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# Epidemiological and clinical manifestation of dengue virus infection: A Recent Report of 2018 from District Battagram Khyber Pakhtunkhwa, Pakistan

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## Abstract

Dengue virus infection is a human-associated vector-borne disease that spreads in all regions of the world. Dengue belongs to family Flaviviridae contain single stranded Positive sense RNA. It has particular vector for spreading of Disease (*Aedes aegypti* & *Aedes albopictus*). The retrospective study was conducted in 2018 from September to December the main objective of the current research to evaluate problems linked with dengue virus fever infection in district Battagram. The dengue patient visited District Head Quarter Hospital of district Battagram from different area of Battagram. The patient was kept in separate ward dengue patient's full consideration is given them by the hospital staff. The suspected patients were screened for DENV NS1 ICT immune chromatographic technique. The ICT were coated by combined NS1 antigen both antibodies IgG and IgM. A total of 95 patient are positive have infected by dengue virus the more ratio of male (14.50%) as compare to females (5.46%) are less infected. The prevalence of DENV were age group 16 to 35 48.42% years. In present study dengue fever infection was in highest in October (41.04%) due to the post monsoon rain season. Furthermore patients 43.14% had platelets countless 100000cmm which may be critical dangerous for health. On light of this study, we recommend that proper administration and management in the government sector be needed and that adequate funds be raised and well-equipped laboratories with properly qualified technicians be trained.

**Keywords:** Battagram, NS1, IgG, IgM, Dengue, Outbreak 2018

## Introduction

Dengue is an emerging class of mosquito-borne Infectious diseases which Caused by a virus known as dengue virus (DENV) with single-stranded positive-sense RNA that belongs to the genus Flavivirus and family Flaviviridae [1]. Dengue virus disease expanded thirty times more over the most recent fifty years. It infects about 4 hundred million individuals consistently due to its spread from country to country and municipal to remote areas. Around half of the world population is at danger in the regions of Dengue endemic [2]. Dengue fever is a severe arboviral disease rising and reappearing and has made a general medical problem in equatorial regions of the world. [3]. Dengue infection is caused by Dengue virus (DENV), having family Flaviviridae and genus flavivirus. [4]. DENV has been categorized into four sera variants (DENV-1-4) [5]. First outbreak of Dengue fever in Pakistan was reported in 1994-95 in Karachi. Numerous multiple flare-ups have been reported simultaneously from various areas of the country specifically from Lahore and Karachi [6]. Afterward a tremendous dengue incident happened in Pakistan in 2006 because of the Co-dissemination of sera variants DENV-2 and DENV-3, respectively. Currently, a change identified in the pattern and other modes like clinical spectrum, and outcome of this disease has been reported, with an expanded frequency of DHF in clinical practice [7]. The two devastating Dengue episodes were later revealed in the nation, first in Lahore in 2011 and second in Swat a City of KP situated in North-south infecting around twenty thousand individuals with around four thousands passing. [8]. According to World Health Organization approximates there are 2.5 billion individuals in 124 countries which are in danger of dengue infection, with over 100 million cases of DENV

infection and 30,000 approximated deaths from infection reported globally every year. Approximately 500,000 annual cases of DHF and DSS are affected of severe disease expressions due to secondary dengue infections<sup>[9]</sup>. The aim of the study was to find out known cases of dengue Infection in the current outbreak in the year 2018 in District Battagram.

## Materials and Methods

### Description of study Area

District Battagram is the district of Hazara Division of Khyber Pakhtunkhwa province of Pakistan which renowned for its beauty. The district of Battagram is located at the latitude of 34.41 and longitude 73.1. It is surrounded by Mansehra district to the east, Kohistan District to the North, Torghar district to the south and west to District Shangla. The population of Battagram district, according to google in the 2017 census, is 476,612.

### Collection of clinical data

The dengue fever data was collected from district head quarter hospital Battagram with the approval of head of department of pathology. The dengue fever patient having few sign and symptom were registered and admitted specific dengue patient ward. All dengue infected patient were examined thoroughly for Epistaxis, loose motion, Abdominal pain, vomiting, Enlarged liver. The analysis were done liver function, platelets count, and dengue detect the help of different diagnostic kits such as anti-dengue antibodies NS1, IgG, IgM.

