RESEARCH ARTICLE

Assessment of knowledge, attitude, and Practice (KAP) addressing dengue fever

Shaheen-Ul-Islam[1] | Muhammad Ali[1,2*] | Khawaja Atif Naseeb[1] | Asma kousar[3]

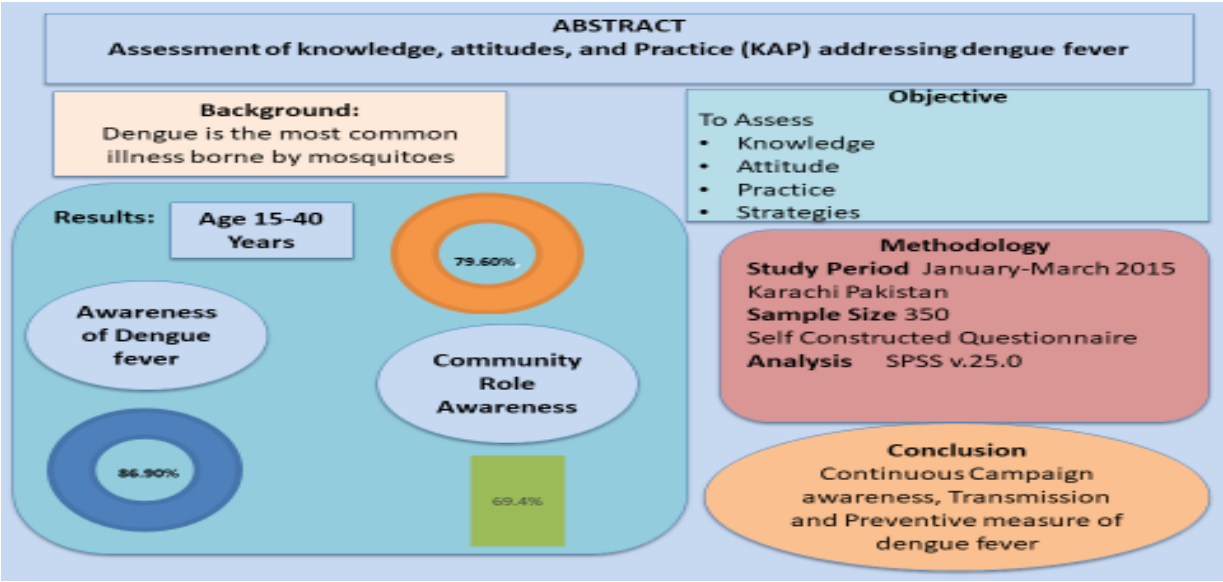
[1]Department of Pharmacy Practice, Faculty of Pharmacy, Salim Habib University, Karachi, Pakistan.
[2]Department of Pharmaceutics, Faculty of Pharmacy, Salim Habib University, Karachi, Pakistan.
[3]Jinnah university for women, Karachi, Pakistan.

Abstract

Background: Dengue is the most common illness borne by mosquitoes. **Aims:** The main aim and goal of this research was to assess the current knowledge, attitude, and strategies addressing fever caused by mosquitoes, and its prevalence among the local community of Karachi. **Methods:** This study was conducted from January 2025 to March 2025 among the community of Karachi. The data was collected by using the proper self-constructed questionnaire method. SPSS version 25.0 statistical techniques were used to analyze the obtained data. **Results:** Data of 350 responses were selected for this survey base research and the average age of the respondents were 25-60 years of age and of theses, 79.6% of the responders were between the age of 15 and 40. Approximately 86.90% of respondents were aware of mosquitoes, viral infections, and dengue fever, and 69.40% had knowledge of the role and participation of the community in the prevention of these diseases.. **Conclusion:** Regular efforts are desperately needed in local communities, schools, and colleges to raise awareness of dengue fever, its transmission, and preventative measures.

Keywords: Attitude, Dengue Fever, Knowledge, Practice

GRAPHICAL ABSTRACT



***Corresponding Author:**

Muhammad Ali
Salim Habib University Karachi, Pakistan
qazi.ali@shu.edu.pk

1. Introduction

Dengue is virus that is spread by mosquito found in tropical and subtropical regions of the globe and now continuously spreading all over the world [1, 2]. Over the last few decades, the concept of health has evolved from a personal concern to a global concept, health care is considered as a fundamental human right [3, 4]. Infections caused by mosquito causes more deaths than any other infectious disease. Mosquitoes are an important vector for the movement of viruses and parasites from one animal to another, one person to another, and between humans. They do so without damaging the insects that carry the disease-causing symptoms [5, 6]The virus that causes dengue fever is spread by two Aedes mosquito species: Aedes aegypti (the primary vector) and Aedes aldopictus [7, 8]It is a single-stranded, non-segmented RNA virus that spreads to humans via mosquito vectors. Dengue is transmitted by four different dengue serotypes DEN-1, DEN-2, DEN-3, and DEN-4 and shows itself as dengue fever and dengue hemorrhagic fever (DHF) [1]. Clinical signs include a abrupt onset of elevated temperatures (103 to 106F), intense headache, backache, severe pain in the joints and muscles, and retro-orbital pain, typically referred to as "break-bone fever" [9, 10]. Neutropenia is one of the clinical laboratory results associated with dengue fever, and lymphocytosis. Levels of Liver enzyme are high in serum; aspartate amino transferase and alanine aminotransferase levels in some dengue patients might reach 500–1000 U/litter [11, 12]. Dengue fever has been increasingly common in recent decades, placing nearly half population of world are at risk [13-15]. Dengue prevalence is increased as a result of several factors, including the world's population growth, people's lack of knowledge, changes in environment , sociological changes, and an increase in vector mosquito breeding, the breeding grounds for Aedes mosquitoes include water storage drums, criterns, flower vases, cement tanks, plastic and metal drums, tires, bottles, tin cans, coconut shells, and other similar discarded containers that can hold rainwater, overhead tanks, ground water storage tanks, etc [16, 17]. There is no specific medicine or vaccinations to treat dengue, the WHO and CDC suggest conducting community education campaigns emphasising vector breeding site reduction as a successful method of avoiding dengue. The greatest way to prevent dengue illness is to minimise mosquito bites; therefore, promoting community knowledge about dengue prevention is critical, particularly in schools and colleges. Since there is no vaccine or specific antiviral medication to treat dengue fever, vector management is one of the most crucial preventive measures in the fight against the illness.

The annual recurrence of DF, as well as the increasing number of cases with each epidemic, highlight the need for stronger vector control efforts, which are most likely ineffectual right now [17-19]. In 1994, the first dengue outbreak in Pakistan was recorded in Karachi, an industrial city, similarly, an outbreak of dengue illness was recorded in various areas of Pakistan in 2006, 2010, and 2011, respectively. Dengue virus is endemic in Pakistan, with a peak incidence occurring during the late monsoon season. The flood of 2010 in Pakistan exacerbated the issue. Over 20864 instances were registered in Punjab in 2011, with 17256 in Lahore, resulting in 323 deaths in the state and 279 deaths in Lahore. Pakistan's three provinces, Sindh, Punjab, and Khyber Pakhtunkhwa, are experiencing a dengue outbreak. According to reports, Karachi is one of the ideal places for dengue mosquito breeding and consequently illness transmission [20-24]. This present study will help determine people's knowledge, attitudes, and strategies for preventing dengue fever in public and will pinpoint the main issue regarding dengue fever.

2. Methods:

2.1. Study design and setting

A descriptive cross-sectional study, employing an online survey with open-ended questions as its primary research method was conducted to assess about the knowledge, attitude and practices of adult population of Karachi regadring dengue fever prevention. The current study targeted the populations including male & female of age 18 – 65 years among Local population of Karachi.

2.2. Sampling Technique and Sample Size

A **random sampling technique** was utilized to select participants for this study. Randomization was achieved by distributing the validated questionnaire link through social media platforms and community groups targeting a broad demographic range. Every individual who met the inclusion criteria had an equal chance of

participation, ensuring randomness in the selection process. A total of **350 responses** were collected and included in the final analysis. The questionnaire was adapted and validated based on prior published studies [25–27], ensuring its reliability and relevance to the objectives of the current study.

2.3. Study Sample

Data was gathered from random 350 residents of the Karachi by using a predesigned questionnaire [25-27]

2.4. Study Timeline

The data was collected from months (January 2025 to March 2025).

2.5. Statistical Analyses

Using a predesigned questionnaire that was taken from earlier research, data was gathered using random sampling [25-27]. Data were gathered from a total of 350 respondents. Data were entered in Statistical Package for the Social Sciences (SPSS) version 25.0 software and analyze by using that software. The results were considered statistically significant at P=0.05 0r P< 0.05.

2.6. Ethical Considerations

The Declaration of Helsinki's guidelines were adhered to in this study [28]. Because the research was non-clinical,so ethical approval was not required and waived off by ethical review committee (ERC) [29]. Written informed consent was given by participants, and privacy was maintained.

