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Determinants of Insecticide-Treated Bed-Net: Knowledge, Attitude, and Practice in a Malaria-Endemic District of Ethiopia

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ABSTRACT

Background: Insecticide-treated bed nets (ITNs) remain a cornerstone of malaria control, yet their population-level impact depends on sustained household ownership and correct use. Evidence on determinants of ITN uptake in rural Ethiopia remains limited. This study assessed knowledge, attitudes, and practices (KAP) regarding ITNs and identified factors associated with net possession and utilization in Dodicha Kebele, a malaria-endemic district.

Methods: A community-based cross-sectional survey was conducted from 14 January to 17 February 2023. Using systematic random sampling, 124 of 183 households were interviewed using a semi-structured questionnaire, and sleeping spaces were inspected with an observation checklist. Descriptive statistics summarized KAP indicators. Associations between socio-demographic variables and ITN outcomes were assessed using chi-square (χ^2) tests and odds ratios (OR) with 95% confidence intervals.

Results: Household respondents were predominantly female (71/124, 57.3%); mean age was 36.0 ± 1.2 years (range 16–80). ITN ownership was 61.3% (76/124), with a median of one net per owning household. Consistent use was reported by 54.0% and occasional use by 24.0% of owners. Households with an educated spouse were significantly more likely to own ≥1 ITN (OR = 2.6, 95% CI 1.3–5.3, $p < 0.01$). Prior health education on ITNs was predictive of ownership (70.7% vs 46.9%; OR = 2.7, 95% CI 1.3–5.9, $p = 0.008$). Utilization was significantly higher where >1 net was available (100% vs 70.7%, $p < 0.001$). Knowledge of mosquito bites as the primary mode of malaria transmission was independently associated with ITN use ($p < 0.05$).

Conclusion: ITN coverage in Dodicha Kebele falls below national targets, with substantial gaps between ownership and effective use. Household education—both formal schooling and targeted ITN training—emerged as key determinants. Strengthening behavior-change communication and ensuring provision of at least two nets per household could significantly enhance protective coverage in malaria-endemic settings.

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Abbreviations

AAU - Addis Ababa University
ACT - Artemisinin based Combination Therapy
IRS - Indoor Residual Spray
IPT - Intermittent Preventive Therapy
ITN - Insecticide Treated Bed Nets
KAP - Knowledge, Attitude and Practice
LLINs - Long Lasting Insecticidal Nets
OR - Odds Ratio
P value - Probability Value
SE - Standard of Error
SPSS - Statistical Package for the Social Sciences
UNICEF - United Nations Children's Fund Program
Vs - Versus
WHO - World Health Organization
WSU - Wolaita Sodo University
X² - Chi Square

Introduction

Malaria is a mosquito-borne infectious disease affecting humans and other animals caused by parasitic protozoans (a group of single-celled microorganisms) belonging to the Plasmodium genus. The disease is most commonly transmitted by infected female Anopheles mosquitoes [1].

Methods used to prevent malaria include medications, vector control, and the prevention of bites. There is currently no vaccine for malaria. Insecticide-treated bed nets represent one of the most effective vector control methods [1].

The WHO estimated that in 2015 there were 214 million new cases of malaria resulting in 438,000 deaths. The majority of cases (65%) occurred in children under 15 years old. Approximately 125 million pregnant women were at risk of infection each year; in Sub-Saharan Africa, maternal malaria was associated with up to 200,000 estimated infant deaths yearly. According to the WHO and UNICEF, deaths attributable to malaria in 2015 were reduced by 60% from a 2000 estimate of 985,000, largely due to the widespread use of insecticide-treated nets and artemisinin-based combination therapies [2].

From 2015 to 2023, malaria cases and deaths have increased globally. In 2023, there were an estimated 263 million malaria cases and 597,000 deaths worldwide, up from 214 million cases and 438,000 deaths in 2015. The WHO African Region continues to bear the highest burden, accounting for about 95% of malaria deaths and 94-95% of cases, with children under 5 years old being the most affected group [3,4]. This rise in cases and deaths since 2015 is partly attributed to disruptions in malaria control efforts caused by extreme weather, conflicts, funding shortfalls, and delays in distribution of prevention tools like insecticide-treated nets and medicines [5]. Despite these challenges, significant progress has been made since 2000, with an estimated 2.2 billion cases and 12.7 million deaths averted due to interventions [6]. New malaria vaccines and improved prevention methods are being introduced to accelerate control efforts, but funding gaps and access inequities remain critical issues [7,5].

Malaria remains endemic in a broad band around the equator, including areas of the Americas, many parts of Asia, and much of Africa. According to WHO, in 2015, 88% of global cases and 90% of global deaths occurred in the African region. Between 2000 and 2015, the number of malaria cases declined by 42% while the malaria death rate declined by 66% in the African region. This represents remarkable success in the fight against malaria, especially in sub-Saharan Africa, including Ethiopia. Nevertheless, malaria remains a significant global public health and socio-economic burden [2].

