Brazilian Journal of Biology®

ISSN 1519-6984 (Print)
ISSN 1678-4375 (Online)

Original Article

Knowledge, attitude and practices regarding dengue and its vector among medical practitioners in Malakand region, Pakistan

Conhecimento, atitude e práticas em relação à dengue e seu vetor entre médicos na região de Malakand, Paquistão

W. Khan[a]*, A. Rahman[b], S. Zaman[b], M. Kabir[c], R. Khan[a], W. Ali[d], S. Ahmad[a], S. Shabir[e], S. Jamil[f] and P. De los Ríos-Escalante[f,g]

[a]University of Malakand, Department of Zoology, Lower Dir, Pakistan
[b]University of Malakand, Department of Botany, Lower Dir, Pakistan
[c]University of Sargodha, Department of Biological Sciences, Sub-Campus Bhakkar, Sindh, Pakistan
[d]University of Malakand, Department of Biotechnology, Lower Dir, Pakistan
[e]Agriculture University Faisalabad, Department of Zoology, Wildlife and Fisheries, Faisalabad, Pakistan
[f]Rawalpindi Women University, Department of Zoology, Rawalpindi, Pakistan
[g]Universidad Católica de Temuco, Facultad de Recursos Naturales, Departamento de Ciencias Biológicas y Químicas, Temuco, Chile

Abstract

Dengue fever (DF) is increasingly recognized as one of the world's major mosquito borne diseases and causes significant morbidity and mortality in tropical and subtropical countries. Dengue fever is endemic in most part of Pakistan and continues to be a public health concern. Knowledge, attitude and practices can play an important role in management of the disease. Current study was aimed to determine the level of knowledge, attitude and practices regarding dengue fever among health practitioners, to study the level of knowledge and attitude with preventive practices for dengue fever. A cross sectional study was carried out in medical practitioners of the four districts of Malakand region during October to November 2019. A pre-structured questionnaire was used to collect data from medical practitioners. Data was analyzed using Graph Pad version 5. Significant value was considered when less than 0.05 (at 95% confidence of interval). The results revealed that most of participants have seen dengue vector (62%), the media being the most quoted source of information. Nearly 81.2% participants were aware from transmission of dengue fever is by mosquito bite. Practices based upon preventive measures were found to be predominantly focused towards prevention of mosquito bites rather than elimination of breeding places. Although the knowledge regarding DF and mosquito control measure was quite high among the medical practitioners but this knowledge was not put into practice. Further studies are required to aware the people about dengue and its vector in order to get prevention and control.

Keywords: dengue fever, viral infection, awareness, mosquito born viral disease, endemic disease.

Resumo

A dengue (DF) é cada vez mais reconhecida como uma das principais doenças transmitidas por mosquitos do mundo e causa significativa morbidade e mortalidade em países tropicais e subtropicais. A dengue é endêmica na maior parte do Paquistão e continua a ser um problema de saúde pública. Conhecimento, atitude e práticas podem desempenhar papel importante no manejo da doença. O presente estudo teve como objetivo determinar o nível de conhecimento, atitude e práticas em relação à dengue entre os profissionais de saúde, para estudar o nível de conhecimento e atitude com as práticas preventivas da dengue. Um estudo transversal foi realizado com médicos dos quatro distritos da região de Malakand de outubro a novembro de 2019. Um questionário pré-estruturado foi usado para coletar dados de médicos. Os dados foram analisados no Graph Pad versão 5. Valor significativo foi considerado quando menor que 0,05 (com intervalo de confiança de 95%). Os resultados revelaram que a maioria dos participantes já viu o vetor da dengue (62%), sendo a mídia a fonte de informação mais citada. Quase 81,2% dos participantes sabiam que a transmissão da dengue é por picada de mosquito. Constatou-se que as práticas baseadas em medidas preventivas se concentravam predominantemente na prevenção de picadas de mosquitos, e não na eliminação de criadouros. Embora o conhecimento sobre DF e medidas de controle de mosquitos fosse bastante elevado entre os médicos, esse conhecimento não foi colocado em prática. Mais estudos são necessários para conscientizar a população sobre a dengue e seu vetor, a fim de se obter prevenção e controle.

Palavras-chave: dengue, infecção viral, conscientização, doença viral transmitida por mosquito, doença endêmica.