3. Results

3.1. Demographic Information about the Participant

The study was conducted at Local community of Karachi. There were Three hundred and fifty (350) individuals participating in the survey. As set forth in the tables below, the ages ranged from 11 to 60 years. Most of the participants had completed secondary education (57.4%), and unemployed (62.0%), Furthermore, a great number (63.1%) of them had a monthly income more than 50, 000PKR. Thus, the data reveal that most of the participants are belonging from middle class families. Almost 62 % of the participants of our study are students. A small number of respondents are living in the villages that are 11.4% of the total sample. The data can be seen in the Table .1

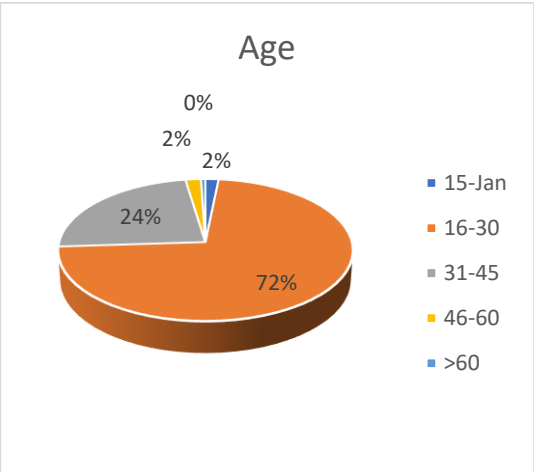


Figure 1. Demographic information Age

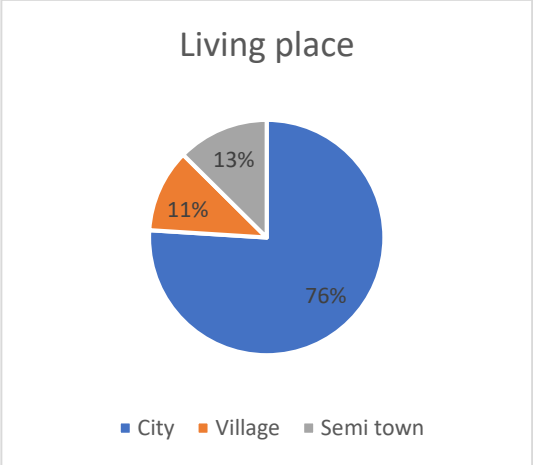


Figure 2. Demographic information Living Place

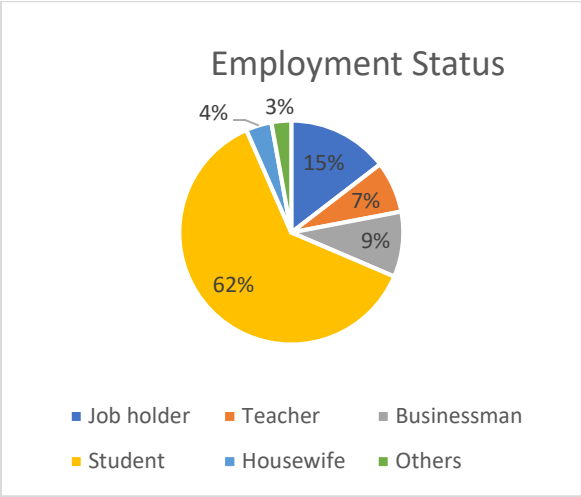


Figure 3. Demographic information Employment Status

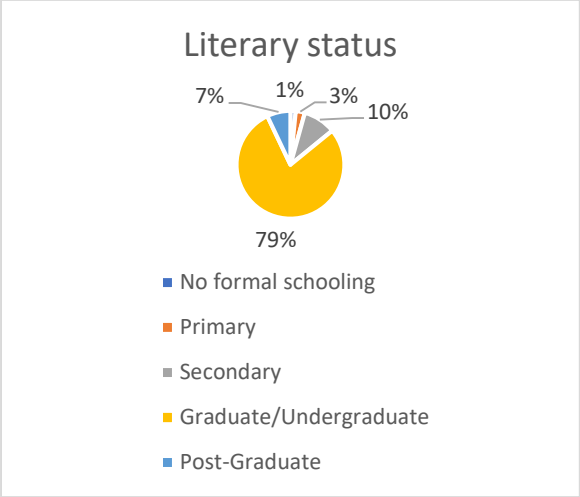


Figure 4. Demographic information Literary Status

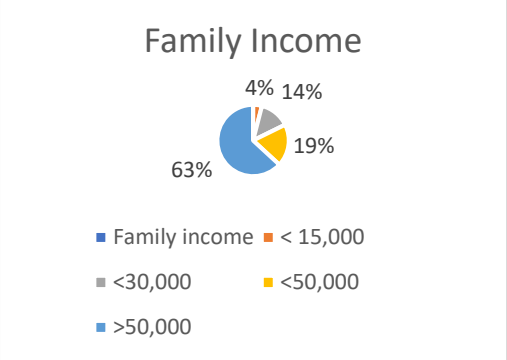


Figure 5. Demographic information Family Income

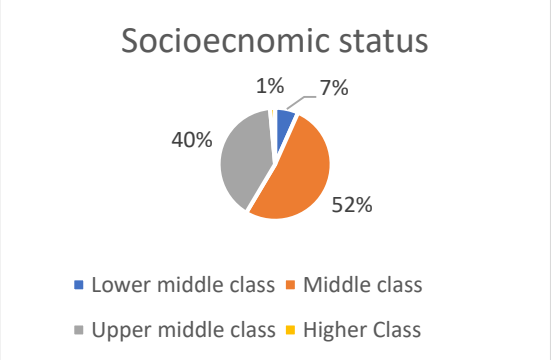


Figure 6. Demographic information Socioeconomic Status

Table 1. Demographic characteristics of respondents (n = 350)

Factors	No of Respondents	Percentage (%)
Age		
1-15	6	1.7
16-30	270	70.6
31-45	88	25.1
46-60	7	2
>60	2	0.6
Living place		
City	266	70
Village	40	11.4
Semi town	44	12.6
Employment status		
Job holder	51	14.6
Teacher	26	7.4
Businessman	33	9.4
Student	217	62
Housewife	13	3.7
Others	10	2.9
Literary status		
No formal schooling	4	1.1
Primary	7	2
Secondary	25	7.1
Graduate/Undergraduate	201	57.4
Post-Graduate	18	5.1
Family income		
< 15,000	14	4
<30,000	48	13.7
<50,000	67	19.1
>50,000	221	63.1
Socio-economic status		
Lower middle class	23	6.6
Middle class	179	51.1
Upper middle class	138	39.4
Higher Class	5	1.4

3.2. Knowledge on Dengue: -

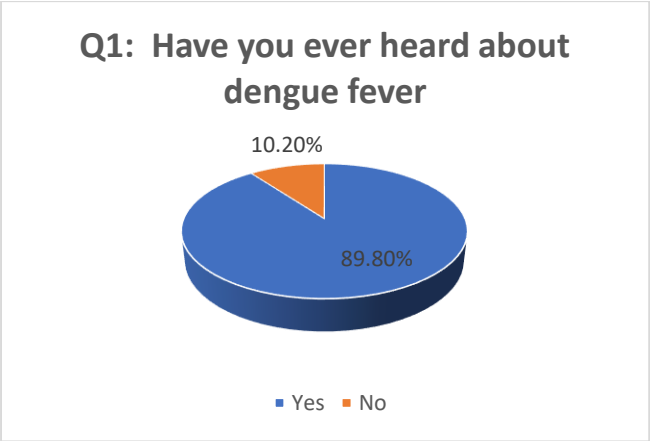
The mostly 89.8% of the respondents knew about dengue fever. About 80.9% of the respondents answer that the cause of the dengue fever is the mosquito bite that shows the majority of them know the cause of the dengue fever. As questioned about the timing of the mosquito's bites, 204(58.2%) respondents answered 'at sunrise & sunset',43 (12.2%) respondents said 'at night' and 66 (18.8%) answered both 'afternoon. When asked ,during which season of the year is dengue most prevalent? 227(64.9%) respondents think that dengue causing mosquito is more prevalent in rainy season. Upon further questioning about breeding of the dengue, 250 (71.4%) respondents think that Aedes mosquito was breeding in the unclean water, Here there is lack of knowledge regarding its breeding as we know that Aedes mosquito is breeding in the clean water. Almost 170(48.6%) of the respondents think that the symptoms of the dengue are high fever, pain in abdomen, sever body ache, nausea

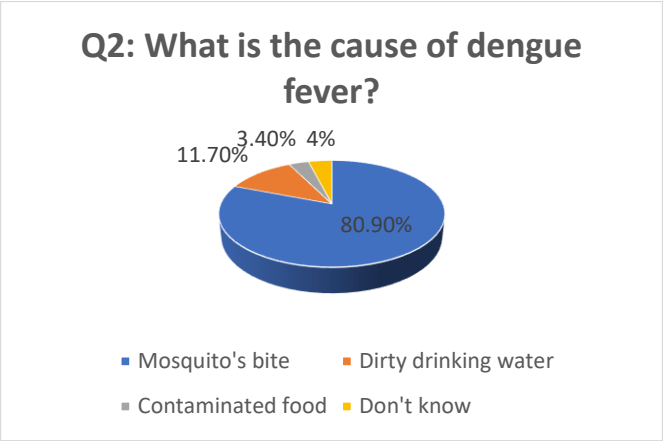
and vomiting, red spots on the body and Diarrhea as mentioned in table.2 given below. Overall , 296(81.7%) out of the total was aware about the high fever occur in the dengue. There is also lack of knowledge observed about the transmission of the dengue as about 80.3% respondents think that dengue can be transmitted from person to person. While dengue cannot be transmitted from person to person neither by blood transfusion nor by human to human contact.

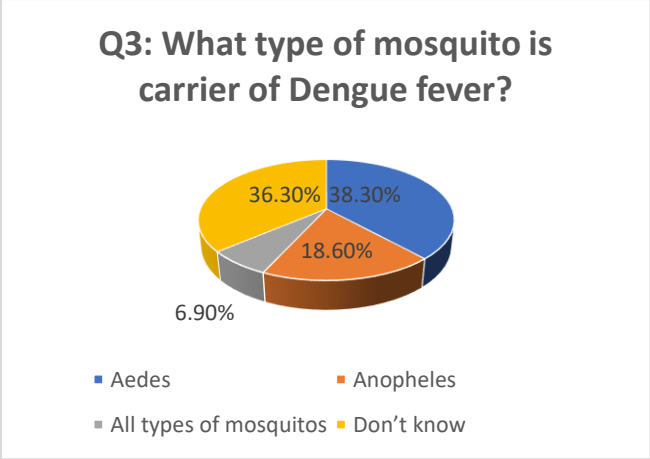
206 (58.8.8%) respondents were be aware that dengue is a viral disease. While 80.9% knew that dengue was transmitted by mosquitoes. But only 134(38.3%) respondents knew name the type of mosquito (Aedes).

