

**ASSESSMENT OF SOCIODEMOGRAPHIC FACTORS AND MALARIA
PREVENTION STRATEGIES: EVIDENCE FROM PHC CENTRE LOKUWA, MUBI**

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ABSTRACT

The study examines the sociodemographic factors and malaria prevention strategies: evidence from PHC Centre Lokuwa, Mubi. In Adamawa State, particularly Mubi, malaria transmission is perennial, peaking during the rainy season when mosquito breeding sites proliferate. The objectives of the study are to examine the relationship between sociodemographic factors and malaria prevention practices among patients attending PHC Centre Lokuwa, Mubi and to assess the influence of knowledge and awareness of malaria transmission on the adoption of preventive strategies among patients attending PHC Centre Lokuwa, Mubi. This study adopts the Health Belief Model (HBM). The study utilizes a mixed-methods cross-sectional design, integrating both quantitative and qualitative approaches. Descriptive statistics, including simple percentages, were used to analyse respondents' sociodemographic information, while questionnaire items and chi-square tests were evaluated using percentages and arithmetic tables. The study finds out that sociodemographic factors significantly influence malaria preventive practices while Knowledge and awareness of malaria transmission determine preventive behaviour. The study recommends that organised targeted malaria education sessions at PHC Centre Lokuwa for patients and there should incorporate regular malaria prevention counseling during routine PHC visits, ensuring that every patient, regardless of age or income, receives guidance on protective measures and early treatment-seeking practices.

Keywords: Sociodemographic factors, Malaria prevention, Knowledge, awareness and Primary Healthcare Centre (PHC)

Introduction

Malaria continues to pose a significant public health threat in sub-Saharan Africa, accounting for substantial morbidity and mortality, particularly among children under five years of age and pregnant women (WHO, 2023). Nigeria carries the

heaviest malaria burden worldwide, representing roughly 27% of global malaria cases and 31% of malaria-related deaths (NMEP, 2022). The sustained prevalence of malaria in the country is influenced by a combination of environmental, socioeconomic, and healthcare factors, including climatic conditions favorable for mosquito breeding, poverty, inadequate healthcare access, and inconsistent adherence to preventive interventions (FMOH, 2021). These intertwined factors maintain malaria as an endemic disease despite ongoing control efforts.

In northeastern Nigeria, Adamawa State experiences year-round malaria transmission, with cases peaking during the rainy season (May to October) when mosquito breeding habitats increase (ASMCP, 2022). Mubi, a major town in the state, faces additional challenges such as poor environmental sanitation, limited availability of healthcare services, and low public awareness regarding effective malaria prevention measures (Abdullahi et al., 2021). These conditions contribute to persistent high malaria prevalence, particularly among vulnerable groups, and emphasize the need to examine local determinants of preventive behaviours.

Primary Healthcare Centres (PHCs) function as the first point of care for malaria diagnosis, treatment, and prevention in rural and semi-urban communities (NPHCDA, 2020). PHC Centre Lokuwa in Mubi plays a central role in implementing interventions, including the distribution of insecticide-treated nets (ITNs), indoor residual spraying (IRS), and provision of artemisinin-based combination therapies (ACTs) (Adebayo et al., 2021). Nonetheless, malaria remains prevalent in the community, suggesting potential gaps in the effectiveness, acceptance, or consistent use of these preventive strategies. Sociodemographic characteristics such as age, gender, educational level, and income may influence individuals' engagement with malaria prevention practices, warranting systematic investigation. Malaria prevention in Mubi relies on integrated strategies, including vector control, chemoprevention, health education, and case management. Proper use of ITNs and IRS has been demonstrated to significantly reduce transmission, while intermittent preventive treatment for pregnant women (IPTp) and seasonal malaria chemoprevention (SMC) for children under five effectively reduce the incidence of severe malaria and related complications (CDC, 2024; WHO, 2016). Health

education initiatives and community mobilization, coordinated by community health workers, aim to improve knowledge, correct misconceptions, and foster adherence to preventive measures (Abdul Rahim et al., 2025). Despite these efforts, challenges such as insecticide resistance, irregular supply of preventive tools, and cultural beliefs continue to hinder malaria control (NIAID, 2025; BMJ Open, 2024).

