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The Awareness, Perceptions, and Prevention of Malaria Among Residents of Waterloo Community, Sierra Leone

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Abstract

Malaria remains a major public health concern in Sierra Leone, particularly in endemic communities like Waterloo. Understanding local awareness, perceptions, and practices is essential for designing effective interventions. A cross-sectional survey was conducted among 250 residents of Waterloo community. The study assessed malaria symptom recognition, treatment perceptions, sources of information, and preventive behaviors using structured interviews. General awareness of malaria was high, with 99% of respondents having encountered malaria-related information. Fatigue (39%), fever (22%), vomiting (20%), and muscle pain (19%) were the most recognized symptoms. While 89% believed malaria is treatable, 10% were unsure and 2% denied treatment availability. Healthcare facilities (43%) and informal networks (42%) were the primary sources of information, whereas government programs (5%) and NGOs (0%) showed limited visibility. Only 24% had participated in malaria-related campaigns, and 130 respondents were unsure whether any initiative existed locally. Preventive knowledge was low: just 10% believed malaria is preventable, and misconceptions about transmission were common. Traditional medicine remained influential, with 60% expressing belief in its efficacy. Perceptions of malaria control efforts were mixed, and beliefs about symptom onset and seasonal severity varied. While Waterloo demonstrates high malaria awareness, persistent misconceptions, limited engagement, and low visibility of

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institutional efforts suggest the need for more inclusive, culturally sensitive, and community-driven approaches. Strengthening outreach, clarifying prevention strategies, and building trust through local engagement are essential to improving malaria outcomes in this and similar settings.

Keywords

Malaria awareness, Sierra Leone, Community health, Traditional medicine, Public health education, Prevention practices

INTRODUCTION

Malaria remains one of the most persistent global health challenges, with its impact felt across sub-Saharan Africa, Southeast Asia, and parts of South America. According to the World Health Organization (WHO), malaria accounted for approximately 229 million

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cases and 409,000 deaths in 2019, with children under five years old disproportionately affected comprising 67% of all malaria-related deaths globally (Kaushik *et al., 2022*). The disease is caused by Plasmodium parasites, primarily transmitted through the bites of infected female Anopheles mosquitoes. Despite being both preventable and treatable, malaria continues to thrive in endemic regions where socio-economic conditions, limited healthcare access, and environmental factors contribute to its persistence *(*Mishra *et al., 2021*).

Awareness and perception of malaria vary significantly across populations and regions. In endemic communities, local knowledge about transmission and prevention plays a critical role in shaping effective control strategies. Studies have shown that community engagement and education are vital for promoting preventive behaviors such as the use of insecticide-treated nets (ITNs) and indoor residual spraying (IRS) (Awasthi *et al., 2021*). For example, in Ghana, increased ownership and use of ITNs have been linked to targeted education efforts (Bawuah and Ampaw*, 2021*). However, persistent misconceptions about malaria transmission and treatment continue to hinder progress in many regions (Muhammad *et al., 2021).*

Globally, malaria perception is also influenced by travel and migration. The rise in international travel has led to an increase in imported malaria cases in non-endemic countries, posing risks for re-establishment of transmission in areas that had previously eliminated the disease (Liu *et al., 2014*). Sri Lanka, for instance, experienced re-introduction of malaria through returning travelers, underscoring the need for robust surveillance and response systems (Dharmawardena *et al., 2015).* The COVID-

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19 pandemic further complicated malaria control efforts, disrupting healthcare services and reducing access to preventive measures and treatment (Heuschen *et al., 2021*).

In Sierra Leone, malaria remains a critical public health concern, with an estimated 3.5 million cases reported annually (WHO, 2023). Vulnerable populations particularly children under five and pregnant women bear the brunt of malaria-related morbidity and mortality (WHO, 2022). Research indicates that awareness of malaria's causes, symptoms, and prevention methods is relatively high among Sierra Leoneans, especially in urban and peri-urban areas (Wang *et al*., 2021). Community health initiatives, such as free malaria testing and treatment by community health workers, have improved access to care and contributed to better public health outcomes (Thomson *et al*., 2011).

However, challenges persist in translating awareness into consistent preventive practices. In communities like Waterloo, residents often rely on traditional medicine or self-diagnosis, sometimes delaying formal treatment (Ranasinghe *et al*., 2015). Misconceptions about malaria's causes such as attributing it to poor hygiene or environmental exposure continue to influence behavior. Additionally, discomfort and social acceptability issues undermine ITN usage, despite widespread distribution efforts (Scott *et al*., 2021). The emergence of insecticide resistance among mosquito populations further complicates prevention strategies (Wang *et al*., 2020).

The economic burden of malaria in Waterloo is substantial, affecting household productivity and straining healthcare resources. Limited access to health facilities, financial constraints, and inadequate understanding of malaria's severity

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contribute to delayed treatment-seeking and inconsistent prevention. These factors underscore the need for targeted, culturally sensitive interventions that address both knowledge gaps and behavioral barriers.