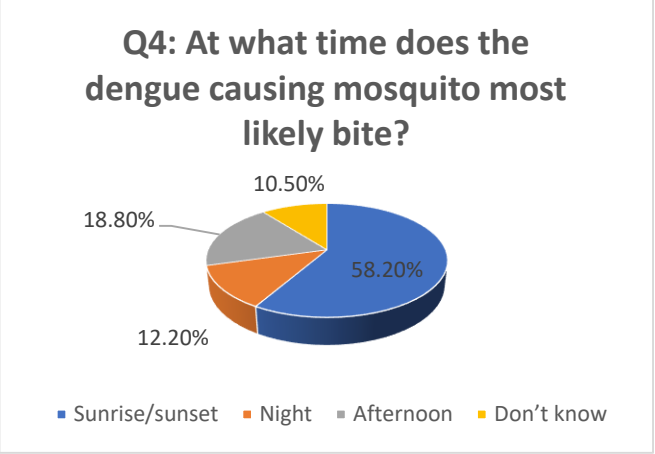
The majority recognized common symptoms like fever, body aches, and nausea, though Q10 responses overlapped due to multiple options being selected (see **Table 2**).

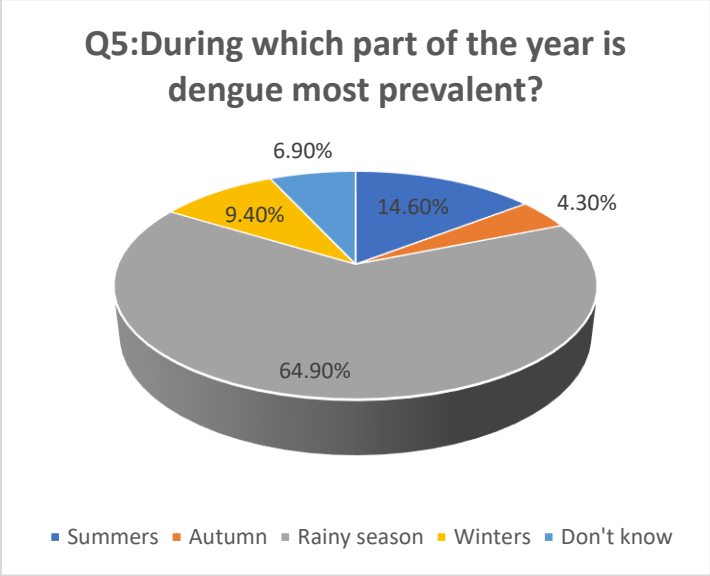
Table 2. Knowledge towards dengue fever

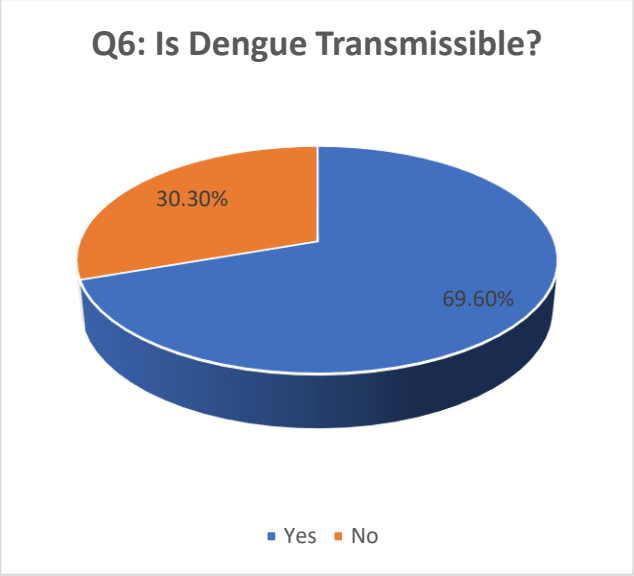


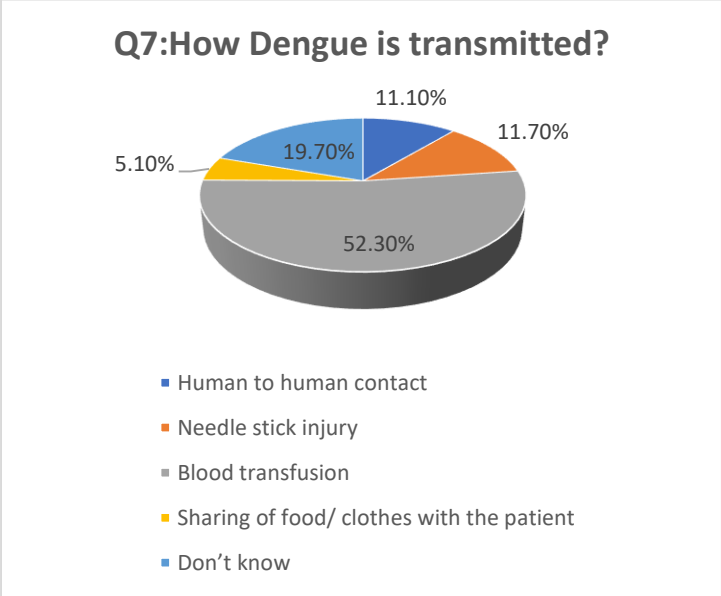


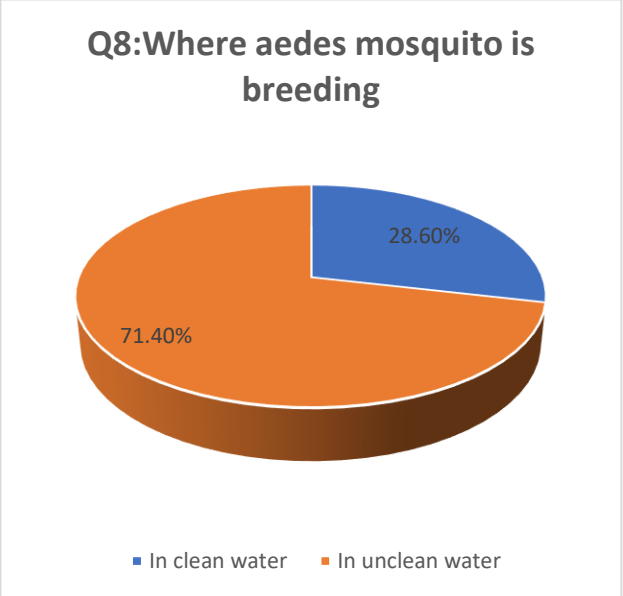


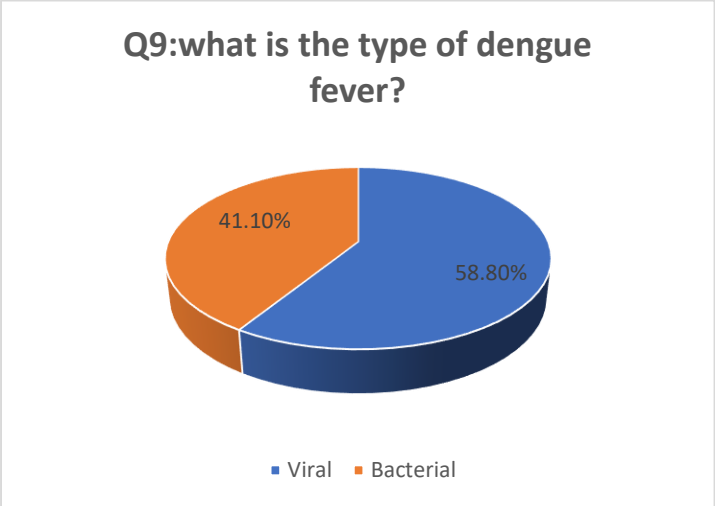



Q5:During which part of the year is dengue most prevalent?
6.90%
14.60%
4.30%
9.40%
64.90%
Summers
Autumn
Rainy season
Winters
Don't know


Q6: Is Dengue Transmissible?
30.30%
69.60%
Yes
No


Q7:How Dengue is transmitted?
11.10%
11.70%
5.10%
19.70%
52.30%
Human to human contact
Needle stick injury
Blood transfusion
Sharing of food/ clothes with the patient
Don't know


Q8:Where aedes mosquito is breeding
28.60%
71.40%
In clean water
In unclean water


Q9:what is the type of dengue fever?
41.10%
58.80%
Viral
Bacterial

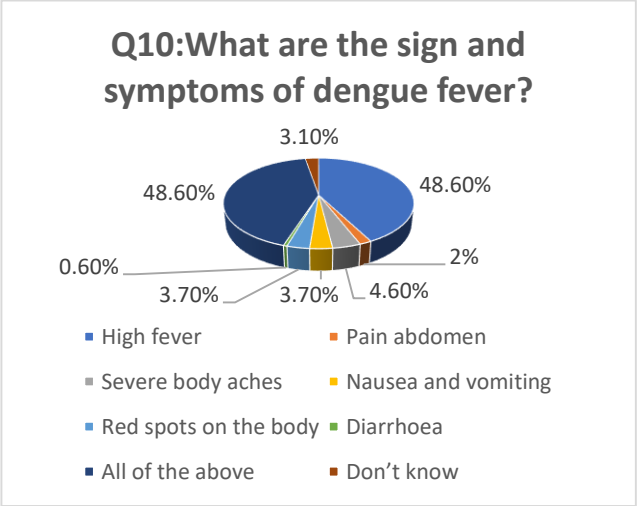

Q10:What are the sign and symptoms of dengue fever?
3.10%
48.60%
48.60%
0.60%
2%
3.70%
3.70%
4.60%
High fever
Pain abdomen
Severe body aches
Nausea and vomiting
Red spots on the body
Diarrhoea
All of the above
Don't know

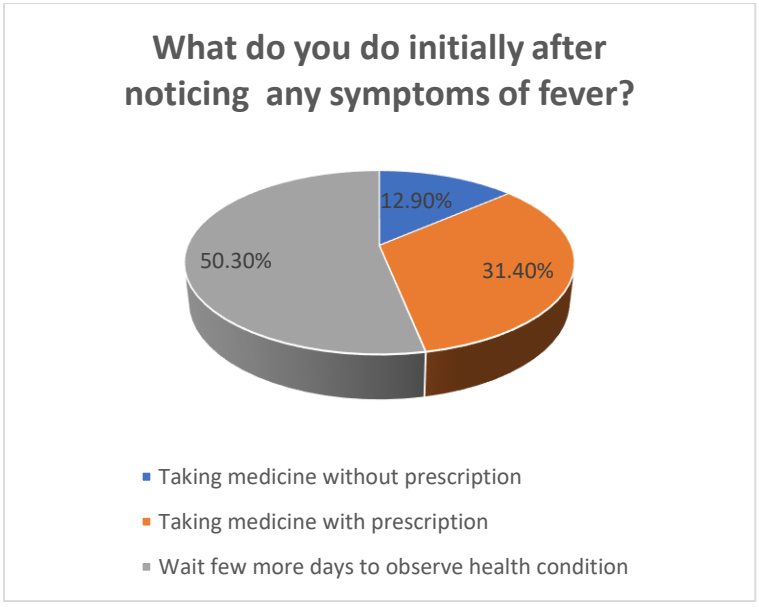
Table 2. Knowledge questions asked regarding dengue fever

