

Age and Gender Pattern of Dengue Disease in Lahore Epidemic of 2011

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ABSTRACT

Objective: Gender and the age groups most affected by dengue fever were determined in patients coming to Services Hospital, Lahore during the 2011 epidemic for suspected dengue infection on clinical basis. This will help in the efficient allocation of health resources with reference to burden of Dengue Virus infection in local population.

Study Design: An analytical study

Place and Duration of Study: Microbiology Section, Department of Pathology, SIMS/Services Hospital, Lahore from November 2011 to December 2011.

Methodology: Blood samples were received in a disposable properly labeled syringe. Sera were separated by centrifugation. Dengue NS1 antigen, Dengue IgM and Dengue IgG antibody ELISA tests were performed on these sera on the same day. Statistical evaluation of the results was performed by use of percentages and chi square test where applicable.

Results: Two hundred and fifty samples of both gender were tested. Out of these 77.5% males and 65.5% female patients were positive for acute Dengue Virus infection with no significant difference between the two groups(>0.05). Age wise distribution of these cases revealed that positivity was significantly higher(<0.05) in age group less than 20 years (84.6%) as compared to age group more than 60 years(55%).

Conclusion: Dengue Virus infection has occurred in children and adults more than the elderly. It has also been seen more in males than females. Hence, it is important to focus on cleansing of larva and mosquitoes from workplaces, schools and colleges. There is need for regular monitoring of this problem with measures to control the vector responsible for this problem.

Key Words: Dengue Fever; Gender ; Age groups; Dengue NS1 antigen

INTRODUCTION

Dengue Fever (DF) and Dengue Hemorrhagic Fever (DHF) originated in Africa and were seen in Asia 600 years ago. The 1780s epidemics occurred in three continents simultaneously including Asia.¹ Dengue fever continues to spread globally, causing major epidemics and putting great strain on health systems in affected countries. The infection is caused by flavivirus, which comprises of four serotypes, and is transmitted by Aedes mosquitoes. Since 1990, DF is the most important mosquito borne disease after malaria².

Pakistan first reported an epidemic of dengue fever in 1994 in Karachi. Since then it has become endemic in our country. The predominant serotype is DEN2³. Co-circulation of DEN-2 and DEN-3 was responsible for the 2006 outbreak in Karachi⁴. Mini epidemics of dengue fever occurred in Lahore in

2007, 2008 and 2009 caused by Den virus 2 and Den virus 3⁵. This lead to many susceptible people with preexisting non-neutralizing heterologous dengue antibody.

The risk of clinical disease after primary dengue infection is low throughout childhood and then increases through adolescence and early adulthood⁶. The incidence of DF and DHF varies in different age groups and shifts in affected age groups have been observed after a period of time. In Brazil, the incidence of DF & DHF was highest in adults from 1998-2006 but children younger than 15 years were predominantly affected during the epidemic of 2007⁷. In Sri Lanka, before the year 2000, most of the cases were seen in children but since then children as well as young adults aged between 20-30 years are being affected⁸. There is difference in the clinical features and laboratory findings in children and adults⁹. The severity of the

disease and its management may also depend on the age of the patient⁸.

In the present study, the frequency of DF and the age groups affected were determined in patients coming to Services Hospital, Lahore during the 2011 epidemic for suspected dengue infection on clinical basis. This will help in the efficient allocation of health resources with reference to burden of Dengue Virus infection in local population.

MATERIALS AND METHODS

Samples were received from patients of all ages and both gender presenting to Emergency Department with DF/DHF and admitted in different wards at Services Hospital Lahore, from October 2011 to November 2011. Blood sample were received in the Microbiology Laboratory along with requisite information about the patient and his/her problem. Samples were allowed to clot and then centrifuged to separate the serum. Dengue NS1

antigen, Dengue IgM and Dengue IgG antibody ELISA tests were performed on these sera on the same day. For Dengue NS1 antigen, ELISA kits manufactured by Biorad(Germany) were used. For Dengue IgM and Dengue IgG, ELISA tests were performed on RD- Ratio Diagnostic kits (USA). The tests were performed according to the instructions given by the manufacturers of the kits.

Statistical evaluation of the results was performed by use of percentages and chi square test where applicable.

RESULTS

Two hundred and fifty samples of both gender were tested for Dengue NS1 Antigen, Dengue IgM and Dengue IgG antibodies. Results of the tests are shown in Table 1. The results of dengue tests of the 194 patients according to age are shown in Table 2.

