

Clinical, Epidemiological and Virological Features of Dengue Virus Infections in Tehsil Matta District Swat Patients Presenting to Primary Care Facilities with Acute Undifferentiated Fever

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Abstract:

This study was conducted to evaluate the Epidemiology, Clinical Characteristics and virologic characteristics of Dengue fever and Dengue hemorrhagic fever and to conduct the population-based surveillance for determining the proportion of Dengue Virus infections, dengue incidence and disease burden. The information regarding Dengue IgM, IgG and NS1 of all patients tested for dengue antibody at different hospitals and private laboratories were analyzed to look for trends of NS1, IgG and IgM positive cases in tehsil matta. According to the WHO severity grades the patients were distinguished into DF and DHF. The patients presenting symptoms as petechiae, purpura, and bleeding from the mucosa, gastrointestinal tract, hematemesis or melena and positive tornique test were categorized in DHF. The total numbers of patients were 911 out of which 627 (68.82%) were male and 284 (31.17%) were female. The disease burden was high in males as that of females. The infection rate was high in the age of 21-50 years. The characteristics symptoms were vomiting (67.70%), Abdominal pain (40.50%) and Splenomegaly (23.70%). It was concluded that the major factor involve in this epidemiology was the migration of infected

individual form other infected areas.

Key words: Dengue fever, Dengue Hemorrhagic fever, Epidemiology, Clinical Findings.

Introduction

Dengue fever has become the major cause of mortality and morbidity in tropical and subtropical areas of the world in the past several past decades (Sarkar et al. 2010).

Dengue virus belong to genus Flavivirus, family Flaviviridae, having four distant serotypes (DENV-1 to DENV-4), and causes dengue fever an arthropod-borne disease. According to an estimate the risk of dengue virus transmission is in 2.5 billion peoples of tropical and subtropical areas distributed in 100 countries (Guedes et al. 2010).

According to World health Organization (WHO) South Asia is declared as common area for dengue and dengue hemorrhagic fever. About 50 million dengue infections are estimated every year by WHO. In 2007 890000 cases of dengue were reported, of which 26000 were dengue hemorrhagic fever (DHF) in America (Jahan 2011).

The *Aedes aegypti* is the main vector in Singapore in the dengue virus transmission in dengue outbreaks. In urban areas the *Aedes albopictus*, is widespread but play secondary role (Committee on Epidemic Diseases, Ministries of the Environment and Health, Singapore, unpublished data). First case of Dengue hemorrhagic fever was reported in 1960 in Singapore, and outbreaks are increased in recent years (Chow et al. 1998).

In Pakistan dengue virus infection had made several outbreaks had been reported. In 1982 the first dengue infection in Pakistan was documented in year 1982 from Punjab in which out of 174, 12 patients were found positive for dengue virus, the collection of samples were collected in 1986 and 1978 respectively. In 1994 the first outbreak of DHF was reported by

Chan and colleagues who tested 10 patients for dengue virus in which they observed DEN-1 and DEN-2 in 3 patients (Fatima et al. 2011).

In Pakistan the dengue virus is now prevalent in the post monsoon periods; the virus circulates throughout the year with a peak incidence. The situation is been made worst by the recent floods of 2010 in Pakistan (Jahan 2011).

In the current study we aimed to demonstrate the epidemiology, clinical and laboratory findings in the current outbreak of Tehsil Matta district Swat, Khyber Pakhtoonkhwa Pakistan.

Methods and materials

This survey was conducted in Tehsil Matta in the period of July to November 2013, in order to study the prevalence of dengue fever and dengue hemorrhagic fever in recent outbreak. The data was collected through designed performa from the patients who presented dengue infection symptoms and fulfilling the diagnostic criteria of Dengue fever (DF) and Dengue hemorrhagic fever (DHF) and have positive IgG, IgM and NS1 anti-dengue antibodies. According to the Who severity grades the patients were categorized into DF and DHF [7]. All the infected patients were examined thoroughly for Skin rashes, Abdominal pain, Splenomegaly, Epistaxis, Gum bleeding, Haematemesis, Loose motion, vomiting. The patients presenting symptoms as petechiae, purpura, and bleeding from the mucosa, gastrointestinal tract, hematemesis or melena and positive tornique test were categorized in DHF. The age wise, sex wise and month wise analysis of the data was done.