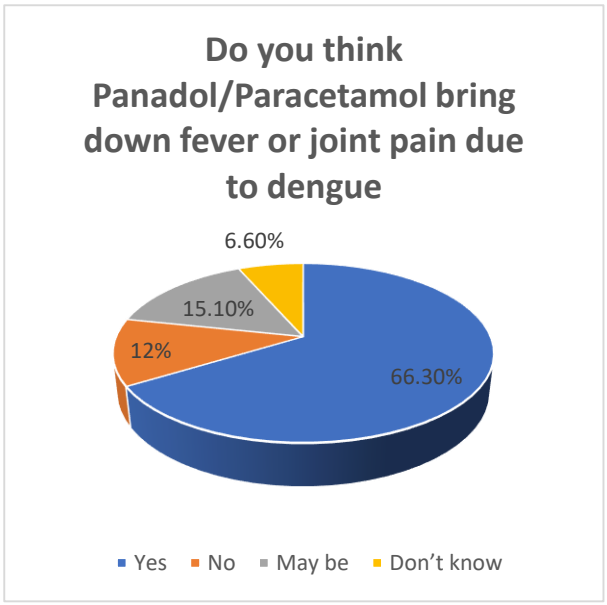
Q1: Have you ever heard about dengue fever	Responses	Percentage(%)
Yes	304	89.8
No	46	10.2
Q2: What is the cause of dengue fever?		
Mosquito's bite	283	80.9
Dirty drinking water	41	11.7
Contaminated food	12	3.4
Don't know	14	4
Q3: What type of mosquito is carrier of Dengue fever?		
Aedes	134	38.3
Anopheles	65	18.6
All types of mosquitos	24	6.9
Don't know	127	36.3
Q4: At what time does the dengue causing mosquito most likely bite?		
Sunrise/sunset	204	58.2
Night	43	12.2
Afternoon	66	18.8
Don't know	37	10.5
Q5:During which part of the year is dengue most prevalent?		
Summers	51	14.6
Autumn	15	4.3
Rainy season	227	64.9
Winters	33	9.4
Don't know	24	6.9
Q6: Is Dengue Transmissible?		
Yes	219	69.6
No	131	30.3
Q7:How Dengue is transmitted?		
Human to human contact	39	11.1
Needle stick injury	41	11.7
Blood transfusion	183	52.3
Sharing of food/ clothes with the patient	18	5.1
Don't know	69	19.7
Q8:Where aedes mosquito is breeding		
In clean water	100	28.6
In unclean water	250	71.4
Q9:what is the type of dengue fever?		
Viral	206	58.8
Bacterial	144	41.1
Q10:What are the sign and symptoms of dengue fever?		
High fever	118	48.6

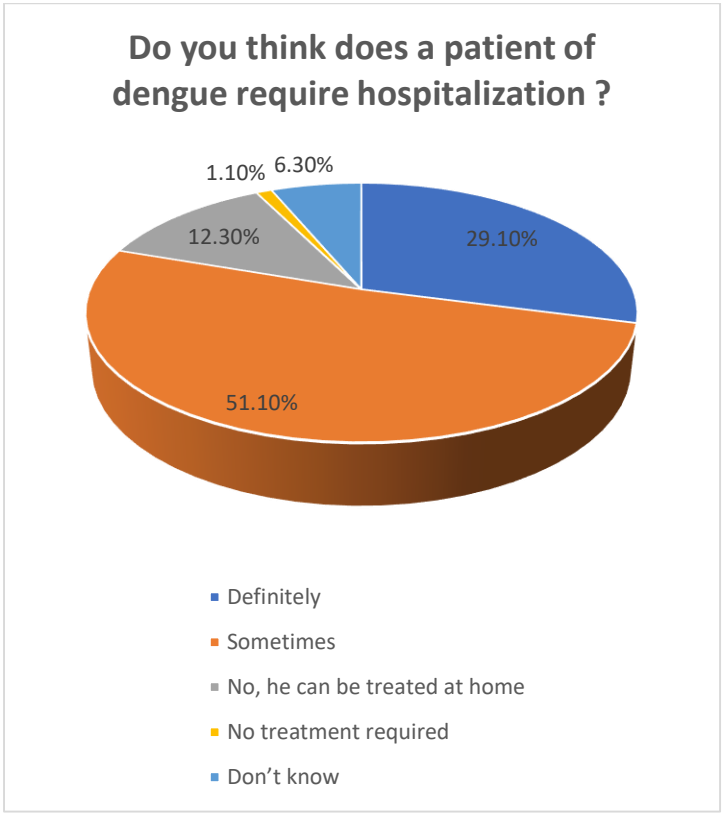
Pain abdomen	7	2
Severe body aches	16	4.6
Nausea and vomiting	13	3.7
Red spots on the body	13	3.7
Diarrhoea	2	0.6
All of the above	170	48.6
Don't know	11	3.1

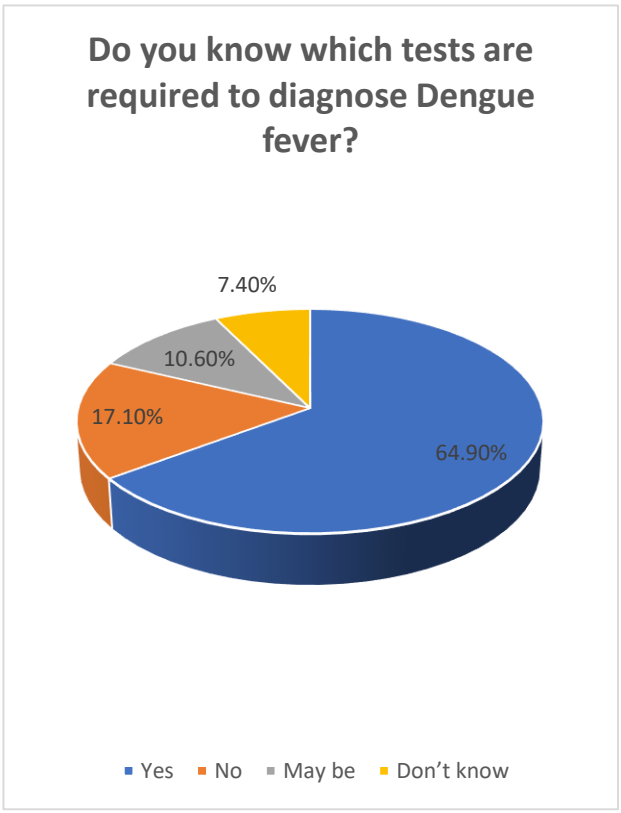
3.3. Attitude towards Dengue Fever

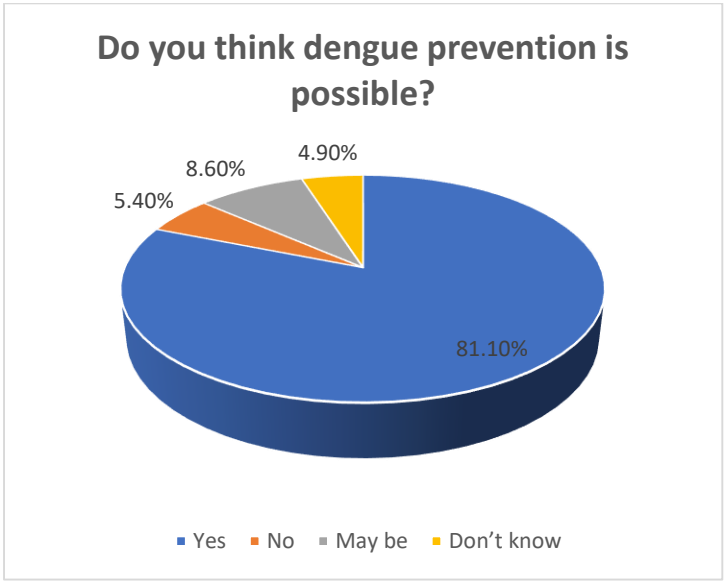
Mostly respondents (66.6%) considered dengue as a serious illness. Among them 51.1% respondents believed patient of dengue require hospitalization. Among 350, 269 respondents felt that prevention is better than cure and they know the preventing ways of the dengue fever. In response to questions concerning the efficacy of different Aedes control strategies, the respondents believed that the majority of them were successful.. The usage of smoke felt least effective method to drive away mosquitos is (3.7%). A significant portion of the respondents (50.3%) felt that they wait for few more days as noticing any symptoms of fever. After observing the signs of dengue fever, another third of the respondents believe that they were taking medication as prescribed. After observing the dengue symptoms, 52.6% of the respondents were found to take it extremely seriously. This is further observe that 66.3% of the respondents agree Panadol or paracetamol bring down the fever due to dengue. Based on the responses 135(38.6%) of the people think that dengue fever is curable by using home-based treatments like papaya juice, other liquid fluids etc. rather than the treatment. As the data of the respondents regarding attitude towards dengue fever is mentioned in the table 3 given below.