*e-mail: walikhan.pk@gmail.com
Received: October 26, 2020 – Accepted: January 5, 2021

This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Introduction

Dengue fever is an epidemiological infection that is closely similar to symptoms of yellow fever (Paul et al., 1998). Dengue is a mosquito born viral infection found in tropical and subtropical regions of the globe and now continuously spreading all over the world. Dengue fever is transmitted by the bite of female mosquito caused by human viral pathogen that belongs to the genus Flavivirus of the family Flaviviridae (single-strand, non-segmented RNA viruses) which is closely similar to West Nile virus (Luqman et al., 2013). The dengue virus is divided into four serotypes (DEN-1, DEN-2, DEN-3, and DEN-4). First case of epidemics of DF had reported from Asia, Africa, and North America during 1779-1780 (Qureshi et al., 2014). Outbreaks in the three continents indicate a worldwide distribution of these viruses and their mosquito vectors presence in the tropics. A pandemic situation was adopted in Southeast Asia soon after World War II and since then has spread around the world (Halstead, 1980; Halstead, 1992).

The dengue virus disease is reported to be prevalent across the whole tropical belt in more than 100 countries with about 2.5 billion residents at risk of being infected (Guglani and Kabra, 2005). According to the WHO, 50 to 390 million people are become infected each year (Semenza et al., 2014), with around 25000 deaths, mostly children (Semenza, 2015). For the first time dengue outbreak in Pakistan was reported in the industrial city, Karachi, in 1994 (Rai and Khan, 2007). In the same way the outbreak of dengue infection was reported in many areas of Pakistan for three following years 2006, 2010 and 2011 respectively (Luqman et al., 2013). In Pakistan, dengue virus is endemic, now present throughout the year with a peak incidence in the period of late time of monsoon. Flood of 2010 in Pakistan made the situation worse. All over 20864 cases had been reported in Punjab in 2011 including 17256 in Lahore with 323 deaths in the Punjab province and 279 deaths in Lahore. The three provinces in Pakistan Sindh, Punjab and Khyber Pakhtunkhwa are facing the epidemic of dengue. It was reported that Karachi is one of the supreme habitat for breading of dengue mosquito and thus for spreading the diseases (Almeida et al., 2009; Shamim, 2010).

There has been a gradual global increase in the number of dengue cases in the last decade. According to mathematical models which are established by researchers it can be demonstrated that Southern Europe are more susceptible to dengue outbreaks in the next decade due to climate changes and globalization. Any prophylactic drug or vaccine are not developed against dengue fever up to now so vector management and prevention against mosquito bites are the best preventive methods for control of the disease.

Dengue is transmitted in humans by two species of *Aedes* mosquitoes namely, *Aedes Aegypti* and *Aedes Albopictus* (Shuaib et al., 2010; Yboa and Labrague, 2013; Semenza et al., 2014; Liu-Helmersson et al., 2016). Currently *Aedes aegypti* are found in, South-east Asia, Africa, Middle-East, South-eastern United States, Pacific Islands and Northern Australia. This species is also distributed in Georgia, Madeira (Portugal) and has been introduced in the Netherlands (Seixas et al., 2018) while *Aedes albopictus* although a less active vector than its corresponding partner, the distribution area of *Aedes albopictus* are greater than *Aedes aegypti* and currently found in Asia, Africa, Caribbean, South-America, Central America, Australia, and in a large number of European countries, mostly in Southern Europe, which possess Portugal, South of France, Spain, Greece, Italy, Albania and now it has been introduced in United Kingdom, Germany, Eastern Europe, and France. The area of the distribution of *A. albopictus* is rapidly increasing and has been listed in top hundred most invasive species (Semenza et al., 2014; Liu-Helmersson et al., 2016).

According to Arif et al. (2015) there are three main forms of dengue disease, the 1st one is dengue fever 2nd one the more severe dengue hemorrhagic fever (DHF) and 3rd ones Dengue Shock Syndrome (DSS). Dengue has been reported to cause more illness and death than any other Arbovirus disease in the world, there are approximately 2.5 billion people at risk of infection (Guglani and Kabra, 2005) and the World Health Organization (WHO) estimates that there are about 50 to 100 million cases per year. It has become a major health problem in Pakistan, and it is likely to become an even greater health problem in the coming years (Rasheed et al., 2013). Current paper describes the knowledge, attitudes and practices regarding dengue fever and its vector among health care workers in Malakand region, Pakistan.