Results

Age wise distribution of the patients

In the current study 911 patients were investigated in Tehsil Matta district Swat, the high infection rate was recorded in the age of 21- 50 years. The age wise distribution is shown in table 1.1.

Age (Years)	Frequency	Percentage
< 20 years	123	13.50 %
21 – 50	713	78.26 %
> 50 years	75	8.2 %

Table 1.1: Table showing Dengue Infection age wise (n=911).

Sex wise distribution of dengue patients

In current study among the 911 patients 627 (68.82%) were male and 284 (31.17%). The details are shown in table 1.2.

Age (Years)	Male (%)	Female (%)
< 20 years	82 (9.0%)	41(4.50%)
21 – 50	494 (54.22%)	219 (24.03%)
> 50 years	51 (5.59%)	24 (2.63%)
Total	627 (68.82%)	284 (31.17%)

Table 1.2: Table showing Dengue Infection sex wise (n=911).

Patients presenting signs and symptoms

In current study the patients presenting symptoms were fever (100%), vomiting (67.70%), and abdominal pain (40.50%), splenomegaly (23.70%), Petechiae (16.20%) and gum bleeding (6.70%).

Symptoms	Frequency	Percentage
Fever	911	100%
Vomiting	616	67.70%
Abdominal pain	387	42.50%
Splenomegaly	215	23.70%
Petechiae	147	16.20%
Gum bleeding	61	6.70%

Table 1.3: Patients presenting signs & symptoms of dengue fever (n=911)

In the study the condition of fever of the patients was not uniform, the fever of 257 (28.21%) was continuous, 509 (55.87%) was intermittent and 145 (15.91%) was remittent. Table 1.4 shows the condition of fever of the patients.

Continuous N (%)	Intermittent N (%)	Remittent N (%)
257 (28.21%)	509 (55.87%)	145 (15.91%)

Table 1.4: Condition of fever of Dengue patients (n=911)

In our study the frequency of the platelets count was 146 (16.02%) below 50,000, followed by 364 (39.95%) having platelets count between 50,000- 100,000 and 419 (45.99%) having platelets count more than 100,000. Table 1.5 shows the details of platelets count.

Platelets count / cmm	Frequency	Percentage %
< 50,000	146	16.02 %
50,000-100,000	364	39.95 %
> 100,000	419	45.99 %

Table 1.5: Table showing platelets count/cmm among dengue patients (n=911)

During the 5 month study it was noted that the infection rate was low in July and gradually increases and the infection was at peak in September and October. The details of the month wise infection is shown in graph 1.6.

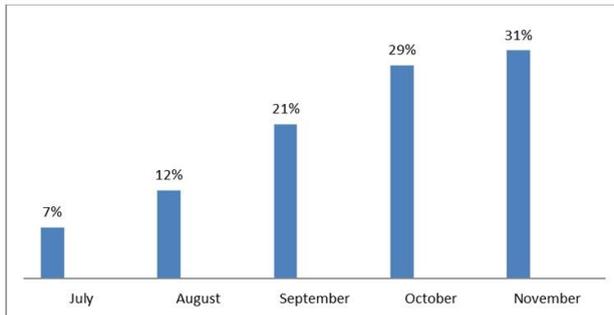


Table 1.6: Graph showing the infection of dengue infection month wise (n=911)

Discussion

Unprecedented population growth and unplanned urbanization are the two main factors that have led to the emergence of dengue virus infection in tropical developing countries (Gubler 1998). Swat is located in the lap of mountainous ranges, which are the offshoots of Hindukush; so the larger part of Swat is covered with mountains and hills. True plain is not found in Swat, yet local people call some areas plain surfaces. These plain surfaces receive water from river Swat and its tributaries for irrigation which provide sufficient breeding grounds for mosquitoes.

According to (Sajid et al. 2012) 35 cases of Dengue fever were recorded out of which, 20 patients were male and 15 were females. According to (Khan et al. 2007) out of a total of 15040 patients (63.2% male and 36.8% female), 3952 (26.3%) tested positive for dengue IgM antibody. Regarding the previous studies that show the high infection rate in the males as compared to females, similar results are found in our study. In our study out of total 911 patients 627 (68.82%) were male and 284 (31.17%).

