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Knowledge, Attitudes and Preventive Practices towards Malaria in Pregnancy among Women of Child-Bearing Age Attending Arakale Comprehensive Health Centre, Akure, Ondo State, Nigeria

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Abstract

Background: Malaria in pregnancy (MiP) remains a leading, preventable cause of maternal anaemia, low birth weight and perinatal death in sub-Saharan Africa. Facility-level evidence on what women know, believe, and do to protect themselves is needed to guide health education. This study assessed knowledge, attitudes and preventive practices towards MiP among women of child-bearing age attending Arakale Comprehensive Health Centre, Akure, Ondo State, Nigeria, and identified the factors influencing them.

Methods: We conducted a descriptive cross-sectional survey using a self-structured, interviewer-administered questionnaire. Respondents were selected by multi-stage sampling (age-stratified, then convenience sampling) from women attending antenatal clinics over two weeks. Of 271 questionnaires distributed (Cochran formula plus 10% non-response allowance), 250 were returned (response rate 92.3%). We analysed the data descriptively (frequencies and percentages) using SPSS version 27.

Results: Most respondents were aged 25–44 years (68.0%). Overall, 76.0% (190/250) had good knowledge of MiP; 80.0% knew that mosquito bites transmit malaria, 92.0% that pregnant women are more vulnerable, and 98.0% that malaria can cause anaemia. Attitudes were favourable: 96.0% felt confident using recommended preventive measures and considered prescribed antimalarials safe. Practices were uneven: 80.0% attended antenatal care regularly and 88.0% sought care immediately when symptomatic, but only 20.0% reported regularly sleeping under an insecticide-treated net (ITN) and 68.0% took preventive medication as prescribed. Respondents identified health education (92.0%), advice from health workers (92.0%), level of education (88.0%), cultural beliefs (88.0%), family support (80.0%) and cost (76.0%) as influencing their practices.

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Conclusion: Good knowledge and positive attitudes did not translate into consistent ITN use, revealing a knowledge–practice gap. We recommend continuous, culturally sensitive health education during antenatal care; improved access to affordable ITNs and intermittent preventive treatment; and community involvement.

Keywords: Malaria in Pregnancy, Knowledge, Attitudes, Preventive Practices, Insecticide-Treated Nets, Antenatal Care, Akure, Nigeria

INTRODUCTION

Malaria remains one of the most important infectious causes of illness and death in the world. The World Health Organization (WHO, 2025) estimated 282 million cases and about 610,000 deaths globally in 2024, with the WHO African Region carrying roughly 94% of cases and 95% of deaths. The disease is caused by protozoa of the genus *Plasmodium* and transmitted by the bite of infected female *Anopheles* mosquitoes; *Plasmodium falciparum*, the most virulent species, predominates in sub-Saharan Africa. Within this burden, pregnant women and young children are the groups at greatest risk, because pregnancy alters immune responses and exposes women to infection of the placenta (Rogerson et al., 2018).

Malaria in pregnancy is associated with severe maternal anaemia, miscarriage, stillbirth, intrauterine growth restriction, preterm delivery, low birth weight and increased maternal and neonatal mortality (Rogerson et al., 2018). Its scale is considerable. WHO (2023) estimated that, in 2022, about 12.7 million pregnancies (35%) in moderate- and high-transmission African countries were exposed to malaria infection. Current IPTp-SP use is estimated to avert low birth weight in about 530,000 neonates each year (WHO, 2025), which illustrates how much harm remains preventable. To reduce this harm, WHO recommends a package of interventions: insecticide-treated nets (ITNs), intermittent preventive treatment in pregnancy with sulfadoxine–pyrimethamine (IPTp-SP) delivered through antenatal care (ANC), and prompt diagnosis and effective treatment of clinical cases (WHO, 2022).

The biology explains why pregnancy is a period of special risk. Parasitised red cells accumulate in the placenta, where they provoke inflammation and impair the transfer of oxygen and nutrients to the fetus, and the resulting anaemia can be severe in the mother (Rogerson et al., 2018). Women are most vulnerable in their first pregnancies and remain at increased risk throughout gestation, and many infections are asymptomatic, so a woman may feel well while the placenta and fetus are already affected. For this reason prevention cannot wait for symptoms. WHO (2022) advises that IPTp-SP be started as early as possible in the second trimester and given at each scheduled antenatal visit, at least one month apart, so that every pregnant woman in a moderate- or high-transmission area receives at least three doses before delivery, and that she sleeps under an ITN every night. Each element depends on a woman's own decisions as well as on the health system, which is why her knowledge, attitude and practice matter as much as the supply of commodities.