2. Materials and Methods

2.1. Materials

This cross sectional study was conducted over a period of two months from October 2019 to November 2019 in four districts of Malakand Division using the pre structured and self-explanatory questionnaire. The four districts are Lower Dir, Upper Dir, Swat and district Malakand. Samples were collected by visiting different areas and hospitals of the districts. Doctors, pharmacists and the paramedical diploma holders were included in present study. Pre-testing of the questionnaires was conducted among 20 participants and minor changes were done after pretesting. The participants were required to complete the self-administered questionnaires which took about 10-15 minutes. The questionnaire was developed after an extensive literature review and was validated for its reliability. The questionnaire comprises 31 questions. The questionnaire comprises four parts. The first part concerned with the demographic status of the medical practitioner of Malakand region Pakistan (questions 1 to 6), the second part concerned with knowledge of the respondents related to dengue vector among health practitioners of four districts of Malakand region, (questions 7 to 14), the next part dealt with knowledge of the respondents related to dengue fever among health practitioners of four districts of Malakand region, (question 15 to 24) and the last part dealt with attitude of the respondent related to practice and prevention of the dengue fever (question 25 to 31).

2.2. Population and study sample

The targeted population was all practitioners aged over 20 years serving in various health care units in four districts of Malakand region. The study areas comprises Lower Dir, Upper Dir, Swat and district Malakand, have selected due to several outbreaks occurred in this region.

2.3. Source and collection of data

The source of the data was the population of medical practitioners of the four districts of Malakand region Pakistan. The data was collected in a form of questionnaire. One questionnaire was given to one participants for filling all the questions in the areas and then collected from them. The questionnaire was in English language and so sample, that all of the questions are easily solved by the participants. The data was collected from October 2019 to November 2019.

2.4. Data analysis

The data was analyzed by using Graph Pad version 5. Significant value was considered when less than 0.05 (at 95% confidence of interval).

2.5. Ethical consideration

The participants were informed about the advantages and risk factors of the study through distribution of an inform consent letter. All the participants were included voluntarily. Respondents had to read and approve that they had read the inform consent letter before filling the questionnaire. Only respondents who were medical practitioners and aged 20 years or over at the time of the survey were allowed to fill the questionnaire. No authorization was required from the official board of committee of the university as well as local administration of Malakand division, No Objection Certificate (NOC) as the way of collecting the data via the questionnaire while following ethical guidelines, such as respect for the participants' respect for human dignity, autonomy and freedom.

3. Results

3.1. Demographic information among health practitioners

Regarding the demographic information of the respondents the age is divided into three groups ranges 21 to 40(75%), 41-60(20%) and above 60 years (5%). In the current study male and female proportion are 85% and 15% respectively. Three professions are included the finding are physician (20.4%), public health officers (27.5%) and paramedics (51.6%). The respondents were in two practice setting health centre and referral hospitals which result are 67.5% and 32.5% respectively. The respondents experience were divided into three groups which result are 1-10 years (54.1%), 11-20 years (30.8%), 21 and above are (15%), Zone wise division resulted hot spot and non-hot spot which results 46.2% and 53.8% respectively (Table 1).

3.2. Knowledge of the respondents related to dengue vector

Table 2 describes the knowledge of the respondents related to dengue vector among health care workers in Malakand region, Pakistan. Four districts were selected for the operation of the present study. In response to the question "have you ever seen dengue vector?" 61.2%(n=147) were voted as yes. The 2nd question" What is the cause of dengue fever?" result are (mosquito=62.0%, Bacteria=7.50%, virus=22.0% and parasite=8.33%), the 3rd "question is "how do dengue mosquito looks like?"(small dark mosquito with white strips on legs=78.3%, marking in form of a layer on its thorax=21.7%), another question was asked about the breeding site the result are (flowing dirty water=10.8%, flowing clean water=23.3%, stagnant dirty water=15%, stagnant clean water=41.6%, puddles=6.25%, garbage=2.91%), a question was asked about the living place the results are (underneath furniture=17.1%, shelter places=65.4%, indoor=17.5%), the response to the question "what is the most frequent mosquito bite time" are (sunset/sundown=77.1%, day time=13.3%, night=13.3%), how is dengue transmitted? the results are (an infected dengue mosquito bite=81.2%, contacting DP*=11.3%, drinking dirty water=7.50%), a question was asked "Is government responsible for controlling mosquito causing dengue" the result are (agree=88.7%, disagree=11.3%).

