



Knowledge and Awareness about the Mode of Transmission of Vector Borne Diseases among General Public

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Authors' contributions

This work was carried out in collaboration among all authors. Author CMA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RVG and TL managed the analyses of the study. Author RVG managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Vector borne diseases account for more than 17% of other contagious diseases and can be caused either by parasites, bacteria or viruses. Malaria is a parasitic infection caused by female Anopheles mosquitoes. It causes millions of cases globally and most deaths occur in children. Dengue is another vector disease caused by Aedes mosquito and also affects millions of people, also causing more deaths. Other vector diseases may include yellow fever, zika fever, west Nile fever, chikungunya, elephantiasis etc. The aim of the study was to assess the knowledge and awareness about the mode of transmission of vector borne disease among the general public and also to analyse the correlation between gender and the level of awareness about vector borne disease among them. A cross sectional questionnaire survey was conducted among people in the region of

Chennai. A set of 15 questions including questions on knowledge and awareness on the mode of transmission of vector borne diseases among the general population. It included questions like examples of vector borne diseases, mode of transmission of disease, preventive measures etc. The people of age group between 25-45 years were involved in the survey. There were 100 responses to the survey. The duration of the study was about 7 days. It is clear that the population was aware about the vector borne diseases but not very clear about the preventive measures to be taken to prevent the spread of vector borne diseases.

Keywords: Knowledge; general population; vector borne diseases; awareness.

1. INTRODUCTION

Vector borne diseases are those transmitted by the bite of infected agents like mosquito, ticks, flies etc. These vectors are cold blooded and so are influenced by climatic conditions. It enhances the survival and reproduction rate of vectors and also reproduction and survival of pathogens within the vectors throughout the year. Many of the vectors are blood sucking agents and so they tend to ingest the disease producing microorganism during a meal from an infected host. Invertebrates are very common vectors of diseases. A classic example of invertebrate vector is mosquito and flies. They transmit diseases like dengue, malaria, yellow fever and leishmaniasis [1]. Below are some common diseases caused by vectors and are prevalent in our environment: Dengue is caused by Flavivirus and the vector is *Aedes* mosquito. It is also called breakbone fever and is difficult to identify, as the symptoms usually overlap with those of malaria and typhoid. The symptoms include fever, headache, muscle and joint pain. Acute dengue can be treated with oral or intravenous rehydration and transfusions [2]. The majority of the cases are reported in children less than 15 years of age. Infants and children with secondary dengue infections are most at risk for severe dengue. Lab results can reveal within 5 days of the onset of disease. After 5 days, serological tests provide indirect evidence of dengue. There are no effective antiviral agents available to treat dengue infections. Hematological monitoring, recognition of warning signs of severe disease, fluid replacement therapy and blood transfusion can be done to control dengue. Chikungunya is caused by chikungunya virus. The general symptoms include fever and joint pain [3]. Diagnosis is either by blood test or antibody test. Yellow fever is caused by Falvivirus [4]. The general symptoms are fever, nausea, loss of appetite etc. Blood test followed by PCR is helpful in detecting this disease as it is difficult to assess in the early stages. Zika fever is caused by Zika virus [5]. It usually does not exhibit

distinct symptoms and only resembles that of a mild dengue fever. It can be treated with paracetamol while no other specific medication is effective against it [6].

Malaria is caused by *Plasmodium vivax* and the vector is *Anopheles* mosquito. There are 4 species in the *Plasmodium* group namely-*P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae*. The usual symptoms include fever, tiredness, vomiting etc. Diagnosed by the microscopy of blood film and antigen based reactions [7]. Elephantiasis / Lymphatic filariasis is caused by Filarial worms. Affected ones exhibit swelling in limbs, breast, genital areas. They damage the lymphatic system [8]. It can be diagnosed through blood samples observed in microscopes [8–10]. West Nile Fever- caused by a West Nile virus and the vector is *Culex* mosquito. It usually does not show any symptoms but sometimes may exhibit fever, headache, vomiting [11]. Leishmaniasis is caused by *Leishmania* type and the vector is Sandflies. It persists as cutaneous, subcutaneous and visceral type. It is due to poverty, malnutrition and various factors [11,12]. Leishmaniasis is endemic in most southern countries. It is a major vector borne disease which has been invading countries for decades. The most common form of leishmaniasis seen is zoonotic visceral leishmaniasis and cutaneous leishmaniasis out of which visceral leishmaniasis is more dangerous. Asymptomatic leishmaniasis is also seen in some cases [13]. The spread of the disease is associated with many risk factors and climate is one of them. The changes in the environment and migration of people to places may result in the alterations in the densities of vectors and reservoirs [14]. *Leishmaniasis* spp developed resistance to antimonial drugs and was resistant to miltefosine. *Leishmaniasis* is a disease which is emerging in most of the developing countries for which there is no effective drug developed for now [15]. Vector-borne diseases exert a huge burden of morbidity and mortality worldwide, particularly affecting the poor people. These diseases can be controlled