Nigeria carries the heaviest national burden. It accounts for approximately 27% of global malaria cases and 31% of global malaria deaths (WHO, 2024), and malaria is estimated to contribute up to 11% of maternal deaths in the country (Federal Ministry of Health [FMoH], 2021). The National Malaria Strategic Plan 2021–2025 set out to reduce parasite prevalence to below 10% by 2025 (FMoH, 2021). Coverage of the pregnancy-specific interventions, however, remains well below the levels needed. The 2018 Nigeria Demographic and Health Survey found that only 17% of pregnant women received three or more doses of IPTp-SP and that about 52% had slept under an ITN the night before the survey (National Population Commission [NPC] & ICF, 2019). Across 34 African countries, coverage of three or more IPTp doses

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reached only 45% in 2024, far below the 80% target (WHO, 2025).

Why do women who attend antenatal clinics still go unprotected? Part of the answer lies in what they know, how they feel about prevention and what they are able to do in daily life. Studies in Nigeria repeatedly show that awareness of malaria is high, yet consistent use of nets and complete IPTp-SP uptake are low (Kalu et al., 2022). In a national analysis grounded in Andersen's behavioural model, optimal IPTp use was seen in less than a quarter of women and was shaped by education, employment, autonomy over personal health care, place of residence and the type of facility attended (Solanke et al., 2023). Facility-based studies in south-eastern Nigeria have likewise paired parasitological testing with assessments of women's knowledge, attitudes and practices to explain persistent infection (Okoro et al., 2021), and health education delivered through ANC has been shown to influence attitudes towards malaria prevention (Adeniji et al., 2023). Knowledge, attitudes and practices (KAP) therefore form a logical chain in which information shapes belief, and belief shapes behaviour, a premise consistent with the Health Belief Model (Alyafei & Easton-Carter, 2024).

The Health Belief Model offers a useful lens for this chain. It proposes that people take preventive action when they perceive themselves as susceptible to a health threat, believe the consequences would be serious, judge that the recommended action is beneficial, and perceive the barriers (such as cost, discomfort or social disapproval) to be manageable, and when cues to action and confidence in their own ability are present (Alyafei & Easton-Carter, 2024). Applied to malaria in pregnancy, a woman who knows that malaria harms her baby, believes that nets and IPTp-SP work, and can afford and tolerate them is more likely to protect herself consistently. Measuring knowledge, attitudes and practices side by side, and asking women what influences them, shows which of these links is weakest in a given community. This is the information that health workers need in order to prioritise their counselling.

Local context matters for this chain. Akure, the capital of Ondo State, lies in the tropical rainforest zone of south-western Nigeria, with a long rainy season (April to October) and mean annual rainfall of 1,200–1,500 mm that favours mosquito breeding. A survey of pregnant women across Ondo State reported that about 47% knew the adverse effects of malaria on mother and fetus, while 84.4% agreed that bed nets prevent malaria (Akanbi & Ajayi, 2025), which shows that awareness is uneven even where attitudes toward nets are favourable. Arakale Comprehensive Health Centre is one of the 51 public primary health care facilities in Akure South Local Government Area and provides free ANC, IPTp-SP and ITN distribution. Despite these services, cases of malaria in pregnancy and malaria-related anaemia continue to be recorded at the facility, which suggests that the problem is not access alone but also women's knowledge, attitudes and actual preventive behaviour.

Taken together, the published evidence leaves an important gap. National surveys describe coverage of IPTp-SP and ITNs, and studies from other parts of Nigeria describe what women know and do, but they rarely report, for a single antenatal facility in Akure, how knowledge, attitudes, practices and the perceived influences on them fit together. Without this picture, health education at the facility is likely to repeat general messages to all women, even where awareness is already high and the real obstacle lies elsewhere, for instance in the cost or acceptability of nets. A description of respondents' socio-demographic profile, their level of knowledge, their attitudes, the practices they report and the factors they believe shape those practices therefore provides a practical baseline against which future educational interventions at the centre can be planned and evaluated.