DHF is considered primarily to be a disease of children under the age of 15 years and is a leading cause of hospitalization of young children in Southeast Asia (Gubler 1998). According to (Khan et al. 2007) 83.6% of adult patients presented to the hospital with signs and symptoms compatible with DHF. A similar age distribution was also noted during the 1994–1995 outbreak in Karachi. This observation is consistent with reports from other endemic countries. A 3-year study from India showed a maximum number of cases between the ages of 21 and 30 years (Gupta et al. 2006). In the 2001 outbreak in Kaohsiung city in Taiwan, the mean age of the patients with DHF was 55 years (Lai et al. 2004). Similarly in Singapore, young adults were predominantly affected by DHF in the 2005 outbreak (Low et al. 2006). In our study the high rate of infection was recorded in the age between 21-50 years.

According to (Khan et al. 2007) the symptoms of the patients were vomiting in 110 (64%), abdominal pain in 50 (29.1%) and diarrhea in 46 (26.7%). Body aches were reported by 41 (23.8%). The majority of these patients had right hypochondrial tenderness on examination. A diffuse erythematous or maculopapular rash, over the face, upper torso and/or lower limbs was noted in 65 (37.8%) of the patients. Although abdominal pain and vomiting have been found to be prominent presenting symptoms (Anuradha et al. 1998) the exact mechanism underlying gastrointestinal symptoms in dengue virus infections is not fully known. Gastrointestinal manifestations of DF are mainly in the form of bleeding or liver function abnormalities (Krishna et al. 2006). Liver injury from dengue virus is mediated by its direct infection of hepatocytes and Kupffer cells (Ling et al. 2007). Liver involvement is usually associated with severe complications such as gastrointestinal bleeding, secondary to the associated coagulation defects (Wichmann et al. 2004). Regarding the previous studies the abdominal pain and vomiting are common

symptoms recorded from the dengue patients. In our study the patients presenting symptoms were fever (100%), vomiting (67.70%), and abdominal pain (40.50%), splenomegaly (23.70%), Petechiae (16.20%) and gum bleeding (6.70%).

According to (Sajid et al. 2012) Most of the patients had platelet count between 50,000-100,000/cmm and 4 patients had counts below 50,000/cmm. According to (Akhtar et al. 2014) the platelets count of the 1427 (16.01%) were below 50,000, the platelets count of 2726 (30.59%) were from 50,000-100,000 and the platelets count of 4758 (53.39%) was above 100,000. According to (Khan et al. 2007) Thrombocytopenia with an overall mean platelet count of 85.5 cells/mm³ was noted in 81.4% of patients. The lowest platelet count was 5 cells/mm³. In our study the frequency of the platelets count was 146 (16.02%) below 50,000, followed by 364 (39.95%) having platelets count between 50,000- 100,000 and 419 (45.99%) having platelets count more than 100,000.

According to (Akhtar et al. 2014) the high infection rate was recorded in month of October 37% and lowest infection rate was found in the month of august that was 11%. Analysis of monthly dengue cases showed peak incidence from August to October 2006. This pattern is consistent with reports from other endemic countries (Gupta et al. 2006; Lai et al. 2004; Islam et al. 2006) and correlates well with the hot summer and monsoon season, which provide ideal breeding conditions for *Aedes aegypti*. In our study quite similar results were found, the highest infection was found in the month of November 31%, followed by October 29%, September 21%, August 12% and lowest infection rate was recorded in the month of July that was 7%.

Conclusion

In our study it was concluded that those patients, who drink

plenty of fluids, get plenty of rest and taking antipyretics were in good conditions as that of other. The users of aspirin and other nonsteroidal, anti-inflammatory medications were in high risk of hemorrhage. During the febrile phase of illness the dehydrating patient were in serious condition. In conclusion, despite the limitation in terms of patient population (not all infected patients were included) and study design (retrospective review), the results of our study have highlighted significant findings, such as adult susceptibility to DHF, abdominal symptoms and low platelets count, at the time of presentation of our study in population. From our study we have observed that Dengue virus is endemic in the country, circulating through the year with a peak incidence in the post-monsoon period.

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