment for the development of mosquito larvae?	129 (72.9)	48 (27.1)
Do you know that poor waste disposal increases the epidemics of malaria fever?	151 (85.3)	26 (14.7)
Do you know that receptacles holding water around your house favor breeding of mosquitoes?	146 (82.5)	31 (17.5)
Poor personal hygiene aids in the outbreak of malaria fever.	117 (66.1)	60 (33.9)
Do you think improper storage and disposal of wastewater encourage mosquito breeding?	148 (83.6)	20 (11.3)
		29 (16.4) did not know

Table 3 illustrates that poor sanitation is associated with the prevalence of malaria among pregnant women, with 67.2% of respondents agreeing. The respondents also believe that swampy zones encourage the spread of mosquitoes (94.4%), and paddy fields provide opportunities for mosquito breeding (80.2%). Overgrown weeds around shelters (90.4%), water-

filled toilets (72.9%), poor waste disposal (85.3%), and receptacles holding water around homes (82.5%) are recognized as favorable conditions for mosquito breeding.

Additionally, 66.1% of respondents agree that poor personal hygiene can encourage the outbreak of malaria. Moreover, improper storage and disposal of wastewater are seen by 83.6% of respondents as factors that encourage mosquito breeding, while 16.4% either disagreed or did not know. These findings highlight the awareness among respondents regarding various environmental factors that contribute to the spread of malaria.

Table 4: Socio-economic Status of Mothers Regarding Malaria Epidemics

Questions	Yes (%)	No (%)
Do you know that one's Occupation determines the epidemics of malaria?	159 (89.8)	18 (10.2)
Do you know that the level of income determines the effect of malaria fever on pregnancy?	160 (90.4)	18 (10.2)
Do you know that some types of food help boost your immunity against malaria fever?	138 (77.9)	35 (19.8)
Do you know that the type of house you live in determines your exposure to mosquitoes?	149 (84.2)	28 (15.8)
Do you believe that inadequate malaria tests can affect pregnancy?	122 (68.9)	55 (31.1)
Do you think the level of education can aid in the spread of malaria fever?	89 (50.3)	88 (49.7)
Do you think that irregular ante-natal attendance can affect pregnant women?	127 (71.8)	50 (28.3)
Do you know that one's lifestyle determines the effect of malaria?	159 (89.8)	18 (10.2)

1. **Occupation and Malaria Density:**
    - A significant majority (89.8%) believe that one's occupation determines the density of malaria. This indicates a perception that certain occupations may expose individuals to a higher risk of contracting malaria.
2. **Income and Malaria's Effect on Pregnancy:**
    - The majority (90.4%) dispute the idea that the level of income determines the effect of malaria fever on pregnancy. This challenges the notion that economic status directly correlates with the impact of malaria during pregnancy.

3. **Food, Immunity, and Malaria:**
    - A substantial portion (77.9%) acknowledges that certain foods boost immunity against malaria fever. This understanding reflects the awareness of the role nutrition plays in preventing or mitigating the impact of malaria.
4. **Housing and Exposure to Mosquitoes:**
    - A large percentage (84.2%) believes that the type of house influences exposure to mosquitoes. This highlights the awareness that living conditions can contribute to the risk of malaria transmission.
5. **Inadequate Malaria Tests and Pregnancy:**
    - A considerable number (68.9%) agrees that inadequate malaria tests can affect pregnancy. This underscores the importance of proper diagnosis and testing during pregnancy to manage and prevent malaria-related complications.
6. **Education and Spread of Malaria Fever:**
    - There is a divided opinion on whether the level of education aids in the spread of malaria fever, with 50.3% supporting this idea. This suggests a need for targeted health education to address misconceptions.
7. **Ante-natal Attendance and Malaria Impact:**
    - A majority (71.8%) recognizes that irregular ante-natal attendance can affect pregnant women concerning malaria. This emphasizes the role of consistent healthcare engagement in managing and preventing malaria during pregnancy.
8. **Lifestyle and Malaria Effect:**
    - A significant majority (89.8%) believes that one's lifestyle determines the effect of malaria. This highlights the holistic understanding that personal habits and choices play a role in malaria susceptibility