Given the high burden of malaria in Waterloo and the broader Sierra Leonean context, this study aims to explore the community's awareness, perceptions, and practices related to malaria. By examining local attitudes and identifying barriers to effective prevention and treatment, the research seeks to fill critical gaps in existing literature and inform more responsive public health strategies. The findings have the potential to guide the design of community-based interventions, improve health education campaigns, and support policy efforts aimed at reducing malaria transmission. The significance of this study extends beyond academic inquiry. It offers actionable insights that can catalyze meaningful changes in public health programming, enhance community engagement, and contribute to the long-term reduction of malaria incidence in Waterloo and similar high-risk settings.

METHODS

Study Design

This study adopted a cross-sectional survey design to assess malaria-related awareness, perceptions, and preventive behaviors among residents of Waterloo, Sierra Leone. The design was chosen because it allows for the simultaneous evaluation of multiple variables such as knowledge levels, attitudes, and practices within a defined timeframe. This approach is particularly effective for capturing a snapshot of public health indicators in a community setting.

Rationale for using this design

The cross-sectional design was selected for its efficiency and practicality. It enabled the

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collection of data from a broad population in a short period, making it ideal for assessing current malaria-related behaviors and beliefs. Additionally, this design allowed for the exploration of relationships between variables, such as the link between awareness and preventive practices or how perceptions of malaria severity influence treatment-seeking behavior. By sampling a diverse group of residents, the study aimed to generate findings that are representative of the broader Waterloo community. Cross-sectional surveys are widely used in public health research due to their reliability and cost-effectiveness, further supporting the suitability of this design.

Study area

The study was conducted in Waterloo, a rapidly expanding town located in the Western Area Rural District of Sierra Leone, approximately 30 kilometers southeast of the capital city, Freetown. Waterloo is characterized by a mix of urban and rural environments, with diverse ethnic groups and socio-economic conditions. The town experiences a tropical climate, with a rainy season from May to October that contributes to increased mosquito breeding and heightened malaria transmission.

Geographically, Waterloo is situated at approximately 8.3389° N latitude and -13.0700° W longitude. The area has limited health infrastructure, consisting mainly of small clinics and health centers. Access to healthcare remains a challenge for many residents, and preventive resources such as insecticide-treated bed nets (ITNs) are often inadequate. Environmental factors like stagnant water and poor waste management further exacerbate the risk of malaria. These conditions make Waterloo a critical location for studying malaria awareness and prevention, with findings potentially

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applicable to other malaria-endemic regions in Sierra Leone.

Study Population

The target population for this study included adult residents of Waterloo aged 18 years and above. Participants were selected to reflect a range of age groups, genders, educational backgrounds, and socio-economic statuses. This inclusive approach was designed to ensure that the findings would accurately represent the diversity of malaria-related knowledge, perceptions, and practices within the community.

Sampling Techniques

A multi-stage sampling method was employed to achieve a representative sample. First, stratified sampling was used to divide the population into subgroups based on characteristics such as age, gender, and socio-economic status. This ensured that all relevant demographic segments were included. Within each stratum, simple random sampling was then applied to select individual participants. Based on the 2015 national census and current demographic estimates, Waterloo has a population of approximately 50,000 residents, with an estimated 50% aged 18 and above, yielding an adult population of around 25,000 (Statistics Sierra Leone, 2017; Worldometer, 2025). This approach minimized selection bias and enhanced the generalizability of the results. The sample size was determined using Krejcie and Morgan's (1970) formula, which ensures statistical significance and reliability. The formula used is:

$$n = \frac{Z^2 PQ}{d^2}$$

Where:

- n = required sample size

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- Z = Z-score for 95% confidence level (1.96)
- P = estimated proportion of the population with the characteristic of interest
- Q = 1 - P
- d = margin of error (typically 0.05)

For this study, a sample size of 250 respondents was used. According to Krejcie and Morgan's (1970) method, a sample size of 250 adults was considered sufficient for several reasons, even though the optimal sample size for a population of about 25,000 individuals would be about 378 for a 95% confidence level and 5% margin of error. The study first used a multi-stage sampling technique that included basic random sampling and stratified sampling, which improved the sample's representativeness across important demographic groups like age, gender, and socioeconomic level. The ultimate sample size was determined by practical factors including time limits, resource availability, and accessibility within the community, and this methodological rigor helps make up for the somewhat reduced sample size by minimizing sampling bias and guaranteeing diversity in responses. It is normal and acceptable to use smaller but well-structured samples in public health research when practical constraints arise, particularly in places with limited resources. Finally, a sample of 250 people still offers a solid dataset for descriptive analysis and insightful interpretation of patterns in malaria awareness, attitudes, and prevention practices.

Data Collection

A structured questionnaire that was given in-person was used to gather data. Direct communication with participants was made possible by this approach, which guaranteed

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inclusivity across reading levels and allowed questions to be clarified. To gather data on demographics (e.g., age, gender, household size, education level, and awareness of malaria symptoms), severity perceptions, and preventive measures like bed net and insecticide use, the questionnaire had both closed-ended and scaled-response items. The in-person method promoted candid answers and made rapport-building easier. Every one of the 250 participants finished the survey.

