Malaria Knowledge, Attitudes, Preventive Practices and Use of Malaria-Control Measures among Adults in Gabasawa Local Government Area, Kano State, Nigeria

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ABSTRACT

Malaria control in Nigeria has focused strongly on children and pregnant women, while less is known about malaria-related knowledge, attitudes and preventive practices among adults in rural northern communities. This study described malaria knowledge, attitudes, preventive practices and use of malaria-control measures among 388 adults aged 18 years and above in four study locations in Gabasawa Local Government Area, Kano State, Nigeria (97 respondents per location). Participants were selected using multistage probability sampling and interviewed with a structured questionnaire in English or Hausa. Knowledge was assessed with six items (score 0–6), attitudes with four five-point items, and practices through indicators of insecticide-treated net (ITN) ownership, availability and use, environmental management, indoor spraying by an organised malaria-control team, and caregiver-reported seasonal malaria chemoprevention (SMC) uptake among eligible children. Data were analysed descriptively. Mean age was 44.0 years (SD 13.6), and 54.6% were female. The mean knowledge score was 4.10 (SD 1.18) out of 6, and 66.2% knew that not every fever is malaria. About half agreed with each supportive attitude statement (52.0–56.6%), while 11.3% agreed that prevention was not worth the effort. Household ITN ownership was 77.6%, personal availability was 67.8%, and 47.9% reported using a treated net the previous night. Only 15.2% reported indoor spraying by an organised malaria-control team in the previous six months, and 33.5% cleared stagnant water or drains weekly or more often. Among 178 respondents with an eligible child who answered the SMC uptake item (including respondents who did not know the uptake status), 70.2% reported that all eligible children received at least one SMC cycle. Overall, knowledge was moderate and attitudes generally supportive, but reported preventive practices were less consistent. These findings describe self-reported practices in four study locations and suggest the importance of improving net access and use, reinforcing messages about malaria testing, and promoting environmental management.

KEYWORDS

Malaria, knowledge, attitudes, preventive practices, insecticide-treated nets, seasonal malaria chemoprevention, Kano State

I. INTRODUCTION

Malaria remains a leading cause of illness and death in sub-Saharan Africa. The World Health Organization estimated 282 million cases and 610,000 deaths worldwide in 2024, with the WHO African Region accounting for about 94% of cases and 95% of deaths, and a small group of high-burden countries, Nigeria among them, carrying most of the burden (World Health Organization [WHO], 2025). Prevention rests on tools that households must obtain and then use correctly and consistently, chiefly insecticide-treated nets (ITNs), indoor residual spraying (IRS) and environmental management, with seasonal malaria chemoprevention (SMC) given to young children in areas of seasonal transmission (WHO, 2023). Prompt diagnosis also matters: WHO recommends parasitological confirmation of suspected malaria, so that fever alone is not treated as malaria.

Whether households protect themselves depends partly on what people know and how they regard prevention. Community surveys in other malaria-endemic settings have often found reasonable knowledge alongside weaker practice. In Mizoram, India, 77.9% of respondents had good knowledge and 82.7% good attitudes, yet only 55.5% had good prevention practices. In rural Afar, Ethiopia, 64.2% of household heads had good knowledge, and those with poor knowledge were more likely to use nets irregularly. In West Belessa, Ethiopia, 75.6% had good knowledge of prevention methods (Aragie, 2020), and a survey in semi-urban Ota, Nigeria, found that most respondents had moderate knowledge but 60% had poor preventive practices.

Much of the malaria knowledge, attitude and practice literature concerns children, caregivers and pregnant women, and adults in rural northern Nigeria are comparatively little described, even though adults carry a substantial burden of illness and lost productivity and share the nets and sprayed rooms on which child protection also depends. Gabasawa LGA, Kano State, is a largely farming and trading area with seasonal transmission, in which a Special Intervention Task Force operates alongside routine services. To plan prevention, programme managers need a clear picture of what adults in this setting know, how they regard prevention, and which control measures they actually use.

This paper reports findings from a larger dissertation study on exposure to the Special Intervention Task Force and malaria outcomes among adults in Gabasawa LGA, focusing on one of its objectives: to describe malaria-related knowledge, attitudes, preventive practices and the use of malaria-control measures among adults in four study locations of the LGA. Exposure to the Task Force and its association with outcomes are analysed separately.