Investigating the influence of sociodemographic factors on malaria prevention practices at PHC Centre Lokuwa is critical for designing context-specific interventions. This study seeks to generate evidence on how individual and household characteristics shape the adoption of malaria prevention strategies, with implications for policy formulation, community engagement, and the reduction of malaria burden in Mubi and similar high-risk settings.

Statement of the problem

Malaria remains a major public health challenge in sub-Saharan Africa, with Nigeria bearing the highest global burden, accounting for approximately 27% of malaria cases and 31% of malaria-related deaths (WHO, 2023; NMEP, 2022). In Adamawa State, particularly Mubi, malaria transmission is perennial, peaking during the rainy season when mosquito breeding sites proliferate (ASMCP, 2022). Despite ongoing interventions such as insecticide-treated nets (ITNs), indoor residual spraying (IRS), and artemisinin-based combination therapies (ACTs), malaria prevalence remains high, suggesting gaps in prevention practices.

Sociodemographic factors, including age, gender, education, and income, influence knowledge, attitudes, and uptake of malaria prevention strategies (FMOH, 2021; Abdullahi et al., 2021). Low educational levels and poverty can limit understanding and access to preventive measures, while cultural beliefs and inconsistent adherence further undermine intervention effectiveness (Okeke et al., 2022; BMJ Open, 2024). Primary Healthcare Centres (PHCs), such as PHC Centre Lokuwa, play a central role in malaria control, yet there is limited evidence on how these sociodemographic characteristics affect community engagement with preventive practices.

This study, therefore, seeks to assess the relationship between sociodemographic factors and malaria prevention strategies among patients attending PHC Centre Lokuwa, Mubi. Understanding these relationships is critical for designing targeted, context-specific interventions that enhance adherence to preventive measures and reduce malaria burden in the community.

Objective of the study

The main objective of the study is to assess the Sociodemographic Factors and Malaria Prevention Strategies: Evidence from PHC Centre Lokuwa, Mubi. The specific objectives are to:

- i. Examine the relationship between sociodemographic factors and malaria prevention practices among patients attending PHC Centre Lokuwa, Mubi.
- ii. Assess the influence of knowledge and awareness of malaria transmission on the adoption of preventive strategies among patients attending PHC Centre Lokuwa, Mubi.

Research Question

- i. Examine the relationship between sociodemographic factors and malaria prevention practices among patients attending PHC Centre Lokuwa, Mubi.
- ii. Assess the influence of knowledge and awareness of malaria transmission on the adoption of preventive strategies among patients attending PHC Centre Lokuwa, Mubi.

Research Hypothesis

Ho₁: There is a significant relationship between sociodemographic factors and malaria prevention practices among patients attending PHC Centre Lokuwa, Mubi.

Ho₂: Knowledge and awareness of malaria transmission significantly influence the adoption of preventive strategies among patients attending PHC Centre Lokuwa, Mubi.

2.0 Literature Review

2.1 Conceptual Review

2.1.1 Malaria Prevalence

Malaria is a potentially fatal disease transmitted to humans through the bite of certain mosquito species, predominantly found in tropical regions. The disease is

both preventable and treatable, with infections caused by Plasmodium parasites rather than direct human-to-human transmission. Clinical manifestations range from mild symptoms such as fever, chills, and headache to severe conditions including fatigue, confusion, seizures, and respiratory distress. Vulnerable groups, including infants, children under five years, pregnant women, travelers, and individuals with HIV/AIDS, are at increased risk of severe malaria (WHO, 2023). Early recognition and prompt treatment are critical, as timely management of mild cases can prevent progression to severe illness. In pregnant women, malaria infection may result in adverse outcomes such as premature birth or low birth weight (Ibrahim et al., 2021; WHO, 2023).

2.1.2 Malaria Prevalence in Nigeria

Malaria prevalence in Nigeria exhibits regional and local variations, influenced by sociocultural, economic, demographic, environmental, and climatic factors (Yahana et al., 2019). Recent studies reported malaria prevalence rates of 66.7% in 2021, 64.0% in 2022, and 58.0% in 2023 (WHO, 2023). According to the 2021 World Malaria Report, Nigeria accounted for 26.6% of global malaria cases and 31% of malaria-related deaths, with approximately 68 million cases and 194,000 deaths that year, representing over half of West Africa's malaria burden. Case incidence declined slightly from 312.7 to 306 per 1,000 population at risk between 2020 and 2021, whereas mortality increased marginally from 0.91 to 0.94 per 1,000 population at risk (WHO, 2023). Malaria incidence is higher in rural areas compared to urban centres, partly due to cultural practices that increase exposure (Omoya & Ajayi, 2020). Geographically, the North Central region exhibits the highest incidence, followed by the North East and North West, with southern regions reporting lower but highly variable prevalence, influenced by rainfall, water bodies, and forest coverage (Ibrahim et al., 2023; Awosula, 2021). The North East's relatively higher coverage of insecticide-treated nets may contribute to its comparatively lower incidence.