through vector control, to a greater extent than drugs or vaccines. Due to threat of insecticide-resistant vectors, global environmental change, and the need to incorporate more vector control interventions to eliminate these diseases, there is a need to return to vector control approaches based on a thorough knowledge of the determinants of pathogen transmission. A better knowledge among the public is essential to prevent from various vector borne diseases.

2. MATERIALS AND METHODS

A cross sectional questionnaire survey was conducted among people in the region of Chennai. A set of 15 questions includes questions on knowledge and awareness on the mode of transmission of vector borne diseases among the general population. The questions were uploaded in google forms. The people of age group between 25-45 years attended the survey. There were 100 responses to the survey. The duration of the study was about 7 days. Convenient sampling technique was used for data collection. The independent variables were the age, gender, etc. While the dependent variables were the knowledge and awareness about vector borne diseases. Association between variables was tested using chi-square test between the variables Any P value less than 0.05 was considered statistically significant.

The obtained results were represented in the form of bar graphs.

3. RESULTS AND DISCUSSION

Fig. 1 shows that the majority (40%) of the population had experienced dengue or malaria. As they were affected by the disease, they had some knowledge about the transmission of the disease and the symptoms. Development of the dengue vaccine is accounted to be a high priority to reduce the people being affected by the disease. Fig. 2 shows that the majority (39%) said that it is possible to get rid or control the mosquito management. They also feel that the role of the government is important in controlling the spread of diseases by following a regular hygiene in the environment and also ensure that there is no stagnant water at houses which could prevent the breeding ground for mosquitoes. Fig. 3 shows that the majority (66) % say that malaria is more contagious and a serious disease when compared to dengue. Malaria had a great impact on world history when compared to any other disease. It involves deadly fever and

splenomegaly. Fig. 4 reveals that the majority (37%) answered that dengue is an example of the vector borne disease. The other responses were malaria (36%), plague (11%), chikungunya (16%) while all the options given were the examples of vector borne diseases. Fig. 5 shows that the majority (46%) says that prevention of accumulation of water, control of vectors and their reservoirs contribute to the control of spread of diseases. We have also analyzed the correlation between gender and other parameters regarding the awareness about the vector borne diseases. Bar Fig. 6 represents the association between gender and responses to the question whether they have suffered from dengue or malaria. Chi square test was used to find association between variables and was found to be statistically significant. Pearson chi square value is 1.246, p value is 0.264 and df is 1. Male participants had suffered from dengue or malaria than female participants, however not significant. Bar Fig. 7 represents the association between gender and responses to the question whether mosquito management can be achieved. Chi square test was used to find association between variables and was found to be statistically significant. Pearson chi square value is 5.822, p value is 0.121 and df is 3. Male participants are more aware about the vector control than female participants, however statistically not significant. Bar Fig. 8 represents the association between gender and responses to the question whether Dengue or malaria is serious. Chi square test was used to find association between variables and was found to be statistically significant. Pearson chi square value is 0.852, p value is 0.356 and df is 1. Male participants have an opinion that malaria is more serious than dengue compared to female, though it is not significant. Bar Fig. 9 represents the association between gender and responses to the question regarding vectors that cause diseases. Chi square test was used to find association between variables and was found to be statistically not significant. Pearson chi square value is 7.496, p value is 0.58 and df is 3. Most of the male participants say mosquitoes are the major cause of vector borne diseases.

Since our study involved the general public, the questionnaire was set up in such a way that they were all focused on the basic idea about the vector borne diseases. It includes dengue, malaria, West Nile virus, yellow fever, chikungunya etc. The most common form of vector involved was the mosquito.