II. MATERIALS AND METHODS

A. Study Design and Area

An analytical cross-sectional household survey was conducted in Gabasawa LGA, northern Kano State, Nigeria (approximately 12.15° N, 8.86° E; about 605 km²). The LGA has 11 wards, its headquarters is at Zakirai, and its 2006 census population was 211,204. Residents

are mainly farmers and traders, and malaria transmission is seasonal. The study followed the STROBE guideline for cross-sectional studies.

B. Study Population and Sampling

Eligible participants were adults aged 18 years or older who had lived in a selected settlement for at least six months, could take part in an interview and gave informed consent. Visitors, recent arrivals and people who declined consent were not interviewed. The sample size was calculated with Cochran's single-proportion formula (Cochran, 1977), using $Z = 1.96$, $p = 0.50$ and $d = 0.05$, which gave 384.16. This was rounded up to 385 and then to 388 to allow equal allocation of 97 respondents to each of four study locations.

Sampling involved four stages. First, four of Gabasawa LGA's 11 wards; Zakirai, Zugachi, Garundanga and Gabasawa were selected using a probability sampling procedure. Second, communities or settlements within the selected wards were selected using a probability procedure. Third, households within the selected communities were selected by systematic random sampling, using a sampling interval based on the available household listing or estimated household count and a randomly selected starting household. Fourth, one eligible adult was selected per household; where more than one eligible adult was available, balloting/simple random selection was used. A total of 97 completed interviews was targeted for each of the four study locations, giving 388 respondents. A reserve household list was used after repeat visits where needed. Because allocation was equal across locations, pooled figures are unweight sample summaries and should not be interpreted as population-proportionate estimates for the LGA.

C. Data Collection and Measures

The data collected for this study were analysed using descriptive and inferential statistics. These methods were used to answer the research questions and test the formulated null hypotheses. Frequencies and percentages were used to summarise respondents' socio demographic characteristics and malaria-related practices, including exposure to the Special Intervention Task Force. Means and standard deviations were used where appropriate to summarise knowledge and attitude scores.

The chi-square test was employed to examine associations between categorical variables and selected malaria-related outcomes among the respondents.

Binary logistic regression was used to identify factors associated with reported malaria diagnosis and other outcomes specified in the study objectives. The hypotheses were tested at the 0.05 significance level using IBM SPSS, Version 26.0.

D. Quality Assurance

The questionnaire was pre-tested on 30 adults with similar characteristics, who were excluded from the main survey. Interviewers explained that responses did not affect access to services, followed all skip instructions and used calendar dates to anchor recall periods. Questionnaires were checked daily for skipped fields and logical inconsistencies without changing respondents' answers.

E. Data Analysis

Data were checked for duplicates, impossible values and skip inconsistencies and analysed in SPSS. Categorical variables are summarised as frequencies and percentages, and continuous variables as means with standard deviations or medians. Denominators are shown for each indicator, and lack of a net was not treated as missing behaviour. The analysis was descriptive, and no hypothesis tests were pre specified for this objective.

F. Ethical Considerations

Ethical approval was obtained from the Department of Public Health and Community Medicine, Al-Hikma University, Ilorin, before the study began. [AUTHOR ACTION REQUIRED: insert the verified ethics approval/reference number and approval date; do not submit with this note unresolved.] Community entry was agreed with local leaders, and verbal and written informed consent was obtained from participants. Questionnaires carried codes rather than names, and respondents who were unwell were encouraged to seek care.

III. RESULTS

All 388 planned interviews were completed, with 97 respondents sampled in each of the four study locations: Zakirai, Zugachi, Garundanga and Gabasawa.

A. Characteristics of Respondents

The mean age was 44.0 years (SD 13.6; range 21–85) and 54.6% were female. Most respondents were married (64.2%). Secondary education was the most frequent level (25.0%), 23.7% had Qur'anic or Islamiyya education only and 16.0% had no formal schooling. Farming (28.1%) and trading or business (25.5%) were the leading occupations. Mean personal monthly income was ₦57,997 (SD ₦58,490; n = 378), mean household size was 6.0 persons (SD 3.3), and mean travel time to the nearest health facility was 36.1 minutes (SD 27.6) (Table 1).