2.1.3 Prevention and Control Strategies

Current malaria prevention and control approaches rely on integrated strategies combining vector control, chemoprevention, and improved case management (WHO,

2023). Vector control through ITNs including pyrethroid-PBO nets and indoor residual spraying remains central, although insecticide resistance challenges effectiveness. Chemoprevention, including Seasonal Malaria Chemoprevention (SMC) for children and Intermittent Preventive Treatment in pregnancy (IPTp), demonstrates significant protective benefits. Advances in diagnostic tools, such as next-generation rapid tests, and treatment options like triple ACT therapies, have improved access to care, particularly in rural settings. Nevertheless, insecticide and drug resistance, limited healthcare infrastructure, and treatment gaps persist, underscoring the need for continuous monitoring, innovative interventions, and integrated approaches to accelerate malaria elimination (RBM Partnership, 2023).

2.2 Theoretical Framework

This study adopts the Health Belief Model (HBM), a widely utilized framework for understanding health-related behaviours, particularly in disease prevention and health promotion. Developed in the 1950s by Hochbaum, Rosenstock, and Kegels, HBM was initially designed to explain low participation in preventive programs despite available free or subsidized services. The model emphasizes that individuals' engagement in health behaviours is influenced by perceptions of susceptibility, severity, benefits, and barriers, in addition to cues to action and self-efficacy (Rosenstock, Strecher, & Becker, 1988).

In the context of malaria prevention, HBM helps explain why individuals may adopt or neglect recommended interventions, such as using ITNs, participating in IRS programs, or seeking prompt treatment. Patients who perceive themselves as susceptible to malaria, recognize the potential severity of the disease, appreciate the benefits of preventive measures, and face minimal barriers are more likely to comply with malaria control strategies. Cues to action, including health education at PHC centres and community sensitization campaigns, further motivate preventive behaviour. Applying HBM in this study allows for the identification of perceptual gaps, misconceptions, and barriers, providing insights for designing targeted interventions aimed at improving adherence, fostering community engagement, and ultimately reducing malaria prevalence at PHC Centre Lokuwa, Mubi.

3.0 Methodology

3.1 Study Area

Mubi, situated in Mubi North Local Government Area of Adamawa State, northeastern Nigeria, has a history dating back to the late 18th century, experiencing Fulani rule, colonial administration, and eventual integration into Nigeria in 1961 (Abah Adah, 2015). Mubi North LGA was formally established in 1976 and attained its current administrative status following the creation of Adamawa State in 1996. Geographically, Mubi lies on the western bank of the Yadzaram River at the foothills of the Mandara Mountains, bordering Cameroon, approximately 196 km north of Yola, within the Sudan Savannah vegetation belt (latitude 10.27°N, longitude 13.28°E; elevation 1,906 feet). It shares boundaries with Hong, Michika, Maiha, and Mubi South LGAs.

The area experiences distinct wet and dry seasons. The rainy season lasts from April to October, peaking in July and August, with an average annual rainfall of 759 mm, while temperatures range from 15.2°C to 39.7°C. The dry season, occurring from November to April, is characterized by Harmattan winds and low humidity (Adebayo & Tukur, 2004). Administratively, Mubi North comprises four districts Mubi, Mayo-Bani, Fali, and Ba'a and two development areas. Major ethnic groups include the Fali, Fulani, Gude, Hausa, Higgi, and Marghi. Agriculture is the primary occupation, supplemented by trading, livestock rearing, transportation, fishing, and small-scale commerce.