3.3. Knowledge of the respondents related to dengue fever

Table 3 demonstrates the knowledge of the respondents related to dengue fever. In this regard some questions were asked from the respondents who are medical practitioner in Malakand region Pakistan. In response of the question "have you ever seen dengue fever cases?" the response for yes are 76.6%, a question was asked about the symptoms of the dengue fever the finding were (prolong high fever=58.3%, muscular pain=15.0%, bleeding from nose and other areas=20.4%, rashes=4.14%, headaches, nausea and vomiting=2.08%), in response to the question "can dengue fever be prevented?" the finding are (agree=91.2%, disagree=8.75%), a question was asked about the vaccine the result was (yes=26.6% and no=73.3%), the response to the question "can dengue be treated?" n=194 (80.8%) of the respondents are voted for yes, a question was asked about the medicine for the treatment of dengue the finding are (antibiotic=15.8%, antipyretic=73.3% and pain killer=10.8%), a question was asked about the confirmation of dengue in the suspected patient from the respondents the result are (PCR=10%, ELISA=10.8%, CBC=20.4%, dengue serology=5.75% and viral culture=1.25%).

3.4. Knowledge of the respondents related to attitude, prevention and practice of dengue

Table 4 describe attitude, prevention and practice of the respondents related to the dengue fever in Malakand region Pakistan, in response to the question "are you familiar with the WHO clinical management of dengue guidelines?" 67.9% of the respondents were voted for yes, another question were asked "WHO dengue guidelines help in managing dengue fever"82.5% of the respondents are marked yes, a question were asked that are their

Table 1. Demographic information among health practitioners of four districts of Malakand region, Pakistan.

Factors		Districts (n=240)				Total	%
		Swat (n=60)	Lower Dir (n=120)	Upper Dir (n=10)	Malakand (n=50)		
Age (years)	21-40	44	83	10	43	180	75.0%
	41-60	11	30	00	07	48	20.0%
	60<	05	07	00	00	12	5.00%
Gender	Male	44	105	10	45	204	85.0%
	Female	16	15	00	05	36	15.0%
Profession	Physician	12	25	01	11	49	20.4%
	Public health officers	28	25	02	11	66	27.5%
	Paramedics	20	70	07	28	125	51.6%
Practice settings	Health center	36	77	07	42	162	67.5%
	Referrals hospitals	24	43	03	08	78	32.5%
Experience (years)	1-10	36	60	03	31	130	54.2%
	11-20	08	45	07	14	74	30.8%
	21 and above	16	15	00	05	36	15.0%
Zone	Hot spot	37	50	05	19	111	46.2%
	Non-hot spot	23	70	05	31	129	53.8%

adequate resources are available to treat dengue at local areas the results were 62.1% for yes, a question were asked about the resources that are lacking to treat patient with dengue the result are (sufficient training=46.2%, medication=37.0%, instruments=5.83% and laboratory tools=10.8%) a question were asked about the prescription of paracetamol to the dengue patient from the respondents the results were (always=62.0%, sometimes=31.2% and never=6.66%), in response to the question "how frequently do you advise DP to avoid mosquito bite?" the result were (always=79.1%, sometimes=16.2% and never=4.58%), in response to the question "how frequently do you prefer CBC lab investigation to monitor patient with suspected or confirm dengue?" the results were (always=64.5%, sometimes=16.2% and never=2.91%).

4. Discussion

Current study pinpoint to understand the knowledge, attitude and practices among health care workers in Malakand region, Pakistan. In this research 3 age groups (20-40, 41-60 and above 60 years) were considered. Age wise this study was comparable to the study findings of Itrat et al. (2008). While another study was conducted in Kuala Kangsar district of Malaya which are not comparable age wise to our finding in that study the proportional of >50 were quite high (47%) Hairi et al. (2003).

Sex wise almost all the study was found the same of Oriental region in literature the proportion of male was high as compare to female due to some restriction of female in society but this situation was not same in European country, current study finding of gender proportion were same with finding of Khalil et al. (2016), Arif et al. (2015), Hairi et al. (2003), Itrat et al. (2008) and Syed et al. (2010) in all these studies the proportion of male is greater than the female, while contradicted with the finding of Qureshi et al. (2014) and Siddiqui et al. (2013) in the first two study the proportion of male and female were almost similar but in Siddique study the proportion of male were less than the female (male 34% and female 66%).

Knowledge of mosquito breeding site were asses in this paragraph, according to the current study most of the participants were voted to clean water for mosquito breeding site (64.9%), dirty water 25.8%), puddles (6.25%) and garbage (2.91%) according to this data most of the medical practitioners were aware of the breeding site of mosquito, the finding of the current study were not comparable with the other study which were conducted at other areas like Khalil et al. (2016) Arif et al. (2015) and Itrat et al. (2008) this deviation may due to the selected population in the current study we are selected the health

Table 2. Knowledge of the respondents related to dengue vector among health practitioners of four districts of Malakand region, Pakistan.

