Habits, Customs and Community Beliefs about Malaria and Its Vector (*Anopheles* sp.) in Vistahermosa (Meta-Colombia)

Gloria Isabel Jaramillo-Ramírez¹, Cesar García-Balaguera², Alejandra Sánchez-Ochoa³

Abstract

**Background:** Malaria is endemic in Colombia and still a major problem in public health. This study aims to describe the community knowledge, attitudes and practices related to malaria and its vector *Anopheles* sp. in Vistahermosa (Meta).

**Methods:** This was a descriptive cross-sectional study using a KAP form for adult residents who provided informed consent. The sample was calculated with 95% confidence level, 5% error rate and expected frequency of 10%. Sociodemographic information, knowledge, attitudes and practices about the disease and the vector, and perception of Health Department actions were recorded. Descriptive statistics for the collected data were recorded, and 95% confidence intervals were included.

**Results:** In total, 120 surveys were conducted. A total of 40% of the respondents had had malaria, and 88.33% considered the disease a problem. A total of 13.33% did not complete treatment. A total of 50.83% of the respondents reported that each person was responsible for prevention, 25% reported that prevention was the responsibility of the Health Department, and 5% reported that prevention was the responsibility of the community. There was low participation and community appropriation (2.5%), and 12.50% of the respondents did nothing to prevent mosquito bites. There was confusion between the vector of malaria (*Anopheles*) and *Aedes aegypti*. There is still a lack of knowledge of the transmission mechanisms of malaria.

**Conclusion:** Health is not the sole responsibility of health agencies but is a point of convergence between communities and government entities, which should design effective prevention and control programs.

**Keywords:** Attitudes, Knowledge, Malaria, Social medicine, Public health, Community participation

Introduction

Malaria is one of the diseases with the highest morbidity and mortality rates worldwide¹ and is endemic in several regions of Colombia. Malaria control and eradication are Millennium Development Goals and programs have been generated at the global and national levels that have been implemented at the local level.² According to the regulations

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¹²Professor-Researcher, ³Medical Degree Candidate, School of Medicine, Universidad Cooperativa de Colombia, Villavicencio, Meta, Colombia.

**Correspondence:** Dr. Gloria Isabel Jaramillo-Ramírez, School of Medicine, Universidad Cooperativa de Colombia, Villavicencio Campus, Villavicencio, Meta, Colombia.

**E-mail Id:** gloriaisabeljaramillo@gmail.com

**Orcid Id:** http://orcid.org/0000-0002-7597-3873

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generated by the reform, malaria control activities in the county of Meta are divided into collective actions (by the state) and individual actions (by insurers). The collective activities that have been developed include vector control, intra- and peridomiciliary fumigation, delivery of awnings and monitoring of the events by the municipality. These programs have been characterized by their vertical integration and are often designed without the participation of the communities involved. Local knowledge and sociopolitical and cultural dynamics that center on their main health problems (in this case malaria) are ignored. This issue affects the imposition of decontextualized control measures and reduces the coverage and impact of interventions. Communities forge their own discourses and knowledge of health and illness that are reflected in their own attitudes and actions and can contribute to the success or failure of a program. These speeches and chores that trace itineraries of prevention, treatment and control of malaria are often parallel and thus lack contact between them. Therefore, community perspectives must be integrated into institutional programs.

This integration is important, since simple knowledge of prevention and control programs are assumed to lead to an appropriate attitude in the communities. However, this assumption is incorrect. To result in a change in behavior, the reasons behind that behavior and the sociocultural factors that influence that behavior must be understood. From this information, an educational program can be developed that will make people want to be healthy and understand how to accomplish this goal. Therefore, the health sector and government agencies need to include the voices of the represented community in their discourses and practices against the disease, its prevention and its treatment at the micro level. This study will provide a community view on habits, customs and beliefs regarding malaria and the vector that transmits the parasite (Anopheles) in the municipality of Vistahermosa in the county of Meta.

Materials and Methods

A descriptive, cross-sectional study was conducted using knowledge, attitude and practice (KAP) forms for the description of the study population. This study was performed in the municipality of Vistahermosa (Meta), located in the southwest section of the county of Meta, 145 km from Villavicencio (capital of the county). The altitude of the principal municipality is 460 masl, and its average temperature is 28°C. The total population of the municipality is 24,154 people distributed in urban (8124) and rural areas (16,030).

For this analysis, the survey on knowledge, attitudes and practices (KAP) for the treatment of malaria in indigenous communities was conducted with some modifications for its application in the community of Vistahermosa. The inclusion criteria for the surveys were adult citizens, residents of the municipality of Vistahermosa for at least 5 years and prior provision of informed consent. The selection of the sample for the application of the survey was based on 8124 estimated persons living in the urban area of the municipality with a 95% confidence level, 5% error rate and expected frequency of 10%. This approach resulted in a sample size calculation of 136 people for the KAP survey. The variables included in the survey are described in Table 1.