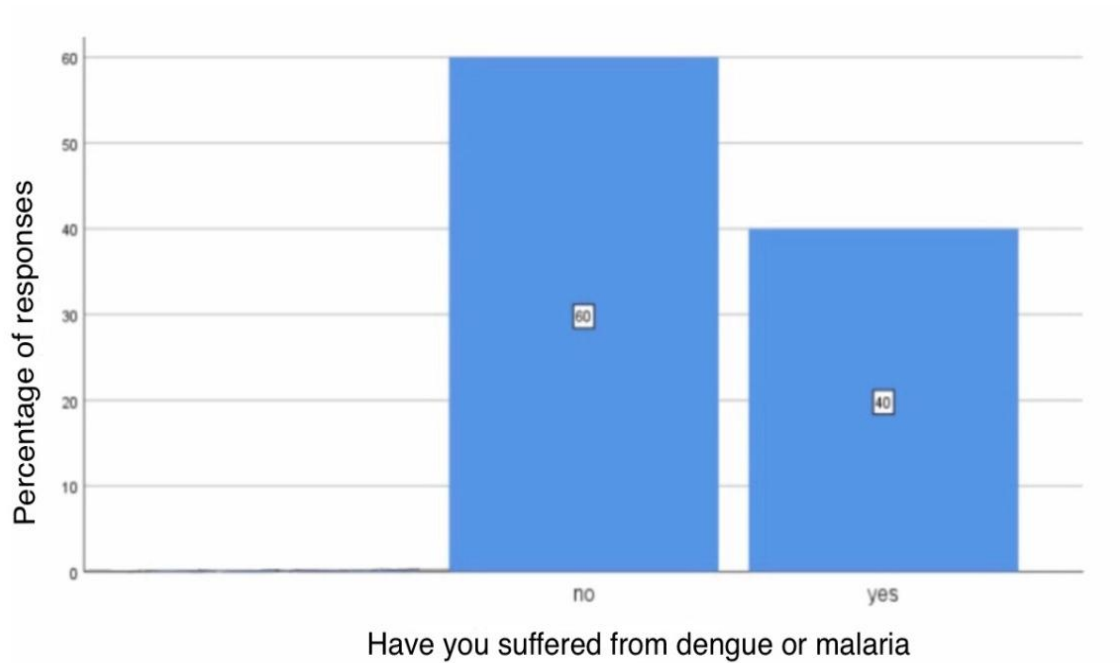


Fig. 1. Bar graph represents the response to the question whether the participants have suffered from dengue or malaria. Majority of the respondents (60%) said that they had not experienced dengue or malaria. X axis represents the options given and Y axis represents the number of responses