Table 5: Public Health Management of Malaria

Questions	Yes (%)	No (%)
Do you visit quack traditional men, prophet to treat or manage malaria infection?	38 (21.5)	139 (78.5)
Do you use ‘akapo’ drug whenever you have malaria because it is cheap?	83 (46.9)	94 (54.1)
Do you believe environmental sanitation is the best prevention/control for mosquitoes breeding?	48 (27.1)	129 (72.9)
Do you use chloroquine tablet to treat malaria when sick?	45 (25.6)	132 (74.6)
Do you use Amodiaquine tablets to treat malaria when sick?	10 (5.6)	167 (94.4)
Do you use Sulphadoxine or pyrimethamine (fansidar) to treat malaria?	155 (87.6)	22 (12.4)
Is Artemisinin Combination Therapy (ACT) effective in the treatment of malaria?	78 (44.1)	99 (51.0)
Does your household have bed nets?	156 (88.1)	21 (11.9)

1. **Treatment Seeking Behavior:**
    - A notable portion (21.5%) visits quack traditional men or prophets for malaria treatment, while the majority (78.5%) seeks treatment from other sources. This suggests a diverse range of health-seeking practices in the community.
2. **Use of ‘Akapo’ Drug:**
    - Almost half of the respondents (46.9%) use 'akapo' drug for malaria treatment, indicating a preference for this option. However, a significant portion (54.1%) opts for other drugs aside from 'akapo'.

3. **Belief in Environmental Sanitation:**

- About one-fourth (27.1%) believes in environmental sanitation as the best prevention/control for mosquitoes breeding, while a larger portion (72.9%) disagrees. This indicates varying perceptions regarding the effectiveness of environmental measures.

4. **Choice of Antimalarial Drugs:**

- Chloroquine tablets are used by 25.6% of respondents, and Amodiaquine tablets are used by only 5.6%. Sulphadoxine or pyrimethamine (fansidar) is the choice for a significant majority (87.6%). This highlights diversity in antimalarial drug preferences.

5. **Perceived Effectiveness of Artemisinin Combination Therapy (ACT):**

- A considerable portion (44.1%) supports the use of ACT as an effective treatment for malaria, while 51.0% express uncertainty or disagreement. This reveals a need for awareness and education on the benefits of ACT.

6. **Ownership and Usage of Bed Nets:**

- The majority (88.1%) of households have bed nets, and 81.4% indicate that mothers own these nets. However, only 43.5% claim to use the bed nets, suggesting a gap between ownership and consistent usage.

7. **Bed Net Usage Practices:**

- All respondents use bed nets overnight. There are different practices, with 31.6% spreading the net outside for an hour before sleeping under it, while 43.5% immediately lay and spread the net on the bed before sleeping under it.

Table 6: Hospital Patronage by Pregnant Women from 2019 to 2022

Facilities	Year	Registered Pregnant Women	Treated & Discharged	Non-Admitted	Percentage of Admission %	Percentage of Non-Admission %	Remarks
General Hospital Ikire	2019	500	458	42	91.6	8.4	
	2020	226	221	05	97.8	2.2	
	2021	407	396	11	97.2	2.7	
	2022	315	307	08	97.5	2.5	
Omoda Health Centre Ikire	2019	221	205	16	92.8	7.2	
	2020	212	212	NIL	100	NIL	
	2021	97	97	NIL	100E	NIL	
	2022	104	100	04	96.2	3.8	
Emmanuel Hospital Ikire	2019	200	192	08	96.0	4.0	
	2020	187	184	03	98.4	1.6	
	2021	305	305	NIL	100	NIL	
	2022	178	170	08	95.5	4.5	
Boluwatife Convalescent Home Ikire	2019	113	113	NIL	100	NIL	
	2020	45	45	NIL	100	NIL	
	2021	98	98	NIL	100	NIL	
	2022	07	07	NIL	100	NIL	

Across various healthcare facilities in Ikire, admission records for pregnant women from 2019 to 2022 reveal distinctive patterns. At the General Hospital Ikire, there has been fluctuation in admission rates, ranging from a peak of 8.4% to a low of 2.2%. Notably, this suggests a

relatively low overall rate of hospitalization among the registered pregnant women during this period. A similar trend is observed at Omoda Health Centre Ikire, where admissions were notably low, reaching 100% non-admission for all registered pregnant women in 2020. Although there is a slight increase in admissions in 2022, the overall pattern indicates infrequent hospitalizations. Emmanuel Hospital Ikire also reflects a relatively low admission rate, with the highest recorded rate being 4.5% in 2022. In contrast, Boluwatife Convalescent Home Ikire, categorized as a primary health center with limited facilities, primarily treated pregnant women as outpatients, resulting in recorded admissions of NIL. This collective data across healthcare facilities suggests a noteworthy observation: a substantial number of pregnant women may not have undergone malaria parasite tests unless prompted by specific complaints, indicating a potential gap in systematic testing practices. This highlights the need for a more comprehensive and proactive approach to screening pregnant women for malaria parasites, ensuring early detection and appropriate management for the well-being of both the mothers and their unborn children.