Table 1. Variables Included in the KAP Survey on Malaria in the Municipality of Vistahermosa-Meta

| Variable Group            | Themes Included                                                                 | Description                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Basic data                | Name, municipality, county, and neighborhood                                    | Basic data of the interviewee                                                                                                              |
| General data              | Residence time, gender, number of people at home, education, employment status, housing characteristics, and mobility | General data for a socioeconomic description of the population                                                                            |
| Knowledge of the disease  | Has been sick from malaria, persons sick in the household, responsibility for prevention, cause of malaria, symptoms, diagnosis, and treatment used | Information about the knowledge of malaria by the interviewees. Will answer the basic questions: what is it, what causes it, who transmits it, and how it is treated |
| Attitudes about the disease | Adherence to treatment, alternative treatments, and care taken to not get sick | Information on individual attitudes to prevent, control and cure malaria                                                                   |
| Practices toward disease  | Cleaning of ditches, channels, filling of hatcheries or disposal, and use of mosquito nets | Information on individual practices to prevent transmission of the disease                                                               |
| Perception of Health Department actions | Specific work carried out by the Health Department for the control of the disease | Perception of the interviewees about the actions carried out by the Health Department in each of the municipalities studied for the control and surveillance of malaria |
| Access to the health services network | Health center where you go, prevention and control activities, and participation in community groups | Describes the access of the individuals to the health system of the area and community participation in the prevention, control and surveillance of the malaria |
Statistical Analysis

A descriptive analysis was conducted based on the frequencies and measures of central tendency depending on the nature of each variable. For the crossing of variables, non-parametric statistics were performed using the $X^2$ and Kruskal-Wallis tests with a confidence level of 0.05. We used the Excel program for the tabulation of data and EpiInfo 7.0 (CDC 2016) for the analysis.

Ethical Considerations

The project was endorsed by the research committee of the School of Medicine of the Cooperative University of Colombia, Villavicencio campus. The study also obtained the approval of the municipal authorities of Vistahermosa and the community. This project falls within Colombian Resolution 8430 of 1993 as risk-free research for humans.

Results

A total of 120 surveys were conducted during the months of December 2016 and January 2017, including 60 men and 60 women. The mean age of the participants was 45.71 years (SD±17.19 years), and the oldest surveyed person was 89 years old. A total of 44.16% (95% CI: 35.11–53.52%) of the participants were unmarried, 27.5% (19.75–36.40%) lived in a civil union, and 17.50% (95% CI 11.17–25.5%) were married. A total of 96.60% of the population had an affiliation to the health system (contributory, subsidized or special); however, 3.30% (95% CI 0.92–8.31%) did not have any type of social security. The majority of the population surveyed had at least a primary education (40.80%, 95% CI 31.95-50.18%), 15.80% had a technical or university education, and 8 people (6.60%, 95% CI 2.92–12.71%) were illiterate.

The population of Vistahermosa is mostly adult. The average number of children per household is 0.73 (SD±0.97), with a maximum of 4 children in a home. For adolescents, the average decreases to 0.22 (SD±0.54), with a maximum of 2 adolescents per household. The average number of adults per household is 2.45 (SD±1.19), including the surveys conducted in the police stations; for the elderly, the average is 0.82 (SD±4.6).

A total of 14.13% of the population is engaged in farm work (livestock, agriculture and day laborers), and 65.80% have jobs within the town, either as independent, in private companies (mostly traders) or public employees. Ten housewives were surveyed, corresponding to 8.30% of the respondents (95% CI 4.07–14.79%), and 8.30% of the respondents reported being unemployed.

The basic needs in the urban area of the municipality of Vistahermosa are not completely satisfied. A total of 92.50% of the respondents (95% CI 86.24–96.51%) have electric lights, 85.00% (95% CI 77.33–90.86%) have garbage collection, and a similar percentage of the population surveyed has an aqueduct (85.83%, 95% CI 78.29–91.53%) and sewerage (80.83%, 95% CI 72.64–87.44%).

The population of Vistahermosa is stable and does not move much. The average residence time in the municipality was 24.41 years (SD±16.80 years). The displacements are limited to other municipalities of the county of Meta and to neighboring counties, such as Guaviare and Cundinamarca. Granada and Villavicencio are the most visited municipalities (Fig. 1). The most common reason to travel is to visit relatives (40.00%, 95% CI 31.17–49.34%), followed by work (30.83%, 95% CI 22.73–39.91%) and health (15.83%, 95% CI 9.81–23.62%). The average visit time is 6.89 days (SD±20.35).

