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# KNOWLEDGE, ATTITUDES, AND PRACTICES REGARDING MALARIA PREVENTION AND VECTOR CONTROL AMONG RURAL HOUSEHOLDS: A COMMUNITY-BASED CROSS-SECTIONAL STUDY

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ABSTRACT

**Background:** Malaria continues to be one of the top killers and disease-causers in rural tropical areas. Though vector control products like insecticide treated nets (ITNs) and indoor residual spraying (IRS) have been distributed en masse, pockets of outbreaks remain. The success and failure of these interventions is greatly dependent upon community behaviours, which are established through local knowledge and attitudes. Objectives: To evaluate the Knowledge, Attitude and Practices (KAP) in malaria transmission, symptoms and vector control measures of the rural households.

**Materials and Methods:** Community based cross sectional survey was carried out with 320 household heads of an endemic rural district. Information was gathered by an interviewer administered structured questionnaire aimed at disease transmission, symptom awareness, seeking for care, and vector control. The descriptive statistics were used to describe the data and Chi-square tests were used to identify the association between socio-demographic factors and malaria prevention practices.

**Results:** The average age of the respondents was 41.3 ± 10.5 years, with majority being males (62.5%). 94.4% had heard of malaria, but of these, only 45.3% identify the mosquito as the only vector of transmission, many also saying that the dirty water or weather changes are responsible for it. The most common symptoms were fever, and chills (82.1%). With regard to practices, 71.2% had at least one ITN, and 52.5% said they slept under it the night before. Higher education significantly associated with correct use of ITNs (68.4% vs. 38.6%, $p < 0.001$) and prompt treatment seeking within 24 hours of onset of fever (65.2% vs. 41.5%, $p = 0.004$).

**Conclusion:** The conclusion was that despite the high baseline knowledge about malaria, significant gaps remain in knowledge about malaria transmission and in the regularly use of malaria control tools. Therefore, creating and delivering culturally appropriate and tailored educational initiatives to improve community health literacy is critical for the effectiveness of malaria elimination efforts.

**Keywords:** Malaria, Knowledge attitudes and practices (KAP), Vector control, Insecticide-treated nets, Rural households.

## INTRODUCTION

Malaria continues to cause significant mortality and morbidity in the world, particularly among the poor and most vulnerable populations in tropical and subtropical countries.[1] Recent epidemiological estimates have shown that rural populations suffer the greatest burden both in terms of morbidity and mortality, as they are exposed to favourable conditions for vectors breeding, precarious housing conditions and limited access to formal healthcare.[2] In the last 20 years, vector control interventions have been scaled up with a particular emphasis on

distributing long-lasting insecticide-treated nets (LLINs) and targeted indoor residual spraying (IRS) globally. These biomedical interventions have been effective in preventing millions of cases. In practice, however, behavioral and sociocultural factors often make vector control tools less effective in real world situations.[3-4] The effectiveness of the malaria elimination strategies is directly tied to the community's understanding of the disease, attitude towards prevention and the household practices.

Even after a lot of health campaigns, misconceptions about the transmission of malaria remain common in many rural settings. The belief in the causes of malaria due to diet, evil spirits, or changes in weather directly affects the perceived need for vector control.[5] In addition, there is usually a considerable gap between the ownership and use of preventive tools.[6] For example, households might not be aware of the protective effect of bed nets or disease prevention motives might be stronger than attitudes towards mosquito nuisance, leading to the repurpose of bed nets for fishing or agriculture.[7]

To be able to tailor national malaria control guidelines to local conditions, it is important to understand the granular details of knowledge, attitudes and practices (KAP) at the grassroots level.[8] But recent socio-behavioural monitoring in deep rural pockets, however, is insufficient in terms of real-time programmatic feedback. The current study was conducted to assess the current KAP on malaria transmission and vector control among rural households to design the strategies of health education and engagement with the community.

## MATERIALS AND METHODS

A cross-sectional design was used in a highly-endemic rural area. Heads of households or their designee as adults in the area for one year or more were studied. An estimated 50% adequate knowledge of vector control, a 95% confidence level and a 5% margin of error was used to arrive at a sample size of 320 households.

The two-stage cluster sampling method was used. The first eight rural villages were randomly sampled by probability proportional to size. Then, households were sampled randomly from each village, following a systematic sampling method, based on local administrative registers. All participants gave written informed consent before the data were collected.

The data was collected with a pre-tested and structured questionnaire translated to the local dialect. The questionnaire covered the following four areas: socio-demographic characteristics (age, gender, education, income), knowledge about malaria (causes, transmission, symptoms, severity), attitudes (perceived susceptibility, acceptance of the IRS, vector control tools), and practices (ITN ownership and use, IRS acceptance, environmental management, treatment-seeking practices).

The surveys were conducted in the field by trained field researchers to ensure understanding. The score for knowledge was given for correct identification of mosquito vector and classic symptoms. Self-reported use of ITN the night preceding the survey and the routine for a febrile episode were used for the assessment of practices.

All the data were analyzed statistically using SPSS 26.0. Frequencies and proportions were calculated for descriptive variables. Chi-square tests were used to assess the relationships between socio-demographic variables (education and income level) and appropriate actions taken against malaria (ITN use and timely treatment seeking). A p-value $< 0.05$ was considered statistically significant.

## RESULTS

The study successfully enrolled 320 household heads. The mean age of the respondents was 41.3 ± 10.5 years. A significant portion of the population (48.8%) had no formal education, reflecting the deep rural setting of the study.