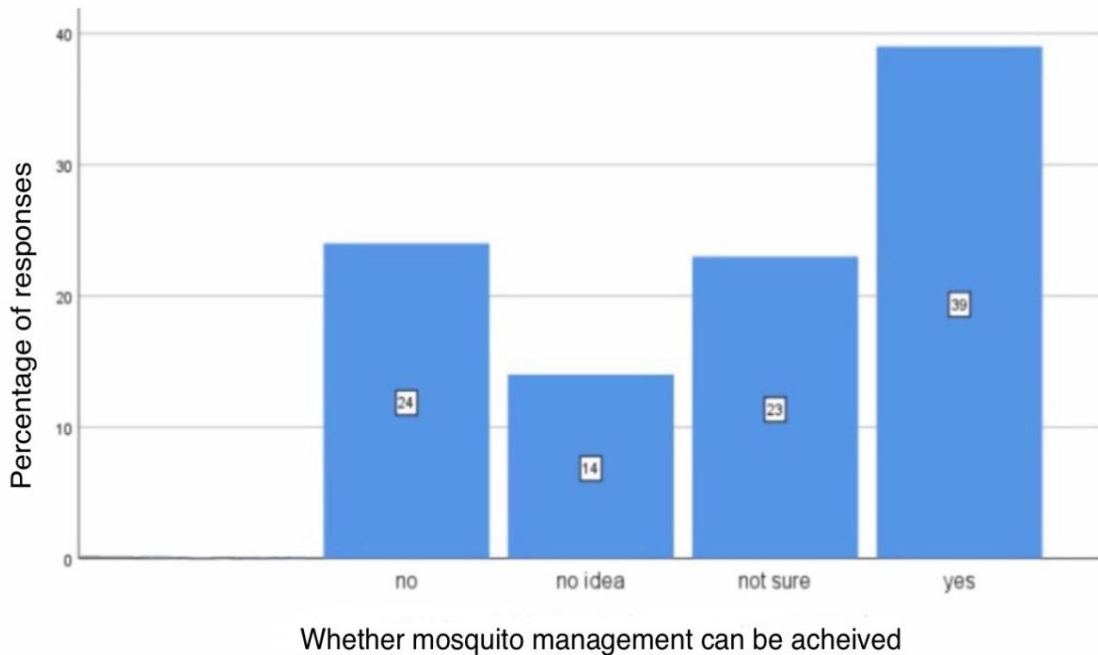


Fig. 2. Bar graph represents the response to the question whether mosquito management can be achieved. Majority of the respondents (39%) agreed that it is possible to get rid or control mosquito management. X axis represents the options given and Y axis represents the number of responses

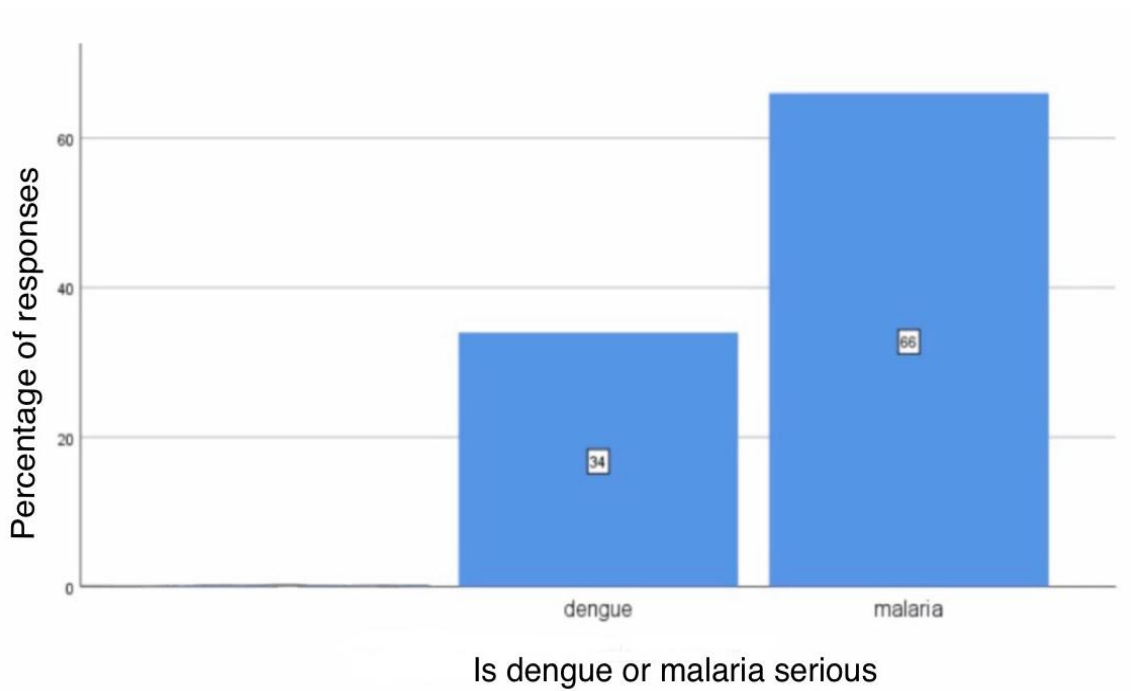


Fig. 3. Bar graph represents the response to the question which is serious, dengue or malaria. Majority of the respondents (66%) aid that malaria is more serious than dengue. X axis represents the options given and Y axis represents the number of responses

