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Dengue virus epidemics: A recent report of 2018 from district Swat, Khyber-Pakhtunkhwa Pakistan

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Abstract
Dengue is a vector-borne tropical disease caused by dengue virus (DENV) infection that affects more than a hundred million human beings globally with a high mortality rate of 30000 per year. The study was aimed to highlight the clinical, epidemiological, and diagnostic characteristics of dengue infection in the recent outbreak. The role of various diagnostic tools was also determined to achieve the highest accuracy level. A total of suspected dengue subjects, about 902 blood samples were collected along with clinical and epidemiological information. These patients had visited saidu teaching hospitals during a dengue outbreak in district Swat. The data was taken from July to November 2018. The Collected blood samples were screened for dengue infection through Immunochromato graphic technique (ICT), nonstructural protein-1 (NS1) antigen, IgG antigen, and IgM antibodies. About 305(33.81%) were found positive for dengue infection IgG, IgM, or both IgG and IgM, NS1, NS1+IgM, NS1+IgG, NS1+IgM+IgG. The dengue infection rate in males 207 (14.50%) was higher as compared to females 98 (5.46%). The rate of infection was found more in the age group of 16-30 years of age (38.68%). All patients were suffering from severe fever (97%), Abdominal pain (40%), Vomiting (57%), Nose bleeding (27%), Gum bleeding (51%), Abdominal pain (61%), Skin rash (10%). The prevalence of Dengue virus infections shows a great rate of incidence in 2018 at district swat. Due to the lack of poor health system and as well as lack of awareness in the individual. Our results show that males are more affected as compared to females in the current outbreak.

Keywords: dengue virus, NS1, recent report 2018, swat

Introduction
Dengue is a vector-borne viral infection that affects more than a hundred million human beings with a mortality rate of 30000 per year worldwide [1]. Dengue is a single-stranded positive-sense RNA virus that belongs to the Flavivirus genus of the Flaviviridae family [2, 3]. There are 4 antigenically different serotypes of the dengue virus (DEN- 1, DEN- 2, DENV- 3, and DENV 4) [2-5]. Even so, serotype 5 (DEN-5) has been identified by way of different neutralization techniques [6, 7]. Latest studies from Pakistan confirmed the prevalence of serotypes 2, 3, and 4 in Punjab and serotype 2 and 3 in the Swat region of KPK with high morbidity and mortality [3, 8]. The vectors for the above-stated viruses are transmitted by female Aedes mosquito belongs to (order *Diptera* and *Culicidae* family) named *Aedes aegypti* is commonly known as a yellow-fever mosquito (primary vector) and *Aedes albopictus is* known as Asian tiger mosquito (secondary vector) [9, 10]. Dengue fever (DF) lies in three main phases: mild dengue fever, severe dengue-hemorrhagic fever, and fatal dengue shock syndrome. In Pakistan, dengue fever (DF) is endemic for the last few years, where the highest morbidity and mortality were reported post-monsoon [11]. Various regions of the country had faced some deadly epidemics of dengue infection along with extensive human health problems and deaths. Since 2010, an increase in outbreaks in various regions has been reported. For the very first time in Lahore in 2011, the largest pandemics were reported with more than 360 deaths. After, the second outbreak causing more than eight thousand morbidities, and 57 deaths were reported in Swat in 2013. Freshly, several huge outbreaks from KPK reported about 24 938 cases along with 70 deaths [3, 11, 12].

Hence, the present study was aimed to examine the recent outbreak of 2018 that occurred in district Swat of Khyber Pakhtunkhwa, Pakistan.

Materials and methods
Study site
This study was conducted in the District swat Malakand