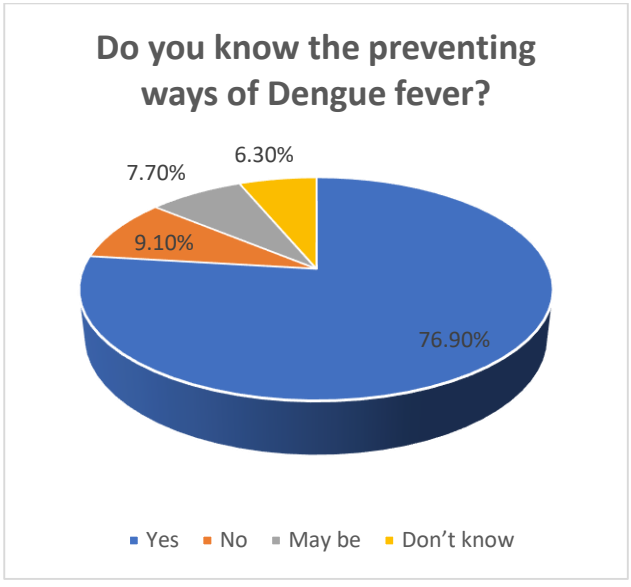


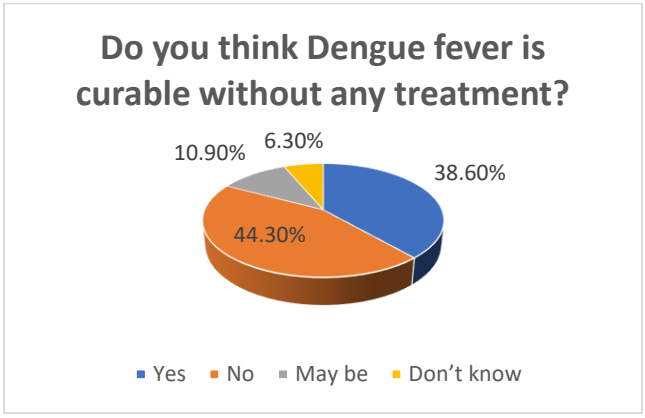


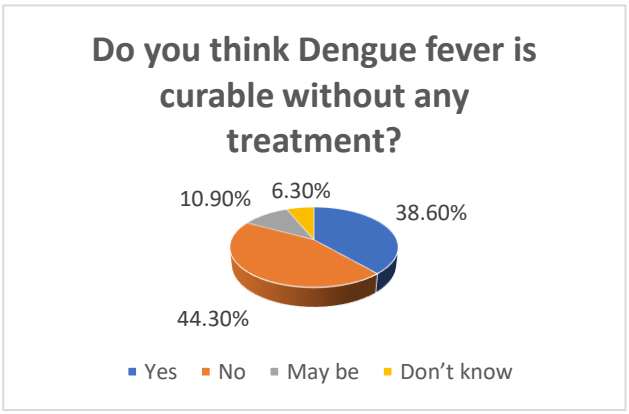

Do you think does a patient of dengue require hospitalization ?
1.10%
6.30%
12.30%
29.10%
51.10%
Definitely
Sometimes
No, he can be treated at home
No treatment required
Don't know


Do you know which tests are required to diagnose Dengue fever?
7.40%
10.60%
17.10%
64.90%
Yes
No
May be
Don't know


Do you think dengue prevention is possible?
4.90%
8.60%
5.40%
81.10%
Yes
No
May be
Don't know


Do you know the preventing ways of Dengue fever?
6.30%
7.70%
9.10%
76.90%
Yes
No
May be
Don't know





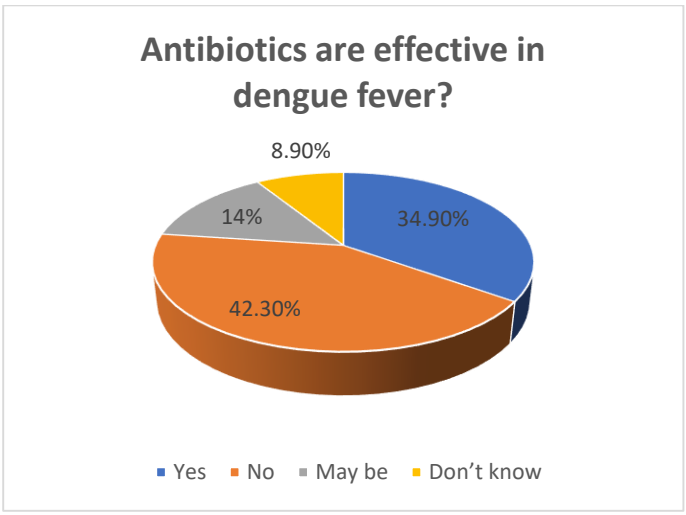


Table 3. Attitude questions asked regarding dengue fever

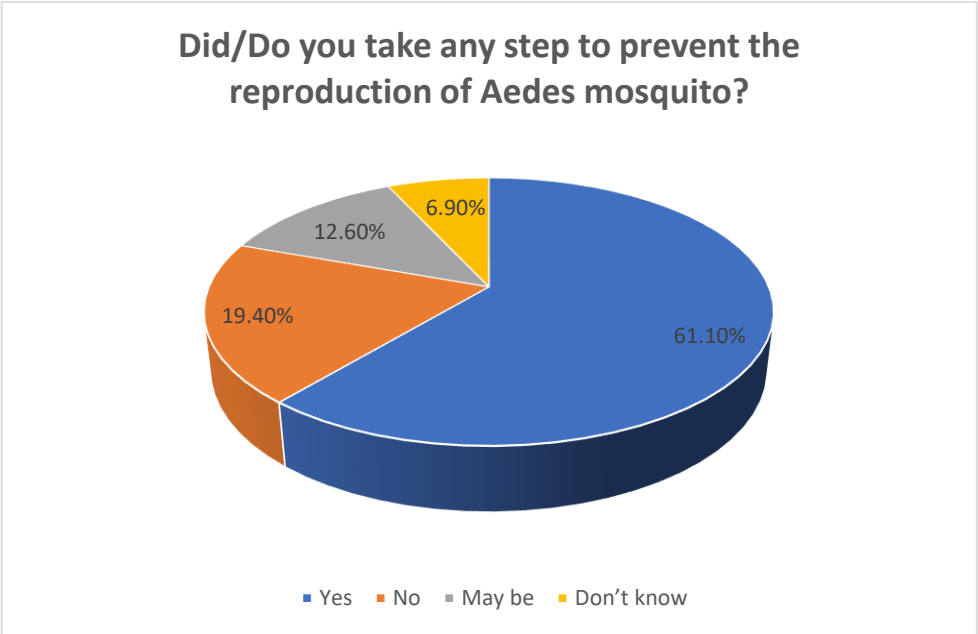
What do you do initially after noticing any symptoms of fever?		
	Responses	**Percentages**
Taking medicine without prescription	45	12.9
Taking medicine with prescription	110	31.4
Wait few more days to observe health condition	176	50.3
Do nothing	19	5.4
Do you think Panadol/Paracetamol bring down fever or joint pain due to dengue		
Yes	232	66.3
No	42	12
May be	53	15.1
Don't know	23	6.6
Do you think does a patient of dengue require hospitalization?		
Definitely	102	29.1

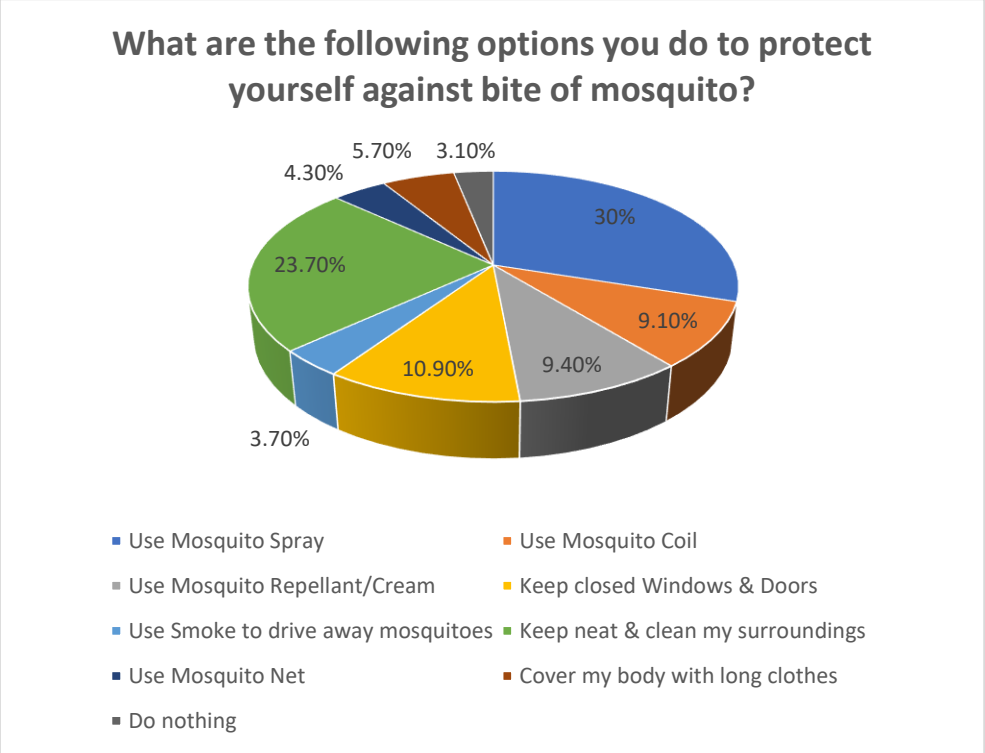
Sometimes	179	51.1
No, he can be treated at home	43	12.3
No treatment required	4	1.1
Don't know	22	6.3
Do you know which tests are required to diagnose Dengue fever?		
Yes	227	64.9
No	60	17.1
May be	37	10.6
Don't know	26	7.4
When do you test after suffering from fever?		
Immediately	99	28.3
Never do test	18	5.1
After getting serious condition	119	34
After a few days	75	21.4
Didn't face yet	39	11.1
Do you think dengue prevention is possible?		
Yes	284	81.1
No	19	5.4
May be	30	8.6
Don't know	17	4.9
Do you know the preventing ways of Dengue fever?		
Yes	269	76.9
No	32	9.1
May be	27	7.7
Don't know	22	6.3
Do you think Dengue fever is curable without any treatment?		
Yes	135	38.6
No	155	44.3
May be	38	10.9
Don't know	22	6.3
Antibiotics are effective in dengue fever?		
Yes	122	34.9
No	148	42.3
May be	49	14
Don't know	31	8.9