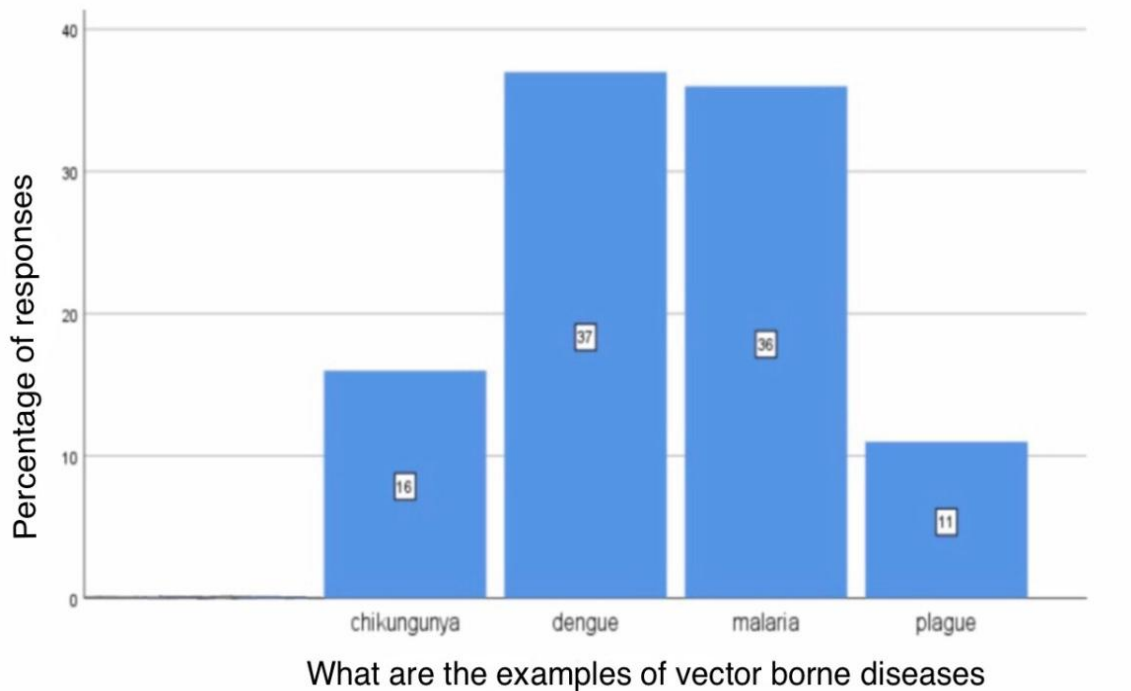


Fig. 4. Bar graph represents the response to the question about the examples of vector borne disease. Majority of the respondents (37%) answered that dengue is an example of vector borne disease. X axis represents the options given and Y axis represents the number of responses

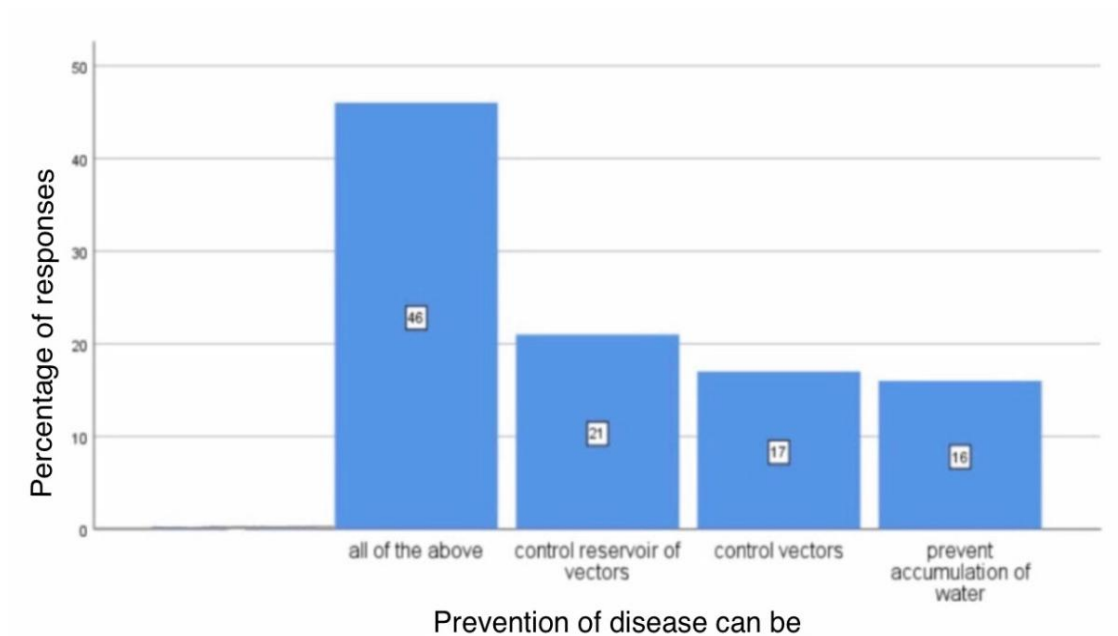


Fig. 5. Bar graph represents the response to the question about prevention of disease. Majority of the respondents (46%) said that prevention of stagnant water, control of vectors and reservoirs of vectors helps in the prevention of disease. X axis represents the options given and Y axis represents the number of response