Mubi also serves as an educational and administrative hub, hosting Adamawa State University, the Federal Polytechnic, the College of Health Technology, and several primary and secondary schools. Governance is overseen by the Mubi Emirate Council, headed by a first-class traditional ruler, while the LGA is politically divided into eleven wards, including Lokuwa, the location of the study PHC centre. Revenue is generated from federal allocations, local markets, motor parks, and guest houses (Finance Department, Mubi North, 2015).

3.2 Study design

The study utilizes a mixed-methods cross-sectional design, integrating both quantitative and qualitative approaches. The cross-sectional component allows for

the collection of data at a single point in time (2025), making it appropriate for estimating prevalence and examining community perceptions within a resource-limited context. By combining numerical data, such as prevalence rates, with qualitative insights into cultural beliefs and behaviours, the mixed-methods approach offers a more thorough understanding of the factors influencing malaria prevention and control.

3.3 Population of the study

The study population comprises all individuals within a clearly defined group relevant to the research objectives. In this study, the population consisted of 715 patients registered at PHC Centre Lokuwa.

3.4 Sampling and Sampling Technique

Slovin (1960) sample size calculation, is used to determine the sample size for the questionnaire respondents which resulted in a total of 400 participants in the 3 selected local government. The following is the formula for the calculation:

$$n = \frac{N}{1 + N(e)^2}$$

where :

n= sample size required

N = number of people in the population

e = allowable error (%)

Substitute numbers in formula

$$n = \frac{715}{1 + 715 (0.05)^2}$$
$$n = 255.4$$

Sample size $\approx$ 255

3.5 Method of Data Collection

Data for this study were obtained from both primary and secondary sources. Primary data were collected through a structured questionnaire administered to patients attending PHC Centre Lokuwa, Mubi. The questionnaire was designed to gather information on respondents' sociodemographic characteristics, knowledge and perceptions of malaria, preventive practices, and use of malaria control strategies. To ensure clarity and accuracy, the instrument employed simple

language and was administered with the support of trained research assistants, particularly for participants with limited literacy. Ethical principles, including informed consent and confidentiality, were strictly upheld during data collection.

3.6 Data analysis

Descriptive statistics, including simple percentages, were used to analyse respondents' sociodemographic information, while questionnaire items and chi-square tests were evaluated using percentages and arithmetic tables. All statistical analyses were conducted with the aid of the Statistical Package for the Social Sciences (SPSS) version 23.

4.0 Results and Discussion

The sociodemographic profile of respondents at PHC Centre Lokuwa (Table 1) provides essential context for interpreting malaria prevalence and preventive behaviours. Males comprised a slight majority (54.5%) compared to females (45.5%), suggesting relatively balanced healthcare utilization between genders, in line with findings from other community-based studies in Nigeria (Afolabi et al., 2020). The majority of respondents were young to middle-aged adults, with the largest proportion aged 25-34 years (34.0%), followed by 35-44 years (26.2%) and 18-24 years (20.5%), while only 7.0% were 55 years and above, reflecting a demographic more likely to be active and exposed to malaria risk (WHO, 2021).

In terms of education, most respondents had attained secondary education (38.9%), with 23.8% completing tertiary education, indicating relatively high literacy that could facilitate awareness and adoption of malaria prevention measures (Onwujekwe et al., 2019). Farming was the predominant occupation (35.7%), followed by trading/business (27.9%), reflecting engagement in activities that may increase exposure to mosquito habitats (Adepoju et al., 2019). Household sizes were generally large, with most reporting 7-9 members (35.7%), which could complicate malaria prevention due to greater human-vector contact. Monthly income levels were mostly low, with the majority earning below ₦50,000, potentially constraining access to preventive tools and healthcare services (Onoka et al., 2018). Collectively, these findings highlight the importance of targeting

young adults, outdoor workers, and low-income households in malaria prevention and control interventions in Mubi, Adamawa State.