Data Analysis

All data collected were analyzed using Excel, descriptive statistics like Pic chart, Bar chart were used to visually present key findings and enhance interpretability.

RESULTS

In this study, 250 residents of Waterloo community were interviewed. (Figure 1) shows that nearly everyone (99%) said they had heard about malaria before, suggesting that general awareness of the disease is widespread in the community.

Among the symptoms of malaria, fatigue was the highest mentioned (39%), followed by fever (22%), vomiting (20%), and muscle pain (19%). Interestingly, muscle pain was nearly as frequently cited as vomiting, indicating that residents are familiar with the common signs of the illness. (Figure 2)

Most respondents (79%) believed that malaria can be treated, while 12% thought otherwise, and 10% were unsure. When asked more directly about treatment awareness, 89% confirmed that treatment exists, 9% were uncertain, and only 2% said there was no treatment, this small group also showed the lowest levels of awareness overall. In terms of how serious people think malaria is, 82% considered it a major health concern. Another 17% were not sure, and just 2% did not see it as serious. Most people

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(76%) believed malaria is more severe during the rainy season, while 18% thought it was worse in the dry season. A small group (7%) did not have an opinion. (Figure 4)

Healthcare facilities were the most trusted and frequently cited source of malaria information, mentioned by 43% of respondents. Close behind were informal sources like family, friends, and community members which accounted for 42%. Radio was the third most common source (10%). Government programs were mentioned by only 5%, and non-governmental organizations (NGOs) were not cited at all. This suggests that official outreach efforts may not be reaching or resonating with the community.

When asked whether they were aware of any government or NGO-led malaria initiatives in their area, more than half (130 people) said they were not sure. Another 94 said no, and only 26 respondents confirmed awareness of such efforts. This points to a significant visibility gap in public health programming. (Figure 5)

Views on the effectiveness of malaria control efforts were mixed. About 36% said the efforts were "somewhat effective," while 32% were unsure. Another 22% felt the efforts were not effective, and only 10% described them as "very effective." These responses suggest room for improvement in both implementation and communication of malaria interventions. (Figure 6)

Only 10% of respondents believed malaria is preventable, while 37% said it is not, and 52% were unsure. When asked about the causes of malaria, 60% correctly identified mosquitoes as the main culprit. Another 36% blamed poor hygiene, and 4% admitted they did not know the cause. (Figure 7)

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There were varied beliefs about how soon symptoms appear after infection. The most common response (41%) was that symptoms show up within 7–14 days. Another 35% believed symptoms appear within 1–2 days, while 9% each said symptoms could appear within a few hours or after more than two weeks. A small number were unsure. (Figure 8). When it came to traditional medicine, 60% of respondents said they believed in its effectiveness for treating malaria, 30% did not, and 10% were undecided. (Figure 9)

DISSCUSSIONS

This study assessed the awareness, perceptions, and preventions of malaria among residents of Waterloo community, Sierra Leone. It reveals a high level of general awareness of malaria with 99% of respondents said they had previously come across information about malaria, indicating that people in the Waterloo community in Sierra Leone have a high overall awareness of the disease. Because of its endemic character and frequent exposure at the community level, malaria is still a recognized public health concern in Ghana and Ethiopia, where this conclusion is consistent with regional research (Lopez and Brown, 2023, Zegene *et al*., 2025). Nevertheless, awareness by itself does not ensure precise comprehension or constant preventive action.

The most often reported symptoms were exhaustion (39%), fever (22%), vomiting (20%), and muscle pain (19%). Symptom recognition was comparatively strong. Fatigue's dominance over fever could be a result of localized experiences or unofficial knowledge sharing. Similar trends were noted in Nigeria, where people frequently used their own or their families' experiences to determine symptoms, which occasionally resulted in incorrect classification or postponed treatment (Sonibare and Abegunde, 2020). There was a wide range of

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opinions regarding when symptoms might manifest; 41% of respondents thought they would show up in 7–14 days, 35% in 1–2 days, and smaller percentages in shorter or longer time frames. This discrepancy emphasizes the necessity of more precise instruction on the course of malaria.

89% of respondents said that malaria is treatable, which is a positive indication of treatment availability. Nonetheless, the percentages of confusion (9%) and denial (2%) indicate that some people are still not receiving official health information. Findings from Uganda and Cameroon, where dependence on traditional remedies and poor access to healthcare were associated with gaps in treatment knowledge, are consistent with this (Chutiyami *et al.,* 2024; Asanga and Shey, 2025). The confluence of biomedical and cultural healing practices a phenomenon observed in many African communities is further supported by Waterloo's strong 60% belief in traditional medicine (Jalloh *et al*., 2023).