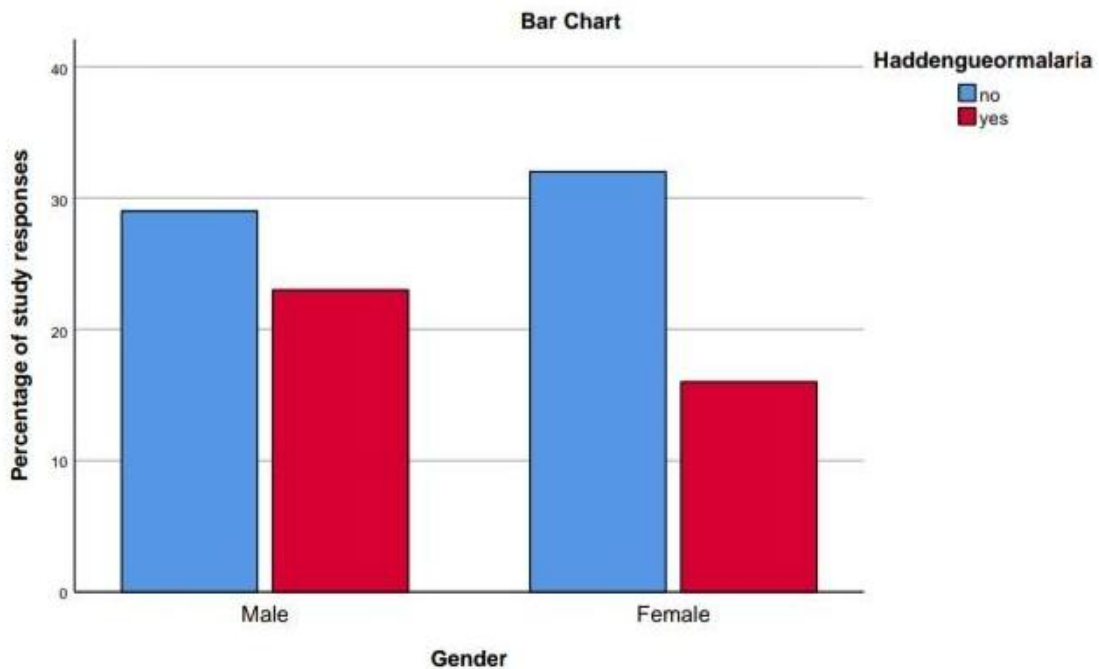


Fig. 6. Bar graph represents the association between gender and responses to the question whether they have suffered from dengue or malaria. X axis denotes gender and Y axis denotes percentage of responses. Red denotes yes and blue denotes no. Chi square test was used to find association between variables and was found to be statistically significant. Pearson chi square value is 1.246, p value is 0.264 and df is 1. Male participants had suffered from dengue or malaria than female participants, however not significant