Factors		Districts (n=240)				Total	%
		Swat N=60	Dir (L) N=120	Dir(U) n=10	Malakand N=50		
Have you ever seen dengue vector?	Yes	44	72	08	23	147	61.2%
	No	16	48	02	27	93	38.8%
What is the cause of dengue fever?	Mosquito	31	74	08	36	149	62.0%
	Bacteria	12	05	00	01	18	7.50%
	Virus	16	25	02	10	53	22.0%
	Parasite	01	16	00	03	20	8.33%
How do dengue mosquito looks like?	Small dark mosquito with white strips on legs	48	88	08	44	188	78.3%
	Marking in form of a lyre on its thorax	12	32	02	06	52	21.7%
Where does dengue mosquito breeds?	Flowing dirty water	10	11	01	04	26	10.8%
	Flowing clean water	24	21	00	11	56	23.3%
	Stagnant dirty water	04	22	01	09	36	15.0%
	Stagnant clean water	22	48	05	25	100	41.6%
	Puddles	00	12	02	01	15	6.25%
	Garbage	00	06	01	00	07	2.91%
Where does dengue mosquito prefer living?	Underneath furniture	12	12	04	13	41	17.1%
	Shelter places	34	90	05	28	157	65.4%
	Indoor	14	18	01	09	42	17.5%
What is the most frequent mosquito bite time	Sunset/Sundown	40	94	08	43	185	77.1%
	Day time	13	17	00	02	32	13.3%
	Night	07	09	02	05	23	9.58%
How is dengue transmitted?	An infected dengue mosquito bite	40	103	10	42	195	81.2%
	Contacting DP*	12	11	00	04	27	11.3%
	Drinking dirty water	08	06	00	04	18	7.50%
Is government responsible for controlling mosquito causing dengue	Agree	53	107	10	43	213	88.7%
	Disagree	07	13	00	07	27	11.3%

care workers of malakand division while in the other study they were selected the general population.

Question about mosquito bite time are asked in different article they were not comparable with current study, according to the current study which were conducted in the four districts of malakand division the responded were health worker in this study three timing were asked about the question sunset/sundown, day time and night time, according to the most of the respondents Aedes mosquito are crepuscular the biting time are sunset and sundown (77.1%) day time are marked by (13.3%) but some of the respondents are believed that the dengue mosquito are

Table 3. Knowledge of the respondents related to dengue fever among health practitioners of four districts of Malakand region, Pakistan.

Factors		Districts (n=240)				Total	%
		Swat n=60	Dir(L) n=120	Dir(U) n=10	Malakand n=50		
Have you ever seen dengue fever cases?	Yes	51	83	06	44	184	76.6%
	No	09	37	04	06	56	23.4%
Total		60	120	10	50	240	
Cases dealt with?		80	132	28		240	
What are the symptoms' of dengue?	Prolong high fever	30	76	03	31	140	58.3%
	Muscular pain	09	19	01	07	36	15.0%
	Bleeding from nose and other areas	11	20	06	12	49	20.4%
	Rashes	05	05	00	00	10	4.14%
	Headaches, nausea and vomiting	05	00	00	00	05	2.08%
Can dengue fever be prevented?	Agree	58	103	09	49	219	91.2%
	Disagree	02	17	01	01	21	8.75%
Is vaccination available for dengue?	Yes	18	33	01	12	64	26.6%
	No	42	87	09	38	176	73.3%
Can dengue be treated?	Yes	49	95	09	41	194	80.8%
	No	11	25	01	09	46	19.2%
How can it be treated?	By using antibiotics	12	17	00	09	38	15.8%
	Anti pyretic	43	87	10	36	176	73.3%
	Use pain killer	05	16	00	05	26	10.8%
By what test can dengue be confirmed?	PCR	09	11	02	02	24	10.0%
	ELISA	10	10	00	06	26	10.8%
	Leukocyte,platlets, hematocrit	11	26	01	11	49	20.4%
	Dengue serology	27	73	07	31	138	57.5%
	Viral culture	03	00	00	00	03	1.25%
What is the most effective preventive measure for controlling dengue	Use of mosquito nets	35	87	10	30	162	67.5%
	Use of mosquito mats/coils	14	11	00	03	28	11.6%
	Use of mosquito repellants	03	12	00	10	25	10.4%
	Use of mosquito window-door screen	08	10	00	07	25	10.4%
How you heard about dengue?	Radio/TV	10	14	00	10	34	14.1%
	Print media	22	32	02	15	71	29.5%
	Teacher/Lecture	11	15	05	04	35	14.5%
	Social media	17	59	03	21	100	41.6%

nocturnal there feeding time are night (9.58%) while in other study this proportion were quite different.