Epidemiological data and seasonal knowledge of malaria risk were in good agreement. In line with research from Kenya and Burkina Faso that links increased mosquito breeding to rainfall, the majority of respondents (76%) named the rainy season as the time of most transmission (Kirakoya-Samadoulougou et al., 2022). The existence of opposing opinions, meanwhile, with 18% pointing to the dry season and 7% unclear, implies that seasonal messaging might be more dependable and tailored to the local population.

The consequences of preventive knowledge and actions were not entirely consistent. More than half were uncertain, and just 10% thought malaria could be avoided. This is troubling because the prevention of malaria is mostly dependent on environmental

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management and insecticide-treated nets. Due to uneven communication and little community involvement, prevention was frequently misinterpreted or underestimated in Malawi and Tanzania, where similar misunderstandings were reported (PATH, 2024).

Healthcare institutions (43%) and informal networks (42%), with radio coming in second (10%), were the main sources of knowledge about malaria. NGOs (0%) and government programs (5%) were hardly cited, suggesting a lack of awareness in official outreach initiatives. This is consistent with research from Senegal and Zambia, which found that the presence and participation of local actors was strongly associated with community trust and program efficacy (PATH, 2024). The need for more visible and participatory public health programming is further highlighted by the fact that 130 respondents were unclear if there were any malaria-focused efforts in their area.

There were differing opinions about the measures to control malaria. Only 10% thought they were "very effective," compared to 36% who thought they were "somewhat effective," 32% who were doubtful, and 22% who thought they were ineffective. These opinions imply that although initiatives might exist, the community may not always understand their full impact. In comparable contexts, it has been demonstrated that participatory approaches in which communities are involved in planning, execution, and evaluation improve outcomes and trust (Lopez and Brown, 2023).

CONCLUSIONS

This study identifies the gaps and strengths in the Waterloo community's members' knowledge, attitudes, and prevention strategies about malaria in Sierra Leone.

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Despite the strikingly high level of general awareness of malaria nearly all respondents had heard of the illness deeper analysis reveals disparities in knowledge, involvement, and confidence in official health institutions.

Respondents showed a high conviction in the disease's treatability and a reasonable recognition of malaria symptoms. Uncertainty surrounding symptom onset, prevention, and the function of traditional medicine, however, indicates that knowledge is frequently developed by unofficial networks and firsthand experience rather than conventional health education. While the limited visibility of government and NGO-led activities suggests the need for more inclusive and visible outreach efforts, the dependence on healthcare facilities and community-based sources for information highlights the need of bolstering local communication channels.

Many respondents had conflicting opinions regarding the effectiveness of present initiatives and perceptions of attempts to reduce malaria. This indicates a chance for public health stakeholders to enhance community involvement, feedback systems, and transparency in malaria interventions. Although seasonal knowledge of malaria risk was generally correct, there are still misconceptions regarding transmission and prevention, especially among people who don't regularly use mosquito nets or think malaria cannot be prevented.

Waterloo shows promising levels of awareness, the findings underscore the importance of culturally sensitive, community-driven strategies that go beyond information dissemination. Future efforts should focus on bridging knowledge gaps, reinforcing prevention behaviors, and building trust through participatory approaches that reflect the lived realities of

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the community. By doing so, malaria control programs can become more effective, equitable, and sustainable in Waterloo and similar settings..

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FIGURES AND TABLES

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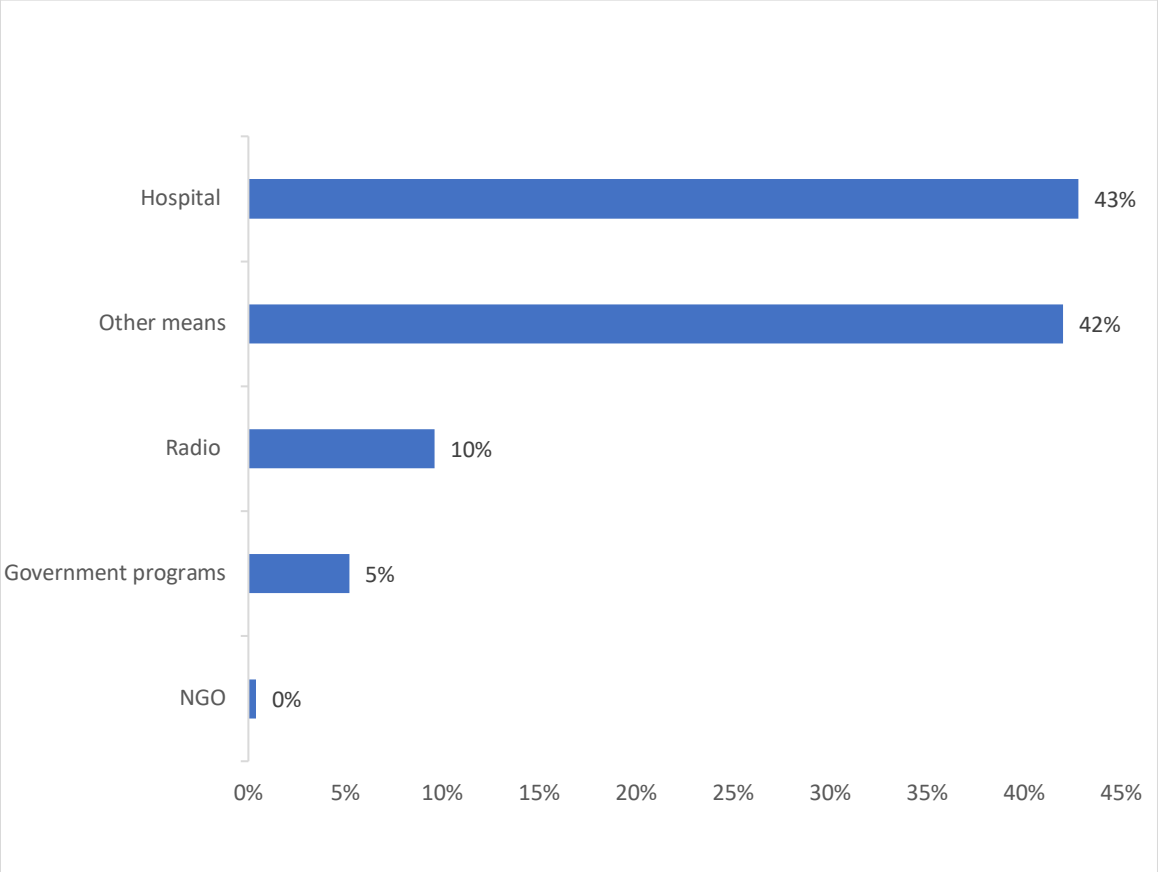

