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AWARENESS OF MALARIAL TRANSMISSION BASED ON A SURVEY IN KOLKATA

Atreyee Choudhuri*
Research Scholar, Department of Bioscience, JIS University, Kolkata, India

*Address for Correspondence: Atreyee Choudhuri, Research Scholar, Department of Bioscience, JIS University, Kolkata, India E-mail: atreyee649@gmail.com

Abstract

Introduction: A female Anopheles mosquito carrying the malaria parasite bites a human as the bug gathers her blood meal to start the Plasmodium species infection process. Despite notable gains and advancements in human health and the reduction of the disease's burden, malaria continues to be a serious public health issue. It is among the top ten leading causes of illness and death in a variety of age groups, including adults and children below the age of five. In South-East Asia, particularly India, malaria is still a significant public health issue. Malaria affects about 36.3% of the world's population in 91 nations. India accounts for 76.5% of the 2.5 million cases of malaria in the South-East Asian region, which contributes to the overall malaria burden.

Aims and Objectives: To evaluate and analyze the awareness of malaria through surveying and to determine the hemoglobin level among the population of Kolkata.

Methods: This survey was concluded in Kolkata city in India from December, 2021 to December, 2022. The researcher surveyed 2300 participants from communities in Kolkata and had classified two categories to the participants who had past history of malaria they determined positive Microscopic demonstration and who had no past history they identified negative Microscopic demonstration. Moreover, the researcher had collected 1125 participants of positive Microscopic demonstration and 1175 participants of negative Microscopic demonstration .

Results: Throughout the in-depth analysis, the researcher had presented a few survey questions such as sources of drinking water, sources of water, purpose of other activities , use of mosquito net among the positive and negative Microscopic demonstration.The researcher had recognised the hemoglobin level of positive Microscopic demonstration and negative Microscopic demonstration.

Conclusion: Moreover, this survey had concluded that through this in-depth analysis, it had demonstrated several methods of preventing malaria. It used 1125 participants for positive Microscopic demonstration and 1175 of participants of negative Microscopic demonstration to conclude this argument. Moreover, this survey was effective for researchers to increase the awareness of malaria prevention.

Keywords: malaria, survey, falciparum, vivax, fever.

Introduction

All cases of malaria should be effectively and promptly treated within 24 hours of onset. Most "malaria" cases, in reality fevers, are treated at home, and most deaths have occurred at home. It

is, therefore, of paramount importance that new drug combinations are reserved for laboratory-confirmed cases of malaria, not only on ethical grounds but also for economic reasons [1]. Diagnostic accuracy in malaria may be enhanced in a cost-effective manner, but few simple, reliable, and inexpensive methods exist, particularly in those underdeveloped areas of the world where such tools are needed most [1].

Malaria remains a serious public health concern with morbidity and mortality, more so in the poor populations of developing nations. The four primary species of Plasmodium that cause human infection are P. falciparum, P. vivax, P. ovale, and P. malariae [2]. In addition, the monkey parasite P. knowlesi may also be a causative pathogen for human infection. P. vivax is very widespread, accounting for the most common cause of malaria infection. It prevails majorly in tropical, subtropical, and temperate regions [3]. P. falciparum is the most common cause of severe malaria and prevails in tropical and subtropical areas. The main vectors of malaria transmission are basically the Anopheles mosquito; among these, Anopheles arabiensis is the principal vector, although A. phronesis and A. Funestus as secondary vectors [4].

Infection is initiated by the vector—a fed infected female Anopheles mosquito. In the process of feeding on human blood, she inoculates Plasmodium species into the human body [5]. The danger of infection, together with the ambient temperature, is enhanced by the diversity and density of the vector mosquito population in the area. Unstable malaria transmission, characterized by intermittent outbreaks, may be due to sudden variations of weather through clouds or heavy rain in the "Woina Dega" or temperate zones from 1500 m to 2500 m altitude. The "degas" or cold zone above 2500 meters, about 8.3% of the country, is reportedly malaria-free [6]. Though the burden of malaria has declined, the core epidemic remains a significant public health challenge and one of the leading causes of morbidity/mortality in different age groups, like children under five years and adults. Malaria becomes the number one cause of inpatient admissions, outpatient visits, and deaths. Timely screening, diagnosis, and treatment are the keys for reducing the spread of this disease [7,8].