The findings of a KAP assessment at this level are directly usable. Primary health care is the first point of contact for most pregnant women in Nigeria, and ANC visits offer repeated opportunities for counselling. Evidence from the specific facility, rather than from national averages, allows health workers, the Local

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Government Area Primary Health Care Coordinator and the Ondo State Ministry of Health to design health education that addresses the gaps women actually have. It also supports Nigeria's commitment to Sustainable Development Goal 3, which aims to reduce maternal and neonatal mortality.

Statement of the problem. Despite free antenatal services, IPTp-SP and ITNs, malaria in pregnancy and malaria-related anaemia persist at Arakale Comprehensive Health Centre, yet no recent study has examined what women attending the facility know, how they feel about prevention and what they actually do, so health education remains generic and the gap between awareness and practice is unmeasured.

Objective of the study. This study assessed knowledge, attitudes and preventive practices towards malaria in pregnancy among women of child-bearing age attending Arakale Comprehensive Health Centre, Akure, Ondo State, and identified the factors influencing them.

LITERATURE REVIEW

Knowledge. Knowledge of malaria in pregnancy covers how the disease is transmitted, how it presents, what it does to mother and child, and how it is prevented. Evidence from Nigeria suggests that general awareness is high but that detailed understanding is thinner. Kalu et al. (2022), reviewing what Nigerian pregnant women know and do about malaria prevention, reported that adequate awareness frequently coexists with sub-optimal use of ITNs and IPTp. Okoro et al. (2021) combined parasitaemia testing with a KAP survey among pregnant women attending health facilities in Owerri, illustrating how knowledge and infection status can be examined together. In Ondo State, Akanbi and Ajayi (2025) found that fewer than half of pregnant women (about 47%) knew the harm malaria can cause to the fetus, although 84.4% agreed with bed-net use.

Attitudes. Attitudes are the beliefs and feelings that sit between knowing and doing. Health education offered during ANC has been linked to more favourable attitudes towards malaria prevention among pregnant women in Oyo State (Adeniji et al., 2023). Perceived susceptibility, trust in providers and confidence in the safety of antimalarials are recurring themes, and attitudes that are positive on paper do not always translate into routine behaviour (Kalu et al., 2022).

Preventive practices. The recommended package combines ITNs, IPTp-SP and early treatment (WHO, 2022). National data show that uptake of the pregnancy-specific components lags: 17% of Nigerian pregnant women received three or more IPTp doses and about 52% slept under a net (NPC & ICF, 2019), while a recent comparison of antenatal attendees using IPTp alone with those using IPTp together with ITNs underlines the value of combining measures (Madukwe et al., 2025).

Influencing factors. In an analysis based on Andersen's model, higher education (adjusted odds ratio [aOR] 4.07), employment (aOR 2.59), autonomy over health care (aOR 2.02) and attending a private facility (aOR 2.26) raised the odds of optimal IPTp use, whereas rural residence lowered them (aOR 0.44) (Solanke et al., 2023). These determinants map onto the Health Belief Model, which holds that preventive action depends on perceived susceptibility and severity, perceived benefits and barriers, cues to action and self-efficacy (Alyafei & Easton-Carter, 2024). Taken together, the literature points to a knowledge–practice gap whose size at facility level in Akure has not been documented, which the present study set out to measure.

Four research questions guided the study:

i. what is the level of knowledge of malaria in pregnancy among women of child-bearing age attending Arakale Comprehensive Health Centre;
ii. what are their attitudes towards malaria prevention and treatment during pregnancy;
iii. what preventive practices do they adopt; and

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iv. what factors influence their knowledge, attitudes and preventive practices? Answering these questions at a single,

METHODS

Study area

The study was conducted at Arakale Comprehensive Health Centre in Akure South Local Government Area (LGA), Ondo State, south-western Nigeria (latitude 7.25° N, longitude 5.20° E). Akure South, the state capital, covers about 152 km^2 and lies in the tropical rainforest zone, with a rainy season from April to October and a dry season from November to March. Mean annual rainfall is 1,200–1,500 mm and temperature ranges from 24 °C to 34 °C, conditions that support mosquito breeding. Arakale is one of 51 health facilities in the LGA and one of the oldest government primary health care centres in Akure. It has evolved from basic maternal and child health services into an integrated primary health care facility in line with Nigeria's Primary Health Care Policy and serves a large number of antenatal clients.

