ORIGINAL ARTICLE

Gender Difference in patients with Dengue Fever admitted in a Teaching Hospital, Lahore

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ABSTRACT

Aim: To evaluate the gender related differences in dengue fever incidence in 95 patients admitted in teaching hospital of Lahore.
Study design: Observational study
Place & duration of study: Department of medicine GTTH, Lahore from 15-10-2011 till 10-11-2011.
Methodology: Analysis included data of 95 patients.All patients included in the study were suffering from fever, had antibody IgM against dengue and platelet count of < 100. Patients with age < 15 years or >75 years, having IgM antibodies negative or platelet count of > 100 were excluded from the study. Chi-square test was applied and p-value < 0.05 was accepted as significant.
Results: A total of 95 patients suffering from dengue fever and fulfilling the inclusion criteria were enrolled in the study. There were 77 males (81.1%) and 18 females (18.9%), with age range of 15-75 years. 76 (98.7%) of males and 100% of females, recovered fully while 1(1.1%) patient expired with p-value of 0.031, that is statistically significant.
Conclusion: Dengue fever, a viral infection is re-emerging as a serious public health problem. Fever, rash, headache, myalgia with chills were common presenting features. Demographic factor such as sex, is associated with likelihood of exposure to Aedes Aegypti, the vector for dengue. Male sex is associated with more likelihood of suffering from dengue. An excess of males was found among reported dengue cases in our study.
Keywords: Dengue. Fever. Male. Female

INTRODUCTION

Dengue is a tropical and subtropical mosquito-borne infection that can cause severe illness and death. During the last 30 years, dengue fever has dramatically expanded its geographical range and shortened its epidemic cycle. According to World Health Organization (WHO), dengue is endemic in over 100 countries and approximately two-fifths of the world population is currently at risk of dengue fever with an estimated 50 million infection annually[1]. Among the estimated 2.5 billion people at risk globally for dengue, about 1.8 billion (i.e., more than 70%) reside in Asian continent[2].

The most important vector for dengue, Aedes Aegypti, is a predominantly urban mosquito species that favours particular environment such as location where water storage is common and waste disposal services are inadequate.[1,3] While exposure to such environments may be related to specific demographic factors such as sex, there is scarcity of sex-specific dengue data. Indeed, sex-diaggregated dengue data are not routinely reported or analyzed by surveillance systems. The few studies from Asia, such as those from Singapore, that have examined male and female dengue incidence have tended to find greater male incidence.[4] Differences in dengue incidence have been attributed to gender related differences in exposure such as time away from home[4,5].

As gender role and the exposure, change over the human life span, it is important to examine dengue cases by both sex and age. While there are recent studies that provide age[6] or sex specific[3] incident dengue surveillance data, few studies provide incident dengue data stratified by both age and sex. This study describes the reported number of incident dengue cases by sex in GTTH, Lahore.

METHODS

The study protocol was approved by Ethical Review Committee at GTTH, Lahore. The data of 95 patients admitted in department of medicine, GTTH was collected after taking informed consent from the patients. GTTH is a 450 bed tertiary care hospital, located in Lahore, Pakistan. Ninety-five patients both male and female, admitted in male and female wards of department of medicine, were selected. All patients presented with fever and headache. Dengue IgM antibodies were detected using the Calbiotechnique,

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including Elisa test system. This is a commercial enzyme linked immunosorbent assay for detecting IgM antibodies against dengue virus in human serum or plasma. Optical density (OD) was read at dual wavelength with reference filter of 600-650nm. Antibody index was calculated using the OD value and the cut-off value. (Calibrator OD x calibrator factor) Antibody index of > 1.1 was considered positive for acute dengue infection and those between 0.9 and 1.1 were included in borderline positive category. Hence sample with indices below 0.9 were concluded as negative for dengue infection. Statistical Package for Social Sciences (SPSS) was used for data entry, processing and statistical analysis at the end of the study. P-values less than 0.05 were considered significant.