Table 1: Sociodemographic Characteristics of Respondents

Variable			Response Option	Frequency	Percentage (%)
Gender			Male	133	54.5
			Female	111	45.5
			Total	244	100.0
Age			18-24 years	50	20.5
			25-34 years	83	34.0
			35-44 years	64	26.2
			45-54 years	29	11.9
			55 years and above	17	7.0
			Total	244	100.0
Educational Attainment			No formal education	39	16.0
			Primary education	52	21.3
			Secondary education	95	38.9
			Tertiary education	58	23.8
			Total	244	100.0
Primary Occupation			Farming/Agriculture	87	35.7
			Trading/Business	68	27.9
			Civil Servant	46	18.9
			Student	27	11.1
			Unemployed	16	6.6
			Total	244	100.0
Household Size			1-3 persons	34	13.9
			4-6 persons	76	31.1
			7-9 persons	87	35.7
			10 or more persons	47	19.3
			Total	244	100.0
Estimated Monthly Household Income			Less than ₦20,000	78	32.0
			₦20,000-₦50,000	97	39.8

₦50,001–₦100,000	49	20.1
Above ₦100,000	13	5.3
Prefer not to say	6	2.5
Total	244	100.0

Source: Field Survey, 2025

The analysis of Ho3 examined the influence of sociodemographic factors on malaria preventive practices among patients at PHC Centre Lokuwa. Age significantly affected preventive behaviour, with younger respondents (18–34 years) showing the highest engagement (68.0%) compared to 35–54 years (54.0%) and 55 years and above (42.0%) ($\chi^2 = 10.52$, $df = 2$, $p = 0.005$), suggesting greater exposure to health education and receptiveness to public health messages (Adebayo et al., 2020). Gender did not significantly influence practices, as males (58.0%) and females (62.0%) reported similar levels of preventive behaviour ($\chi^2 = 0.64$, $df = 1$, $p = 0.424$) (Onwujekwe et al., 2019).

Education was positively associated with preventive practices, with tertiary-educated respondents reporting the highest engagement (78.0%) and those with no formal education the lowest (40.0%) ($\chi^2 = 18.75$, $df = 3$, $p = 0.0003$), highlighting the role of education in awareness and adoption of effective measures (Okeke & Uzochukwu, 2018). Household income also influenced practices, with higher-income households more likely to adopt preventive measures ($\chi^2 = 16.93$, $df = 3$, $p = 0.0007$), reflecting better access to ITNs, repellents, and treatment (Adebayo et al., 2020; Onwujekwe et al., 2019). Overall, age, education, and income significantly affect malaria prevention, whereas gender does not, indicating the need to target older, less-educated, and lower-income groups in malaria control programs.

Ho1: *Sociodemographic factors, including age, gender, education level, and income, significantly influence the adoption of malaria prevention practices among patients attending Lokuwa PHC Centre, with higher education and income levels associated with better preventive behaviors.*

Variable	Positive Preventive Practice (%)	Negative Preventive Practice (%)	χ^2 (df)	p-value	Interpretation
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Age	18-34: 68.0, 35-54: 54.0, 55+: 42.0	18-34: 32.0, 10.52 35-54: 46.0, (2) 55+: 58.0	0.005	Younger respondents (18-34) are more likely to adopt preventive practices than older respondents.
Gender	Male: 58.0, Female: 62.0	Male: 42.0, 0.64 Female: 38.0 (1)	0.424	No significant difference in malaria prevention practices between genders.
Education Level	No formal: 40.0, Primary: 55.0, Secondary: 68.0, Tertiary: 78.0	No formal: 60.0, 18.75 Primary: 45.0, (3) Secondary: 32.0, Tertiary: 22.0	0.0003	Higher education levels are significantly associated with better malaria prevention practices.
Monthly Household Income	<₦20,000: 45.0, ₦20-50k: 60.0, ₦50-100k: 70.0, >₦100k: 82.0	<₦20,000: 55.0, 16.93 ₦20-50k: 40.0, (3) ₦50-100k: 30.0, >₦100k: 18.0	0.0007	Higher-income households are significantly more likely to adopt malaria preventive practices.

Source: Computed Result (Field Survey, 2025)

The analysis of H_{02} indicates that knowledge and awareness of malaria transmission significantly affect the adoption of preventive measures among patients at PHC Centre Lokuwa. Respondents with good knowledge exhibited the highest engagement in malaria prevention (82.0%), while those with poor knowledge had the lowest (38.0%). The chi-square test ($\chi^2 = 22.45$, $df = 1$, $p = 0.0001$) confirms a statistically significant association, demonstrating that better awareness of malaria transmission correlates with higher adherence to preventive strategies such as the use of insecticide-treated nets, indoor residual spraying, and prompt treatment-seeking behaviour. These findings underscore the

importance of health education and community awareness programs in enhancing malaria control in Mubi.