In Ethiopia, malaria is one of the major public health problems. The dominant malaria parasites are Plasmodium falciparum (77% of all reported malaria cases) and P. vivax (23%) with Anopheles arabiensis being the main vector [8]. Ethiopia has registered remarkable progress in reducing the burden of malaria and other major communicable diseases over the last two decades. Over the past decade, the burden of malaria has declined significantly, which could be attributed to improved coverage of high-impact interventions, such as prompt treatment of cases using artemisinin-based combination therapy (ACT), prevention and control of malaria among pregnant women using intermittent preventive therapy (IPT), use of vector control methods including insecticide-treated bed nets (ITNs), and indoor residual spray (IRS) [9]. In its recent strategic plan on malaria, the country targets by 2025: (1) to achieve not more than one confirmed malaria death per 100,000 populations at risk; (2) to reduce malaria cases by 75% from the baseline in 2013; and (3) to eliminate the disease from selected low transmission areas [10].

Despite the above promising outcomes, Ethiopia still needs to do much for malaria elimination. Among others, the unstable seasonal malaria coupled with emergence of drug-resistant Plasmodium and insecticide resistance in Anopheles mosquitoes are bottlenecks for malaria prevention and control in Ethiopia.

The use of LLINs is among the major malaria vector control strategies in Ethiopia. By 2025 the country foresees 100% ownership of LLINs by households in target areas with an allocation rate of at least one LLIN per two persons in a household [10].

However, the success of insecticidal net use for malaria prevention depends on perception of the target human population and behavior of the local malaria vector mosquitoes. Lack of knowledge about priority groups to sleep under LLINs, perceiving insecticidal nets to have negative side effects, and inappropriate frequency of use are among factors that hamper the role of insecticidal nets in preventing malaria in Ethiopia [11]. Although mass distribution has been considered as the best method to rapidly scale up the coverage of long-lasting insecticidal nets (LLINs) for malaria prevention, little information is available on knowledge, attitude, and practice of insecticide-treated bed nets in local settings. Therefore, the objective of our study is to assess knowledge, attitude, and practice of ITNs, and to identify the factors affecting their utilization in rural communities of Dodicha Kebele, Ethiopia.

Materials and Methods

Study Area and Period

This research was conducted over a period of five weeks from January 14 to February 17, 2023, in Dodicha Kebele, rural communities of Zeway, a town located in Oromia National Regional State, East Shoa Zone, Adami Tulu Woreda, at a distance of 160 km from Addis Ababa. Its astronomical location is 7°56' North Latitude and 38°43' East Longitude with an elevation of 1,643 meters above sea level [19]. The Woreda comprises 43 kebeles covering approximately 149,166 hectares. Malaria is a major health problem in the area, with the majority of cases occurring between September and December.

Source population

Rural communities of Adami Tulu Woreda constituted the source population of this study.

Study Population

The study population comprised households residing in Dodicha Kebele of the Woreda. The kebele has approximately 1,123 inhabitants distributed across 183 households.

Study Design

A cross-sectional community-based study design was employed. A sample of households was selected from the study population for data collection, and their respective outcomes were documented simultaneously. This design was chosen for its cost-effectiveness and time efficiency, making it suitable for this research.

Sample Size Determination and Sampling Procedure

Sample size was calculated based on the proportion of knowledge, attitude, and practice of ITNs among the source population, estimated at 50% from previous studies, with 95% confidence interval and precision level (margin of error) of 5%.

The sample size was calculated using the formula:

$n = z^2p(1-p)/d^2$

Where: n = sample size, z = 1.96 (95% CI), p = 0.5 (50%), d = 0.05 (5% margin of error)
$n = (1.96)^2 \times 0.5 \times (1-0.5) / (0.05)^2 = 384$

Correction factor for finite population:
$n = n_o / (1 + (n_o/N))$
$n = 384 / (1 + (384/183)) = 124$

After applying the correction factor, a total of 124 households were included in the study. A systematic random sampling procedure was employed to ensure households were evenly sampled with a constant

interval (k = 2). The first household was selected randomly, and subsequently, every second household was included in the sample.

Study variables
Dependent variable

Knowledge, attitude and utilization of ITNs by households.

Independent variables

Socio-demographic variables including age, educational status, family size, knowledge about the causes and prevention of malaria, and understanding of ITN contribution to malaria prevention.

Data Collecting Method
Data were collected using a semi-structured approach that followed systematic procedures while maintaining flexibility in implementation. This approach allowed for more detailed responses from participants and enabled them to express their views in their own manner. In-depth information regarding participants' knowledge, attitude, and practice of ITN use was obtained through interviews, direct observation, and photographic documentation.

The data collection employed both questionnaire and observation instruments. The questionnaire was prepared in both English and Amharic versions and administered to study subjects in their preferred language. For illiterate participants, the questionnaire was administered as an interview, with responses recorded by trained data collectors.

An observation guide (printed form with recording spaces), recording sheets, checklists, and field notes were used to document information from direct observations of household ITN ownership and usage patterns.

Data Collecting Tools
The aforementioned data collection methods i planned is employed via questionnaire and observation data collection instruments. Questionnaire will be prepared in English and Amharic versions. It will be distributed to the study subjects in either of the languages they can understand and write. If a subject is illiterate, the questionnaire will be presented in the form of interview and the answers will be recorded by the data collector.

Observation guide (printed form with space to record), recording sheet or checklist and field notes is used to record Information from observations.