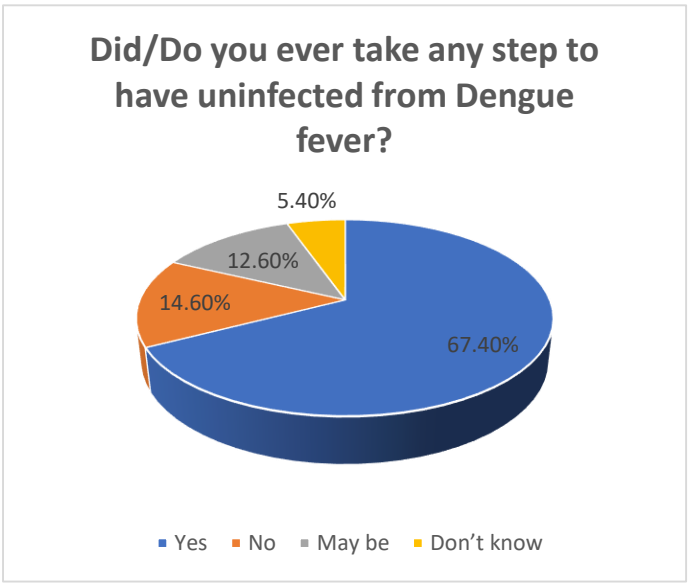
4. Practices on Dengue Fever

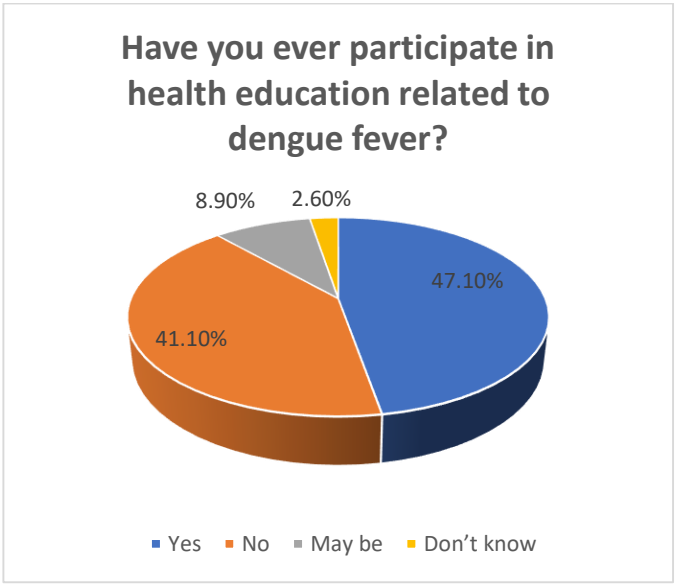
Out of 350 , 214 (61.1%) respondents took action to stop the production of Aedes mosquito. In addition, 30% respondents use mosquito spray to prevent bite of the mosquito. Regarding precautions against mosquito bites, 96.9% of the respondents seem to be aware of how to avoid getting bitten by a mosquito. Using mosquito coils (9.1%) and maintaining tidy and clean surroundings (23.7%) were the two most often implemented strategies. The use of repellents (9.4%) and window netting (10.9%) are two more techniques that were hardly employed or unpopular. 209 (59.7%) of the respondents think that hospitalization can reduce the spread of dengue fever. While 276(78.9%) of the respondents answer that they prefer to see the doctor immediately after suspecting dengue fever symptoms. The data regarding the common practices regarding dengue fever tell by the respondents are also mentioned in the table 4 given below. There is lack of knowledge seen that 38.9% of the total think that there is specific treatment available for the dengue while majority of them consider that taking preventive measure against dengue to spread.

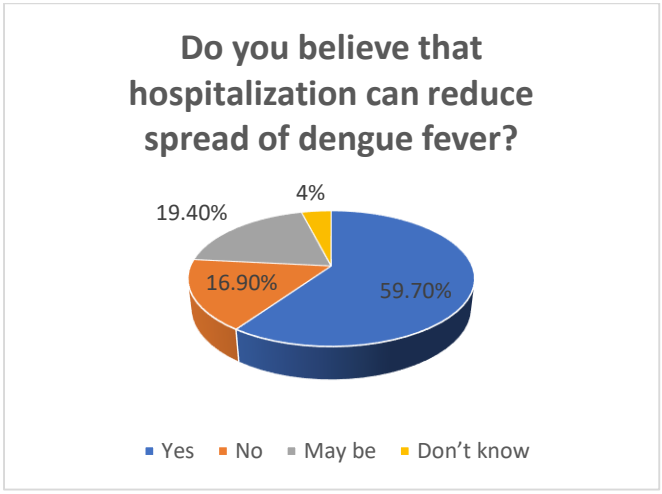
Table .4 Practices questions asked regarding dengue fever

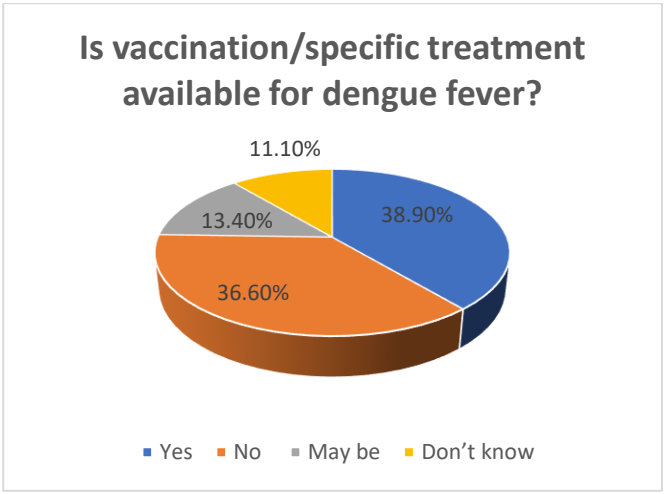


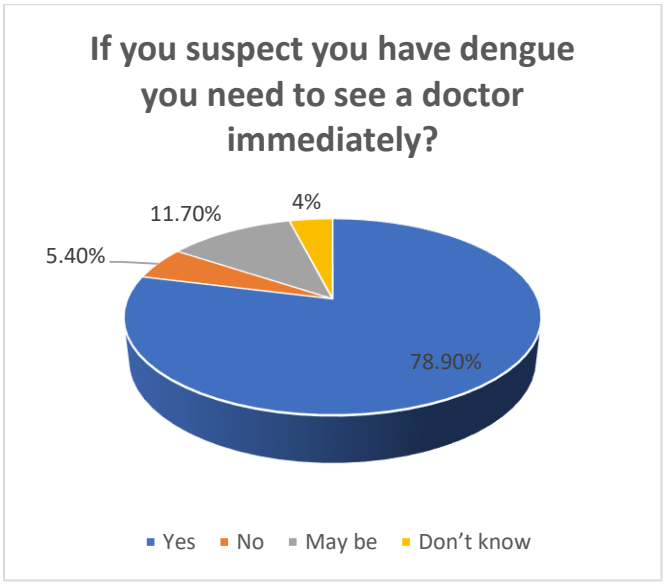

What are the following options you do to protect yourself against bite of mosquito?
30%
9.10%
9.40%
10.90%
3.70%
23.70%
4.30%
5.70%
3.10%
Use Mosquito Spray
Use Mosquito Coil
Use Mosquito Repellant/Cream
Keep closed Windows & Doors
Use Smoke to drive away mosquitoes
Keep neat & clean my surroundings
Use Mosquito Net
Cover my body with long clothes
Do nothing


Did/Do you ever take any step to have uninfected from Dengue fever?
67.40%
14.60%
12.60%
5.40%
Yes
No
May be
Don't know


Have you ever participate in health education related to dengue fever?
47.10%
41.10%
8.90%
2.60%
Yes
No
May be
Don't know







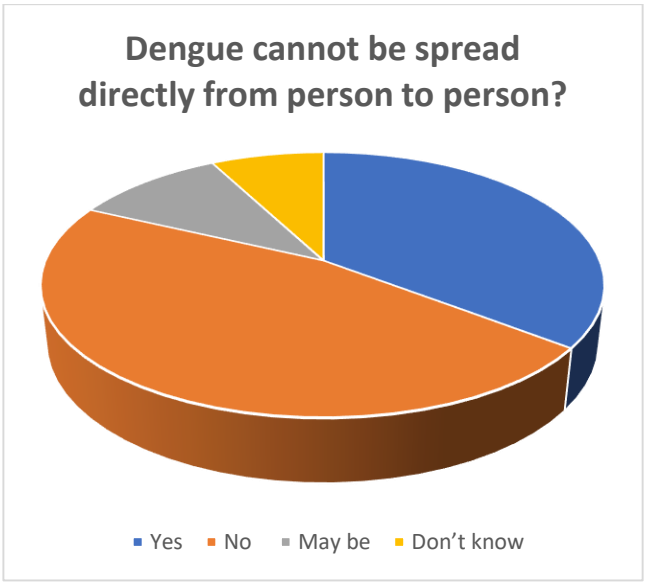


Table 4. Practices questions asked regarding dengue fever

	No of Respondents	Percentage(%)
Did/Do you take any step to prevent the reproduction of Aedes mosquito?		
Yes	214	61.1
No	68	19.4
May be	44	12.6
Don't know	24	6.9
What are the following options you do to protect yourself against bite of mosquito?		
Use Mosquito Spray	105	30
Use Mosquito Coil	32	9.1
Use Mosquito Repellant/Cream	33	9.4
Keep closed Windows & Doors	38	10.9
Use Smoke to drive away mosquitoes	13	3.7
Keep neat & clean my surroundings	83	23.7
Use Mosquito Net	15	4.3
Cover my body with long clothes	20	5.7
Do nothing	11	3.1
Did/Do you ever take any step to have uninfected from Dengue fever?		
Yes	236	67.4
No	51	14.6
May be	44	12.6