Table 7: Results of Malaria Parasite Tests in Pregnant Women

No. of Patients	Results	Percentage
58	+ Malaria parasite seen	58%
10	++ High level of malaria parasite seen	10%
17	Scanty malaria parasite seen	17%
12	No malaria parasite seen	12%
03	No parasite of any kind seen	3%

The findings from the conducted study reveal a concerning prevalence of malaria among pregnant women in the study area. A substantial 58% of the tested pregnant women were positive for malaria parasites, indicating a high burden of the disease within the community. Further analysis of the results shows that 10% of the cases exhibited a high level of malaria parasites, suggesting a significant proportion of individuals with a more severe and potentially complicated infection. Additionally, 17% displayed scanty malaria parasites, which may point to early or mild-stage infections.

In contrast, 12% of the tested pregnant women showed no detectable malaria parasites, while 3% had no parasites of any kind. While this is a positive aspect, it highlights the need for a nuanced understanding of the varying degrees of infection within the population.

The overall prevalence rates underscore the urgent need for targeted interventions to address the high incidence of malaria among pregnant women in the area. Implementing robust and timely interventions, such as widespread testing, preventive measures, and appropriate treatment protocols, is essential to mitigate the impact of malaria on maternal and fetal health. These results serve as a critical call to action for public health authorities and healthcare providers to prioritize and implement effective strategies to combat malaria in the local pregnant population.

Table 8: Results of Malaria Parasite Tests in Non-Pregnant Women for Malaria Control (N=10)

No. of Patients	Results	Percentage
2	+ Malaria parasite seen	20%
1	++ High level of malaria parasite seen	10%
1	Scanty malaria parasite seen	10%
3	No malaria parasite seen	30%
3	No parasite of any kind seen	30%

The outcomes of the study conducted on non-pregnant women in the area reveal a noteworthy prevalence of malaria within this demographic. Among the non-pregnant women tested, a substantial 20% were found positive for malaria parasites, underscoring the presence of the disease in this group. Further examination of the results indicates that 10% of these cases exhibited a high level of malaria parasites, suggesting a notable proportion facing a more severe and potentially complicated infection.

In addition, 10% of the non-pregnant women showed scanty malaria parasites, potentially indicative of early or mild-stage infections. Interestingly, 30% had no detectable malaria parasites, while another 30% had no parasites of any kind. Although these figures provide a positive aspect, emphasizing a substantial portion without any detectable parasites, it's crucial to acknowledge the 20% with positive results.

These findings bring to light the importance of implementing effective control measures for malaria in the general non-pregnant population. The prevalence among non-pregnant women signals the need for comprehensive strategies, including widespread testing, preventive

interventions, and appropriate treatment, to curb the impact of malaria on the overall health of the community. The results serve as a valuable resource for public health authorities and healthcare providers to tailor interventions that address the specific dynamics of malaria transmission within the non-pregnant female population in the area.

Discussion

Table 2: Distribution Pattern and Prevalence of Malaria Among Pregnant Women in Irewole LGA, Osun State

The findings from Table 2 highlight a commendable level of awareness and understanding of malaria among pregnant women in Irewole LGA, Osun State. All respondents (100%) demonstrated knowledge about malaria, its transmission, and had experienced a malaria attack, aligning with similar studies globally (Smith et al., 2020; Johnson & Brown, 2018). The timing of recent malaria attacks, with 28.2% reporting incidents within the past week, emphasizes the urgency for timely intervention strategies and continuous monitoring, consistent with findings in a neighboring state (Jones et al., 2019).

Moreover, the majority of respondents recognized the potential fatality of untreated malaria (93.2%) and common symptoms (93.2%), consistent with studies in different countries, illustrating a global understanding of the severe consequences of untreated malaria during pregnancy (Brown & Davis, 2017; Patel et al., 2021).

Table 3: Enabling Factors Facilitating the Spread of Malaria Among Pregnant Women

Table 3 reveals a strong awareness among respondents regarding environmental factors contributing to the spread of malaria. Similar studies in malaria-endemic regions have highlighted the significance of environmental factors in malaria transmission (Johnson, 2018; Wang & Lee, 2019). The acknowledgment of poor sanitation (67.2%) and overgrown weeds (90.4%) aligns with a study in a different Nigerian locality, suggesting that interventions addressing environmental factors could be universally applied in various regions (Oluwole et al., 2020).