Data Quality Assurance
To ensure data quality, questionnaires were carefully designed by adapting questions from validated instruments used successfully in similar studies. Response formats were standardized through pre-testing. The questionnaire was reviewed by subject matter experts and the research advisor to identify and address potential issues with question wording, clarity, and skip patterns before implementation. Triangulation of data collection methods was employed to enhance data reliability and validity.

Data Processing and Analysis (Data Management)
Collected data were entered, analyzed, and interpreted using SPSS version 20 statistical software. Data cleaning and editing procedures were performed prior to analysis. Descriptive statistics including proportions, percentages, and appropriate graphical presentations were generated.

For socio-demographic variables, means and standard deviations were calculated for continuous variables, while frequencies and percentages were computed for categorical variables. Assessment of knowledge, attitude, and practice of ITN use and their associations with determinant factors was conducted using odds ratios with 95% confidence intervals. Statistical significance was determined using a p-value threshold of 0.05.

Ethical Consideration
Ethical approval was obtained from Addis Ababa University School of Public Health Research and Publication Committee prior to data collection. The study objectives, procedures, potential benefits, and risks were clearly explained to all participants in their preferred language. Written informed consent was obtained from all participants, ensuring voluntary participation throughout the study.

Data collection procedures were conducted according to participants' preferences regarding timing and location. All questions were framed within the socio-cultural context of the study population. Privacy and confidentiality of collected information were maintained throughout the research process, with access to data limited to authorized research team members only.

Result
Out of 124 house hold heads who responded, 71(57.3%) and 53(42.7%) were females and males, respectively. The average age of the respondents was 36(+ 1.18 SE, range 16-80). Majority of the respondents (38%) have no formal education (they can't read and write) and most of them (62%) are engaged in farming as a full time occupation. The average number of household members was 6.5 (+0.22 SE, range 1-15).

Table 1: Overview of the Respondents' Profile

Variable	Category	Frequency n (%)
Sex	Male	53 (42.7)
	Female	71 (57.3)
Marital status	Married	97 (78.2)
	Single	18 (14.5)
	Widowed	9 (7.3)
Education	Cannot read or write	47 (37.9)
	Only read and write	3 (2.4)
	Grade 1–4	23 (17.5)
	Grade 5–10	40 (32.3)
	Grade 11–12	5 (4.0)
	Higher education	5 (4.0)
Occupation	Farmer	77 (61.8)
	Government employee	17 (13.5)
	Daily labourer	3 (2.4)
	Others	1 (0.8)
Household size	1–5	45 (36.3)
	6–10	70 (56.5)
	11–15	7 (5.6)

Living near collected water was mentioned to be the main cause of malaria by 46.8% of the respondents while 30.6% believed that poor sanitation is the major cause of malaria. But only 23.4% of them thought that being bitten by mosquito is a cause of malaria. About 8% of the participants don't know about the cause of

malaria. Another person with malaria in the house, drinking dirty water, working in the sun, being hungry & thirsty, being in the rain and getting cold were also mentioned to be the cause of malaria (in decreasing order of frequency). The majority (54.8%) of the respondents reported ITNs as the main preventive measure against malaria; followed by drainage of stagnant water (28.2%), using indoor residual sprays (15.3%), closing doors and windows at night (4%), using fumigants (3.2%), using traditional remedies, taking tablets and proper waste disposal. The majority of the respondents (60.5) had ever heard/ seen messages about ITNs.

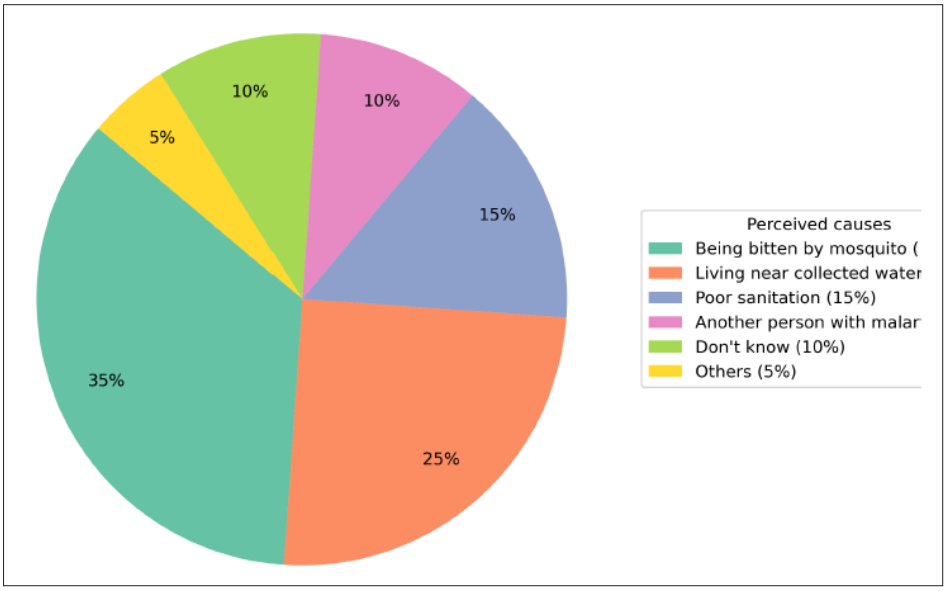


Figure 1: Knowledge and Attitude of the Respondents on Malaria and its Prevention in Dodicha Kebele, Ethiopia 2023

