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KNOWLEDGE, AWARENESS AND PREVENTIVE PRACTICES OF DENGUE IN PAKISTAN

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Abstract
Dengue, a mosquito-borne disease has become endemic. This study was conducted to explore the knowledge, awareness and preventive practices of dengue in the Faisalabad district. This study was quantitative and a cross-sectional survey was conducted in the study area. A total of 160 randomly chosen respondents from the 20 public secondary schools participated in the survey. Data were collected through a structured, validated and reliable questionnaire. Collected data were analyzed using the Statistical Package of Social Sciences (SPSS). Descriptive statistics were applied to the data to explore the distribution of responses regarding knowledge, awareness and prevention practices against dengue. The majority (86.9%) of respondents had heard about dengue fever and for 90.6% of respondents, Aides was the carrier of dengue. Around 56% of respondents had belied that Aedes breed in unclean water and 96.2% had a mistaken belief that it bites often at noon. Fever was the leading symptom (80.6%) and the use of mosquito repellent coil (98.8%), net (95%) and lotion (88.1%) were key preventive measures. Almost 76% of respondents were informed to visit the nearest Basic Health Unit (BHU) for urgent treatment followed by 21.2% of respondents favoring consulting a Hakeem (quacks) for the treatment. The school was the leading information source (80.6%) and the role of modern gadgets in awareness creating was dismal. This is suggested that community awareness level is obligatory, integration of modern gadgets in awareness campaigns is requisite, thus for high preventive measures synergistic strategy is needed.
Key words: *Dengue, fever, School, Education, awareness, knowledge*

Introduction

Dengue is one of the prominent threats to society tending to cause a large number of human threats. Dengue, the mosquito-borne disease, transmitted by the bites of Aedes mosquitoes, primarily Aedes aegypti and Aedes albopictus, is considered the most widespread human arboviral infection across the world (Sharmin et al., 2015). Brady et al. (2012) have reported 20,000 deaths each year due to dengue in the world. The cause of dengue fever (DF) is the infection with any one of the 4 serotypes (DENV-1, 2, 3, and 4) of dengue virus and the DF may appear as a fatal disease characterized by dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) (Lambrechts et al., 2010; Naing et al., 2011). Dengue fever is caused by a virus named single standard RNA by biting three types of genus Aedes and Alboictus

(Hafeez *et al*., 2012). Dengue fever (DF) is responsible for significant human diseases and deaths worldwide (Bhatt, 2013). Aedes aegypti is known as the primary vector for DF in both rural and urban areas of the world (Lambrechts *et al*., 2010). Many species of mosquitoes affect people and causes many diseases in human such as malaria, yellow fever and dengue fever also (Murugan *et al*., 2007).

The first dengue virus case emerged in South East Asia and approximately 52% of people were vulnerable le to the risk of dengue around the world (Vachvanichsanong and Thisyakorn, 2016). Pakistan lies in the south Asian region and is also considered one of the prominent countries for its diverse geographical circumference. The first confirmed case of dengue fever was reported in 1994 in Pakistan. However, the annual prevalent trend and startling rise in dengue cases first became ostensible in November 2005 (WHO, 2021; Jehan, 2011). Since 2010, Pakistan has seen an incredible number of cases of dengue. In 2020, 47,120 confirmed cases were reported of which 75 causalities were recorded as well. By the end of 2021, 48,906 dengue cases including 183 deaths were recorded (Dengue fever, 2022). Over the period and pertinent to its hefty penetration the dengue has become endemic in Pakistan mingling the whole year with a high level of prevalence in the post moon soon season expanding the vulnerability across the four provinces (Jahan, 2011).

The health sector of Pakistan has reported the lethal effects and fatalities of dengue in Pakistan for reasons including unhealthy food, and edibles with unsuitable sanitation in the community (Ali et al., 2017). According to Islam et al. (2022), owing to deprived healthcare capacity, slower vaccination rate, increasing COVID-19 variants, socio-economic inequalities, and misinformation the dengue fatalities are mounting over time.

DF is an automatic fever, which usually lasts for 5-7 days. It is sometimes weakened during the acute phase of the disease. The medical characteristics of DF vary according to the age of the patient. Newborns and young children may have an uncontrolled feral disease with mycoplasma rash. Older children and adults may have mild fever syndrome or high fever (usually biphasic), retroviral pain, myalgia, arthralgia, nausea, vomiting, and petechiae. Leukopenia and thrombocytopenia are common in all ages. In some cases, DF bleeding may be accompanied by complications such as gangrene, epilepsy, gastrointestinal bleeding, and hematuria (Swaminathan *et al*., 2013).

