Original Article

Dengue Infected Patients in Local Population of Lahore

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ABSTRACT

Over the past 20 years, dengue fever's demographic characteristics have significantly altered in Pakistan. Different facets of particular epidemics have been covered in small-scale research from around the nation during this time. However, there is a dearth of information on the country's general trend of dengue virus infection. **Objectives:** To examine liver function test of dengue infected patients, age and gender wise distribution of dengue virus infected patients. **Methods:** During August-November 2011, patients with clinical presentation of DF, who came to Emergency department of Mayo Hospital Lahore, were included in this study. Total 64 patients were included in this study and LFTs were performed photometrically to see the effect of dengue virus infection on liver of affected patients during early days of infection from 2-7 days. **Results:** Out of 64 patients, 47 were males and 17 were females. Dengue fever was more common among the age group of 16-25 years and less common among children and older age group. All the patients had low platelet level with 29 patients had complaint of bleeding. Serum raised level of ALT and ALP was observed in some patients. **Conclusions:** Presently widespread throughout the year with a high frequency in the post-monsoon season, dengue fever is currently endemic in Pakistan. The median patient age for dengue has dropped, and younger patients, particularly men, may be more vulnerable. Total and differential leukocyte counts can assist identify individuals who are at risk for bleeding, and LFTs can show whether dengue virus infection has an impact on the liver.

INTRODUCTION

One of the four serotypes (DEN-1, DEN-2, DEN-3, and DEN-4) of the dengue virus causes the infectious illness dengue, which is spread via mosquitoes. It is a member of the Flavivirus genus. It is an 11 kilobase-long, single-stranded, non-segmented RNA virus with an icosahedral nucleocapsid and a lipid envelope [1]. Breakbone fever is another name for dengue illness, a serious vector-borne disease. Patients who get a dengue serotype infection have lifetime immunity to that serotype as well as partial immunity to the other serotypes. It is spread by the bite of *Aedes* mosquitoes, particularly *Aedes aegypti* and *Aedes albopictus* (subgenus Stegomyia) [2]. The Asian tiger mosquito, *Aedes aegypti,* is the one that transmits dengue fever most often worldwide. Other *Aedes* species, including *Aedes albopictus*, may also spread the dengue virus. Most *Aedes* mosquitoes reside in areas where people dwell. They often reproduce in little amounts of stagnant water found in old tyres or in tiny containers that people have abandoned. Their preferred hosts are people, and their preferred locations are the ankles and the back of the neck. The female *Aedes* mosquito feeds throughout the day. This mosquito may be identified by its white patterns on the legs and thorax, which resemble lyres. One day before the commencement of a fever illness, a person with dengue viruses in their blood may transfer the viruses to mosquitoes, and the patient can continue to be infected for the next 6-7 days. This mosquito may spread dengue if it bites another host right away. Normal viral replication in the salivary gland of the mosquito takes 8 to 12 days to complete [3]. Rare instances of vertical transmission of dengue and human-to-human transmission by needle sticks have been reported [4]. After being injected into people, the dengue virus takes 3 to 14 days to begin to incubate. Target dendritic cells, hepatocytes, and

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endothelial cells are the sites of viral replication, which leads to the formation of immunity. This cellular and humoral immune response to both the original and follow-up viral infections [5]. Africa is where the mosquito first emerged [6]. However, because to its requirement for a warm temperature to survive, it is now often found in tropical and subtropical regions across the globe [7]. More than 2.5 billion individuals in 112 different nations are presently at high risk for the dengue virus in tropical and subtropical parts of the globe [8]. Males and females both get dengue illness at the same rates. Dengue fever may afflict people of all ages. Children under the age of 15 only have generic, transient febrile illnesses. In 50–90% of cases, the first dengue virus infection may be asymptomatic [9]. The most frequent electrolyte imbalance in dengue patients is hyponatremia [10, 11]. The most frequently used serologic test for dengue is the IgM capture enzyme-linked immunosorbent assay (MAC-ELISA). Because the presence of thrombocytopenia and leukopenia is present in 40.4% of confirmed cases but only 6.1% of false-positive cases, platelet and white blood cell counts may be diagnostically useful in the absence of additional testing [12, 13]. Dengue fever is a self-limited disease. Analgesics, fluid replacement and bed rest are the supportive care for dengue patients. Corticosteroids should be avoided. Up till now there is now antiviral medication available for dengue infection. In the treatment of DSS single dose of methylprednisolone showed no mortality benefit in a double-blind, placebo-controlled trails [14]. Community-based vector control programs and vectoricidal agents should be used as biological control agent [15, 16]. Dengue is now endemic in Pakistan and after its recent outbreak during 2011 which has hit Lahore there is need to do research on different aspects of dengue virus infection. There is no sufficient data available in Pakistan regarding hepatic manifestations due to dengue virus infection. Our study aims to provide sufficient information on it. It will be helpful in improving healthcare management in dengue infection in future.