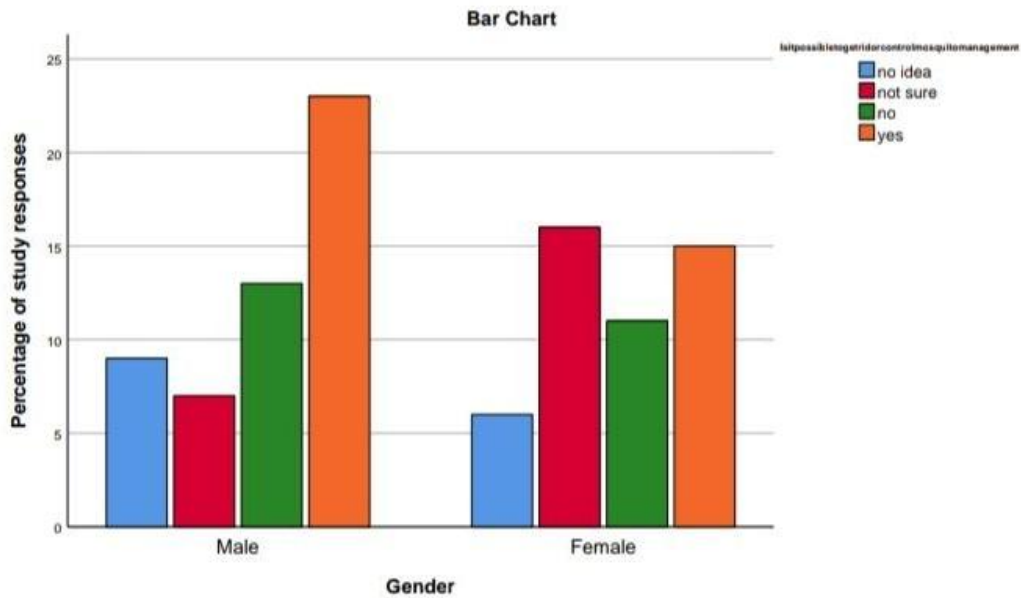


Fig. 7. Bar graph represents the association between gender and responses to the question whether mosquito management can be achieved. X axis denotes gender and Y axis denotes percentage of responses. Orange denotes yes, green denotes no. Red denotes not sure and blue denotes no idea. Chi square test was used to find association between variables and was found to be statistically significant. Pearson chi square value is 5.822, p value is 0.121 and df is 3. Male participants are more aware about the vector control than female participants, however statistically not significant

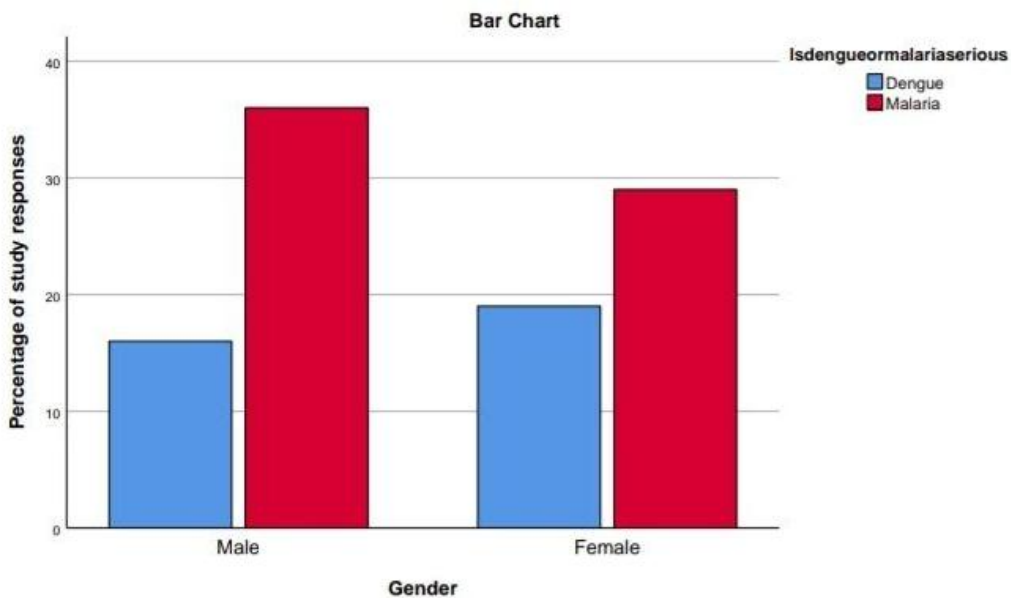


Fig. 8. Bar graph represents the association between gender and responses to the question whether Dengue or malaria is serious. X axis denotes gender and Y axis denotes percentage of responses. Red denotes malaria is serious and blue denotes dengue is serious. Chi square test was used to find association between variables and was found to be statistically significant. Pearson chi square value is 0.852, p value is 0.356 and df is 1. Male participants have opinion that malaria is more serious than dengue compared to female, though it is not significant