Figure 1. Respondents first knowledge about malaria.

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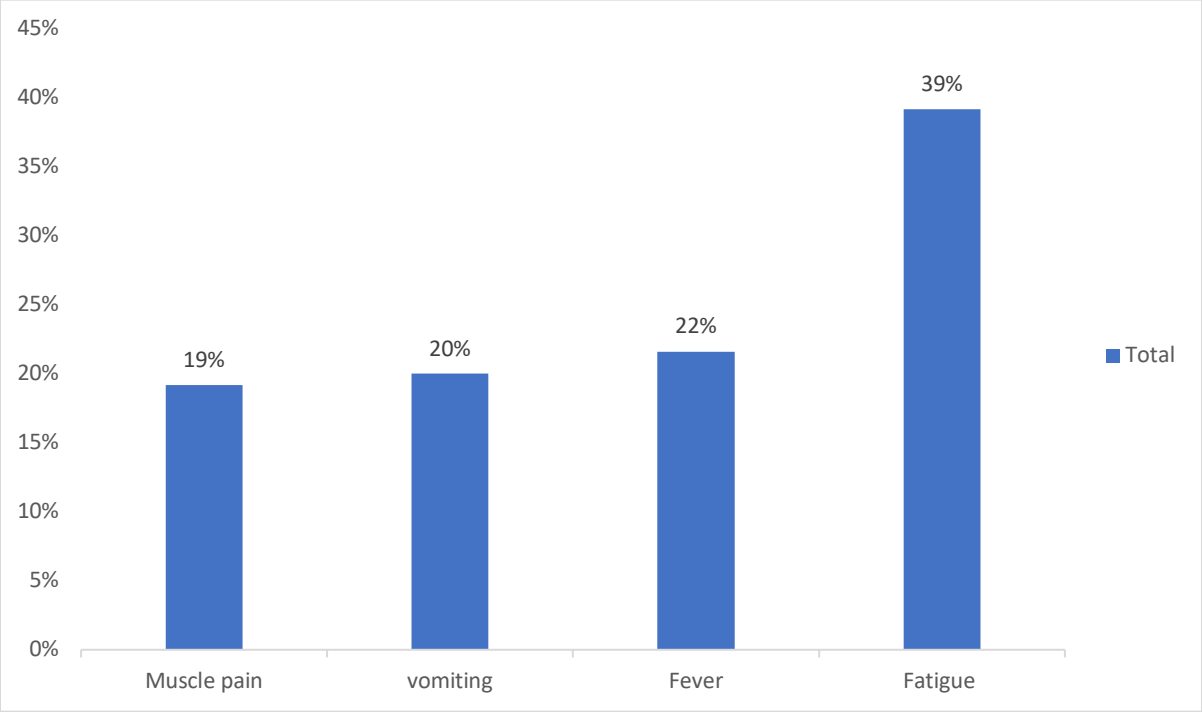