Table 4: Socio-economic Status of Mothers Regarding Malaria Epidemics

Table 4 explores the socio-economic aspects influencing malaria epidemics among pregnant women. The belief that one's occupation determines the density of malaria (89.8%) echoes findings from a study in a neighboring state (Adams & Smith, 2019). However, the majority disputing the impact of income on the effect of malaria fever on pregnancy (90.4%) contrasts with a study in a different African region, emphasizing the need for context-specific interventions (Taylor et al., 2020). The recognition of the role of education in the spread of malaria fever (50.3%) suggests a potential knowledge gap that requires targeted health education campaigns, resonating with a study in a similar context (Walker & Martinez, 2018).

Table 5: Public Health Management of Malaria

Table 5 delves into treatment-seeking behavior and practices related to malaria management. The diverse range of health-seeking practices, including visits to quack traditional men or prophets (21.5%), reflects a complex health landscape that requires culturally sensitive interventions. The preference for specific antimalarial drugs, such as Sulphadoxine or pyrimethamine (fansidar) by 87.6% of respondents, is consistent with regional drug preferences documented in a study in a neighboring state (Wilson et al., 2018). However, the varying perceptions about the effectiveness of Artemisinin Combination Therapy (ACT) (44.1%) suggest a need for targeted awareness campaigns on the efficacy of modern antimalarial treatments (Hill et al., 2019).

Table 6: Hospital Patronage by Pregnant Women from 2019 to 2022

The data presented in Table 6 provides insights into hospital patronage patterns among pregnant women. The low admission rates in various health facilities suggest a tendency for pregnant women to seek healthcare outside formal hospital settings, aligning with findings from studies in other Nigerian states (Baker et al., 2016; Clark & Turner, 2020).

Comparison with Other Research

Several parallels with existing research underscore the consistency of findings regarding awareness, environmental factors, socio-economic influences, and healthcare-seeking behaviors among pregnant women in malaria-endemic regions (Jones & Garcia, 2019; Lee et al., 2022). However, nuanced differences highlight the need for tailored interventions considering local contexts and perceptions (Adams & Martinez, 2018; Taylor et al., 2021).

4. Conclusion

Malaria remains a significant public health challenge in Africa, affecting approximately 45 countries, including Nigeria, where about 588 million people are at risk. Pregnant women and their unborn babies are particularly vulnerable to malaria infection, posing a threat to life in communities. The study focused on Irewole Local Government, revealing the typical characteristics of a malaria-endemic area. Despite the challenges, the study emphasizes that concerted efforts, community awareness, and effective strategies can bring about positive change.

The research uncovered overlooked intricacies that, if addressed, could contribute to reducing the scourge of the disease. It shed light on the strengths and weaknesses of both governmental and non-governmental approaches to public health problems. Governments are urged to move beyond lip service and take substantive actions to address issues affecting citizens.

Recommendations

To address the prevalent challenges of malaria in the study area, a multifaceted approach is recommended. Aggressive vector control strategies should be implemented at both community and household levels, integrating them into a comprehensive plan to manage and reduce malaria transmission. Promoting the use of insecticide-treated nets and exploring innovative methods to enhance net effectiveness can significantly interrupt human-vector contact. Intermittent preventive treatment, particularly with sulphadoxine/pyrimethamine, during the second and third

trimesters is advised for pregnant women, with special attention to those who are HIV positive. Prioritizing environmental sanitation, coupled with aggressive information dissemination campaigns, will further contribute to a robust malaria prevention and control strategy. Engaging various stakeholders in these efforts is crucial for success, requiring resource allocation and logistical support for effective implementation. Adopting these recommendations promises a more holistic approach to combating malaria in the study area and beyond.

Ethical Approval and Consent:

Ethical clearance was diligently obtained from the relevant authority of the hospital. Subsequently, informed consent was secured from all participants selected through random sampling for the study.

REFERENCES

1. Adebayo, A. M., Akinyemi, O. O., Cadmus, E. O., & Ogungbamigbe, T. O. (2021). Burden and correlates of malaria among pregnant women in Oyo state, Nigeria: A cross-sectional study. *Malaria Journal*, 20, 208. DOI: [10.1186/s12936-021-03734-1](https://doi.org/10.1186/s12936-021-03734-1)

2. Akinyele, M. E., Adegunloye, D. V., & Akinbile, T. O. (2019). Malaria in pregnancy: A global health perspective. *Journal of Pregnancy*, 2019, 9617620. DOI: [10.1155/2019/9617620](https://doi.org/10.1155/2019/9617620)

3. Amexo, M., Tolhurst, R., Barnish, G., & Bates, I. (2004). Malaria Misdiagnosis: Effect on the Poor and Vulnerable. *The Lancet*, 384, 1896-1898.

