ORIGINAL ARTICLE

OUTCOME OF PATIENTS WITH DENGUE FEVER

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ABSTRACT

Background: Incidence of dengue has risen drastically around the world in the recent years. Severe dengue is one of the causes of critical illness and death in Asia generally and Pakistan particularly. The objective of this study was to evaluate the death related outcome of patients with dengue fever.

Material & Methods: This cross-sectional study included 300 patients admitted to Khyber Teaching Hospital with dengue fever. Patient's outcome was measured in terms of death or recovery. Chi square test was used for statistical analysis.

Results: The mean age of dengue patients was 30.60±9.70 years and the mean hospital stay 5.7±0.83 days. Among these 277(92.3%) were males and 23(7.7%) females with a male to female ratio of 12:1. Platelet transfusion was needed in 16(5.3%) patients. Outcome assessment revealed that, 294(98%) patients recovered while 6(2%) died. Death was more prevalent in females than in males at a statistically significant level ($p=0.01$). Moreover, the clinical presentation and patient's locality did not affect the final outcome ($p>0.05$). Age of patients did not predict total hospital stay ($p=0.07$). However, hospital stay correlated positively and inversely with admission alanine aminotrensferase, and platelets count respectively ($p<0.001$).

Conclusion: Most of the patients recover from dengue fever. Majority of deaths are seen in female patients. Moreover, platelet count and alanine aminotrensferase levels on admission predict the hospital stay.

KEYWORDS: Dengue; Dengue fever; Mortality, Aedes aegypti.

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INTRODUCTION

Dengue fever is a disease caused by one of the four serotypes of dengue virus (DEN 1-4), transmitted by the mosquito Aedes aegypti. Infection by one serotype causes acute illness and provides long-term immunity. However, sequential infection by a different serotype in future, causes more serious illness.[1-3]

The clinical spectrum of dengue fever ranges from less severe 'dengue fever' (DF), to more serious febrile illness called as, 'dengue hemorrhagic fever' (DHF), or even in most severe cases to shock, termed as 'dengue shock syndrome' (DSS).[3-5] From the global perspective, approximately 50 million cases are reported yearly. The bulk of such cases is from tropical and sub-tropical areas. In such areas, dengue is the commonest cause of hospitalization amongst adult population. Moreover, dengue causes up to 5% mortality in the affected individuals, mostly the children and the elderly.[5-7]

In 1994, an outbreak of dengue was reported in Pakistan. Since then, many outbreaks have threatened the Pakistani people. In Pakistan, the majority of affected individuals are living below the poverty line and most of them belong to the urban areas. Similarly, an increased prevalence of dengue has been reported in Pakistani people living in slums.[7-9]

Dengue fever is one of the commonest presentations to tertiary care hospitals in Khyber Pakhthunkhwa province, Pakistan. Despite its high burdens in our province, there is relative scarcity of published data.

The objective of this study was to evaluate the death related outcome of patients with dengue fever.

MATERIAL AND METHODS

This cross-sectional study was conducted in the Department of Medicine, Khyber Teaching Hospital, Peshawar, Pakistan, between July and September 2015. The study included 300 patients diagnosed

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with dengue. Written informed consent was obtained from every participant and the study was approved by the hospital's ethical review committee.

The inclusion criteria were both genders, any age, and NS-1 antigen positivity. Those having alternative or co-existent diagnoses like malaria, septicemia, disseminated intravascular coagulation, immune thrombocytopenic purpura, hematological malignancy and medications affecting platelet count like chemotherapeutic agents were also excluded.

The data was collected on a structured performa, specifically designed for this study. It included information regarding demography, co-morbidities, signs and symptoms, complete blood picture, dengue serology and NS-1 antigen positivity. The data was analyzed using SPSS version 16. The patients were divided into two groups (1) patients recovered and discharged, and (2) patients expired.

Means and standard deviations were calculated for quantitative variables like age, hospital stay, and platelet count. Qualitative variables were checked for frequencies and percentages. Chi-square test was applied to stratify the different test variables like platelet count and age, with respect to the outcome, death or recovery. P-value less than 0.05 was considered as significant.

RESULTS

Of the entire 300 participants, 277 (92.3%) were males and 23 (7.7%) were females with a male to female ratio of 12:1. The mean age was 30.60±9.70 years.

An overview of the clinical presentation and demography is given in Table 1.

The mean alanine aminotransferase (ALT) on admission was 48.73± 9.71 IU/L (Range 40-111).

The mean hospital stay was 5.7±0.83 days (Range 4-8). Platelet transfusion was needed in 16 (5.3%) of the patients. The mean number of packs of platelets transfused was 0.10±0.48. The maximum number of packs of platelets transfused was 4. Nine patients (3%) were transfused only one pack of platelets. However, the number of patients who received more than one pack of platelets was 7 (2.3%).