A question was asked in the current study about the dengue transmission most of the respondents were voted that the dengue are transmitted through bite of the mosquito which were (81.2%) 2nd option are dinking dirty water (7.5%) and the 3rd option is by contacting with dengue patient (11.3%) it means that knowledge about the transmission were quite high among the healthcare worker of Malakand region another study was conducted in Karachi Pakistan Itrat et al. (2008) the finding of that study were comparable to the finding of the current study, in the study of Karachi (86.9%) of the responded are also believed that mosquito bite are the main cause of dengue transmission, the same result are also found in another study Arif et al. (2015) which was (83.8%).

Table 4. Knowledge of the respondents related to attitude, prevention and practice of dengue among health practitioners of four districts of Malakand region, Pakistan.

Factors		Districts n=240				Total	%
		Swat n=60	Dir(L) n=120	Dir(U) n=10	Malakand n=50		
Are you familiar with the WHO clinical management of dengue guidelines?	Yes	53	80	08	22	163	67.9%
	No	07	40	02	28	77	32.1%
WHO dengue guidelines help in managing dengue fever	Yes	49	93	08	48	198	82.5%
	No	11	27	02	02	42	17.5%
Are there adequate resources available to treat dengue?	Yes	42	70	06	31	149	62.1%
	No	18	50	04	19	91	37.9%
What resource lacking to treat patient with dengue?	Sufficient training	30	49	04	28	111	46.2%
	Medication	15	58	06	10	89	37.0%
	Instrument	04	07	00	03	14	5.83%
	Laboratory tools	11	06	00	09	26	10.8%
How frequently do you prescribed paracetamol to dengue patient?	Always	32	78	08	31	149	62.0%
	Sometimes	25	30	02	18	75	31.2%
	Never	03	12	00	01	16	6.66%
How frequently do you advise DP to avoid mosquito bite?	Always	42	94	09	45	190	79.1%
	Sometimes	17	18	01	03	39	16.2%
	Never	01	08	00	02	11	4.58%
How frequently do you prefer CBC lab investigation to monitor patient with suspected or confirm dengue?	Always	40	72	01	42	155	64.5%
	Sometimes	20	11	00	08	39	16.2%
	Never	00	07	00	00	07	2.91%

In the current study a question were asked about the dengue fever cases seen (76.6%) are voted for yes and (23.4%) of the respondents were voted for no, the population of the current study are health care workers so most of the participants are seen dengue fever patient, the finding of the Itrat et al. (2008) are similar with the current study which are (yes=89.9%, no=10.1%) and (yes=65.7%, no=34.3%) respectively.

In the current study a question were asked about the prevention of dengue fever most of the respondents are believed that dengue fever can be prevented, 91.2% of the respondents are voted for yes and 8.2% of the respondents are voted for no, the same study was conducted in Peshawar Pakistan Khalil et al. (2016) in which the situation are not same, the finding of that study were 41.2% of the respondents were voted for yes 43.6% of the respondents were voted for no while 15.2% of the respondents are selected the not sure option meaning that not know about the question the finding of the current study and the finding of the Peshawar study were not match may be due to the selected population, the Peshawar study population were the general population of rural and urban area.

In the current study a question were asked from the respondents that how you heard about the dengue so 41.6% of the respondents are marked the option of social media, 29.5% of the respondents are marked the option of print media, 14.5% are marked the option of lecture and 14.1% of the respondents are marked the option of TV/ Radio. The same study were conducted in central Punjab Pakistan Arif et al. (2015) their finding are not same with the finding of the current study, 61.4% of the respondents were voted for TV/Radio, 19.4% were voted for print media and 37.4% of the respondents were voted for lecture, this differences may be due to selected population, areas of the study, and year of the study it can be said that the use of social media is quite high in Malakand region as compare to the Punjab province of Pakistan.