Numerous factors such as high population growth, rapid urbanization, worsening of the waste management system (Siddiqua et al., 2018) and lack of vector control accelerated the expansion and transmission of dengue (Jeelani et al., 2015). Inadequate water supply (Jeelani et al., 2015), illiteracy, poverty and social disparities have an association with poor dengue management (Guzma´n and Kouri, 2002).

Currently, no effective vaccine against dengue is available, this the only possible method of prevention of dengue is vector control (Udayanga et al., 2018). However, for this prevention method community participation and awareness is obligatory (Naing et al., 2011). Effective participation of the community heavily depends on knowledge, awareness and attitude of people toward the particular disease (Jeelani et al., 2015). In this preview, effective dengue prevention and remedy dengue has become a key concern in Pakistan. Therefore, this study was conducted with the objective aiming at assessing the awareness knowledge and attitude of students towards dengue prevention.

Methodology

Study area

This study was conducted in rural areas of District Faisalabad. Faisalabad district is located between a longitude angle of 73 to 74 East and a latitude angle of 30 to 31.5 North with 600ft regular plains as elevation in north East of Punjab. The district covers 1,280 km^2 having six Tehsils named Faisalabad City, Faisalabad Sadar, Jaranwala, Chak Jhumrah, Samundari and Tandlianwala. Most of the urban area is located in Tehsil Faisalabad City, while the other five tehsils are consisting of rural areas (Bashir *et al*., 2010).

Data collection

The survey method was used to collect data from the selected respondents. The population of the study comprised of the students of 9^{th} and 10^{th} classes studying in rural areas of Faisalabad. There was a total of 175 public secondary schools in the Faisalabad district. A total of 24687 students were enrolled in 175

public secondary schools. The list of all secondary schools was obtained from the office of the District Education Officer (DEO). This obtained list served as a sampling frame and through a simple random sampling technique, 20 schools were chosen from a total of 175 schools. The sample size for the study was 160 respondents determined through the online sample size calculator www.surveysystem.com. Through stratified disproportionate sampling 80 from class 9^{th} and 80 from class, 10^{th} was chosen thereby making a sample size of 160 respondents. Data were collected through structured, validated and reliable questionnaire.

Questionaries content

The questionnaire was developed by reviewing the previously published literature. The questionnaire was developed in English language, then was translated in to local language "Urdu" for the easy understanding of the respondents. The questionnaire was divided further in to four sections. The first section was the demographic profile of the respondents encompassing 9 questions. The second section of questionnaire also consisted 7 questions regarding the knowledge attitude and prevention of the dengue. In third section, respondents were asked to explore their strategies to cope with dengue and in fourth section different information sources were tabulated and respondents were asked to report their use of different information sources. The type of questions in the questionnaire were close ended with "Yes" or "No" options. Before the final data collections, questionnaire was pilot tested on 20 respondents. These respondents were not included in the total sample size.

At the time of final data collection, a verbal informed consent was taken from the respondents, and they were ensured that their information will only be used for the research purpose and their personal information will be kept anonymous and confidential.

Statistical Analysis

The data were entered into excel sheet and later on Statistical Package for Social Sciences (SPSS). The study was descriptive in nature, thus descriptive statistics such as frequency and percentages were calculated for the interpretation of the data. Results are interpreted and explained through the Tables and graphs.

Ethical considerations

The study was approved by the supervisory committee and the three member scrutiny committee headed by the Professor of Agricultural Extension at Institute of Agricultural Extension, Education and Rural Development, Faculty of Social Sciences, University of Agriculture Faisalabad.

Results and Discussion

Demographic profile of participants

The table shows that 26.9% of respondents were aged under 15 years, 32.5% were aged 16 and 30.6% of respondents were aged 17 years. Of the total participants of the study, 58.13% were male and 41.87% were females. The respondents were matriculated students and their medium of instruction was regarded as important. Around 69% of respondents were studying in the English medium whereas 31.5% of respondents were going through the Urdu medium. As for as family income was concerned, 18.1% of respondents fell into the income group earning less than 20,000 Rupees in a month. Out of total respondents, 37.5% had earned between 20,000-30,000 Rupees in a month. Around 19% of respondents had earned between 30,000-40,000 and only 15% of respondents reported their family income exceeding 50,000 Rupees in a month.