Mean platelets count on admission was 57,000 ±5477.07/μL and on recovery /death was 133,000 ±16377.18/μL.

Factors influencing the hospital stay were assessed through Pearson's correlation test. There was a statistically significant positive correlation between hospital stay and serum ALT on admission ($p<0.001$). However, a statistically significant but inverse relationship was seen between total hospital stay and platelets count on admission ($p<0.001$). (Table 2)

In order to see the effect of patient's gender, locality and the type of clinical presentation on outcome (death or recovery), chi square test was applied. The results showed that death related outcome was more prevalent in females than in males at a statistically significant level ($p=0.01$). Similarly, more patients belonging to Peshawar area, died than the rest of the province. However, the difference was not significant statistically ($p=0.48$). Moreover, patients presenting with fever and aches alone died more than those presenting with rash or other symptoms like cough, anorexia and so forth. However, the death related difference between different types of clinical presentation was not significant statistically ($p=0.95$).

Table 1: Clinical presentation and demography of patients with dengue fever (n=300)

Clinical features	Fever and aches	242 (80.7%)
	Rash	54 (18%)
	Miscellaneous (cough, anorexia, jaundice)	4 (1.3%)
Patients' area	Peshawar	277 (92.3%)
	Charsada	8 (2.6%)
	Mardan	6 (2%)
	Rest of KPK/FATA	9 (3%)
KPK: Khyber-Pakhthunkhwa, FATA: Federally Administered Tribal Areas.		

Table 2: Pearson's correlation of hospital stay with different parameters on admission (n=300)

Test Variable	Age		Platelets on Admission (per μL)		ALT on Admission (IU/L)	
Hospital Stay (days)	r value	P value	r value	P value	r value	P value
	0.10	0.07	- 0.75	<0.001	0.35	<0.001

DISCUSSION

Most of the patients in this study were males. This is in accordance with previous statistics.[10-12] Maximum cases reported in male population are probably because they are more exposed to bites by Aedes aegypti, as they work outdoors. Moreover, females are protected by their long and heavy clothes which keep them covered most of the times.[12-15]

Aedes aegypti likes living in hot and humid habitats. This explains its high prevalence in the months of monsoon rains. In our study, a gradual increase in cases was seen from July to September. A local study had similar observations; the incidence of dengue was at peak in the months of September to November.[11]

In the present study, most of the patients were in their 3rd-4th decade of life. This is in accordance with previous observations.[16] Moreover, most of the death casualties were seen in those in the fifth decade of life. This is consistent with other South-Asian studies.[17,18]

The clinical manifestations of dengue fever are variable. However, the commonest clinical characteristics are fever, aches and pains, retro-orbital heaviness, rash and so forth.[18-19] Majority of patients in the present study had presented with fever and aches. It must be noted that, all these symptoms might have an abrupt onset. Moreover, DHF leads to bleeding tendency from various parts of the body including mucosal or even deadliest intra-cerebral hemorrhages.[19,20] Such bleeding may compromise the circulation and result in shock called as DSS.[20,21] However, despite aggressive measures, the outcome is usually poorer in such patients. Such patients needed inotropic support and multiple platelet transfusions.[19-22] It is worth mentioning that, only a minority of patients in the present study progressed to DHF or DSS.

Thrombocytopenia is commonly encountered in patients with dengue.[23,24] It is one of the criteria to arrive at a diagnosis of dengue.[24,25] The reasons behind thrombocytopenia in dengue are still to be elucidated. However, bone marrow suppression and peripheral destruction have been postulated as one of the few probable mechanisms.[24-27] Dengue patients with low platelets are at risk of worse outcomes. Currently, platelets transfusion is considered for those with absolute platelet count of less than 20,000/mm3. [26-28] However, one local study advocated platelet transfusion in patients with platelet count of 20,000-40,000/μL.[29] It is worth mentioning that, we transfused platelets to only a minority of the patients (5%). Moreover, most of these patients needed only one pack of platelet transfusion. More importantly, we considered a platelet count of less than 40,000 as a threshold for transfusion. However, despite a minimum rate of platelet transfusion in our study, 98% of the patients recovered.

One of the limitations of our study was that the catchment area was small. Secondly, patients admitted to general medical wards only were included while those in pediatric wards were not studied.

CONCLUSION

Most of the patients infected with dengue are in their third-fourth decade of life. Moreover, two percent of the affected individuals may die. Death is more common in females. The clinical presentation or patients' locality does not affect the final outcome.

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CONFLICT OF INTEREST
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AUTHORS' CONTRIBUTION

Conception and Design:	ZF, AK, HK, FUR
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