Study design and population

A descriptive cross-sectional survey design was used. The study population comprised women of child-bearing age (15–49 years) attending Arakale Comprehensive Health Centre. Women of child-bearing age attending the facility who consented were included. Women who were ill or had a debilitating illness, and those unwilling to give consent, were excluded.

Sample size and sampling technique

The minimum sample size was calculated with the Cochran formula, $n = Z^2p(1 - p)/d^2$, where Z = 1.96 (95% confidence), p = 0.20 (estimated prevalence of 20% among pregnant women at the facility) and d = 0.05 (margin of error). This gave $n = (1.96^2 \times 0.20 \times 0.80)/0.05^2 = 0.614656/0.0025 = 245.9$, rounded up to 246. Adding a 10% allowance for non-response (24.6) gave 270.6, rounded to 271. A multi-stage sampling technique was used. In the first stage, respondents were stratified by age group to ensure representation of different categories of women. In the second stage, convenience sampling was used to recruit women in each stratum who were available and willing to participate during the data collection period. In all, 271 women were approached and 250 questionnaires were completed and returned (response rate 92.3%); all analyses are based on these 250 respondents.

Data collection instrument and procedure

Data were collected with a self-structured questionnaire of five sections: Section A, socio-demographic characteristics (age group, marital status, level of education, occupation and parity); Section B, knowledge of malaria in pregnancy (six items answered Yes, No or Do not know); Section C, attitudes towards malaria prevention and treatment in pregnancy (six statements); Section D, preventive practices (six statements); and Section E, factors influencing knowledge, attitudes and practices (six statements). Attitude, practice and factor statements were rated on a Likert-type agreement scale. The researcher administered the questionnaire personally on antenatal clinic days over a period of two weeks, guiding respondents to ensure accurate completion.

Operational definitions and scoring

Malaria in pregnancy was understood as a laboratory-confirmed *Plasmodium* infection (by microscopy or rapid diagnostic test) in a pregnant woman. Knowledge was defined as respondents' awareness of transmission, clinical presentation, risks in pregnancy and prevention; attitudes as their feelings and inclinations towards malaria prevention and management in pregnancy; and preventive practices as the actions women take to avoid malaria during pregnancy, such as sleeping under ITNs, taking IPTp and

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controlling mosquito-breeding sites. The overall level of knowledge was classified as good where the respondent acknowledged that malaria in pregnancy can harm the unborn baby, and as poor otherwise.

Data analysis

Data were entered and analysed with the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics (frequencies and percentages) were computed and results are presented in tables.

Ethical considerations

A letter of introduction was obtained from the School of Community Health, Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, and addressed to the officer-in-charge of Arakale Health Centre, Akure. The purpose of the study was explained to each woman and consent was obtained before participation. Respondents were told that participation was voluntary, that responses would be treated confidentially and used for academic purposes, and that declining would not affect their treatment. [Ethics committee approval number to be inserted by the authors if applicable.]

RESULTS

Socio-demographic characteristics of respondents

Table 1: ***Socio-demographic characteristics of respondents (n = 250)***

Variable	Frequency (f)	Percentage (%)
Age group (years)		
15–24	50	20.0
25–34	80	32.0
35–44	90	36.0
45–49	30	12.0
Marital status		
Married	100	40.0
Divorced	100	40.0
Widowed	50	20.0
Level of education		
No formal education	100	40.0
Primary education	40	16.0
Secondary education	60	24.0
Tertiary education	50	20.0
Occupation		
Trader	100	40.0
Civil servant	50	20.0
Artisan	80	32.0

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Unemployed	20	8.0
Parity		
Primiparous	30	12.0
1–2 children	120	48.0
3 or more children	100	40.0

Source: field survey, 2026.