For the 5.6% of respondents, their guardians didn't have formal education. Of the total respondents, 16.3, 34 and 6.9% of respondents' guardians had primary, matriculation and intermediate level of education, respectively. Among total participants, 36.3% reported their guardian having graduated or above the level of education. Taking the employment status of guardians, 16.9% were farmers, 43.1% were government employees, 23.8% were working as a labour and 16.3% of respondents had their own

business. Regarding the family type, 12.5% were living in nuclear families, 53.8% had a joint family system and 33.8% of respondents had an extended family system.

Table 1. demographic profile of participants.

Demographic attributes	N (%)
Age	
<15	43 (26.9)
16	52 (32.5)
17	49 (30.6)
18	12 (7.5)
>19	4 (2.5)
Gender	
Male	93 (58.13)
Female	67 (41.87)
Medium of instruction	
Urdu	50 (31.5)
English	110 (68.7)
Monthly Income	
< 20000	29 (18.1)
20000-30000	60 (37.5)
30000-40000	47 (29.4)
>50000	24 (15.0)
Education of guardian	
Illiterate	9 (5.6)
Primary	26 (16.3)
Matric	56 (35)
Intermediate	11 (6.9)
Graduation or above	58 (36.3)
Employment status	
Farmer	27 (16.9)
Govt. Employee	69 (43.1)
Labor	38 (23.8)
Business	26 (16.3)
Family type	
Nuclear	20 (12.5)
Joint	86 (53.8)
Extended	54 (33.8)

Knowledge, attitude and preventive practice toward DF

Table 2 indicates that a large number of respondents (139: 86.9%) had heard about dengue fever. More than half (59.4%) and 90.6% of participants were informed that Anopheles and Aides were the carrier of dengue facer, respectively. An overwhelming majority of respondents agreed that dengue was different from other mosquitos. This implies that the participants had a good level of awareness regarding the identification of dengue.

Around 71% of respondents were informed that dengue is transmittable while 29.4% believed that dengue was not transmittable. This may be related to the sceptical behaviour among participants as for them there was no difference in the common mosquito and dengue.

In the context of awareness regarding breeding sites of dengue, 32 and 56.3% of respondents were informed that clean water and unclean water were the breeding sites, respectively. Of the total

participants, 92.5% were well informed that dengue breeds are in the trash, garbage and used tires. More than one-fifth (22.5%) of respondents were not informed about the breeding sites of the dengue.

Regarding common symptoms of dengue fever, information was explored about the high-grade fever, nausea and vomiting, body aches, red spots on the body, pain abdomen, and diarrhea. The majority of respondents (80.6%) were informed about the high-grade fever followed by 73.13% of respondents who were aware of nausea and vomiting. Body aches, red spots on the body, pain abdomen and diarrhea were known in 66.25, 58.12, 38.1 and 20% of participants, respectively. All the symptoms were known to only 16.3% of the total respondents.

Considering the biting time, more than half (51.9%) believed dengue bites in the early morning whereas 75.6% believed its biting time was in the evening. Of the total respondents, 83.1 and 86.1% were informed that dengue bites in the night and noon respectively. Only 3.1% of respondents were unknown of the biting time of dengue.

There were different preventive measures known to study participants. An overwhelming majority (98.8%), 95% and 88.1% of respondents were well informed about the use of mosquito repellent coils, nets and lotions respectively. Only 6.9% of respondents were aware of the mosquito sprays. The awareness regarding wearing protective clothes (98.1%), clean surroundings (95.6%) and use of fire smoke (81.9%) were adequate among the respondents. One in ten respondents (10%) reported doing nothing against the dengue.

Table 2. Knowledge, attitude and preventive practice (KAP) towards DF.

	n (%)
Heard about the DF	
Yes	139 (86.9)
No	21 (13.1)
Carrier of dengue	
Anopheles	95 (59.4)
Aedes	145 (90.6)
Different from other mosquitoes	145 (90.6)
Dengue is transmittable	
Yes	113 (70.6)
No	47 (29.4)
Breeding site of Dengue	
Clean water	52 (32)
Unclean water	90 (56.3)
Trash/garbage/used tires etc.	148 (92.5)
Don’t know	36 (22.5)
A common symptom of dengue fever	
High-grade Fever	129 (80.6)
Nausea and vomiting	117 (73.13)
Body aches	106 (66.25)
Red spots on the body	93 (58.12)
Pain abdomen	61 (38.1)
Diarrhea	32 (20)
All of above	26 (16.3)
Biting time of dengue	
Early morning	83 (51.9)
Evening	121 (75.6)
Night	133 (83.1)
Noon	154 (96.2)
Do not know	5 (3.1)