Malaria is one of the most crucial public health problems in Southeast Asia, particularly in India. Infection in malaria prevails in approximately 36.3 percent of the world population in 91 nations. India contributes to 76.5 percent cases out of the total 2.5 million cases in the Southeast Asian region. The annual report of 2013 in India presents 0.91 million with 127 million tests on suspected cases. Of the infections, 53.7% were due to P. falciparum and 47.5% due to P. vivax. India contributed 58.7% of the total malaria cases in WHO Southeast Asia Region. According to the National Vector Borne Disease Control Program, in India, 500–1,100 deaths are recorded every year and 0.8–1.7 million confirmed malaria cases [9,10].
Community perceptions, attitudes, and beliefs about malaria prevention, symptom recognition, treatment, and control significantly influence efforts taken to curb the disease and are often not considered in any of the control strategies. These factors vary between countries and even among individual families [11]. Disregarding existing knowledge, attitude, and practices of the

community with respect to malaria can undermine the success of control programs; hence, KAP assessments should be integrated into the development of effective malaria prevention strategies [12].

Methods

This was a retrospective survey conducted in Kolkata, India, from December 2021 to December 2022. In the study, 1125 participants were assessed for socio-economic parameters and 1175 participants for malaria infections using a questionnaire. The survey assessed drinking water sources, mosquito nets used, and other measures taken to prevent malaria. Participants were grouped according to positive and negative microscopic malaria demonstrations, after which blood samples were taken for identifying cases that had past or new ill health due to malaria. The results obtained showed that 1125 participants had a history of malaria, while 1175 had no history of it.

Inclusion and Exclusion criteria

- Included patients were from Kolkata city and malaria prone areas only.
- Patients who reported having suffered from malaria were asked for the blood reports, microscopy results, physical examination records, and patient history.
- This study excluded those who could not provide adequate reports, those suffering from blood disorders, or those with underlying chronic conditions such as carcinoma.
- The others that were excluded were those patients who turned out to be uncooperative or did not fill in the questionnaire.

Statistical analysis

The study used SPSS 25.0 for analysis. ANOVA was done for hemoglobin levels and chi-square tests were done for other parameters. Other analyses were done on MS Excel. Continuous variables were presented as mean± standard deviation while discrete variables were presented as counts and percentages. The hemoglobin levels in the two groups were studied with calculation of mean and standard deviation. Ethical approval was taken by explaining the study to all participants in detail and written consent was obtained prior to data collection.

Results

As per survey, the researcher has collected information of awareness of malarials who had suffered malaria. This survey concluded by 1125 positive microscopic demonstrations and 1175 negative microscopic demonstrations. The researcher found that 1125 positive microscopic demonstrations participants had used main sources of drinking water: government supplies (25.8%), ponds (25.7%), self owned pump (24.5%), Tube wells (23.8%). On the other hand, 1175 participants were part of negative microscopic demonstrations; they had used the main source of drinking water: government suppliers (25%), ponds (25.7%), self owned pumps (25.4%), Tube wells (23.4%). In addition, as per survey, the researcher found that among 1125 Positive Microscopic demonstrations, people used water for their household activities from

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Government supplies (33.9%), self owned pump (32.1%), tube well (38.3%). Again on the other side, among 1175 negative microscopic demonstrators who had used water for other activities from government supplies (31.6%), self owned pump (31.4%), Tube well (32.5%). Moreover, as per survey, it found that 48.8% of Positive Microscopic demonstrations used mosquito nets and 51.2% did not use mosquito nets. Furthermore, among 1174 negative microscopic demonstration participants , who had used mosquito nets 50.3%, and no user was 49.6%.