Don't know	19	5.4
Have you ever participate in health education related to dengue fever?		
Yes	165	47.1
No	145	41.1
May be	31	8.9
Don't know	9	2.6
Do you believe that hospitalization can reduce spread of dengue fever?		
Yes	209	59.7
No	59	16.9
May be	68	19.4
Don't know	14	4
Is vaccination/specific treatment available for dengue fever?		
Yes	136	38.9
No	128	36.6
May be	47	13.4
Don't know	39	11.1
If you suspect you have dengue you need to see a doctor immediately?		
Yes	276	78.9
No	19	5.4
May be	41	11.7
Don't know	14	4
Dengue cannot be spread directly from person to person?		
Yes	124	35.4
No	163	46.6
May be	36	10.3
Don't know	27	7.7

3.4. Statistical Correlations

Using SPSS descriptive analysis, cross-tabulations between knowledge and practice, knowledge and attitude, and attitude and practice were conducted. However, there were significant association seen between demographics questions (P Value:0.00). The association between Literacy status and employment status was measured. As 63% of the total respondents are belong from undergraduate or graduate level. For the level of education, a pattern was seen where by the higher the education level, the better the knowledge on dengue. Regarding literacy, there was minimal variation in dengue knowledge between literate and semiliterate people and illiterate people. Nonetheless, there seemed to be a pattern among the various professions: the more lucrative the profession, the more knowledgeable the person. As there are small number of respondents who are housewife with primary or no schooling. It impacts on the knowledge regarding dengue fever. There were cross-tabulations between attitude and practice. A noteworthy association was seen between attitude and practice. We apply Pearson chi square and Monte Carlo two sided (95% confidence interval) that showing the upper bound value is 0.009 while our results are significant. With respect to the educational level, it was observed that there is positive trend between those with having education showed better practices and know the cause of the dengue than those who have lower level of education. As our result are showing the insignificance having a value (p value: 0.006).

The attitudes of the respondents were assessed using a set of questions regarding dengue. We apply Pearson chi square and Monte Carlo two sided (95% confidence interval) that showing the upper bound value is 0.00 while our results are significant. With respect to awareness of dengue fever among the respondents and the sign and symptoms of the dengue fever. As our result are showing the insignificance having a value (p value: 0.009). The linkage between knowledge, attitude and practices of dengue control, the consideration of the dengue as a serious illness is analyzed among the respondents. As our result are showing the insignificance having a value (p value: 0.009). Moreover, association between the respondents regarding the transmission of the dengue.52% of the respondents think that dengue can be transmitted from one person to another through blood transfusion. While 28% of the respondents think that sharing of things with dengue patient, needle stick injury or human to human contact are the mode of transmission of the dengue. However, there are only 48 % of respondents think that dengue cannot be transmitted from one person to another. So Here there is a lack of knowledge observed regarding the transmission of the dengue is observed among the respondents that need to be fulfilled.

5. Discussion

Dengue fever remains one of the most widespread and rapidly growing mosquito-borne viral diseases globally, with an estimated 390 million infections annually [30]**.** This study aimed to assess public knowledge, attitudes, and practices (KAP) regarding dengue among 350 respondents across five age groups. While the results indicate an encouraging level of awareness, they also highlight substantial gaps in understanding and practice, consistent with findings from other regions of India and Southeast Asia [31]. A significant proportion of respondents (86.9%) were aware of dengue fever, aligning with similar studies conducted in central India and urban Malaysia, where awareness rates were 85–90% **[32-34].** This high awareness is likely due to frequent exposure to health messaging and media campaigns, especially in urban areas, as 76% of the present study's respondents lived in cities. However, knowledge about transmission was inadequate—only 38.3% identified Aedes aegypti as the primary vector, while 36.3% did not know the mosquito responsible. This is consistent to previous study which reported that although awareness of dengue was high, only 44.87% correctly identified the mosquito species [17] The findings of this study highlight both encouraging trends and concerning gaps in public understanding and practices regarding dengue fever in Karachi. Although many associations between demographics and KAP responses were **statistically significant** ($p < 0.05$), the **practical significance** that is, the real-world impact was more nuanced. For instance, a large number of respondents understood that dengue is a viral illness, yet misconceptions about transmission routes and breeding habitats persisted. Alarmingly, 11.7% of participants believed dengue was caused by drinking dirty water, a common misconception that blurs the distinction between water-borne and vector-borne diseases. Additionally, 58.3% incorrectly believed that dengue-transmitting mosquitoes bite at night, although Aedes mosquitoes bite primarily during the early morning and late afternoon**,** this misinformation may hinder effective protective behaviors [35]. The study also revealed confusion regarding dengue's transmission and treatment. Although 52.3% understood that dengue can be transmitted through blood transfusion, 19.7% were unaware of this possibility. Nearly one-third of respondents (30.3%) believed that dengue could be transmitted from person to person, a misunderstanding also reported [36]**.** Moreover, only 52.6% recognized that dengue is caused by a virus, and 25.1% incorrectly believed it is bacterial—indicative of a common knowledge gap found in similar KAP studies **[37].** These knowledge gaps had tangible effects on attitudes and practices. While 48% believed they were not at risk due to taking precautions, 30.3% admitted poor preventive attitudes. Furthermore, half the respondents delayed treatment after developing fever, and 12.9% reported self-medicating without a prescription. These risky behaviors reflect poor translation of knowledge into practice, as also observed in studies from Bangladesh **[38].**

Treatment knowledge was another area of concern. Although 80.6% believed dengue is treatable, 34.9% wrongly thought antibiotics could cure it. Only 66.3% knew that paracetamol is the recommended treatment for symptom relief. Similar confusion was reported in Nepal, where 30% of participants believed antibiotics were appropriate for dengue **[39].** These misconceptions can lead to misuse of medication and delay appropriate care. Preventive practices, however, were more promising. A majority (81.1%) believed dengue is preventable and adopted mosquito repellents, coils, and full-body clothing. Still, only 47.1% had attended health education sessions, and 69.4% reported sharing dengue-related information with others. This is in line with findings from **[40], w**ho concluded that while knowledge might be high, active participation in prevention efforts often lags behind. Notably, the study found that there is no notable association between knowledge and preventive practice. This reinforces conclusions drawn by **[41, 42],** who emphasized that knowledge alone does not guarantee behavioral change. Cultural beliefs, accessibility to health services, and perceived susceptibility play key roles in influencing behavior. From a policy perspective, this indicates the need for more than just information dissemination. Municipal authorities and health departments in Karachi should consider the following: Localized awareness campaigns should focus on debunking myths (e.g., unclean water as breeding grounds), using culturally relevant messaging delivered via trusted community leaders or local influencers. School-based education should integrate vector biology into basic science curricula to build long-term health literacy. Public health surveillance could be improved by engaging citizens in community clean-up drives and creating feedback loops (e.g., reporting stagnant water through mobile apps). Access to affordable diagnostic testing and early outpatient treatment must be expanded, especially in underserved districts

6. Conclusion

The conclusion of our study is that the knowledge, attitudes and practice are significantly associated. This study emphasizes the close relationship between behavior, attitudes, and knowledge regarding dengue disease, with socioeconomic position, occupation, and educational attainment having the biggest effects. Despite widespread knowledge about dengue among Karachi residents, there are still misunderstandings and uneven preventative measures in place, particularly with relation to mosquito breeding grounds and transmission routes. The necessity of a coordinated, multi-level intervention is highlighted by these findings. Our findings highlight the need for more understanding of the disease vector characteristics. However public is aware of sign and symptoms and preventive measure. Public health stakeholders, such as the Ministry of Health, local government agencies, municipal corporations, and educational institutions, must go beyond basic information campaigns in order to close these gaps. Provide culturally relevant, focused health education programs that dispel common misconceptions (e.g., about breeding environments or transmission). Especially in districts that are at risk, incorporate dengue knowledge and vector control measures into college and school curricula. In metropolitan regions with lower incomes, make sure that everyone has fair access to early treatment and diagnostic testing. To enable residents to keep an eye on and get rid of mosquito breeding grounds, start neighborhood-based cleanup campaigns and reporting tools (such as hotlines or smartphone apps).

7. Limitations

Current study pinpoint to understand the knowledge, attitude and practice among public. In this research 5 age group (1-15,16-30,31-45, 46-60 and > 60) were considered.51.1% of respondent belong to middle class and 39.4% belong to upper middle class. The result of this study are discussed bearing in mind certain errors and limitation. The respondents tend to phrase questions differently, which might influence response. There might be an error in respondent stage. This research lacks the response from village areas because the 76% respondent living in cities. The social economy status of respondents 51.1% from middle class, lack responses from the lower class. There may have been selection bias due to the use of online data gathering, preferring younger, urban, and tech-savvy people. Additionally, rather than reflecting true knowledge or habits, self-reported results might represent social desirability.

Data Availability Statement

The data associated with this study will be provided by the corresponding author upon request.

No Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

References

1. **Guzman, M.G. and E. Harris, Dengue. The Lancet, 2015. **385**(9966): p. 453-465. https://doi.org/10.1016/S0140-6736(14)60572-9

A foundational paper offering a comprehensive clinical and epidemiological overview of dengue virus, setting the context for why this study is important.