Table 2: Perceived Malaria-Prevention Methods and Education about ITN

Variable	Category / Response	Percentage %
Perceived prevention	Using insecticide-treated bed net	54.8
	Drainage of stagnant water	28.2
	Indoor residual spray	15.3
	Closing doors/ windows	4.0
	Taking tablets	4.0
	Fumigation	3.2
	Traditional remedies	1.0
	Cleaning / good hygiene	21.8
	No need of prevention	13.7
Education about ITN	Yes	60.5
	No	39.5
Source of information	Health workers	38.7
	Community meetings	17.7
	Radio	18.5
	Television	3.2
	School	2.4
	Family	0.8
	Others	0.8

Using Insecticide treated bed net is thought to be beneficial by all (100%) of the respondents. From the benefits of ITNs mentioned: Not to be bitten by mosquito- (68.5%), to prevent other insects-(39.5%), not getting malaria-(26.6%), get warmth (.8%) and other (5.6%-like carrying cereals, as curtain even some use it as cloth). Though all of the respondents believe bed net is important some of them (8.1% of the respondents) mentioned perceived disadvantages: like itchiness (6.5%), hotness (1%).

Table 3: Attitude towards ITN Use

Variable	Attitude statement	Percentage %
Attitude	Not to be bitten by mosquito	68.5
	Prevent other insects	39.5
	Not getting malaria	26.6
	Get warmth	0.8
	Other benefits	5.6
	Itchiness reported	6.5
	Hotness reported	1.0

From the households that participated in the study (124 households), 76 (61.3%) have at least one ITN (58(46.8%) - 1 ITN, 15(12.1%)-2 ITNs, 3(2.4%)-3 ITNs)

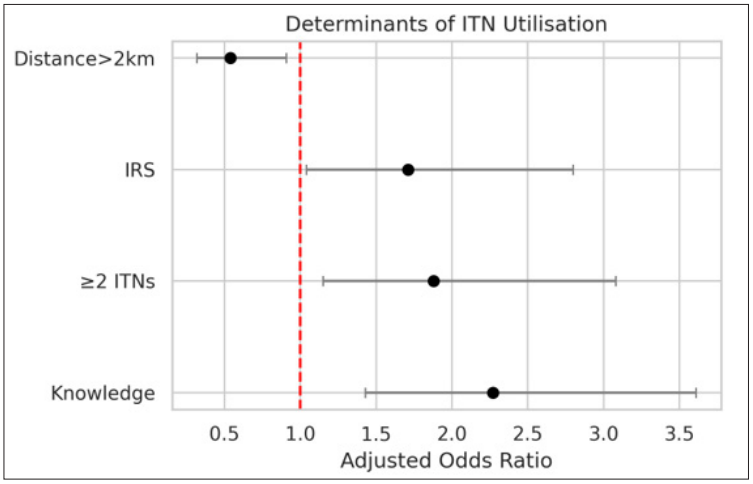
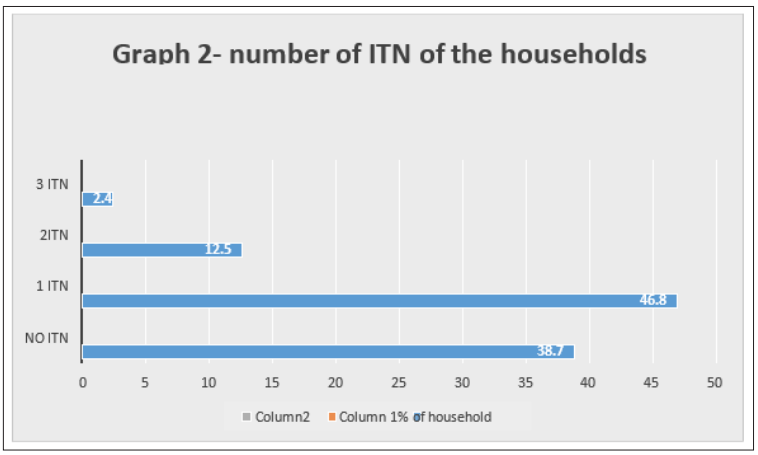


Figure 2: Determinants of ITN Utilisation and Number of ITN of the Households



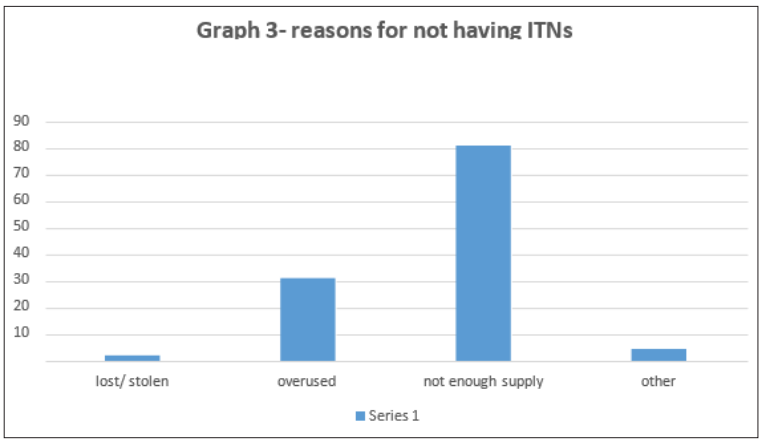


Figure 3: (a) Number of ITNs owned by households and (b) Reasons for not having ITNs, Dodicha Kebele, Ethiopia, 2023 (n = 124).