Table 1: Genderwise distribution of dengue disease patients at Services Hospital, Lahore.

Gender	N	NS1 and/or IgM +ive	%
M	160	124	77.5
F	90	59	65.5

p value >0.05 (No significant difference between male and female patients)

Table 2. Age wise distribution of dengue suspected patients

Age	N	Ns1 and/or IgM+ive	%
< 20 yrs	39	33	84.6
21 – 40 yrs	93	70	75.2
41 – 60 yrs	42	30	71.4
> 60 yrs	20	11	55

p value < 0.05 (infection significantly higher in age group less than 20 years as compared to more than 60 years).

Seventy seven percent of the male patients admitted were seropositive for NS1 Ag and or Ig M. While Sixty five percent of the admitted patients were positive for for NS1 Ag and or Ig M.

The age wise distribution revealed that highest seropositivity was in age group under 20 years while the lowest was in the patients of more than 60 years years was significantly higher than above sixty years age group.

DISCUSSION

In the year 2011, dengue epidemic struck Punjab province with such intensity that hundreds of cases were reported every day during the monsoon

season¹¹. It burdened the already meager resources of the province.

Demographic factors, such as age and sex, are associated with the likelihood of exposure to *Aedes aegypti*¹², different clinical features and laboratory findings, the management of the affected patient and the outcome of secondary dengue infection.^{9,13} Thus, to target the preventive measures efficiently, this information is crucial.

In this retrospective analysis of the dengue viral profile results, of the 250 admitted patients with features suggestive of DF following the WHO(14) criteria, 183 (73%) were laboratory confirmed dengue patients based on seropositivity for NS1 Ag and/ or Ig M antibody. Of the total 250

patients, one hundred and six were males; 77.5% of these were serologically confirmed cases. Rest of the 90 patients were females, 65.5% of whom were serologically confirmed dengue cases (Table 1). This observation of male excess amongst admitted patients coincides with the findings in previous studies carried out in Lahore and Karachi^{4,15}. Similar is the situation in the subcontinent: higher percentage of male patients have been seen in hospitals in India¹⁶. In a study by Martin Ankar¹² in 2011, data from six countries, including Lao People's Democratic Republic, Singapore, Malaysia and Cambodia all showed male preponderance. Among the countries assessed, Singapore had the highest proportion of male dengue cases reported. In their study the proportion of men among reported cases was significantly higher relative to the general population, ranging from 57% in the 5–14 years age group to 61% in the greater than 15 years age group. The difference was significant in all age groups, except in infants where the numbers were small, with a consistent pattern over time from 1999–2005.

The gender-related differences in dengue incidence might be due to exposure differences and because men are more likely to seek medical help. In Singapore, the surveillance data is meticulously maintained and they believe that the higher number of male patients is seen because of a better control of mosquitoes in the homes, as heavy fines are in place; thus, as the male labour force is greater, there is an increased likelihood of them being bitten on the way to work and back. There is no scientific explanation for this higher number of male patients. These findings in Asia are in contrast to studies in South America, which have found either equal proportions of male and female dengue cases or a greater proportion of female cases¹⁶. In children, both sexes are equally affected¹².

The age wise distribution of serological positive cases in this analysis is shown in Table 2. Thirty-nine patients were below 20 years of age, while 155 patients were above 20 years of age. Seropositive cases were 84.6% in those under 20 years of age and 71.6% in those over 20 years of age. In this analysis, all age groups seem to be affected. The trends amongst the age group affected keeps changing, as seen in countries that have experienced dengue epidemics for decades as in Sri Lanka, India and South America^{7,10,16}.

Most of the cases in the present epidemic were DEN 2 virus¹⁷. From the studies in the previous mini epidemics, it is believed that all four serotypes are present in Lahore⁵. Thus, a large number of the population is susceptible to the severe form of DF that is DHF and DSS. Special concern is for the children who have had subclinical dengue. It is important to take effective measure against the vector, as no vaccine is available. Prevention is the only solution.

CONCLUSION

Dengue Virus infection has occurred in children and adults more than the elderly. It has also been seen more in males than females. Hence, it is important to focus on cleansing of larva and mosquitoes from workplaces, schools and colleges. There is need for regular monitoring of this problem with measures to control the vector responsible for this problem. Keeping in mind the role of the presence of enhancing antibodies in the host population and the knowledge that all 4 serotypes are present, we must control the vector at the larval stage to prevent further loss of life in the coming season.

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