Figure 2 shows Respondent level of awareness regarding malaria symptoms

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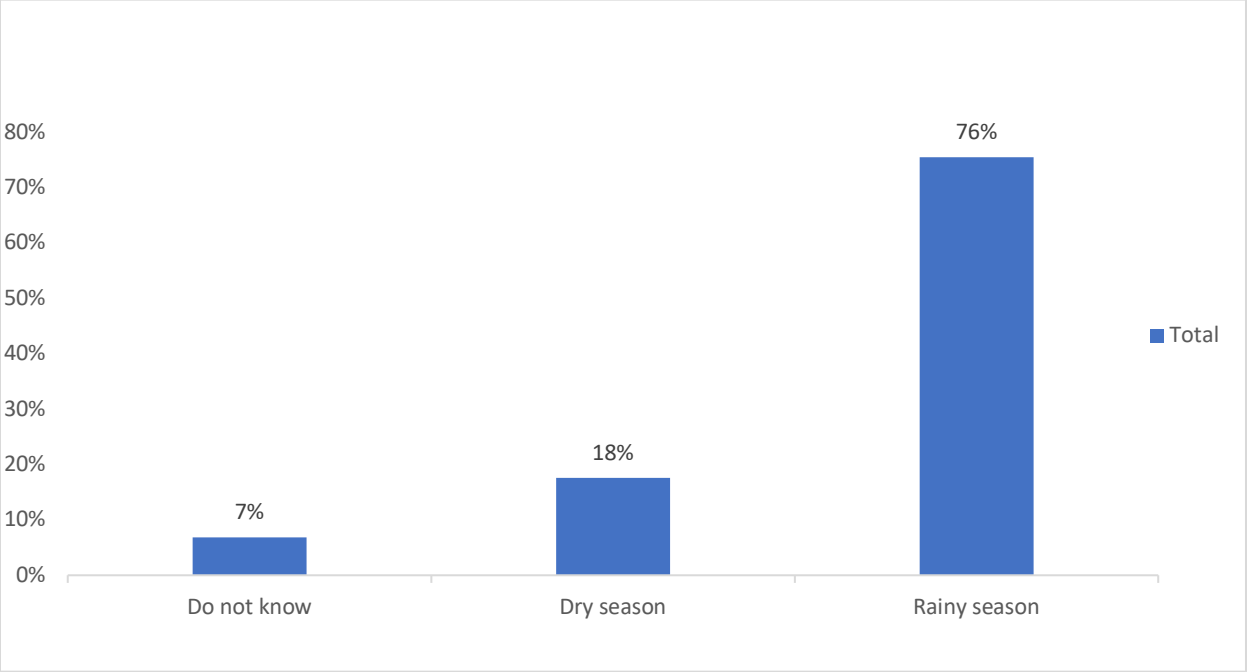

Figure 4 shows Perception of malaria severity among residents

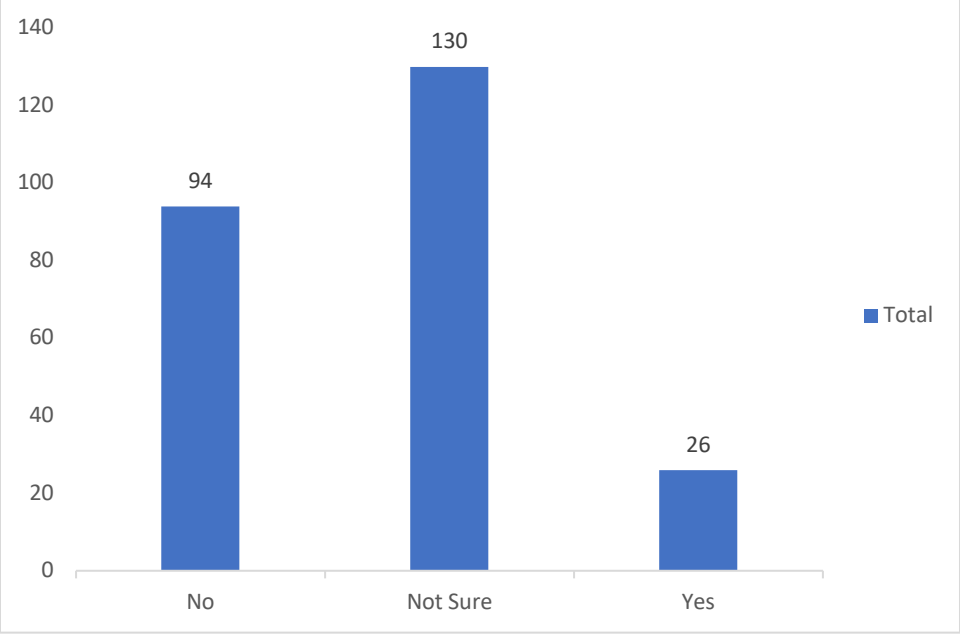

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Figure 5. shows Respondent awareness level of any government or NGO initiative focused on malaria prevention in their area.