METHODS

It was a Cross -sectional study. This study was carried out in the Department of Pathology King Edward Medical University Lahore. Non-probability sampling technique was followed for sampling. Duration of the study was 3 months from August-November 2011. 64 subjects were included in study. Inclusion Criteria: 1- The patients within first seven days of dengue infection were included. 2- Patients with high grade fever. 3- Patients of both sexes and all age groups. 4- Patients without prior treatment. 5- Patients with low platelet count. 6- Patients who were healthy before dengue infection. Exclusion Criteria: 1- The patients after seven days of dengue infection were excluded. 2- Patients with no fever. 3- Patients with normal platelet count. 4- Patients who had already some liver disease e.g., hepatitis. Consent form was taken from the adult patients and from the guardian in case of children. Patients with no previous infection were included in this study. Patients with first seven days of dengue infection having the complaints of fever, rash, retro-orbital pain and bleeding were included in this study. Performa's were filled from patients containing all their clinical presentation. Tourniquet was tightened on the arm for the identification of suitable vein in front of elbow, 3-5ml of venous blood was collected aseptically and after allowing samples to clot for 30 minutes, samples were centrifuged, and serum was isolated from all the samples for further research. LFTs were carried out photometrically using common chemical analyzers and standard kits. According to the photometer's basic operating concept, light intensity in a solution is measured; the amount of light absorbed is directly correlated with the presence of a certain chemical in the solution. For the execution of ALP and ALT, the kits from the ROCHE business were employed. SPSS Version 16 was used to analyze the data.

RESULTS

Figure 1 shows the gender wise distribution of dengue patients. Out of 64 total patients 47 patients were males and only 17 were females.

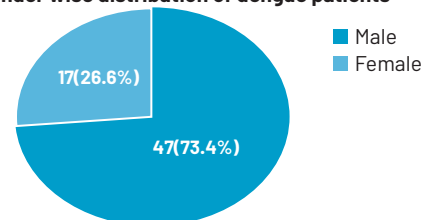**Gender wise distribution of dengue patients**

Figure 1: Gender Wise distribution of Dengue patients

Table 1 shows the age wise distribution of dengue patients. The highest age group in which dengue virus infection was more common was 16-25 years and less common in children and older age group.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5–15yrs	4	6.3	6.3	6.3
	16–25yrs	18	28.1	28.1	34.4
	26–35yrs	13	20.3	20.3	54.7
	36–45yrs	15	23.4	23.4	78.1
	46–55yrs	9	14.1	14.1	92.2
	56–65yrs	5	7.8	7.8	100.0
	Total	64	100.0	100.0	

Table 1: Age Wise distribution of Dengue patients

Table 2 shows the patients who had complaint of bleeding. Out of total 64 patients 29 patients had the complaint of bleeding and 35 patients had no bleeding complaints.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	29	45.3	45.3	45.3
	NO	35	54.7	54.7	100.0
	Total	64	100.0	100.0	

Table 2: Distribution of patients according to complaint of bleeding

Table 3 showing the distribution of patients according to ALT level. Out of total 64 patients 44 patients had normal level of ALT and very few patients had raised level of ALT.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	44	68.8	68.8	68.8
	Moderate	13	20.3	20.3	89.1
	Moderately high	3	4.7	4.7	93.8
	Very high	4	6.3	6.3	100.0
	Total	64	100.0	100.0	