### Laboratory Analysis

The laboratory screening done over Immunochromatographic Technique (ICT) of suspected dengue fever patient having recombinant NS1 antigen and both coated IgG and IgM antibodies. All these cases were registered from September to December 2018 having all sign and symptom are mention in above table No.1

### Ethical Approval

The present study was approved from ethical committee Department of Genetics Hazara University Mansehra.

### Results

A total 476 suspected patient was visited to District Head Quarter Hospital Battagram for Dengue hemorrhagic fever from different areas from district Battagram with different symptom from September to December 2018, a total 95 cases of dengue positive were recorded by pathology department of the hospital. The highest frequency was found in male 69 (14.5) as compare to female 26 (5.46). as show in table No.1.

**Table 1:** Prevalence of Dengue infection

| Total Patient | Total Positive patient | Male        | Female    |
|---------------|------------------------|-------------|-----------|
| 476           | 95 (19.95%)            | 69 (14.50%) | 26(5.46%) |

### Age wise Distribution of Dengue infection

Dengue infected patient were divided into 4 categories group from 1-15, followed by 16 to 35, 36 to 50 and 50 onward. The highest rate of dengue fever was observed in age group 16 to 35 with 46 patient (48.42%), followed by 1 to 15 with 20 (21%), 36-50 16 patients (16.84%) and 50 onward with 13 (13.68%).the aga-wise weightage is given in table No. 2.

**Table 2:** Age wise Distribution of Dengue infection

| Age Group     | No. of Patient | Percentage % |
|---------------|----------------|--------------|
| 1 to 15 year  | 20             | 21%          |
| 16 to 35 year | 46             | 48.42%       |
| 36 to 50 year | 16             | 16.84%       |
| Above 50 year | 13             | 13.68%       |
| Total         | 95             | 100          |

### Clinical feature of dengue fever Patient:

The dengue fever patient were detected to suffer from different sign and symptom like fever, followed by some clinical character nose bleeding, vomiting, enlarged liver, skin rashes. As shown in table no 3.

**Table 3:** Clinical feature and symptom of Dengue infected Patients

| S. No | Symptoms       | Percentage |
|-------|----------------|------------|
| 1     | Fever          | 98%        |
| 2     | Enlarged liver | 59%        |
| 3     | Vomiting       | 55%        |
| 4     | Gum Bleeding   | 29%        |
| 5     | Nose bleeding  | 50%        |
| 6     | Abdominal pain | 63%        |
| 7     | Skin Rashes    | 16%        |

### Month Wise Distribution of Dengue Infection:

Dengue outbreak also report from September to December 2018. In September and October, the spreading rate very high 30.52% and October 41.04%, followed by November with 20%. The lowest spreading rate 8.42% have been reported in the December.as show in table No.4

**Table 4:** Month Wise Distribution of Dengue Fever

| Months    | Total positive case | Male Positive | Female Positive | Percentage |
|-----------|---------------------|---------------|-----------------|------------|
| September | 29                  | 21            | 8               | 30.52%     |
| October   | 39                  | 28            | 11              | 41.04%     |
| November  | 19                  | 13            | 6               | 20%        |
| December  | 8                   | 7             | 1               | 8.42%      |

### Antibodies based Distribution of Dengue Infection:

All the serological test markers of all the positive patients (69) were shown including NS1, IgG and IgM as shown in table No.5.

**Table 5:** Antibodies based Distribution of Dengue Fever

| Anti-Dengue Antibodies | Male | Female | Total | Percentage |
|------------------------|------|--------|-------|------------|
| SN1                    | 19   | 5      | 24    | 25.26%     |
| IgG                    | 6    | 2      | 8     | 8.42%      |
| IgM                    | 27   | 12     | 39    | 41.05%     |
| SN1+IgG                | 4    | 2      | 6     | 6.31%      |
| SN1+IgM                | 7    | 3      | 10    | 10.52%     |
| IgG+IgM                | 4    | 1      | 5     | 5.26%      |
| SN1+ IgG+IgM           | 2    | 1      | 3     | 3.15%      |
| Total                  | 69   | 26     | 95    | 100%       |

### Status of platelets of positive dengue patients:

In positive patient of platelets count in 43.14% (41) 30.52% (29) patients was range 1000000-2000000/cmm, 15.78% patients with 2000000-3000000/cmm, followed by 7.36% patient with 3000000-4000000 and 3.15% are more than >4000000 as shown in table No.6.