Preventive measures	
Mosquito repellent coils	158 (98.8)
Mosquito repellent net	152 (95)
Mosquito-repellent lotion	141 (88.1)
Use of mosquito sprays	12 (6.9)
Wear protective clothes	157 (98.1)
Cleaning the surrounding environment	153 (95.6)
Use of fire smoke	115 (81.9)
Do nothing	16 (10)

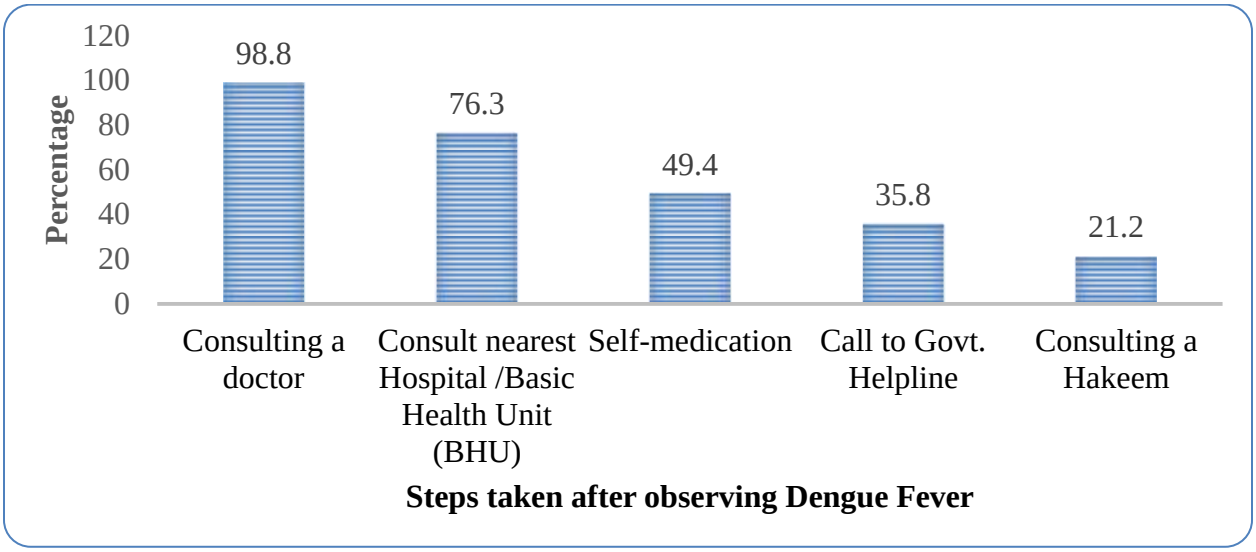

Figure 1. Steps taken after observing the dengue fever.

Figure 1 portrays that 98.8% of respondents were informed to consult the doctor at the earliest the symptoms of dengue are observed. Of the total respondents, 76.3% were informed to visit the nearest Basic Health Unit (BHU) for urgent treatment and prescription. Almost half of the respondents (49.4%) reported self-medication followed by 35.8% of respondents calling to Government Helpline for further guidance and preventive management. Slightly higher than one-fifth (21.2%) of respondents reported their awareness to consult a Hakeem for the treatment.

Table 4. Source of information

Sources	**N (%)**
School	129 (80.6)
T. V	78 (48.75)
Friends and Family	104 (65)
Doctors	35 (21.87)
Internet	82 (51.25)
Radio	21 (13.12)
Newspapers	84 (52.5)
Flexes and Banners	89 (55.62)
Dengue Aagahi walks	81 (50.6)
Health Teams	48 (30)

Table 4 indicates that different information sources played a role in creating awareness among the participants. Around 81% of respondents reported that school contributed to creating awareness. Among all respondents, 48.75, 65, 21.9, 51.3 and 13.1% of respondents reported TV, friends and family, doctors,

the internet and radio played their role in creating public awareness. As for as printed media was concerned, 52.5% and 55.62% were informed through newspapers and flexes and banners, respectively. Almost half of the respondents (50.6%) referred their awareness to dengue *aagahi* walks and 30% reported their awareness due to health teams and their awareness campaigns.