In the current study a question were asked about the treatment of the dengue fever "how dengue be treated" three option are given (anti pyretic, antibiotic and pain

killer) according to 73.3% of the respondents are believed that the dengue fever can be treated by using anti pyretic, 15.8% of the respondents are believed that the treatment of the dengue fever are antibiotic and 10.8% of the respondents are voted for pain killer. The same study were conducted in Karachi Pakistan Itrat et al. (2008) their finding are not similar with the finding of the current study may be due to the selected population their study population were general while the population of the current study are medical practitioner their finding are 22.8% of the respondents are voted for antipyretic, 8.7% of the respondents are voted for pain killer and 5.6% of the respondents are voted for antibiotic, and most of the participants are refused from that question according to them they are not know about the treatment.

5. Conclusions

It is concluded that the health care workers are well aware about dengue fever and its prevention, the proportion of male was quite high and most of participants have seen dengue vector (62%), the media being the most quoted source of information. Nearly 81.2% participants were aware transmission of dengue fever is by mosquito bite. A significant ratio of the respondents are believed that dengue fever can be prevented, 91.2%, however, it was noted that sufficient knowledge doesn't necessarily lead to good practice. Health educational campaigns and seminar should be conducted to improve behavior of the community about dengue. Interdepartmental collaboration is required, medical, religious and municipal corporation for stressing on adopting preventive measures and distributing low cost preventive material against dengue. The knowledge and practice will remain an important challenge for public health to dengue control, climate change including increase in temperature, precipitation and humidity is considered as main factor to increase the epidemics of dengue virus in different parts of the world. This study was conducted in Malakand region the target population are medical practitioners. Further studies are advised in various community to know the exact level of knowledge, attitude and practices about dengue and its vector in other parts of Pakistan.

Acknowledgements

Authors extended their gratitude to the medical doctors of Malakand region who have participated in this study and helped in data collection.

References

ALMEIDA, A.S.D., MEDRONHO, R.D.A. and VALENCIA, L.I.O., 2009. Spatial analysis of dengue and the socioeconomic context of the city of Rio de Janeiro (Southeastern Brazil). *Revista de Saude Publica*, vol. 43, no. 4, pp. 666-673. http://dx.doi.org/10.1590/S0034-89102009000400013. PMid:19649472.

ARIF, M.M., ALI, M.A. and ARIF, A., 2015. Knowledge, Attitude and Practice (KAP) of dengue fever in adult semi-urban and rural population of Central Punjab Pakistan. *Annals of Punjab Medical College*, vol. 9, no. 3, pp. 129-135.

GUGLANI, L. and KABRA, S.K., 2005. T cell immunopathogenesis of dengue virus infection. *Dengue Bulletin*, vol. 29, pp. 58-69.

HAIRI, F., ONG, C.H., SUHAIMI, A., TSUNG, T.W., BIN ANIS AHMAD, M.A., SUNDARAJ, C. and SOE, M.M., 2003. A knowledge, attitude and practices (KAP) study on dengue among selected rural communities in the Kuala Kangsar district. *Asia-Pacific Journal of Public Health*, vol. 15, no. 1, pp. 37-43. http://dx.doi.org/10.1177/101053950301500107. PMid:14620496.

HALSTEAD, S.B., 1980. Dengue haemorrhagic fever: a public health problem and a field for research. *Bulletin of the World Health Organization*, vol. 58, no. 1, pp. 1-21. PMid:6966540.

HALSTEAD, S.B., 1992. The XXth century dengue pandemic: need for surveillance and research. *World Health Statistics Quarterly*, vol. 45, no. 2-3, pp. 292-298. PMid:1462664.

ITRAT, A., KHAN, A., JAVAID, S., KAMAL, M., KHAN, H., JAVED, S., KALIA, S., KHAN, A.H., SETHI, M.I. and JEHAN, I., 2008. Knowledge, awareness and practices regarding dengue fever among the adult population of dengue hit cosmopolitan. *PLoS One*, vol. 3, no. 7, e2620. http://dx.doi.org/10.1371/journal.pone.0002620. PMid:18612437.

KHALIL, K.R., MALIK, F.R. and FAISAL, M.S., 2016. Knowledge, attitude and practices (KAP) study on dengue among rural and urban areas of Peshawar Pakistan. *Rawal Medical Journal*, vol. 4, pp. 153-159.

LIU-HELMERSSON, J., QUAM, M., WILDER-SMITH, A., STENLUND, H., EBI, K., MASSAD, E. and ROCKLÖV, J., 2016. Climate change and Aedes vectors: 21st century projections for dengue transmission in Europe. *EBioMedicine*, vol. 7, pp. 267-277. http://dx.doi.org/10.1016/j.ebiom.2016.03.046. PMid:27322480.