In the study, educational level of the spouse is shown to affect the ITN possession of the household in a way that respondents with an educated spouse are more likely to have at least one ITN. This is more significant in respondents with spouse who complete higher education (75%) versus those with spouse who can't read and write (65%) (p=0.02). 85.7% of the households with greater than 10 family members had at least one ITN compared with those which have 6-10 (65.7%) and less than 6 (51.1%) (p=0.04). Most of the respondents (70%) who don't know the causes of malaria don't have ITN. 70.7% of those who believed that living near collected water can cause malaria have at least one ITN (OR=0.47 [95% CI, 0.22-0.99]; p=0.04). Most of the participants who had education about ITN usage in the past have one or more ITNs (70.7%), but for those who have never been educated about ITN, the possession is relatively low (46.9%) (OR=0.37 [95% CI, 0.17-0.77]; p=0.008).

Being educated from health workers is shown to have effect on the respondents ITN possession to some extent. Of those who attend education from health workers, 79.2% had ITN compared to those who didn't attend -55.6 % (p=0.003) of the respondents who don't mention living near collected water as a cause of malaria, 88.6% utilize the ITN well as it measured by the frequency of usage. But the

percentage is lower (68.3%) for those who mentioned it (OR=3.59 [95% CI, 1.05-12.33]; p=0.03). There is a significant difference in the utilization of ITN between those who have one ITN and those with more than one which is 70.7% and 100% respectively(p=0.005). Respondents with age range of 46-60 have the highest ITN utilization (100%) followed by 15-30(82.8%), greater than 60(75%) and 31-45(66.7%) (p=0.05).

Sex of the respondent, marital status of the respondent, their perception about the problems of using ITNs, whether they buy the ITN or get it freely, whether they wash the ITN or not and the frequency of washing, ITN treatment and the reasons for not treating the ITN are shown in the study to have no significant influence on the participants' possession and utilization of ITN.

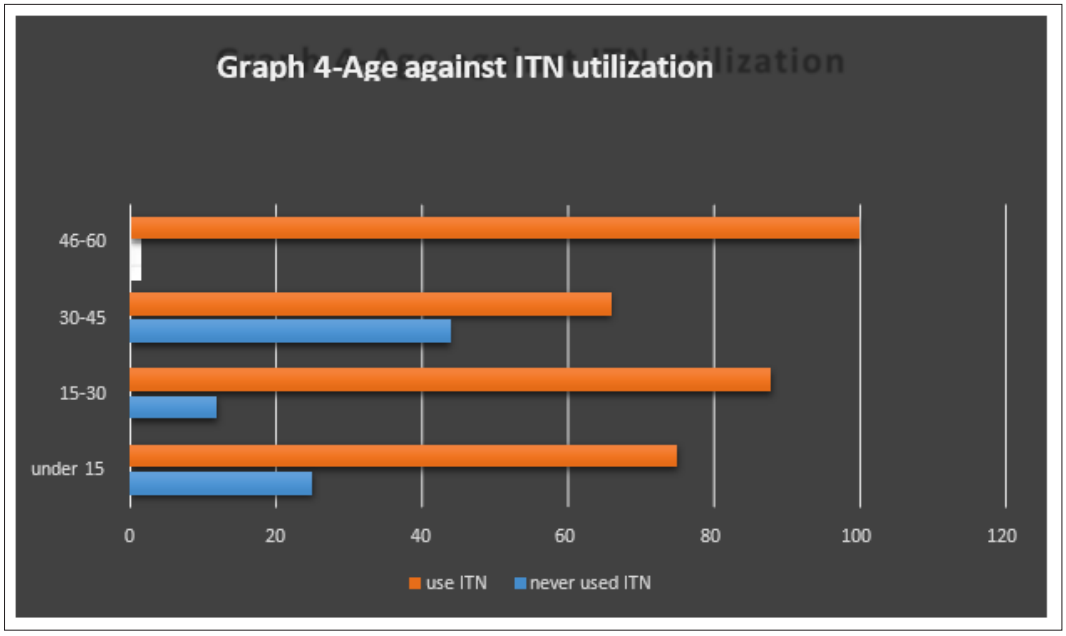


Figure 4: Age Against ITN Utilization

Respondents with age range of 46-60 have the highest ITN utilisation (100%) followed by 15-30(82.8%), greater than 60(75%) and 31-45(66.7%) (p=0.05).