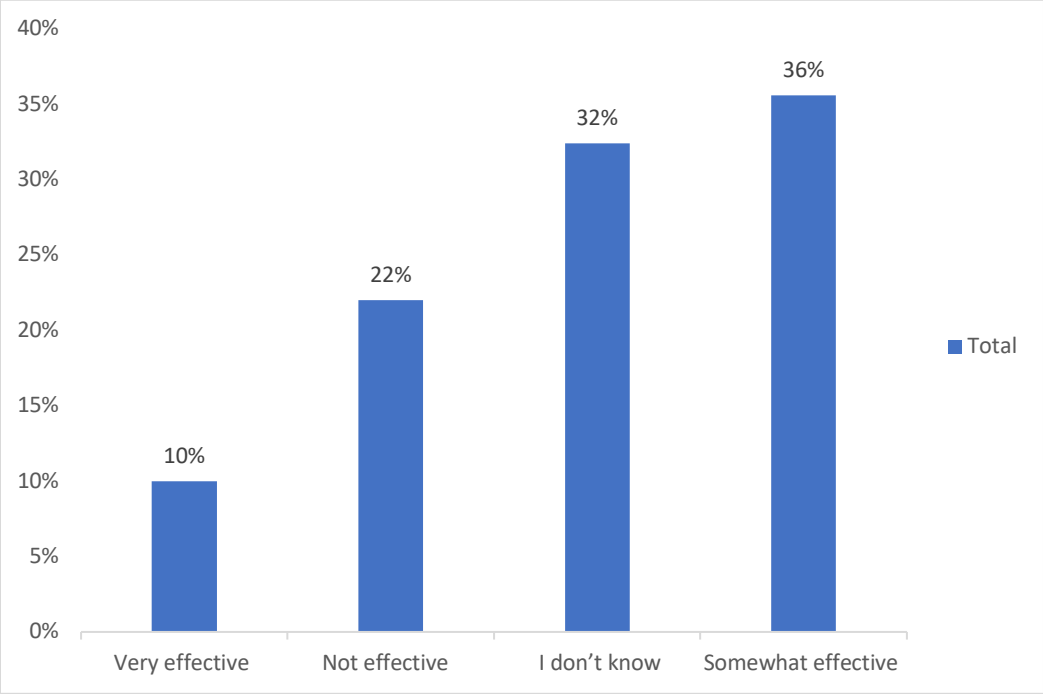

Figure 6 shows Respondent perception on the effectiveness of malaria effort.

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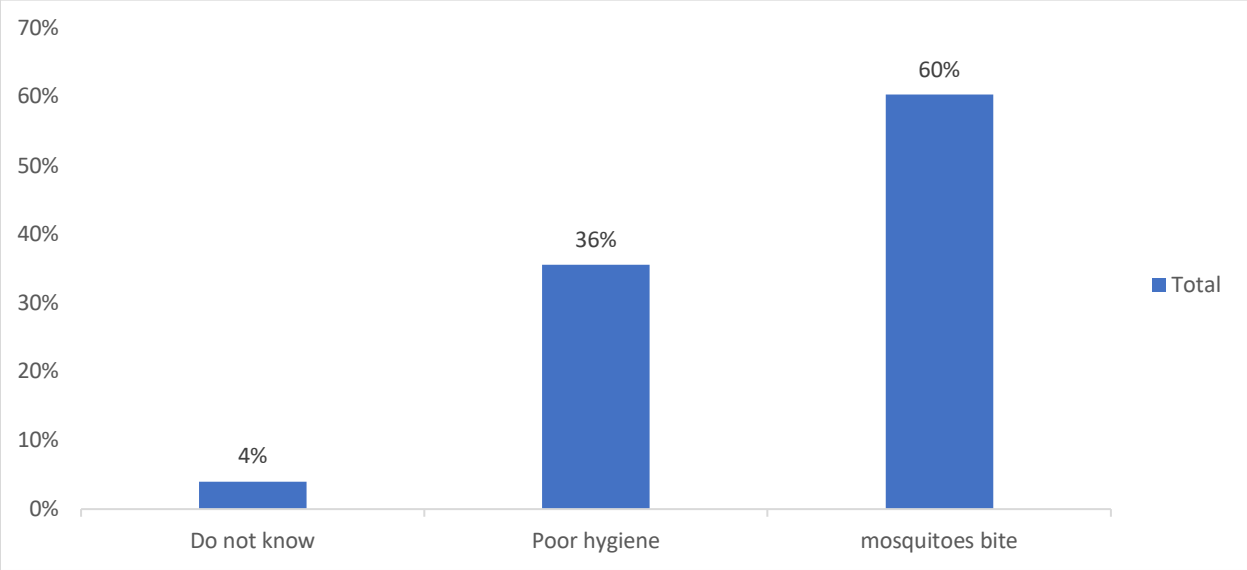
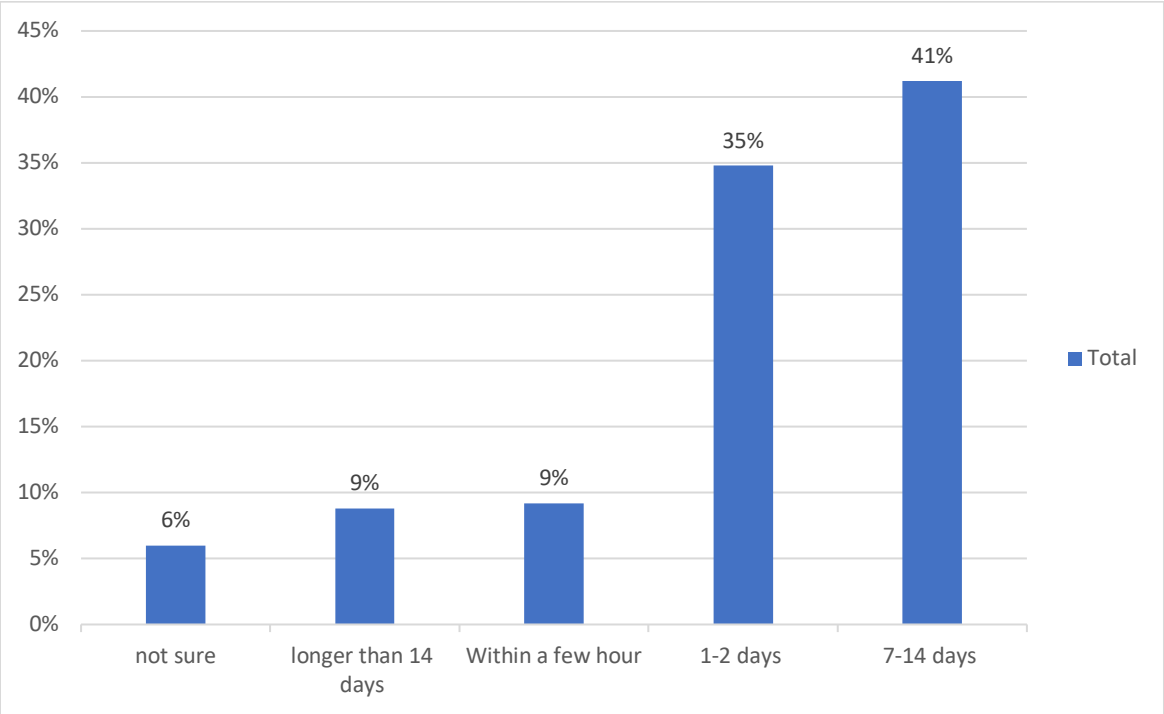