Table 1: Findings on awareness of malarial prevention in the population studied

Main Questions on awareness	**Positive Microscopic demonstration N = 1125**		**Negative Microscopic demonstration N = 1175**		**P-value**
Main Source Of Drinking Water	Government Supplies	291 (25.8%)	Government Supplies	294 (25%)	0.695
	Pond	290 (25.7%)	Pond	302 (25.7%)	0.744
	Self owned pump	276 (24.5%)	Self owned pump	303 (25.7%)	0.743
	Tube well	268 (23.8%)	Tube well	276 (23.4%)	0.741
main source of water used by your household for other purposes	Government Supplies	382 (33.9%)	Government Supplies	372 (31.6%)	0.629
	Self owned pump	362 (32.1%)	Self owned pump	370 (31.4%)	0.699
	Tube well	431 (38.3%)	Tube well	383 (32.5%)	0.536
Does your household have any mosquito nets?	**Yes**	**No**	**Yes**	**No**	
	549 (48.8%)	576 (51.2%)	592 (50.3%)	583 (49.6%)	0.632

As per survey, the researcher had classified among participants who had positive and negative microscopic demonstrations. By the hemoglobin level test the researcher had classified positive of past history of malaria and negative of no malaria of microscopic demonstrations of participants. However, the subsequent figure has demonstrated that in the past history of malaria and negative malaria participants , their hemoglobin level is below average from 8.47±1.2 g/dl of positive microscopic demonstration as well as 9.56±1.2 g/dl of negative microscopic demonstration (P=0.421), which was a significant difference.

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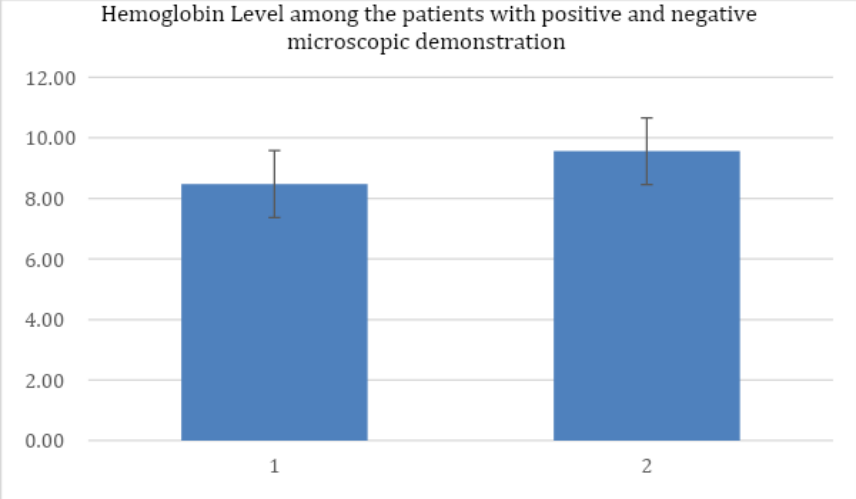

Figure 1: Hemoglobin Level among the patients with positive and negative microscopic demonstration

Discussion

Two-thirds of Myanmar's population is at risk of malaria, where the disease is highly prevalent. Key components of the Roll Back Malaria Initiative include early detection and treatment within 24 hours of fever onset. Raising public awareness is essential for malaria prevention, control, and encouraging treatment-seeking behavior. A recent study highlights misconceptions about malaria transmission despite widespread knowledge of mosquito bites as a primary route. People with limited malaria knowledge often exhibit poor treatment-seeking behavior, with many seeking help from unofficial caregivers and doing so after delays [13].

Attributable factors to the recent surge in malaria in the endemic regions, especially Africa, are the rapid spread of antimalarial drug resistance, climatic changes, and increasing rapid urbanization. Malaria in Africa is generally caused and transmitted by the Anopheles gambiae complex and P. falciparum. Control efforts have remained fragmented and uncoordinated. It is still an urgent need to develop antimalarial drugs and their vaccines, further understand the pathophysiology of the disease, vector dynamics, epidemiological trends, and economic impacts [14].