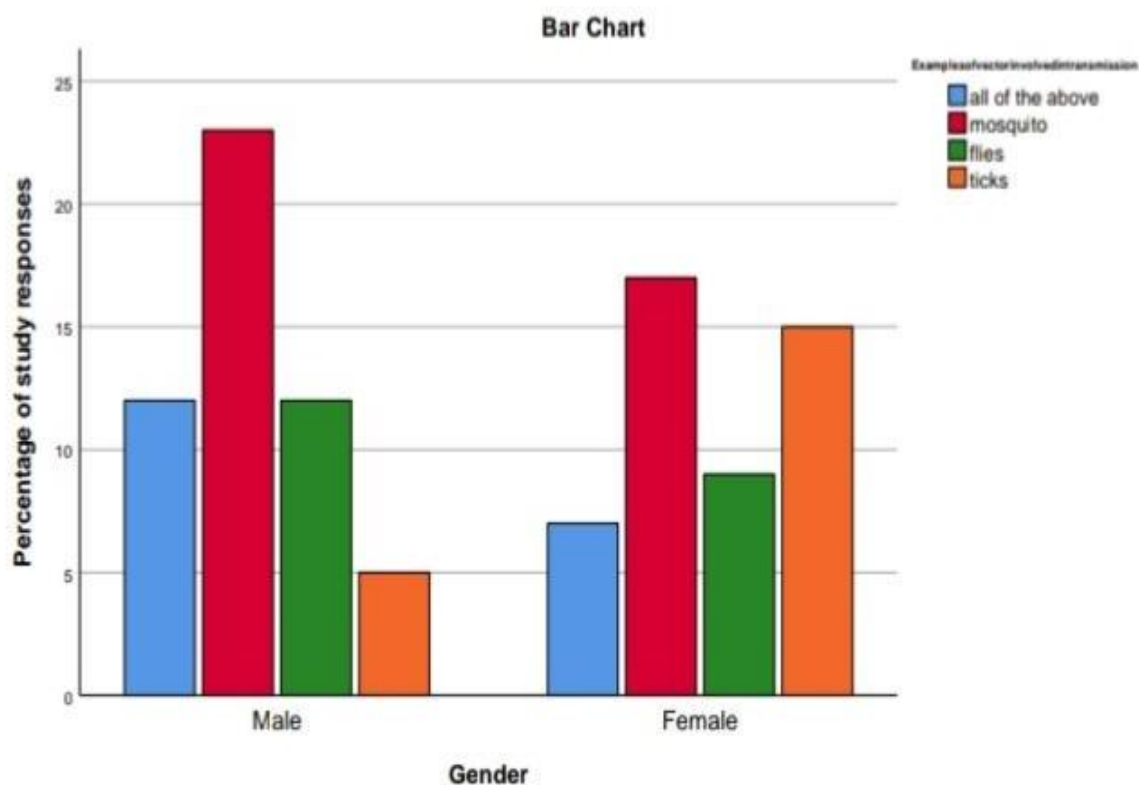


Fig. 9. Bar graph represents the association between gender and responses to the question regarding vectors that cause diseases. X axis denotes gender and Y axis denotes percentage of responses. Red denotes mosquito, green denotes flies, orange denotes ticks and blue denotes all of the above. Chi square test was used to find association between variables and was found to be statistically not significant. Pearson chi square value is 7.496, p value is 0.58 and df is 3. Most of the male participants say mosquitoes are the major cause of vector borne diseases

According to the WHO, the mosquito (vector) bites during the day [16]. Knowledge score was assessed based on the three basic questions - vector involved in transmission, prevention methods and mosquito management. Majority of my population answered it as mosquito is the common vector of transmission of disease. Another question that emphasised on the symptoms of vector borne diseases were known to be fever. As my sample size was of the general public they all were not definite about the vector borne diseases because improper and inadequate awareness or camps about these issues failed to reach the people for which the government is responsible [16,17]. The knowledge they have on this transmission of diseases is purely through what they have experienced and not through any other source. We then asked them about the responsible factor for the poor knowledge about the disease transmission and 69% of them answered that the government was responsible for it. As my study

deals with the awareness of the mode of transmission of diseases, I provided my participants with a booklet which educated them about the mode of transmission and favourable conditions that lead to breeding of those vectors and finally control and management of vectors to live in a healthy environment. Windows and curtains were treated with insecticides in order to prevent the transmission and breeding of vector borne diseases.

4. CONCLUSION

On analysing the data obtained, it is evident that the population is moderately aware about the vector borne diseases but not mainly on the preventive measures to be taken. Stagnant water and clean and hygienic environment should be maintained. It's control can be achieved by prevention of vectors along with the combined effort of health education and public health communication. Based on the results obtained, it

can be concluded by stating that people are aware about the vector borne diseases but has to educate further on a larger population for better and proper control of diseases.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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