Table 1 shows that most respondents were aged 35–44 years (36.0%), followed by 25–34 years (32.0%), 15–24 years (20.0%) and 45–49 years (12.0%). Regarding marital status, 40.0% were married, 40.0% divorced, and 20.0% widowed. For education, 40.0% had no formal education, 16.0% primary, 24.0% secondary and 20.0% tertiary education. Trading was the most common occupation (40.0%), followed by artisanship (32.0%), civil service (20.0%), and unemployment (8.0%). By parity, 48.0% had one or two children, 40.0% had three or more and 12.0% were primiparous.

Knowledge of malaria in pregnancy

Table 2 ***Overall level of knowledge of malaria in pregnancy (n = 250)***

Knowledge level	Frequency (f)	Percentage (%)
Good knowledge	190	76.0
Poor knowledge	60	24.0

Note. Source: field survey, 2026.

Table 3 ***Knowledge of malaria in pregnancy among respondents (n = 250)***

Item	Yes (f)	Yes (%)	No (f)	No (%)
Malaria can be transmitted through mosquito bites	200	80.0	50	20.0
Malaria in pregnancy can harm the unborn baby	190	76.0	60	24.0
Pregnant women are more vulnerable to malaria infection	230	92.0	20	8.0
Malaria in pregnancy can cause anaemia in pregnant women	245	98.0	5	2.0
Untreated malaria in pregnancy can lead to miscarriage or low birth weight	235	94.0	15	6.0
Early diagnosis and treatment can prevent complications	220	88.0	30	12.0

Source: field survey, 2026.

As shown in Table 2, 190 respondents (76.0%) had good knowledge of malaria in pregnancy, having acknowledged that it can harm the unborn baby, while 60 (24.0%) had poor knowledge. Table 3 presents responses to the individual knowledge items. Most respondents (80.0%) knew that malaria is transmitted through mosquito bites, 92.0% knew that pregnant women are more vulnerable, and 98.0% knew that malaria in pregnancy can cause anaemia. In addition, 94.0% knew that untreated malaria can lead to

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miscarriage or low birth weight, and 88.0% knew that early diagnosis and treatment can prevent complications. Awareness that malaria can harm the unborn baby was lower (76.0%), and one in four respondents (24.0%) was not aware of this.

Attitudes towards malaria prevention in pregnancy

Table 4: ***Attitudes of women of child-bearing age towards malaria prevention in pregnancy (n = 250)***

Attitudinal statement	SA f (%)	SD f (%)	U f (%)
Malaria prevention during pregnancy is very important	200 (80.0)	40 (16.0)	10 (4.0)
It is necessary to seek prompt treatment for symptoms	220 (88.0)	20 (8.0)	10 (4.0)
Attending antenatal clinics helps in prevention	210 (84.0)	20 (8.0)	20 (8.0)
I feel confident using recommended preventive measures	240 (96.0)	5 (2.0)	5 (2.0)
Taking prescribed malaria drugs during pregnancy is safe	240 (96.0)	10 (4.0)	0 (0.0)
Prevention is a shared responsibility (women and providers)	180 (72.0)	50 (20.0)	20 (8.0)

Source: field survey, 2026.

Table 4 shows that attitudes were largely favourable. Four in five respondents (80.0%) strongly agreed that malaria prevention during pregnancy is very important, although 16.0% strongly disagreed and 4.0% were undecided. 88.0% supported prompt treatment of symptoms, and 84.0% agreed that attending antenatal clinics helps prevention (8.0% disagreed and 8.0% were undecided). Confidence in using recommended preventive measures (96.0%) and belief that prescribed antimalarials are safe in pregnancy (96.0%) were highest. Seventy-two per cent regarded prevention as a shared responsibility between women and providers, whereas 20.0% disagreed.

Preventive practices towards malaria in pregnancy

Table 5: ***Preventive practices towards malaria in pregnancy (n = 250)***

Practice statement	SA f (%)	SD f (%)	NU f (%)
I regularly sleep under an insecticide-treated net during pregnancy	50 (20.0)	200 (80.0)	0 (0.0)
I ensure my surroundings are kept clean to prevent mosquito breeding	190 (76.0)	50 (20.0)	10 (4.0)
I attend antenatal clinic regularly for malaria prevention and monitoring	200 (80.0)	35 (14.0)	15 (6.0)
I take malaria preventive medication as prescribed during pregnancy	170 (68.0)	55 (22.0)	25 (10.0)

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I use mosquito repellent or coil to prevent mosquito bites	180 (72.0)	60 (24.0)	10 (4.0)
I seek medical care immediately when I experience symptoms of malaria	220 (88.0)	20 (8.0)	10 (4.0)

Source: field survey, 2026.