Division of Khyber Pakhtunkhwa province in Pakistan. Where a population of 2,309,570 according to the 2017 census, Swat is the 3rd largest district of Khyber Pakhtunkhwa. Swat's average elevation is 980 m (3,220 ft).as shown in Fig.No.1.
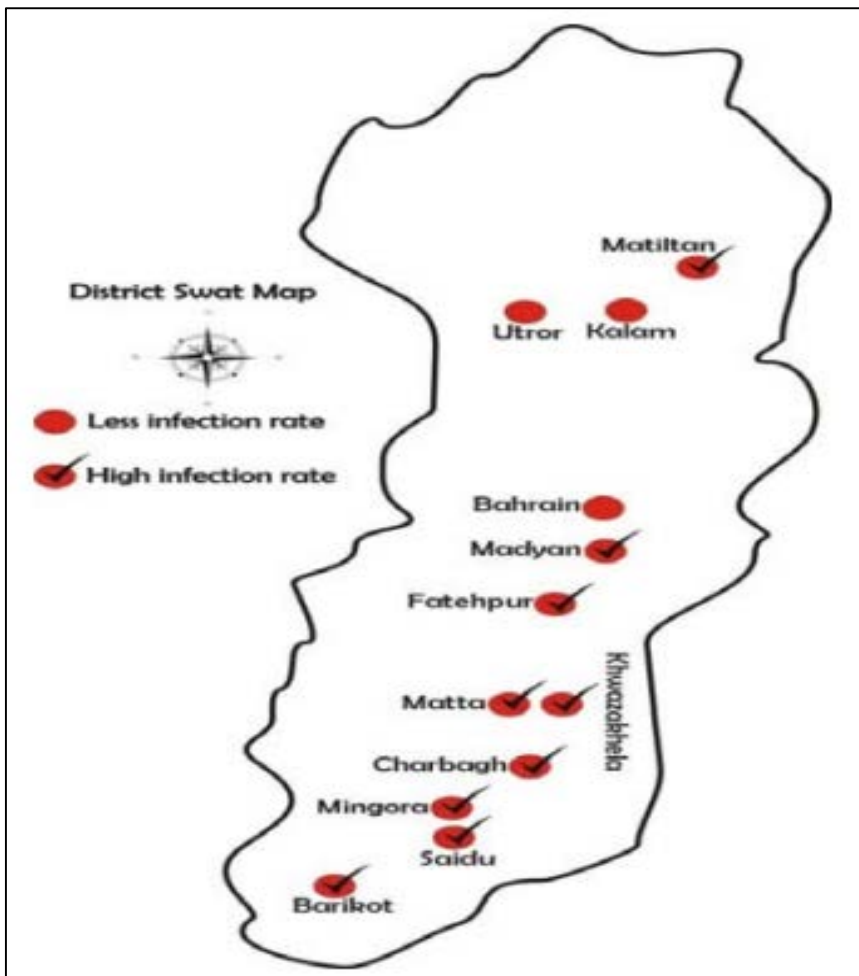

Fig 1: Map of District Swat

Data Collection
Dengue infected patient data was collected from Saidu medical complex swat with the approval of the medical superintendent and in collaboration with laboratory technicians and medical physician staff. The dengue fever patient having signs and symptoms were recorded and admitted to a specific dengue patient ward. All dengue infected patient was examined thoroughly for Epistaxis, loose motion, Abdominal pain, vomiting, Enlarged liver. The analysis was done liver function and dengue detect the help of different diagnostic kits such as anti-dengue antibodies NS1, IgG, IgM.

Laboratory Analysis
The dengue infected patient has been screened through Immunochromatographic Technique (ICT) having recombinant NS1 antigen and both coated IgG and IgM antibodies. All these cases were registered from July to November 2018. laboratory analysis was carried out for anti-dengue antibodies NS1, IgM, IgG with the help of various

diagnostic instruments.
Ethical Approval
The present study was approved by the Ethical Committee Department of Genetics Hazara University Mansehra.

Results
A total of 902 dengue suspected patients were visited District Head Quarter Hospital Swat for dengue hemorrhagic fever from various areas from District Swat with different symptom from July 2018 to November 2018. A total of 305(33.81%) cases that were dengue positive were verified by the pathology lab of the hospital. Male 207 (14.50%) was found more prevalent as compared to female. 98(5.46%) the details are mentioned in Table. No 1.

Table 1: Demographic representation of dengue Fever infection in District Swat

Total Patients	Total Positive patients	Males	Female
902	305(33.81%)	207(14.50%)	98(5.46%)

Clinical Feature of dengue fever

All suspected patients were remarked for clinical signs and symptoms of dengue virus infection such as fever, skin rashes, vomiting, gum bleeding, nose bleeding, and abdominal pain is a percentage as shown in Table.No.2).