Table 1: Socio demographic Characteristics of Respondents (N = 388)

Characteristic	Category	n	%
Study location	Zakirai	97	25.0
	Zugachi	97	25.0
	Garundanga	97	25.0
	Gabasawa	97	25.0
Sex	Male	176	45.4
	Female	212	54.6
Marital status	Married	249	64.2
	Never married	82	21.1
	Divorced/separated	32	8.2
	Widowed	25	6.4
Education	No schooling	62	16.0
	Qur'anic/Islamiyya only	92	23.7
	Primary	69	17.8
	Secondary	97	25.0

	Tertiary	68	17.5
Occupation	Farming	109	28.1
	Trading/business	99	25.5
	Artisan	58	14.9
	Homemaker	43	11.1
	Unemployed	31	8.0
	Civil/public service	26	6.7
	Student	22	5.7

B. Knowledge of Malaria

The proportion answering each knowledge item correctly ranged from 64.9% (D2, fever as a common symptom) to 71.4% (D1, transmission by the bite of an infected mosquito) (Table 2, Figure 1). Two in three respondents (66.2%) correctly rejected the idea that every fever is malaria, and 69.1% knew that a blood test can determine malaria. The mean knowledge score was 4.10 (SD 1.18; median 4; possible range 0–6), calculated for all 388 respondents.

Table 2: Correct Responses to Malaria Knowledge Items (N = 388)

Item	Correct answer	Correct, %
D1. Main mode of transmission	Bite of an infected mosquito	71.4
D2. Common symptom	Fever	64.9
D3. Nets can help prevent malaria	Yes	71.1
D4. Every fever means malaria	No	66.2
D5. A blood test can determine malaria	Yes	69.1
D6. Adults can get malaria	Yes	67.3

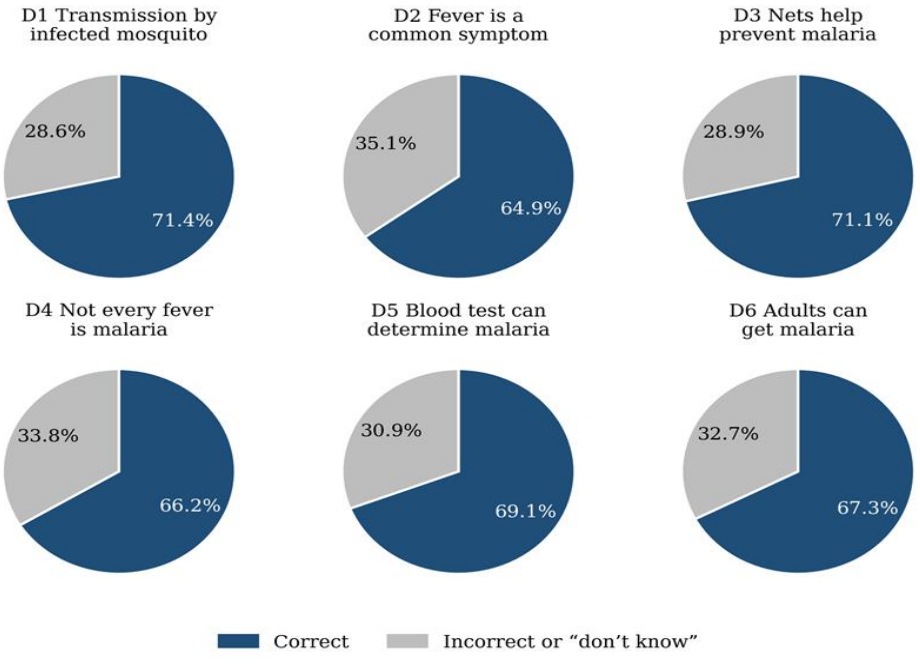


Figure 1: Proportion of Respondents Answering Each Malaria Knowledge Item Correctly (N = 388)

C. Attitudes towards Malaria Prevention

Just over half of respondents agreed or strongly agreed that they could get malaria if they did not protect themselves (E1, 52.0%), that using a treated net is worthwhile even when mosquitoes seem few (E2, 55.7%) and that prevention is part of their daily routine (E3, 56.6%) (Table 3, Figure 2). About one in three gave a neutral response to each of these statements (31.0–35.3%). Only 11.3% agreed or strongly agreed that prevention is not worth the effort (E4), and 54.9% disagreed or strongly disagreed. The mean attitude score was 3.60 (SD 0.50) on the 1–5 scale among the 356 respondents (91.8%) who answered all four items.