Discussion

Background variables such as age, education, gender, income, and residential status are regarded as important especially while exploring the knowledge, attitude and skills of the individuals. Similarly, the socio-economic variables were equally important among the population in the context of the incidence of dengue and the execution of preventive measures (Udayanga et al., 2018). Nyamwembe et al. (2018) have reported a positive association between awareness and information utilization. Education is a prominent attribute which can help the individuals in effective utilization of information. In this study, all the respondents were educated and studying 9^{th} and 10^{th}. This implies that the students had more awareness and understanding of the dengue incidence and preventive measures. Respondents' guardian was also educated and this would have helped the students to become more aware and implement the preventive measures on the household level. Inadequate awareness and lack of knowledge about preventive measures were the key problems that individuals faced (Ho et al., 2013). There was a significant relationship between age, gender and class awareness and knowledge (Adolu et al., 2014). In this study, male and female students participated which reflects the socialization patterns in the area as endorsed by Raudsepp (2001) and Diamontopoulos et al. (2003). At the household level, females often take all the managerial, sweeping and cleaning activities, thus they had a very prominent role in dengue prevention. These findings are supported by those of Ero et al. (2001) as they have reported an association between demographic attributes like age, gender, and education to perform different maintenance tasks at home. Adeolu et al. (2014) also found a relationship between demographic attributes i.e. gender, age, class and their level of awareness and practices of waste management. This is an endorsement of current findings that demographic attributes have key significance in waste management which could be the breeding site for dengue.

In this study majority of the respondents were informed about dengue, its breeding and its transmission though many of the respondents didn't have a basic awareness about dengue, its transmission, breeding and the carrier of dengue fever. With special reference to the breeding of the dengue, respondents had more inclination towards breeding in dirty and unclean water. In a true sense, dengue breeds in fresh water and half of the respondents were unknown of this fact. These results are similar to those of Hossain et al. (2021) as they found that respondents had misconceptions regarding the breeding of dengue in dirty and sewage water. They perceived that swage drains and unclean water were the common breeding sites of the dengue.

Results found in the context of dengue fever awareness in this study are consistent with some studies conducted in different regions such as in Bangladesh (Dhar-Chowdhury et al., 2014; Hossain et al., 2021), India (Arora et al., 2017), Pakistan (Itrat et al., 2008), Malaysia (Naing et al., 2011), Thailand (Phuanukoonnon et al., 2006), Brazil (Degallier et al., 2000) and Jamaica (Shuaib et al., 2010). Our study confirmed that there were different symptoms of dengue fever and some of the respondents were well informed about the identification of symptoms. Although, fever was the foremost and obvious reason for the majority of the respondents. It was perceived that a large number of respondents who participated in this study had not personally experienced dengue fever not any of their family members embraced the dengue, therefore the respondents didn't have full confidence in typical symptoms of the dengue. This kind of unawareness can create a likely confusion among the respondents because the respondents with poor knowledge might have become confused with other traditional causes of fever such as typhoid or influenza (Shuaib et al., 2010). Even respondents may get confused about the covid as a cause of fever.

This study indicated that schools, friends and family, Flexes and banners, newspapers and the internet were the leading information source playing their role in creating dengue awareness among respondents. The role and contribution of electronic gadgets like TV and radio were not so good. These results are different to those of Hossain et al. (2021) as they found that TV was the leading information source in creating dengue awareness among the public. Similarly, some more studies such as Chinnakali et al.

(2012), Harapan et al. (2018), Dhimal et al. (2014), Mayxay et al. (2013), and Yboa and Labrague (2013) were all in agreement that TV had the key role in creating awareness among the public regarding dengue mosquito and dengue fever. In our study, school being the leading information source refers to the special attention given by the government to ensure awareness among students and guide them to disseminate the same in the community.

In our study, we further explored the respondents who were informed to use mosquito repellent oil, net, lotion, wear protective clothing and clean the environment to prevent dengue. Findings are almost consistent with those of Hossain et al. (2021) as they found that most of the respondents were using mosquito coils to prevent dengue. However, our findings are not comparable with those of Acharya et al. (2005) who affirmed that cleaning the surroundings and environment did not help prevent dengue. Considering the results of our study, we believe that cleaning the surrounding can help in destroying the breeding sites of the mosquitos. Once the mosquito sites are destroyed the mosquito would not be able to breed and as result, the population of dengue will remain in control. Our study also confirmed the use of indigenous techniques like using smoke to prevent dengue.

Conclusion

Dengue has become a key threat and dengue fever is the mosquito born disease that is lethal in its impact and its prevention and remedy are inevitable. Being aware about the dengue fever and its prevention seem important especially in the process of dengue infestation. Although, the awareness and knowledge among respondents was adequate enough but still the prevention strategies were not fully implemented and adopted. Negligible role of modern media gadgets in creating dengue awareness was the significant gap observed in this study. This implies that not only the increase in awareness level is obligatory, integration of modern gadgets in awareness campaigns is requisite especially in the country with mammoth population and increasing cases of dengue. The need is to put focus on awareness campaigns, health education programs and mass campaign through modern social media gadgets in order to enhance the community awareness and knowledge towards the prevention strategies across the country.

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