**Table 6:** Platelets count status of dengue positive patient

| No of Platelets     | Total Patients | Percentage |
|---------------------|----------------|------------|
| <1000000ccm         | 41             | 43.14%     |
| 1000000-2000000/ccm | 29             | 30.52%     |
| 2000000-3000000/ccm | 15             | 15.78%     |
| 3000000-4000000/ccm | 7              | 7.36%      |
| >4000000/ccm        | 3              | 3.15%      |

## Discussion

In Pakistan first time dengue virus infection outbreak are registered in 1982 in Lahore district of Punjab province of Pakistan.<sup>[13]</sup> WHO 2013 subsequently, many outbreak have been recognized from Khyber Pakhtunkhwa (KP), Sindh and Baluchistan province of Pakistan, but no effective emphasis has been devoted to developing a comprehensive laboratory-based surveillance Program to understand the burden of viral serotypes circulating disease, which may help primary performance of disease observing and control. As a result of inappropriate consideration two major in 2011 and 2013 DENV outbreaks happened in different district of Pakistan, like in Khyber Pakhtunkhwa district swat and district Mansehra and Punjab district Lahore and neighboring areas<sup>[14]</sup> in our study higher number of prevalence was found in 14.50 (69) positive in male as compare with female infected 5.46% (26) positive case as show in table No.1. in our study positive dengue case were divided into 4 groups according to their age. The most prevalent age group are 16 to 35 with 46 (48.42%), followed by 1 to 15 with 20 (21%) cases, 36 to 40 with 16 (16.84%) case while the minimum number of case were found in above 50 age group with 13 (13.68%). The results are associated with the 2017 KPK study with 45% positive cases in the 16-30 age group<sup>[15, 16]</sup>. additionally, Gadhwal *et al.* consider that most dengue fever infection are reported in young age people<sup>[17]</sup>. other study result were found in KP which males population are more affected as compare to females<sup>[18]</sup>. The factor may be that males outdoor exposure is much higher than females, and other significant cause may be that female cultural dress wear prevents them from biting. In our finding also show that month wise dengue prevalence of DENV. The current study was observed from September to December in which much high positive cases were reported in October (41.04%) followed by September (30.52%), November (20%) while minimum number of positive were reported in December (8.42%). Khan *et al* 2013 same result were found in September (45%). Another analysis of previous incidences also reported the same observation<sup>[19, 20]</sup>. The factor could be that the peak of due rainfall in the humid environment of the critical zone may support in dengue mosquito vector breeding. As a result of this hemorrhagic and blood leakage from certain parts, the current decline in platelets was observed in 43.14 % of dengue fever patients. The same results are similar with our observations in which thrombocytopenia was found<sup>[21]</sup>. In our finding study different laboratory analysis kits are antibodies and anti-antibodies were found similar NS1, IgG, IgM. The highest ratio of IgM is (41.05%), followed by SN1 (25.26%), SN1+IgM (10.52%). In Khyber Pakhtunkhwa, a study also reported that 612 suspected individuals were registered. The overall prevalence ratio was 52.12% of specific dengue antibodies like IgG or IgM was (52.12%) and 23 (3.75%) samples provided to both the IgG+ IgM antibodies. Mostly due to patients traveling to endemic area.

## Conclusion

From the present study it may concluded that dengue fever infection is endemic in district battagram Khyber Pakhtunkhwa KP, Pakistan which under high risk of illness and death rate. The most affect age group is 16 to 35 years. Male are more affected as compare to female its ratio is 2:1 between the total dengue fever infected population. Fewer and abdominal pain is most common symptom among all dengue infection reported cases. It may reach a troubling trajectory in the future in the event of inattention to precautionary measures against the dengue outbreak. Second, the Khyber Pakhtunkhwa government should have made some better arrangements for the prevention of dengue infection in other provincial cities and districts to avoid dengue epidemics in future.

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