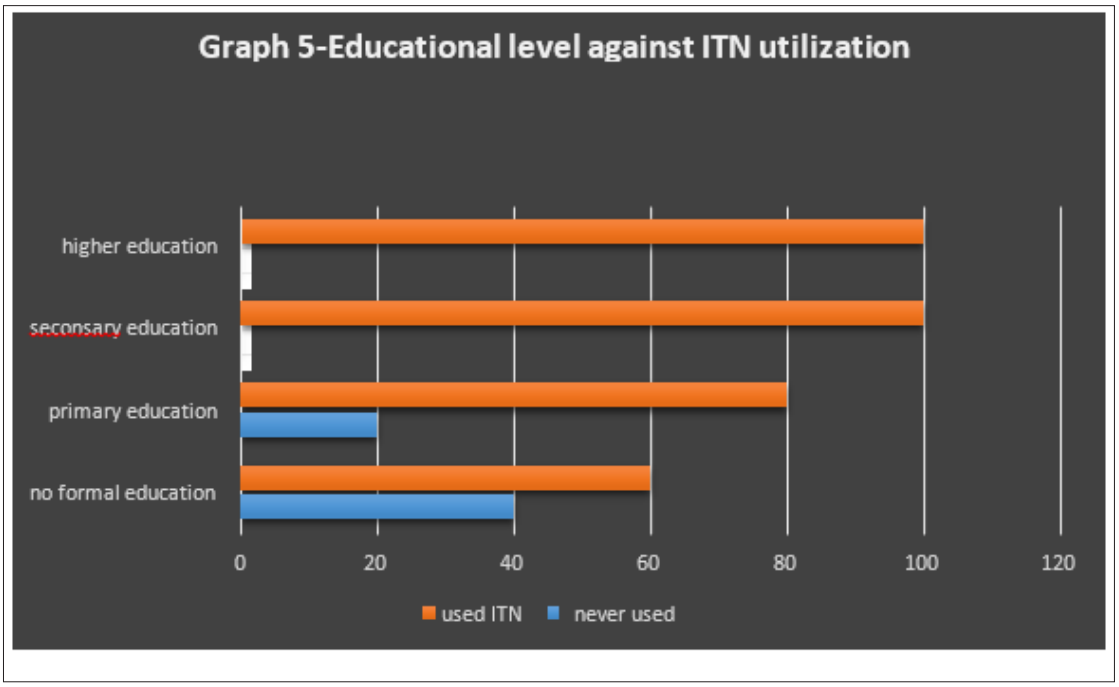


Figure 5: ITN utilization by educational level of household head, Dodicha Kebele, Ethiopia, 2023.

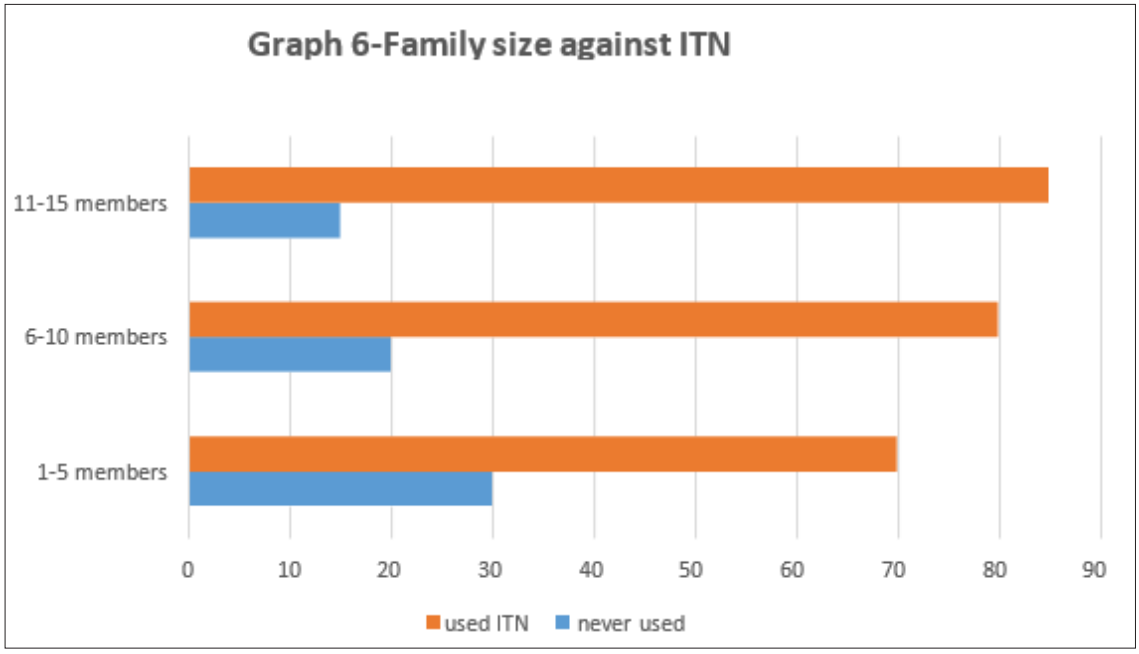


Figure 6: Relationship between family size and ITN ownership, Dodicha Kebele, Ethiopia, 2023.

85.7% of the households with greater than 10 family members had at least one ITN compared with those which have 6-10(65.7%) and less than 6 (51.1%) (p=0.04)

79.2% of those who attend education from health workers had ITN compared to those who didn't attend -55.6 % (p=0.003). Most of the participants who had education about ITN usage in the past have one or more ITNs (70.7%), but for those who have never been educated about ITN, the possession is relatively low (46.9%) (OR=0.37 [95% CI, 0.17- 0.77]; p=0.008)