LUQMAN, M., SATTAR, T., FARID, S., WARRAICH, I.A. and KHAN, W.A., 2013. Effects of dengue incidence on socio-economic status of Patient's family: a comparative analysis of Multan and Lahore City (Pakistan). *Journal of Economic Sustainability Development*, vol. 4, pp. 28-40.

PAUL, R.E., PATEL, A.Y., MIRZA, S., FISHER-HOCH, S.P. and LUBY, S.P., 1998. Expansion of epidemic dengue viral infections to Pakistan. *International Journal of Infectious Diseases*, vol. 2, no. 4, pp. 197-201. http://dx.doi.org/10.1016/S1201-9712(98)90052-2. PMid:9763501.

QURESHI, E.M.A., VEHRA, S., GHAFOOR, G.Z., ALI, A.S. and AHMAD, F., 2014. Community perception regarding dengue epidemic in Lahore, Pakistan. *Pakistan Journal of Science*, vol. 66, no. 1, pp. 7.

RAI, M.A. and KHAN, H., 2007. Dengue: indian subcontinent in the line of fire. *Journal of Clinical Virology*, vol. 38, no. 3, pp. 269-270. http://dx.doi.org/10.1016/j.jcv.2006.12.010. PMid:17254843.

RASHEED, S.B., BUTLIN, R.K. and BOOTS, M., 2013. A review of dengue as an emerging disease in Pakistan. *Public Health*, vol. 127, no. 1, pp. 11-17. http://dx.doi.org/10.1016/j.puhe.2012.09.006. PMid:23219263.

SEIXAS, G., JUPILLE, H., YEN, P.S., VIVEIROS, B., FAILLOUX, A.B. and SOUSA, C.A., 2018. Potential of *Aedes aegypti* populations in Madeira Island to transmit dengue and chikungunya viruses. *Parasites & Vectors*, vol. 11, no. 1, pp. 509. http://dx.doi.org/10.1186/s13071-018-3081-4. PMid:30208974.

SEMENZA, J.C., 2015. Prototype early warning systems for vector-borne diseases in Europe. *International Journal of Environmental Research and Public Health*, vol. 12, no. 6, pp. 6333-6351. http://dx.doi.org/10.3390/ijerph120606333. PMid:26042370.

SEMENZA, J.C., SUDRE, B., MINIOTA, J., ROSSI, M., HU, W., KOSSOWSKY, D., SUK, J.E., VAN BORTEL, W. and KHAN, K., 2014. International dispersal of dengue through air travel: importation risk for Europe. *PLoS Neglected Tropical Diseases*, vol. 8, no. 12, e3278. http://dx.doi.org/10.1371/journal.pntd.0003278. PMid:25474491.

SHAMIM, M., 2010. Frequency, pattern and management of acute abdomen in dengue fever in Karachi, Pakistan. *Asian Journal of Surgery*, vol. 33, no. 3, pp. 107-113. http://dx.doi.org/10.1016/S1015-9584(10)60019-X. PMid:21163407.

SHUAIB, F., TODD, D., CAMPBELL-STENNETT, D., EHIRI, J. and JOLLY, P.E., 2010. Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. *The West Indian Medical Journal*, vol. 59, no. 2, pp. 139-146. PMid:21132094.

SIDDIQUI, F.R., USMANI, A.Q., ATIF, I., USMAN, S.H.B. and HAIDER, S.H., 2013. 2008. Are we aware of dengue fever? A community based KAP survey on dengue fever in Rawalpindi. *Journal of Islamic International Medical College*, vol. 8, no. 3, pp. 69-73.

SYED, M., SALEEM, T., SYEDA, U.R., HABIB, M., ZAHID, R., BASHIR, A., RABBANI, M., KHALID, M., IQBAL, A., RAO, E.Z. and SALEEM, S., 2010. Knowledge, attitudes and practices regarding dengue fever among adults of high and low socioeconomic groups. *JPMA. The Journal of the Pakistan Medical Association*, vol. 60, no. 3, pp. 243-247. PMid:20225792.

YBOA, B.C. and LABRAGUE, L.J., 2013. Dengue fever, dengue preventive practices, dengue knowledge, Samar Province. *American Journal of Public Health Research*, vol. 1, no. 2, pp. 47-52. http://dx.doi.org/10.12691/ajphr-1-2-2.