Table 3: Responses to Malaria Prevention Attitude Items (% of Respondents with a Response)

Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
E1. I could get malaria if I do not protect myself	1.6	11.1	35.3	32.1	19.9
E2. Using a treated net is worthwhile even with few mosquitoes	1.8	10.4	32.0	39.3	16.4
E3. Malaria prevention is part of my daily routine	0.8	11.6	31.0	36.2	20.4
E4. Preventing malaria is not worth the effort (reverse-worded)	17.1	37.8	33.9	10.0	1.3

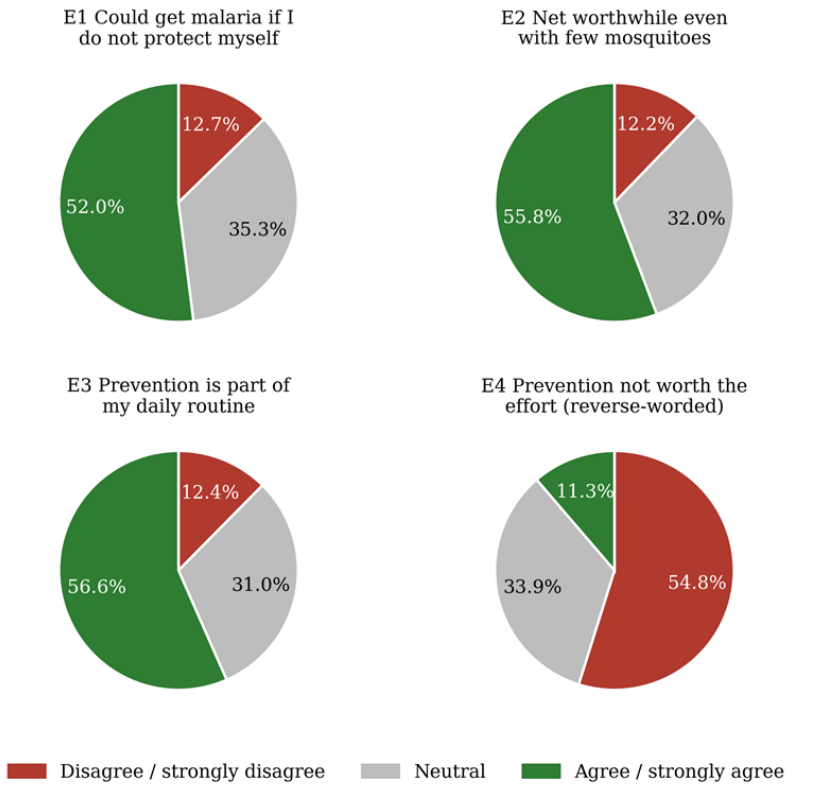


Figure 2: Distribution of Responses to the Four Attitude Items, with "Strongly" Categories Combined

D. Preventive Practices and Use of Control Measures

Household ITN ownership was 77.6% (301/388), a net was available to the respondent personally in 67.8% (263/388), and 47.9% (186/388) reported sleeping under a treated net the previous night; net use was therefore 29.7 percentage points below household ownership (Table 4, Figure 3). The mean number of nights of net use in the previous seven was 3.10 (SD 2.39; median 4).

Only 15.2% (59/388) reported that the inside of their home had been sprayed by an organised malaria-control team in the previous six months. Environmental management was uneven: 33.5% (130/388) removed stagnant water or cleared blocked drainage weekly or more often, while 21.6% reported never doing so.