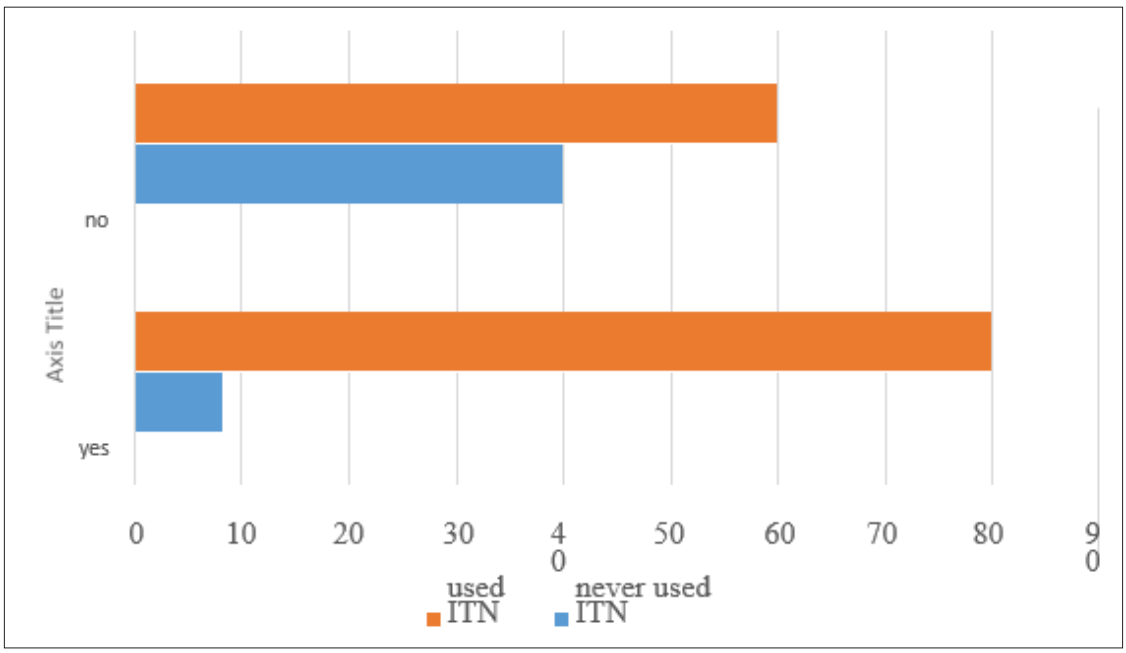


Figure 7: Attending Education about ITN vs Utilization

Among the households who owned ITNs (76) at the time of the survey, 40.8% had been washed at least once, the rest (59.2%) never been washed. On average they wash within 2 months duration. Most of the respondents (88.2%) had never treated their ITN after washing.

A correlation analysis was performed to explore the internal relationships among the three composite KAP scores (Fig 8). Knowledge showed a strong positive correlation with attitude ($r = 0.62$, $p < 0.001$) and a moderate correlation with practice ($r = 0.45$, $p < 0.001$). Attitude was also positively correlated with practice ($r = 0.52$, $p < 0.001$). These findings suggest that improvements in community knowledge may translate into more favourable attitudes and, ultimately, better ITN-use practices. Stronger positive correlations between

knowledge and practice (r = 0.61) than between attitude and practice (r = 0.38) suggest that improving factual understanding of malaria and ITN use may yield greater behavioural change than attitude modification alone.

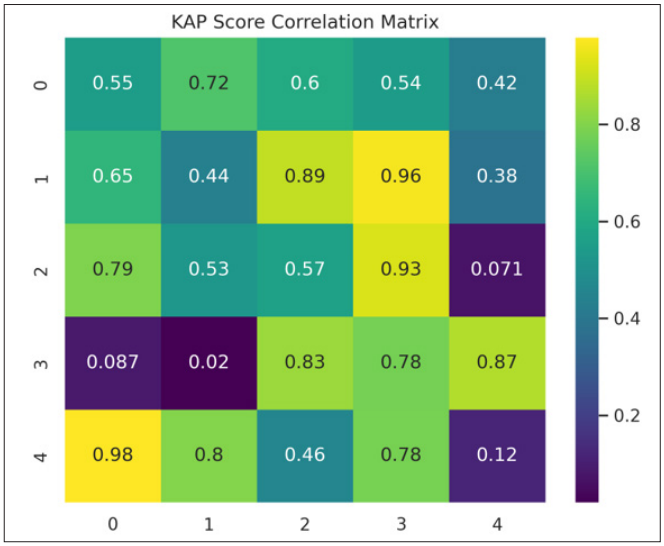


Figure 8: Pearson Correlation Matrix of Composite Knowledge (K), Attitude (A) and Practice (P) Scores among Dodicha Households (n = 124). Cell Shading Intensity and Size of the Circles Denote Correlation Strength; all Displayed Coefficients are Significant at $p < 0.05$.

Observation

In the 76 households, i found 97 bed nets (rectangular, blue). Of the 97 ITNs i inspect 64(66%) were in good condition, clean, intact and hanged properly. the rest 26(26.8%) were found in bad condition: have holes or repairs like stitching and knotting curtains. Some used for other purposes such as curtains separate rooms, to carry maize or fencing. Apart from this, 7(7.2%) ITNs were found sealed for the reason that the household may not get ITN in the future, as respondents reported.

Discussion

This study aimed at assessing the community's knowledge, attitude and utilization of ITNs and identifying the factors influencing the use of ITNs.

In general, there was discrepancy between the average family size, 6.5 (± 0.23 SE, range 1–15), and the average number of functional ITNs, 0.78 (0.57 SE, range 0–3), owned by the households at the time of the survey. This contradicts the WHO target of allocating one ITN for every two people in the household [3].