**Table 1: Sociodemographic Characteristics of the Rural Households.**

| Variable | Categories | Frequency (n=320) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 200 | 62.5 |
| | Female | 120 | 37.5 |
| Education Level | Illiterate/No formal education | 156 | 48.8 |
| | Primary | 98 | 30.6 |
| | Secondary and above | 66 | 20.6 |
| Occupation | Agriculture/Farming | 225 | 70.3 |
| | Daily wage/Labor | 65 | 20.3 |
| | Business/Service | 30 | 9.4 |
| Household Size | ≤ 4 members | 115 | 35.9 |
| | > 4 members | 205 | 64.1 |

Awareness of malaria was virtually universal, yet specific knowledge regarding its etiology revealed substantial misconceptions. Only 45.3% correctly pinpointed the mosquito as the sole agent of transmission.

**Table 2: Knowledge Regarding Malaria Transmission and Symptoms. (Multiple responses permitted)**

| Knowledge Parameter | Response | Frequency (n=320) | Percentage (%) |
|---|---|---|---|
| Heard of Malaria | Yes | 302 | 94.4 |
| | No | 18 | 5.6 |

| | | | |
|---|---|---|---|
| Perceived Cause of Malaria* | Mosquito bite | 145 | 45.3 |
| | Dirty water / poor hygiene | 110 | 34.4 |
| | Weather changes/Cold | 50 | 15.6 |
| | Witchcraft/Curse | 15 | 4.7 |
| Recognition of Symptoms* | Fever and chills | 263 | 82.1 |
| | Headache | 210 | 65.6 |
| | Joint pains/Weakness | 145 | 45.3 |

Preventive practices varied significantly across demographic strata. While ITN ownership was relatively high (71.2%), compliance with overnight usage was lower. Cross-tabulation revealed that higher educational attainment and higher income significantly correlated with better vector control practices and treatment-seeking behaviors.

**Table 3: Association Between Educational Status and Malaria Preventive Practices.**

| Practice Indicator | Lower Education (n=156) | Higher Education (n=164) | p-value |
|---|---|---|---|
| Owns at least one ITN | 98 (62.8%) | 130 (79.3%) | 0.001 |
| Slept under ITN last night | 60 (38.6%) | 112 (68.4%) | < 0.001 |
| Accepts Indoor Spraying (IRS) | 85 (54.5%) | 125 (76.2%) | < 0.001 |
| Seeks medical help within 24h | 65 (41.5%) | 107 (65.2%) | 0.004 |
| Relies on traditional healers first | 50 (32.1%) | 22 (13.4%) | < 0.001 |

## DISCUSSION

Results of this community-based study show a classic paradox in global health: high awareness of diseases does not always lead to correct biomedical knowledge or preventive practices. 94.4% of the population had heard of malaria, but less than half knew that malaria is spread only by mosquitoes. Such a disconnection is very similar to that observed by Raina et al. in Northern India, where widespread superficial awareness of the disease and deep-rooted perceptions of the disease being triggered by dirty water and changes in weather were at play.[9]

The recognition of fever and chill as primary symptoms was very high (82.1%) and is a good sign of community-level case detection. Deressa et al. showed that rapid symptom recognition is the key first step to decreasing paediatric mortality due to malaria.[10] Our findings, however, suggest that the knowledge is not always translated into timely formal health services seeking. A significant proportion, mostly without education, postponed treatment or went first to traditional healers. Okeke et al,.[11] have also reported a substantial document of similar behavioural delays in rural Nigeria where traditional beliefs sometimes outweigh modern medical treatment during the crucial period of fever.

For vector control, high ITN ownership (71.2%) and low ITN use (52.5%) was noted. This phenomenon is all about a critical failure in the end-user adoption chain. In rural Tanzania, Mazigo et al. reported that lack of physical discomfort, lack of heat and the lack of perceived mosquito abundance during dry seasons significantly diminished ITN use even among ITN owners.[12] This is supported by our data which indicates that education is a strong predictor of practice. Household heads who have primary or secondary education were significantly more likely to enforce use of ITN and accept of indoor residual spraying (IRS).

Education has a very deep and reciprocal impact on KAP. Literate people have greater cognitive access to health promotion messages and mass media campaigns.[13] Tyagi et al. had pointed out that educational empowerment is a direct approach to breaking the cycle of fatalism about malaria and changing the community's attitude from passive to active management of the environment.[14] In addition, Jumbam et al. in Zambia showed that increased engagement by community health workers is crucial to overcome the literacy problem, thus connecting the dots between vector control distribution and actual compliance to use of products.[15]

The study acknowledges the limitations of the self-reported cross-sectional surveys which are affected by both recall bias and social desirability bias – the subjects may report high use of ITNs to please the interviewers.[16] Despite this, there is a strong link between socio-demographic shortcomings and poor malaria practices, offering very actionable information to local health authorities.[17,18]

## CONCLUSION

Basic knowledge about the transmission of malaria is poor, although rural households all have an awareness of malaria and basic symptoms. Lack of education and traditional beliefs are major barriers to the implementation of vector control measures, namely the regular use of ITNs and prompt formal treatment seeking. But mass distribution of biomedical tools alone is not enough to break the transmission cycle. To shift from mere awareness to proactive disease prevention, malaria control programmes need to incorporate intensive culturally appropriate health education and behaviour change communication, aimed at illiterate and extremely poor populations.

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