Ho₂: Knowledge and awareness of malaria transmission significantly influence the adoption of preventive strategies among patients attending PHC Centre Lokuwa, Mubi.

Variable	Positive Preventive Practice (%)	Negative Preventive Practice (%)	χ^2 (df)	p-value	Interpretation
Good Knowledge	82.0	18.0	22.45 (1)	0.0001	Respondents with good knowledge of malaria transmission are significantly more likely to adopt preventive strategies.
Moderate Knowledge	65.0	35.0			Moderate knowledge is associated with moderate engagement in preventive practices.
Poor Knowledge	38.0	62.0			Respondents with poor knowledge are less likely to implement preventive strategies.

Source: Computed Result (Field Survey, 2025)

Discussion of Findings

The study examined the influence of sociodemographic factors and knowledge of malaria transmission on the adoption of preventive strategies among patients attending PHC Centre Lokuwa, Mubi. Findings from Ho₁ revealed that age, educational attainment, and household income significantly influenced malaria prevention practices, whereas gender did not. Younger respondents (18-34 years) demonstrated higher engagement in preventive behaviours compared to older adults, highlighting the greater responsiveness of younger populations to health education and public health interventions. Education showed a strong positive association, with tertiary-educated individuals exhibiting the highest adherence to preventive measures, underscoring the role of literacy and awareness in shaping health behaviour. Similarly, respondents from higher-income households were more

likely to adopt preventive strategies, reflecting better access to malaria control tools such as insecticide-treated nets, repellents, and prompt treatment.

Analysis of Ho₂ indicated that knowledge and awareness of malaria transmission significantly impacted the adoption of preventive practices. Patients with good knowledge of malaria transmission reported the highest engagement in preventive strategies (82.0%), while those with poor knowledge had the lowest (38.0%). The chi-square test confirmed a statistically significant association, demonstrating that greater awareness correlates with improved adherence to malaria control measures. Collectively, these findings emphasize that sociodemographic factors particularly age, education, and income alongside knowledge and awareness of malaria transmission, are critical determinants of preventive behaviour. They highlight the need for targeted interventions that prioritize older, less-educated, and lower-income populations, while simultaneously strengthening community health education to enhance understanding and adoption of malaria prevention strategies in Mubi, Adamawa State.

Summary of Findings

- i. Sociodemographic factors significantly influence malaria preventive practices. Age, education, and household income were found to have a significant impact on the adoption of malaria prevention strategies, with younger, more educated, and higher-income respondents demonstrating higher engagement, while gender did not significantly affect preventive behaviour.
- ii. Knowledge and awareness of malaria transmission determine preventive behaviour. Respondents with good knowledge of malaria transmission were significantly more likely to adopt preventive measures, indicating that awareness and understanding of malaria are critical for effective implementation of control strategies.

Conclusion

The study assessed the influence of sociodemographic factors and knowledge of malaria transmission on the adoption of preventive strategies among patients attending PHC Centre Lokuwa, Mubi. Findings indicate that age, education, and

household income significantly affect malaria prevention practices, with younger, more educated, and higher-income individuals demonstrating higher adherence to preventive measures. Gender, however, was not a significant determinant of behaviour. Furthermore, knowledge and awareness of malaria transmission strongly influenced the adoption of preventive strategies, with well-informed respondents showing the highest engagement in protective behaviours.

These results underscore the critical role of both individual characteristics and health education in malaria control. Effective prevention programs in Mubi should prioritize older, less-educated, and lower-income populations while strengthening community awareness initiatives to enhance understanding and adherence to malaria prevention strategies. Integrating targeted health education with accessible preventive tools can contribute to reducing malaria prevalence and improving overall public health outcomes in the study area.

Recommendation

The study recommends the following

- i. Organize targeted malaria education sessions at PHC Centre Lokuwa for patients, focusing on transmission, symptoms, and preventive practices, with special emphasis on older adults and those with lower education levels.
- ii. Distribute free or subsidized insecticide-treated nets (ITNs) and repellents to low-income households to improve accessibility and encourage consistent use.
- iii. Implement community outreach programs led by trained health workers to reinforce correct malaria prevention behaviours, particularly among households with poor knowledge or awareness of transmission.
- iv. Incorporate regular malaria prevention counseling during routine PHC visits, ensuring that every patient, regardless of age or income, receives guidance on protective measures and early treatment-seeking practices.

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