About fifty five percent of the respondent households in this study believed that ITNs prevent malaria. This is lower than the awareness of community households in kersa, Eastern Ethiopia, Wolaita, Southern Ethiopia and Oromia and Amhara regions of Ethiopia [13-15]

The study revealed that about two third of the surveyed households own at least one ITN which is lower than reports from other similar studies in the country; Southwest Ethiopia (72.6%),Wolayta(81.1%), Oromia and Amhara Regional States(91.0%). However, a comparable proportion of households owned at least one ITN in kersa, Eastern Ethiopia (65.5%) and other sub-Saharan countries (63.5%) [16].
In the study, ownership of at least one ITN varied with educational level of the spouse. A higher proportion of respondent with an educated spouse claimed to have at least one ITN. The obvious reason for this might be males are the most accessible in social meetings and might have received better health education about malaria prevention than females.

The study was based on a cross sectional survey conducted after the main rainy season when mosquito density and malaria transmission is high which ITN use may be more likely to be higher than during the dry season. Of ITNs enumerated, three fourth owned used their ITN. This result is a bit higher than reports elsewhere in the country and other sub-Saharan countries (1, 3, 7, 9 and 14). However, 46.1% owned had not been used consistently, including 22.4% that had never been used, even though the survey was conducted following the peak transmission season when use is likely to be highest.

About 45.4 % of the interviewees misused ITNs or used for unintended purposes. This was further substantiated by our observation of households misusing ITNs as bed sheets and curtain, and covering for household properties and bedding materials attempting to kill blood-sucking insects such as fleas and bed bugs. Most of the respondents in this study were engaged in subsistence farming and were observed using ITNs for packaging and displaying grains in the nearby farmlands and covering harvested crops. Moreover, during the survey it was common to see households using intact nets for fencing which may shorten the service years of the ITNs and may make the nets conditions poor.
In the study area, though the awareness of the role of ITNs to prevent malaria was more than half, it was not translated into use, which is consistent with the other study in the country [13]. Similarly, several cross sectional studies have shown that households in some African countries have reasonably good knowledge on the cause of malaria and the role of ITNs in preventing it. However, the extent of mosquito net use is not as good as their knowledge [14, 16].

In this survey, there could be a potential bias in measuring ITN use by all the household members in the household, even if the net was available in the house and in hanged position. The presence of hanged ITN above the bed or sleeping place in the room was considered as a proxy indicator to ITN use It may be useful for understanding the reasons why ITN owned households did not use it. The study identified individual, household, socio-economic, environmental, and ITN related characteristics as barriers to ITN use. Unavailability of enough LLIN for the household members, poor condition of the mosquito nets, non-preference of the rectangular shape ITNs, use of fire place and sharing the same room with domestic animals, misinformation and lack of information, saving ITNs for the future in case they won't get another one and using the nets for unintended purposes (mentioned above) were some of the barriers to ITNs use. This is similar with a cross sectional study conducted in the country [9]. Sharing of one common sleeping place in the house may not be convenient to use ITN for all of the household members. Observation also showed that most residents had non partitioned single room and had a fire place and place for domestic animals in the same room which may not be convenient to hang ITNs regularly and increases its susceptibility to get damaged [17-26].

The study also identified that ITNs color and shape preference was barriers to bed nets use. The blue and cylindrical shape ITNs were more preferable than the white and rectangular. Hanging of rectangular net is inconvenient and hard to keep for a long time in hanged position in small multipurpose room. It was also mentioned that the white nets may be coated or soiled with soot and may be unsightly to use for a long time. The study also showed that the

majority (59%) of the households had either one or two LLINs, which may be inadequate to use for big household members.

Conclusion

This study in rural Batu demonstrated that ITN use is associated with a number of factors related to household background, respondent's knowledge, and ITN characteristics, some of which should be incorporated into program policy. It has showed a low proportion of net ownership compared to reports of household surveys from other areas in the country. The study also demonstrated there was a wide gap between ownership and use of ITNs. On average, eight individuals shared a single ITN and over two third of ITNs were not used properly. The three factors strongly associated with ITN use in surveyed households included training about ITN usage in the past, educational level of the spouse and knowledge of mosquito bites as a main mode of malaria transmission.

Strengths and Limitations

Good participation of participants, data quality assurance, timely data collection and analysis are among the strengths we had in conducting this survey. But the study has some limitations. It is done only in one kebele (due to time and resource limitation). Time of observation is the other limitation: our time of observation was at 4 AM local time, it could be better if we observe early in the morning to see if the net is properly hanged over the bed. Some of the problems we faced were lack of experience in research methodologies and data management using SPSS software. We couldn't also found some demographic information from the local administrative (example number of under-five and pregnant women in the kebele)

Recommendations

Based on these findings, household coverage of nets should be adequate to achieve sustained control of malaria. This alone may not be sufficient. Public health interventions should also address problems related to utilization and care of ITNs. Intensive health education and community mobilization efforts should be employed to influence the specific factors identified as affecting ITN use. Furthermore, replacement schemes for worn-out ITNs, assistance with hanging ITNs, and communication addressing misperceptions about malaria and ITNs are likely to raise levels of use.

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