2. Colombo, T.E., et al., Performance of CDC Trioplex qPCR during a dengue outbreak in Brazil. Journal of Clinical Virology, 2019. **121**: p. 104208. DOI10.1016/j.jcv.2019.104208

3. **Sandeep, K., D. Shettigar, and S. Jayappa, An educational intervention programme on dengue and its prevention among rural high school children, Karnataka, India. Journal of Health and Allied Sciences NU, 2014. **4**(01): p. 109-112. http://dx.doi.org/10.1055/s-0040-1703743

Demonstrates how educational interventions improve knowledge and preventive practices, supporting your recommendation for awareness campaigns

4. Sandeep, K. and B. Sandhyarani, An Educational Intervention Programme on Dengue and its Prevention among Rural High School Children, Karnataka, India. International Journal of Advances in Nursing Management, 2018. **6**(4): p. 283-286. DOI: 10.5958/2454-2652.2018.00064.1
5. Kalpana, B., et al., Assess the prevalence of mosquito borne diseases among school children in selected schools at Nellore district, Andhra Pradesh. International Journal of Applied Research, 2016. **2**(7): p. 246-248. https://www.allresearchjournal.com/archives/?year=2016&vol=2&issue=7&part=D&ArticleId=2273
6. Gubler, D.J., Dengue, in The arboviruses. 2019, CRC Press. p. 223-260.
7. Guzman, M.G., et al., Dengue infection. Nature reviews Disease primers, 2016. **2**(1): p. 1-25.DOI https://doi.org/10.1016/S0140-6736(14)60572-9
8. Halstead, S.B., Dengue. Vol. 5. 2008: World Scientific. DOI https://doi.org/10.1142/9781848162297_0001
9. Mitraka, E., et al., Describing the breakbone fever: IDODEN, an ontology for dengue fever. PLoS neglected tropical diseases, 2015. **9**(2): p. e0003479. https://doi.org/10.1371/journal.pntd.0003479
10. Packard, R.M., The Fielding H. Garrison Lecture:" Break-Bone" Fever in Philadelphia, 1780: Reflections on the History of Disease. Bulletin of the History of Medicine, 2016. **90**(2): p. 193-221.https://doi.org/10.1353/bhm.2016.0041
11. Chaloemwong, J., et al., Useful clinical features and hematological parameters for the diagnosis of dengue infection in patients with acute febrile illness: a retrospective study. BMC hematology, 2018. **18**: p. 1-10.https://doi.org/10.1186/s12878-018-0116-1
12. Chen, C.-H., et al., Clinical features and dynamic ordinary laboratory tests differentiating dengue fever from other febrile illnesses in children. Journal of microbiology, immunology and infection, 2018. **51**(5): p. 614-620 https://doi.org/10.1016/j.jmii.2016.08.018
13. Irekeola, A.A., et al., Global prevalence of dengue and chikungunya coinfection: A systematic review and meta-analysis of 43,341 participants. Acta Tropica, 2022. **231**: p. 106408. https://doi.org/10.1016/j.actatropica.2022.106408
14. **Bhatt, S., et al., The global distribution and burden of dengue. Nature, 2013. **496**(7446): p. 504-507. http://dx.doi.org/10.1038/nature12060

Provides global prevalence data, giving weight to your statement that nearly half the world's population is at risk.

15. Ahmed, A.M., et al., Prevalence and burden of dengue infection in Europe: A systematic review and meta-analysis. Reviews in medical virology, 2020. **30**(2): p. e2093. https://doi.org/10.1002/rmv.2093
16. Morin, C.W., A.C. Comrie, and K. Ernst, Climate and dengue transmission: evidence and implications. Environmental health perspectives, 2013. **121**(11-12): p. 1264-1272. https://doi.org/10.1289/ehp.1306556
17. **Malhotra, G., A. Yadav, and P. Dudeja, Knowledge, awareness and practices regarding dengue among rural and slum communities in North Indian city, India. Int J Med Sci Public Health, 2014. **3**(3): p. 295-299.

http://dx.doi.org/10.5455/ijmsph.2013.181220132

It give insight of knowledge, awareness and practices of dengue in rular and slums area

18. Othman, H., et al., Knowledge and practices regarding Aedes control amongst residents of dengue hotspot areas in Selangor: a cross-sectional study. Sains Malaysiana, 2019. **48**(4): p. 841-849. http://dx.doi.org/10.17576/jsm-2019-4804-16
19. Achee, N.L., et al., A critical assessment of vector control for dengue prevention. PLoS neglected tropical diseases, 2015. **9**(5): p. e0003655. https://doi.org/10.1371/journal.pntd.0003655
20. Saeed, Q., et al., Effectiveness of dengue fever eradication program in Southern Punjab, Pakistan: A cross-sectional survey. J. Entomol. Zool. Stud, 2017. **5**(2): p. 125-9.https://www.researchgate.net//links/60964e9f458515d3150465c9.pdf
21. Qureshi, E., Community perception regarding dengue epidemic in Lahore, Pakistan. Pakistan Journal of Science, 2014. **66**(1).https://nja.pastic.gov.pk/PJS/index.php/PJS/article/view/624
22. **Paul, R.E., et al., Expansion of epidemic dengue viral infections to Pakistan. International journal of infectious diseases, 1998. **2**(4): p. 197-201. https://doi.org/10.1016/S1201-9712(98)90052-2

It shows the outbreak of dengue fever due to multiple serotypes of dengue virus. This confirms that epidemic dengue infection was present in southern Pakistan for 2 consecutive years.

23. Manzoor, S., et al., Knowledge attitude and practice towards dengue fever prevention among adult population of rural area of Lahore Pakistan. International Journal of Scientific & Engineering Research, 2018. **9**(5): p. 1665-1673.https://www.researchgate.net/profile/Muhammad-Afzal27/publication/327336877pdf
24. Luqman, M., et al., Effects of dengue incidence on socio-economic status of Patient's family: a comparative analysis of Multan and Lahore City (Pakistan). J Econ Sustain Dev, 2013. **4**: p. 28-40. http://www.iiste.org/effects_of_dengue_on_family-libre.pdf
25. **Abir, T., et al., Dengue in Dhaka, Bangladesh: hospital-based cross-sectional KAP assessment at Dhaka north and Dhaka south city corporation area. PLoS One, 2021. **16**(3): p. e0249135. https://doi.org/10.1371/journal.pone.0249135

It shows Efforts to increase knowledge about dengue fever through education by the administrations of both corporations would benefit from targeting these high-risk groups for a more sustainable outcome.

26. Ahmed, N. and S. Taneepanichskul, Knowledge, attitude and practice of dengue fever prevention among the people in Male, Maldives. J Health Res, 2008. **22**(suppl l): p. 33-37.https://www.thaiscience.info/Journals/Article/JHRE/10893417.pdf
27. Diaz-Quijano, F.A., et al., Association between the level of education and knowledge, attitudes and practices regarding dengue in the Caribbean region of Colombia. BMC public health, 2018. **18**: p. 1-10. DOI:10.1186/s12889-018-5055-z
28. Goodyear, M.D., K. Krleza-Jeric, and T. Lemmens, The declaration of Helsinki. 2007, British Medical Journal Publishing Group. p. 624-625.

https://onlinelibrary.wiley.com/doi/10.1111/hex.13908

29. Whicher, D. and A.W. Wu, Ethics review of survey research: a mandatory requirement for publication? The Patient-Patient-Centered Outcomes Research, 2015. **8**: p. 477-482.

DOI:10.1007/s40271-015-0141-0

30. Bhatt, S., P.W. Gething, and O. Brady, Messina JP. Farlow AW, Moyes CL, Drake JM, Brownstein JS, Hoen AG, Sankoh O, Myers MF, George DB, Jaenisch T, Wint GRW, Simmons CP, TW Scott, Farrar JJ, Hay SI. The global distribution and burden of dengue, 2013: p. 504-507. DOI:10.1038/nature12060
31. Stanaway, J.D., et al., The global burden of dengue: an analysis from the Global Burden of Disease Study 2013. The Lancet infectious diseases, 2016. **16**(6): p. 712-723. https://doi.org/10.1016/S1473-3099(16)00026-8
32. Hairi, F., et al., A knowledge, attitude and practices (KAP) study on dengue among selected rural communities in the Kuala Kangsar district. 2003, Sage Publications Sage CA: Thousand Oaks, CA. p. 37-43. https://doi.org/10.1177/101053950301500107
33. Hossain, M.I., et al., Knowledge, awareness and preventive practices of dengue outbreak in Bangladesh: A countrywide study. PloS one, 2021. **16**(6): p. e0252852. https://doi.org/10.1371/journal.pone.0252852
34. Mayxay, M., et al., Dengue in peri-urban Pak-Ngum district, Vientiane capital of Laos: a community survey on knowledge, attitudes and practices. BMC public health, 2013. **13**: p. 1-8. http://dx.doi.org/10.1186/1471-2458-13-434
35. Gupta, N., et al., Dengue in india. Indian Journal of Medical Research, 2012. **136**(3): p. 373-390.https://journals.lww.com/ijmr/fulltext/2012/36030/dengue_in_india.6.aspx
36. Syamsuddin, M., et al., Causality analysis of Google Trends and dengue incidence in Bandung, Indonesia with linkage of digital data modeling: longitudinal observational study. Journal of Medical Internet Research, 2020. **22**(7): p. e17633. http://dx.doi.org/10.2196/17633
37. Mohapatra, S. and A.N. Aslami, Knowledge, attitude and practice regarding dengue fever among general patients of a rural tertiary-care hospital in Sasaram, Bihar. Int J Community Med Public Health, 2016. **3**(2): p. 586-91. https://doi.org/10.18203/2394-6040.ijcmph20160455
38. Haque, U., et al., Malaria prevalence in endemic districts of Bangladesh. PloS one, 2009. **4**(8): p. e6737. https://doi.org/10.1371/journal.pone.0006737
39. Dhimal, M., et al., Knowledge, attitude and practice regarding dengue fever among the healthy population of highland and lowland communities in central Nepal. Plos one, 2014. **9**(7): p. e102028. https://doi.org/10.1371/journal.pone.0102028
40. **Wong, L.P., et al., Factors affecting dengue prevention practices: nationwide survey of the Malaysian public. PloS one, 2015. **10**(4): p. e0122890.

https://doi.org/10.1371/journal.pone.0122890

According to the study's findings, measures should be created to encourage dengue prevention among urban residents and focus on places with low mosquito densities where people believe their risk of contracting the disease is lower. Campaigns to prevent dengue should emphasize education to raise awareness of the disease and messaging emphasizing the dangers of getting dengue.

41. Seidahmed, O.M. and E.A. Eltahir, A sequence of flushing and drying of breeding habitats of Aedes aegypti (L.) prior to the low dengue season in Singapore. PLoS neglected tropical diseases, 2016. **10**(7): p. e0004842. https://doi.org/10.1371/journal.pntd.0004842
42. Ali, E.O.M., et al., Prevalence of larval breeding sites and seasonal variations of Aedes aegypti mosquitoes (Diptera: Culicidae) in Makkah Al-Mokarramah, Saudi Arabia. International Journal of Environmental Research and Public Health, 2021. **18**(14): p. 7368. https://doi.org/10.3390/ijerph18147368