Figure 1 shows Believes among respondents on what actually causes malaria.



 https://dx.doi.org/10.4314/sljbr.v16i4.6

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Figure 8 shows Respondents thought on how frequently malaria symptoms appear after a person is infected

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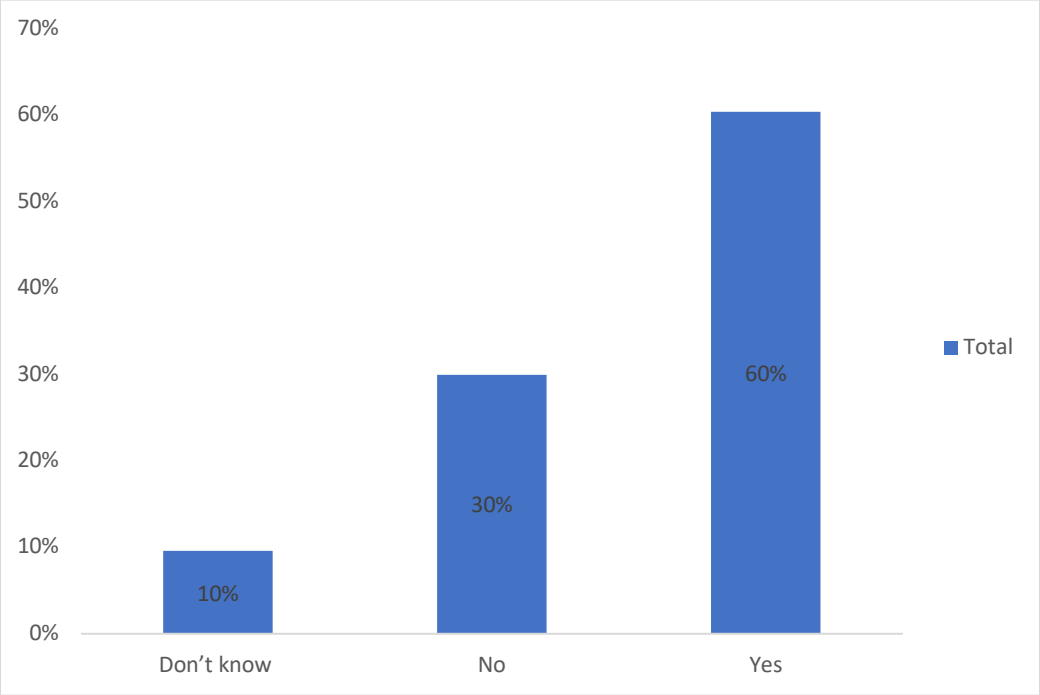

Figure 9 shows Respondent believe if traditional medicine is effective in treating malaria

 https://dx.doi.org/10.4314/sljbr.v16i4.6