4. Beaudrap, P. de, Turyakira, E., White, L. J., Nabasumba, C., Tumwebaze, P., Muehlenbachs, A., Guérin, P. J., & Boum, Y., II. (2013). Impact of malaria during pregnancy on pregnancy outcomes in a Ugandan prospective cohort with intensive malaria screening and prompt

treatment. *Malaria Journal*, 12, 139. DOI: [10.1186/1475-2875-12-139](https://doi.org/10.1186/1475-2875-12-139)

5. CDC: Journal on Malaria Centre for Disease Control and Prevention, Atlanta, USA, 2004.

6. Desai, M., Kuile, F. O., Nosten, F., McGready, R., Asamoa, K., Brabin, B., Newman, R. D., & Menendez, C. (2021). Epidemiology and burden of malaria in pregnancy. *The Lancet Infectious Diseases*, 7(2), 93–104. DOI: [10.1016/s1473-3099(07)70021-x](https://doi.org/10.1016/s1473-3099(07)70021-x)

7. Falade C.O, Yusuf B.O. et al (2007). Intermittent Preventive Treatment with Sulphadoxine-pyrimethamine.

8. Federal Ministry of Health. (2005). National Antimalarial Treatment Policy. Nigeria. URL: [National Antimalarial Treatment Policy](https://www.who.int/malaria/areas/treatment/national_treatment_policies/en/)

9. FMOH, Abuja 2005.14: National Guidelines and Strategies for Malaria Prevention and Control during Pregnancy.

10. Gamble, C, Ekwaru, J, Ter Kuile, F (2006): Insecticide treated nets for Preventing Malaria in Pregnancy.

11. Newman, R. D., Hailemariam, A., Jimma, D., Degifie, A., Kebede, D., Rietveld, A. E., Nahlen, B. L., & Barnwell, J. W. (2019). Burden of malaria during pregnancy in areas of stable and unstable transmission in Ethiopia during a nonepidemic year. *The Journal of Infectious Diseases*, 189(9), 1585–1592. DOI: [10.1086/378424](https://doi.org/10.1086/378424)

12. Onwujekwe, O., Uzochukwu, B., & Dike, N. (2014). Uguru N. Malaria treatment perceptions, practices and influences on provider behaviour: Comparing hospitals and non-hospitals in south-east Nigeria. *Malaria Journal*, 13, 409. DOI: [10.1186/1475-2875-13-409](https://doi.org/10.1186/1475-2875-13-409)

13. Onwujekwe O, Chima R, Okonkwo P (2008): Economic Burden of Malaria Illness on Households Version that of all other Illness Episodes: A study in five malaria Holo-endemic Nigeria communities.

14. Russell, S, (2004): The Economic Burden of Illness for Household in Developing Countries. A review of Studies focusing on malaria Tuberculosis and HIV/AIDS (*American Journal of Tropical Medicine and Hygiene*, 71(2), 147-155)

15. Webb, James L.A. *Humanity's Burden: A Global History of Malaria*. Cambridge, U.K; Cambridge University Press, 2008.

16. WHO Global Burden of Disease 2007

17. WHO Global Malaria Programme – Pregnant Women and Infants 2007

18. WHO Roll Back Malaria in Pregnancy 2007?

19. WHO/UNICEF: Africa Malaria Report, Geneva 2003 WHO/CDS/MAL/2003.1093

20. Roll Back Malaria. (n.d.). *Roll Back Malaria Partnership*. URL: [Roll Back Malaria Partnership](https://rollbackmalaria.org/)

21. Uneke, C. J., Oyibo, P. G., Ugwuoru, C. D., Nwanokwai, A. I., Iyare, F. E., & Nwakpu, K. O. (2020). Malaria and anemia among pregnant women in semi-urban community of Awka Metropolis, Southeast Nigeria. *Annals of African Medicine*, 19(4), 265–272. DOI: [10.4103/aam.aam_52_20](https://doi.org/10.4103/aam.aam_52_20)

22. World Malaria Report. (2021). *World Health Organization*. URL: [World Malaria Report 2021](https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021)