Table 4: Use of Malaria-Control Measures and SMC Uptake

Indicator	n	Denominator	%
Household owns an ITN (F1)	301	388	77.6
ITN available to respondent (F2)	263	388	67.8
Slept under an ITN last night (F3)	186	388	47.9
Home sprayed by an organised team, last 6 months (F7)	59	388	15.2
Removes stagnant water/clears drains weekly or more (F6)	130	388	33.5
Household has an SMC-eligible child (F8)	214	388	55.2
All eligible children received at least one SMC cycle (F9)	125	178	70.2
Some eligible children received SMC (F9)	45	178	25.3
Uptake not known (F9)	8	178	4.5

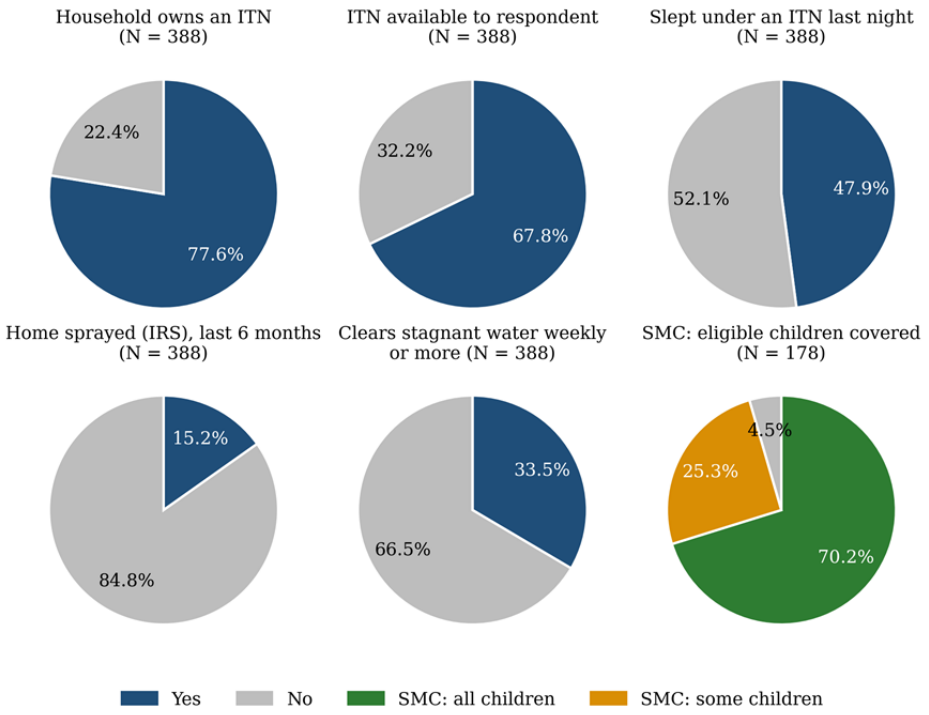


Figure 3: Use of Malaria-Control Measures (Grey = No; the SMC Panel Shows Caregiver-Reported Coverage of Eligible Children, Grey = Don't Know)

E. Seasonal Malaria Chemoprevention among Eligible Household Children

A household child eligible for SMC in the most recent season was reported by 214 respondents (55.2%), and caregiver involvement in the eligible child's care was reported by 144 of them (67.3%). Among the 178 respondents with an eligible child who answered the SMC uptake item, 70.2% reported that all eligible children received at least one SMC cycle, 25.3% that some did, and 4.5% said they did not know the uptake status.

IV. DISCUSSION

Among 388 adults in four study locations of Gabasawa LGA, knowledge of malaria was moderate and incomplete, attitudes towards prevention were generally supportive but with a large neutral group, and protective behaviour lagged behind both. Households commonly owned nets, but fewer than half of respondents had slept under one the previous night, and the reported coverage of indoor spraying and weekly environmental management was limited.

A mean knowledge score of 4.10 out of 6, with each item answered correctly by between 65% and 71% of respondents, indicates that about two-thirds of adults held each key fact and that no single item was known to everyone. The proportions are similar to those reported in rural Ethiopia, where 64.2% of household heads had good knowledge and 75.6% in another district had good knowledge of prevention methods, although definitions of "good" knowledge differ between studies and are not directly comparable with a score that has no cut-off. The weakest items were recognising fever as a symptom (64.9%) and knowing that not every fever is malaria (66.2%). The second is important in practice because WHO advises confirming suspected malaria with a parasitological test before treatment (WHO, n.d.); a third of adults who equate fever with malaria may seek treatment without testing, a possibility this survey cannot test but that merits attention in health education.