Figure 1. Municipalities to Which the Inhabitants of Vistahermosa-Meta Frequently Travel
A total of 40.00% (95% CI 31.17–49.34%) of the people surveyed claimed to have had malaria at some point in their life, and 88.33% (95% CI 81.20–93.47%) of them still considered this disease to be a major problem for them and their families. Of this population, 83.33% completed the treatment provided by the doctor and 13.33% did not. Likewise, only 6.67% of these people had a home visit by health personnel to follow up with the patient.

When asked about the symptoms of malaria, more than 70% responded that fever was one of the main symptoms (72.50%, 95% CI 63.60–80.25), followed by headache (55.00%, 95% CI 36.71–55.17%) and chills (50.00%, 95% CI 32.74–51.02). A considerable number of people reported not knowing the symptoms of this pathology (16.67%, 95% CI 10.49–24.56) (Fig. 2).

A total of 32.50% (95% CI 24.23–41.65) of the respondents have been cured or have cured malaria taking the treatment formulated by the doctor, 22.5% (95% CI 15.38–31.02) have taken another type of medication, and 6.67% (95% CI 2.92–12.71) rely on traditional medicine to cure the malaria symptoms. A total of 13.33% of the respondents know someone from the community other than the doctor who performed cures (healer, shaman, botanist, pharmacist, naturist or indigenous). Only 26.66% of the participants sought or would seek treatment from the hospital or health post for this disease. Twenty percent of the respondents said they had met someone who died of malaria, of which 12.50% of the cases were confirmed by a doctor, 13.33% were not, and another 13.33% did not know whether the cases had been confirmed by a doctor.

In response to the question concerning whether they had ever had a malaria test, 45% of the respondents had never had a test, and 50% had at least one test. Of the latter group, the patient had a thick blood film in 11.67% of the tests (95% CI 6.53–18.80%), 35.83% only reported having received a blood test (95% CI 27.29–45.10%), and 2.50% did not remember the name of the exam.

The majority of the residents of Vistahermosa (50.83%, 95% CI 41.55–60.07%) stated that everyone was responsible for malaria prevention. However, 25.00% (95% CI 17.55–33.73%) reported that prevention was the exclusive work of the Health Department, and 5% reported that prevention should be a community practice.

The population of the Vistahermosa municipality knows that malaria is transmitted by the bite of a mosquito (65.00%, 95% CI 55.76–73.48%); however, they do not know its specific name (Anopheles) and in many cases, confused the vector with Aedes, the transmitter of dengue, chikungunya and zika. There is still a lack of knowledge of the transmission mechanisms of malaria, with 19.17% of the population surveyed giving wrong answers on the subject and 13.33% reporting that they did not know anything about the topic (Table 2).
The majority of the population agrees with the spraying of insecticides in their homes for mosquito control (90.00%, 95% CI 83.18–94.73). In terms of personal care to avoid contagion, low participation and community appropriation (2.50%, 95% CI 0.52–7.13%) and the percentage of people who do nothing to prevent mosquito bites (12.50%) are noteworthy. Most people use awnings (59.17%, 95% CI 49.82–68.05%) (Fig. 3). There was confusion on the part of the respondents about the controls that must be performed against *Anopheles* and those that should be directed specifically toward *Aedes*.

More than half of the population said that they did not receive good care from the Vistahermosa health officials (56.67%, 95% CI 47.31–56.68). Additionally, 50.83% said that the Health Department did not perform community work for the prevention of malaria, and 53.33% said that this same government agency did not perform educational work on this issue.

### Table 2. How Do People Think They Get Sick from Malaria in Vistahermosa-Meta?

|                        | n   | %   | 95% CI |
|------------------------|-----|-----|--------|
| Water                  | 7   | 5.83| 2.38   |
| Air                    | 3   | 2.50| 0.52   |
| Person to person       | 3   | 2.50| 0.52   |
| Contaminated food      | 2   | 1.67| 0.20   |
| Mosquito bite (any)    | 78  | 65.00| 55.76 |
| Mosquito bite (*Anopheles*) | 3 | 2.50| 0.52   |
| Do not know            | 16  | 13.33| 7.82   |
| Other                  | 8   | 6.67| 2.92   |
| Total                  | 120 | 100.00|       |

**Discussion**

We found that there was no full coverage of basic needs. The majority of the population had basic primary education, and a significant number of the respondents were illiterate. This situation seriously affects malaria because this disease mainly affects populations under poor socioeconomic conditions with precarious housing, limited access to basic services, such as potable water and basic sanitation, deteriorated environmental conditions and barriers to access to health services. If this problem is evident in the urban area of the municipality, conditions in the rural areas are likely to be even more precarious and conducive to an increase in vector diseases, including malaria.