Practices, shown in Table 5, were mixed. Only 20.0% of respondents regularly slept under an insecticide-treated net during pregnancy, while 80.0% did not. By contrast, 88.0% sought medical care immediately when they had malaria symptoms, and 80.0% regularly attended antenatal clinics for malaria prevention and monitoring. Seventy-six per cent kept their surroundings clean to prevent mosquito breeding, 72.0% used mosquito repellents or coils, and 68.0% took malaria preventive medication as prescribed, while 22.0% did not and 10.0% were undecided.

Factors influencing knowledge, attitudes and practices

Table 6: ***Factors influencing knowledge, attitudes and practices towards malaria in pregnancy (n = 250)***

Factor statement	SA f (%)	SD f (%)	U f (%)
Health education received at the health centre improves my knowledge, attitude and practice	230 (92.0)	15 (6.0)	5 (2.0)
Advice from health workers influences my attitude	230 (92.0)	20 (8.0)	0 (0.0)
My level of education affects my understanding of prevention	220 (88.0)	20 (8.0)	10 (4.0)
Cost of preventive measures affects my ability to practise prevention	190 (76.0)	40 (16.0)	20 (8.0)
Cultural beliefs influence how I respond to prevention	220 (88.0)	20 (8.0)	10 (4.0)
Family support encourages me to practise malaria prevention	200 (80.0)	30 (12.0)	20 (8.0)

Source: field survey, 2026.

Table 6 shows that respondents identified several influences on their knowledge, attitudes and practices. Health education received at the health centre (92.0%) and advice from health workers (92.0%) were the most frequently endorsed, followed by level of education (88.0%) and cultural beliefs (88.0%). Family support was endorsed by 80.0% and the cost of preventive measures by 76.0%, while 16.0% disagreed that cost affects their practice and 8.0% were undecided.

DISCUSSION

Knowledge of malaria in pregnancy

Three-quarters of the women (76.0%) had good knowledge of malaria in pregnancy, and awareness of specific facts was higher still: 98.0% knew malaria can cause anaemia, 94.0% knew of its link with miscarriage and low birth weight, and 92.0% knew that pregnancy increases vulnerability. This is a favourable picture that is consistent with the high general awareness reported among Nigerian pregnant

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women (Kalu et al., 2022). It is plausible, though this study did not test it, that repeated counselling during ANC contributes to this awareness, as respondents themselves rated health education as the leading influence (Table 6). Two items nevertheless deserve attention. One in four women (24.0%) did not know that malaria can harm the unborn baby, and 20.0% did not recognise mosquito bites as the mode of transmission. A similar gap in fetal-risk awareness was reported across Ondo State, where only about 47% of pregnant women knew the adverse effects of malaria on the fetus (Akanbi & Ajayi, 2025). Since perceived severity is a central driver of preventive action in the Health Belief Model (Alyafei & Easton-Carter, 2024), this residual gap in knowledge of fetal consequences is worth closing.

Attitudes towards malaria prevention

Attitudes were broadly positive. Confidence in recommended measures and belief in the safety of prescribed antimalarials were each expressed by 96.0% of respondents, and 88.0% supported prompt treatment. These figures suggest that fear of drug side-effects, a barrier described in the wider literature, was not a major concern in this setting, and they reflect the trust that antenatal care can build (Adeniji et al., 2023). Weaker areas were the perceived importance of prevention (80.0%, with 16.0% in disagreement) and shared responsibility between women and providers (72.0%, with 20.0% in disagreement). Women who see prevention as the provider's task alone may be less likely to take the initiative, for example by hanging and using a net each night, so counselling should explicitly present prevention as a partnership.