Table 3: Distribution of patients according to ALT level

Table 4 shows the distribution of patients according to ALP level. Out of total 64 patients 36 patients had normal level of ALP and very few patients had raised level of ALP.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	36	56.3	56.3	56.3
	Moderate	23	35.9	35.9	92.2
	Moderately high	4	6.3	6.3	98.4
	Very high	1	1.6	1.6	100.0
	Total	64	100.0	100.0	

Table 4: Distribution of patients according to ALP level

DISCUSSION

In many tropical areas of the world, the dengue virus poses a serious hazard to public health and currently threatens half of the planet. In the past thirty years, there has been a significant change in the demographics and clinical characteristics of dengue infections. The first significant dengue epidemic in Pakistan occurred in 2004, when the DV-2 serotype was discovered [17]. After then, other investigations from Pakistan and other endemic locations showed DV-1 and DV-2 as the prevalent serotypes [18]. Another pandemic was brought on by the introduction of DV-3 to Pakistan in 2005 [19]. The DV-2 and DV-3 genotypes were discovered to be common in Pakistan in 2006 [20]. The co-circulation of all four serotypes and hyper-endemicity of virus may provide an explanation for this tendency. Future research should identify and treat the factors that maintain dengue fever throughout the year. 11 to 25 years old was the age range that was most frequently impacted in recent years. Additionally, a steady rise in the percentage of children with dengue was seen. Worldwide dengue is common in children and infants [21] but in Pakistan it is more common in adult age. The reason is this in children dengue is usually asymptomatic in children and frequencies of symptoms are influenced by age and sex

[22]. These results correlate with our study because in our study it is more common in the age group of 16-25 years and less common in children and older age group. The observed change in median age may be explained by adults developing immunity as a result of previous infections as the DV-2 strain has been present in the Pakistani community since 2004 [17]. No children were impacted in 2003 or 2004, but between 2005 and 2007, there was a sharp increase in the number of kids testing positive for dengue IgM. In Pakistan, Males are more affected with dengue virus than females because females and children spend more time at home. Our study shows the similar results, out of 64 total patients, 47 were males and only 17 were females. Worldwide whites are more susceptible to dengue than blacks, but our population is Asian and we did not discuss race in this study. But we can study dengue virus infection according to different ethnic groups in future. Genetic aspects are not studied in this study, in future we can check genotype, sequences and serotype of viral DNA. PCR facility was not available so we selected the people on the basis of their clinical presentation. Most patients in this study had thrombocytopenia. Out of 64 patients 29 patients had the complaint of bleeding, so suffering with DHF and 35 patients had not the complaint of bleeding, so suffering with classical DF. Deranged liver enzymes levels were also observed in some patients. Out of 64 patients, 44 patients had the normal level of ALT that is 6-37U/L. 13 had moderate level of ALT and remaining 7 patients had very high level of ALT. Same is the case with ALP. 36 out of 64 patients had normal level of ALP that is 30-90U/L. 23 had moderate level of ALP and remaining 5 had very high level of ALP. Patients with DHF compared to those with DF and adults compared to children had considerably higher median ALT levels. The direct infection of hepatocytes and Kupffer cells causes liver damage, which is a typical observation in dengue infections [23, 24]. Recently, Luiz et al. recommended using markers like ALT and AST as measures to assess severity in dengue fever patients [23]. Vigorous follow-up in such individuals is required since severely high liver enzymes are recognized to be an early warning sign for severe illness and clinical bleeding [24]. An important therapeutic goal is the early detection of dengue patients at risk for bleeding [25]. However, it suggests that there would be a rise in the overall number of people examined each year. Increased public knowledge of dengue does not appear to have had an impact on our findings because no such patterns of an annual rise in the total number of people tested or Percentage of those who tested positive for dengue were found.

CONCLUSIONS

The findings of this study outline Pakistan's dengue infection demographic patterns. The dengue virus is currently widespread throughout the nation and peaks in occurrence during the monsoon season. The median patient age for dengue has dropped, and younger people may now be more vulnerable. Further research is needed to determine the value of total and differential leukocyte counts for identifying individuals who are at risk of hemorrhaging. LFT levels demonstrate the impact of dengue virus infection on the liver.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

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