Table 2: Sign and Symptom of dengue fever

Symptoms	Percentage %
Fever	97%
Vomiting	57%
Gum bleeding	27%
Nose bleeding	51%
abdominal pain	61%
Skin Rashes	10%

Month Wise Distribution of Dengue Infection

The spreading and severity rate of dengue fever infection is very high in September (28.85), October (21.96%), July (14.75%). The lowest rate of dengue infection in August (20.2%) and November (14.42%). As shown in table.No.3

Table 3: Month Wise Distribution of Dengue Infection

Months	Total positive	Male positive Case	Female Positive case	Percentage %
July	45	33	12	14.75%
August	61	42	19	20.2%
September	88	56	32	28.85%
October	67	45	22	21.96%
November	44	31	13	14.42%
Total	305	207	98	100%

Age-wise distribution of infected Population:

The dengue fever patients were divided into five age-wise groups from 1 to 15, followed by 16 to 30, 31 to 45, 46 to 60 and above 60 years. The highest rate was found in the age group 16 to 30 with 118 patients (38.68%), followed by 31 to 45 with 72 (23.60%),1 to 15 years 59 (19.34%), 46-60 39 individuals (12.78%) and above 60 with 17 patients (5.57%) is also shown in Table.No.4.

Table 4: Age-wise Distribution of Dengue infection

Age of patients	Number of Positive patients	Percentage %
1 to 15 year	59	19.34%
16 to 30 year	118	38.68%
31 to 45 year	72	23.60%
46-60 year	39	12.78%
Above 60 year	17	5.57%
Total	305	100%

Table 5: Distribution of dengue patients based on antibodies:

Anti-dengue Antibodies	Male	Female	Total	Percentage %
SN1	79	32	111	36.40%
IgG	17	9	26	8.52%
IgM	41	22	63	20.65%
SN1+IgG	29	16	45	14.75%
SN1+IgM	24	13	37	12.13%
IgG+IgM	17	06	23	7.55%
Total	207	98	305	100%

All serological test markers of the positive Dengue patients 305 were including NS1, IgG, and IgM as shown in table No.5.

Discussion

Dengue infection is a tropical disease with most of the cases being reported during summer [12, 14]. Often the cases are reported at some hospitals, accidentally. The disease stays undiagnosed because of lack of laboratory resources, insufficient diagnostic facilities, inadequate knowledge about the initial symptoms, and the different responses or non-specific clinical symptoms make the situation worse. Many studies have reported seropositive population to dengue infection from several regions of the country such as Rawalpindi, Mardan, shangla, and other parts of the KPK and Punjab [15-18]. In our current study, 305 individuals were positive for dengue fever. Here our study different laboratory analysis kits are antibodies and anti-antibodies were found like NS1, IgG, IgM. The highest ratio of SN1 is (36.40%), followed by IgM (20.65%), IgG (8.52%), SN1+IgG (14.75%), SN1+IgM (10.52%) and IgG+IgM (7.55%). In the current study higher prevalence was found in males 14.50% (207) as compared with female infected 5.46% (98) positive case as shown in table No.1 Similar result ae found are conducted in 2018 [16]. Therefore, males are more vulnerable to mosquito bites than females because they are more active outdoor as compare to females due to cover culture dress and staying at home. In the current study highest age group 16 to 30 (38.68%) was found in dengue fever. A similar study was also reported from the swat and Battagram district [19, 20]. Hence teenagers of this region from 16 to 30 are more vulnerable as compare with another age group the Reason possibly being their outdoor activities. According to our current study, a high rate of positive dengue incidence was found in August to September (28.85%, 21.96%) as compared to July and November (14.75%). Because due to moderate temperature and humidity. The area was also explored by agreement with a previously published Swat report [21].

Conclusion

The current study concluded that Govt may have done some better arrangements for the control of dengue infection in other cities and districts of the province. It was remarked that the increasing number of male patients is because of their traveling to urban areas for different purposes. In the light of current and earlier investigations, we came to the point that dengue shows variation from non-epidemic to highly epidemic year. As the study area is remote and generally the public is less educated, further research work along with increased public awareness about the possible risk factors and preventive strategies for dengue infection is the utmost need of the hour.

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