Preventive practices and the knowledge–practice gap

The central finding is the gap between knowledge and behaviour. While 80.0% attended ANC regularly and 88.0% sought care promptly for symptoms, only 20.0% regularly slept under an ITN, and 68.0% took preventive medication as prescribed. The low ITN use stands in contrast to the 52% of pregnant women who slept under a net in the 2018 national survey (NPC & ICF, 2019) and to the 84.4% of Ondo pregnant women who agreed with bed-net use (Akanbi & Ajayi, 2025). It supports the observation that good knowledge and favourable attitudes do not automatically yield consistent ITN use or complete IPTp uptake (Kalu et al., 2022; Solanke et al., 2023). Because IPTp and ITNs act together, a woman who attends ANC and takes medication but does not sleep under a net remains incompletely protected (Madukwe et al., 2025). Because all women in this sample contacted the health centre, the ITN gap points to household-level barriers rather than limited service contact. The Health Belief Model would frame these as perceived barriers outweighing perceived benefits, even where perceived susceptibility is high (Alyafei & Easton-Carter, 2024). The present data do not identify reasons for non-use,, and the cross-sectional descriptive design cannot establish causes; the reasons respondents gave in Table 6 are suggestive, not explanatory.

Factors influencing preventive practices

Respondents most often attributed their practices to health education (92.0%), health workers' advice (92.0%), educational level (88.0%), and cultural beliefs (88.0%), with family support (80.0%) and cost (76.0%) also frequently cited. The prominence of education aligns with Solanke et al. (2023), in which education, employment and autonomy over health care were strongly associated with optimal IPTp use. The importance respondents placed on cost is notable in a sample where 40.0% had no formal education and 40.0% were traders, and it may help explain low net use, although the study did not test this link. Cultural beliefs and family support point to the social environment in which prevention decisions are made, which supports involving husbands, relatives and community leaders in education and net-use campaigns. Taken together, the results indicate that improving practice requires more than raising knowledge: it requires addressing cost, access and sociocultural barriers that stand between knowing and

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doing.

Strengths and limitations

The study provides facility-level data from a setting in which none had been reported, with a high response rate (92.3%) and interviewer-administered questionnaires that helped ensure complete responses. Consider its limitations when interpreting the findings. It was conducted in a single health centre, and convenience sampling within age strata limits generalisability beyond the facility. Participants self-reported practices, which may be subject to social desirability bias, especially for items such as ITN use and medication adherence. Analysis was descriptive only, so associations between respondent characteristics and knowledge, attitudes or practices were not tested, and the overall knowledge classification rested on a single item. The attitude, practice and factor items were also recorded in three collapsed response categories, which limits the detail available. Future studies should use probability sampling, validated multi-item scales and inferential analysis and should directly explore why women who know about nets do not use them.

CONCLUSION

Women of child-bearing age attending Arakale Comprehensive Health Centre had good knowledge of malaria in pregnancy (76.0%) and largely positive attitudes towards prevention, yet only 20.0% regularly slept under an insecticide-treated net. Therefore, knowledge and attitudes alone did not produce consistent protective behaviour. Respondents pointed to health education, health worker advice, education level, cultural beliefs, family support and cost as influences on their practices. Based on these findings,

Recommendations

- Health workers strengthen counselling during every antenatal visit on malaria transmission, fetal and maternal risks, IPTp-SP schedules, consistent nightly ITN use, environmental sanitation and prompt care-seeking, with particular emphasis on the effects of malaria on the unborn baby.
- Facilities and the Ondo State malaria programme ensure that ITNs and IPTp-SP are available free or at affordable cost at the point of antenatal care, and follow up whether nets are actually used at home.
- Behaviour-change communication should be culturally sensitive, involve husbands, family members and community leaders and present prevention as a shared responsibility between women and providers.
- Primary health care workers receive regular refresher training in malaria prevention, diagnosis, and counselling, and facilities routinely monitor ITN use and IPTp uptake.
- Further research should use larger, probability-based samples and analytical methods to identify the specific barriers to ITN use in Akure and similar urban and peri-urban settings.

Declarations

Ethics approval and consent: We obtained permission from the facility officer-in-charge and informed consent from all participants (see Section 3.7). [Ethics approval number, if any, to be inserted.]

Conflict of interest and funding: No

Data availability: The data supporting this study are available from the corresponding author on reasonable request.

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