On attitudes, only about one in nine respondents thought prevention not worth the effort, but only about half agreed with each supportive statement and roughly a third were neutral. The generally positive profile (mean 3.60 of 5) should therefore not be read as strong commitment, because a substantial share of adults had not formed a firm view that prevention applies to them. Favourable attitudes coexisting with weaker action have been reported elsewhere, where good knowledge and attitudes exceeded good practices by 22 and 27 percentage points respectively.

The clearest finding is the gap between household net ownership (77.6%), personal availability (67.8%) and reported use the previous night (47.9%). Self-reported use on a single night cannot be taken as a measure of habitual use, but the mean of 3.10 nights in the preceding seven supports the conclusion that regular use may be inconsistent. Similar gaps between knowledge and preventive practice have been described in Nigeria and elsewhere, and poor knowledge was associated with irregular net use in Afar. The difference between household ownership and personal availability also suggests that owning at least one household net does not guarantee that every adult has access to one. The survey summary lists reasons for not using a net every night, but the denominator and response

Structure could not be verified; reason-specific percentages are therefore not interpreted here pending data verification.

Only 15.2% of respondents reported indoor spraying by an organised team in the previous six months, and about one in five never cleared stagnant water or drains. Spraying is typically targeted rather than universal, and the survey did not record whether respondents' homes were in areas planned for spraying, so the figure describes coverage of the adult sample and not failure to reach a target. It does show that for most adults, nets and personal behaviour are the main protection. Environmental management is within the control of residents: the 21.6% who never clear stagnant water or drains, and the roughly 45% (derived by subtraction) who do so less often than weekly, are a target for community mobilisation.

Caregivers reported that all eligible children received at least one SMC cycle in 70.2% of the 178 households that answered the uptake item; 4.5% of this group did not know the uptake status. This is a caregiver report and not verified administration, 36 of 214 respondents with an eligible child gave no definite answer, and SMC protects children and not the adults interviewed. It nonetheless suggests that a delivery channel for children is functioning, and the household contact it provides could also carry messages about adult prevention.

Strengths include a pre specified sample size, equal allocation across four study locations, probability-based selection of wards and communities as described in the thesis, systematic random household selection, and selection of one eligible adult per household, bilingual interviewing with back-translation, and pre-testing. Limitations should be noted. All data were self-reported, so net use and environmental practices may be overstated through social desirability; knowledge was measured with six dichotomously scored items, with "don't know" counted as incorrect; and the final attitude scale contained only four items, one reverse-worded. The composite attitude score was available for 356 respondents (91.8%). The reported pre-test alpha of 0.816 was calculated for six pre-test attitude items and should not be taken as reliability evidence for the final four-item scale. Net use was measured for the previous night and may vary with season and weather. The analysis reported here is descriptive and does not assess socio demographic associations. Only four study locations were included, and pooled percentages are unweight sample summaries, so results should not be generalised as population-representative estimates for the whole LGA. The manuscript's ward/community naming and the official spelling of one location should be confirmed against the sampling records before submission.

V. CONCLUSION AND RECOMMENDATIONS

Adults in Gabasawa LGA had moderate, incomplete knowledge of malaria and generally supportive but uncommitted attitudes, and their protective behaviour lagged behind both. Net use was 30 percentage points below ownership, and reported indoor spraying and weekly environmental management were each reported by a minority. Reported SMC uptake among eligible household children was high. These are self-reported findings for four study locations and not a measure of observed behaviour.

Based on these findings, it is recommended that:

- malaria programmes distribute enough nets to match sleeping spaces and demonstrate hanging at the point of distribution;
- community health workers reinforce the message that not every fever is malaria and link it to access to testing, and target the large neutral group with messages on the personal relevance of prevention for adults; and
- Programme managers and communities review the targeting and reach of indoor spraying and promote regular clearing of stagnant water and drains. Future studies should combine self-report with observation of net use, analyse who is least protected by sociodemographic group, and verify SMC uptake against programme records.

DECLARATIONS

Ethics approval: Approval was obtained from the Department of Public Health and Community Medicine, Al-Hikma University, Ilorin, before the study began. All procedures related to data management and analysis were carried out in accordance with established academic and institutional guidelines.

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