The efforts put into the Greater Mekong Subregion malaria elimination emphasize asymptomatic parasite reservoirs. Understanding how communities view asymptomatic diseases and the accompanying reservoir-targeted strategies is key to effective community engagement. A study was thus conducted in southern Savannakhet Province, Laos by Adhikari et al. (2018) which involved the assessment of knowledge, attitudes, and practices of malaria-endemic communities with respect to asymptomatic malaria and mass drug administration. The study revealed a lack of awareness on both asymptomatic malaria and MDA as a means of eradication. Such efforts may be further improved by increasing education on asymptomatic infections to the population, and involving government officials, local leaders, and the community in outreach and training [15].

Parts of India and the Indian subcontinent have very high rates of malaria. Mangaluru is located in the southwest coastal area of Karnataka and is endemic for malaria, with an annual parasite index of 10-12. Because of its high prevalence, only a very few studies have analyzed the epidemiology and burden of malaria in this area. P. vivax is the predominant malaria species throughout the year in Mangaluru. There is a notable increase in infection rates during the rainy season. Higher infection rates were noticed in the male category aged 16 to 45 compared to other age groups and women. Besides, immigrants show a higher incidence of malaria as compared to the local population [16].

In Mangaluru, malaria is focussed in pockets of immigrant labourers and socio-economically poor localities. These areas are often inadequately sanitized, with constant water accumulation, offering ample habitats to foster high vector densities and a heightened risk of infection. Use of vector control measures such as bed nets is uncommon. This, therefore, leads to a higher prevalence, also affecting adults with extended hours of work into the evening and scanty dressing. Improved public health measures aimed at increasing public awareness through increased prevention strategies and provision of barrier protection, combined with education in environmental hygiene, would go a long way in reducing infection rates and also in preventing future spread to new areas [16,17].

Compared with the serious sequelae due to severe falciparum malaria, P. vivax has fewer serious sequelae. However, early and aggressive treatment for severe P. vivax malaria still resembles that given to acute falciparum malaria. This systematic review assessed the incidence of severe P. vivax malaria and factors associated with the severe manifestations of P. vivax malaria. According to the WHO, severe anemia is the most frequent presentation of severe P. vivax malaria, even though it occurs less frequently compared to in P. falciparum cases. The poor prognostic indicators in severe vivax malaria include renal failure, anuria/oliguria, jaundice, complications during treatment, prolonged fever, and elevated pulse rates at the time of presentation [18].

Conclusion

To summarize this survey, the researcher had open-ended questionnaires for this survey. The researcher had classified two different categories of participants who had a past history of malaria and a negative report of malaria. Furthermore, this in-depth statistical analysis was helpful for researchers to identify 1125 of participants who had positive microscopic demonstration and 1175 of participants who had negative microscopic demonstration. On the other hand, this retrospective survey was executed in Kolkata city, India by using a primary questionnaire including several open-ended queries to raise awareness of malaria infections. In addition, throughout this analysis, the researcher discussed the reason for malaria and its prevention. On the other hand, in the methodology section, the researcher conducted this survey among 1125 positive microscopic demonstration and 1175 negative microscopic demonstration

participants . In this results section, the researcher had presented a few survey questions to strengthen this argument, it had divided two categories positive and negative microscopic demonstration as well as it had presented use source of drinking water,use of sources of water for other activity, percentages of use of mosquito net or not. Again on the other side, the researcher had presented the hemoglobin level of participants who had positive and negative microscopic demonstrations, which shows there was 48.91% of the positive history of malaria out of all the participants. Moreover, this discussion section also presented several reports of the other nations as well as submitted several methods of malaria prevention control, and rising treatment-seeking conduct is increasing public awareness of malaria. Moreover, throughout this analysis, the researcher came to the conclusion that there were limits of knowledge of asymptomatic malaria diseases and MDA as a method to prevent malaria.

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