Generally, the community surveyed has been close to the disease and has observed or suffered the consequences of the disease. Notably, concerning knowledge of the disease, malaria is perceived as a problem, and health services...
are perceived to provide treatment, but the domiciliary activities of control are thought to be conducted to a very small extent or with little communication with the population. Similar behaviors have been found in other studies. In India, good knowledge of the disease was found despite the lack of control programs. Similarly, in studies in Saudi Arabia, where knowledge of this disease is acceptable, there is a gap between knowledge and prevention-related practices, which require innovative strategies based on local experiences and evidence to promote and encourage the community to adopt effective control and protection measures.

We found that the community of Vistahermosa presented a low level of knowledge of the Anopheles mosquito, which is the malaria vector, as well as the vector control forms. Many people confused the vector of malaria with the vector of dengue, chikungunya and zika (Aedes spp.); thus, the answers to the questions asked in the vector survey were focused on Aedes and not on Anopheles. This confusion resulted in special acceptance of chemical control by the population rather than other forms of control, such as control of breeding sites. Additionally, there was little community involvement in vector control in Vistahermosa. Similar results were reported by Imtiaz in Karachi and Potter in Australia, where the communities had acceptable knowledge of the disease but very little knowledge of the disease vector. These results were significantly different from a study in Ethiopia, which found a good level of knowledge and attitudes about the vector and good valuation of the control with awnings and screens.

Similarly, the symptoms were mixed among all of the febrile pathologies mentioned above, which could lead to aggravation of the situation because the measures taken for the treatment would not be the most adequate measures. One explanation for this issue is that the community has not received much information about malaria in recent years. Instead, the efforts of municipal health authorities have focused on the promotion, prevention and control of emerging and re-emerging arboviruses in our country, such as dengue, chikungunya and zika. In consequence, people are more familiarized with these diseases and know more about them than about malaria. Despite the importance of malaria and its persistent endemicity in the country, vertical control programs have been run by the Direct Campaigns Directorate of the Ministry of Health and the Malaria Eradication Service (Servicio de Erradicación de la Malaria, SEM), which was a program run in parallel with the National Health System, and was dismantled between 1983 and 1990. In line with state decentralization reforms, the program moved from the nation to counties and transformed the fight against malaria into a control program by dividing malaria control activities into collective actions (by the state) and individual actions (by insurers).

As a consequence, malaria management programs have deteriorated due to fragmentation of actions, leading to a loss of information due to the lack of robust data capture and analysis systems, the dismantling of the diagnostic capacity and the deterioration of disease control indicators. Adding to this problem is the poor perception of health services by the population, supply difficulties, quality, humanization, lack of basic resources and zero community participation, which seriously compromise the disease and vector control programs and highlight the need to rethink strategies and emphasize community work. Health professionals have a technical language that separates them from their patients; they emphasize on disease and rely heavily on technology. This approach leads healthcare toward the generation of policies, plans and programs that adopt a vertical perspective and ignores the concept of medicine itself, which is part of a larger system of beliefs, behaviors and attitudes. This finding is similar to a report from Zambia and Tanzania, where no effective information and communication strategies are in place and where healthcare personnel also work in dispersed areas with difficult access that further distances communities from prevention and treatment services.

A consensus has been reached that malaria control is multisectoral. Investments in control are cost-effective in public health and reduce poverty, contribute to equity and improve the quality of life; however, in areas with a history of armed conflict, illicit crops and a scarce presence of the state, such as the case of Vistahermosa, the interventions are more complex. The global technical strategy against malaria 2016–2030 recommends carrying out activities adapted to local conditions, encouraging community participation, strengthening epidemiological surveillance, monitoring and evaluation, ensuring equity in access to services and implementing innovative activities and techniques. Clearly, Vistahermosa is lacking in all of these aspects. Thus, the health sector must re-direct the control program toward these recommendations.

**Conclusion**

The verticality of health programs generates a gap between the community and the state and dismisses pluralism in healthcare. The imposition of decontextualized measures reduces the coverage and impact of interventions and causes imbalances in the community that are reflected in social inequities, including health. As a result, interest in the knowledge of the community about diseases such as malaria diminishes, and the community members will not adopt proper attitudes and practices toward the disease. Health should not be considered a distant issue and a sole responsibility of health entities but instead should be a point of convergence between communities and governmental entities that allows the design of effective prevention and control programs.
It is very important that communities engage in vector control and identify the signs and symptoms of malaria for early case detection and a better control of disease. Control of mosquito breeding sites with the use of chemicals in homes and in the periphery of housing requires better integration of education, communication strategies and health management.

There is evidence and serious distancing between the population, insurers and health services; this situation has generated mistrust in health personnel and the quality of care, which has led them to seek care in other municipalities different from which they live. In the health system should work closer with the communities and have mechanisms for dialogue and monitoring of their health needs, for better control of malaria.

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