RESULTS

A total of 95 patients suffering from dengue fever and fulfilling the inclusion criteria were enrolled in the study. There were 77 (81.1%) males and 18 (18.9%) females, with age range of 15-75 years. 94 (98.9%) patients improved while 1 (1.1%) patient expired. Haemoglobin (Hb) was < 9g/dL in 1 (1.1%) males and 0.0 females with p-value of 0.626 that is not statistically significant, while Hb was between 9-10 in 32(41.6%) of males as compared to 12 (66.7%) females with p-value 0.042, that is statistically significant. Hb was >10 in 44(57.1%) males and 6(33.3%) females with p-value of 0.021 that is statistically significant. Total Leukocyte count (TLC) was < 3000 in 26(38.8%) of males as compared to 6(33.3%) of females with p-value 0,033 that is also statistically significant. It was between 3000-8000 in 45(58.4%) males and 10(55.6%) females with p-value of 0.026, statistically significant while it was >8000 in 6(7.8%) males and 2(11.1%) females, with p-value 0.646 that is not statistically significant. Platelet count was <25000 in 26(33.8%) males and 7 (38.9%) females with p-value of 0.002, that is statistically significant. Platelet count was between 25000-40000 in 28(36.4%) males as compared to 4(22.6%) females with p-value 0.012 that is also statistically significant. Outcome was improved in 76(98.7%) of males and 18 (100%) of females, with p-value of 0.031, that is statistically significant.

Statistics: All data was entered and analyzed through SPSS Version 20. continuous variables like age, HB, TLC and PLT of the patients were expressed as Mean±SD. Whereas categorical variables like gender, outcome and others were presented as frequencies and percentages, Chi-square was used to find the significant relationship among categorical variables. P-value of less than 0.05 was considered as statistically significant.

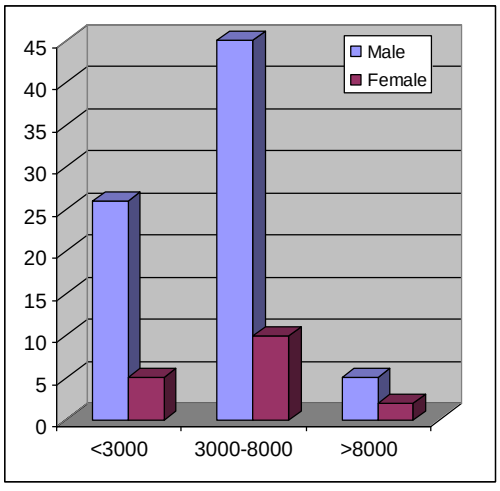
Table 1: Baseline clinical characteristics of patients (n=95)

	n	%age
Male	77	81.1%
Female	18	18.9
Outcome improved	94	98.9%
Outcome expired	1	1.1
Hb level <9	1	1.1
Hb level 9-15	44	46.3
Hb level >15	50	52.6%
TLC level <3000	32	33.7
TLC level 3000-5000	55	57.9%
TLC level >8000	8	8.4
PLT counts <25,000	33	34.7
PLT counts 25,000-40,000	32	33.7
PLT counts >40,000	30	31.6

Table 2: Relationship between Gender & HB Level, TLC Level, PLT level and Outcome

	Male	Female	P value
HB level			
< 9	1 (1.3%)	0.0	0.626
9 – 10	32(41.6%)	12(66.7%)	0.042*
> 10	44(57.1%)	6 (33.3%)	0.021*
TLC level			
< 3000	26(33.8%)	6(33.3%)	0.033*
3000 – 8000	45(58.4%)	10(55.6%)	0.026*
> 8000	6(7.8%)	2 (11.1%)	0.646
PLT level			
<25,000	26(33.8%)	7(38.9%)	< 0.001
25,000 – 40,000	28(36.4%)	4(22.2%)	0.012*
> 40,000	23(29.9%)	7(38.9%)	0.002*
Outcome			
Improved	76(98.7%)	18(100%)	0.031*
Expired	1(1.3%)	0.0	

	n	Minimum	Maximum	Mean ± S.D
Age	95	15	85	33.4±14.41
HB	95	4.8	20.9	14.6±2.2
TLC	95	0.6	29	4.6 ± 3.3
PLT	95	8	238	39.5 ± 33.9



DISCUSSION

Dengue virus presently threatens half of the world population and is a important public health problem in many tropical countries of the world.[12] In the last three decades, the demographical clinical feature of dengue infection have changed rapidly. Pakistan experienced the first major outbreak of dengue in 2004 and serotype identified was DV-2. There after several studies from Pakistan and other endemic areas reported DV-1 and DV-2 to be the predominant serotype in circulation.[7,8] This was followed by the introduction of DV-3 in our population in 2005 resulting in another epidemic.[9] During the epidemic in 2006, the genotype DV-2 and DV-3 were found to be prevalent in Pakistan[10].

This study based on the data collected from 95 patients admitted in the department of medicine in a tertiary care hospital of Lahore, found as consistent and significant male excess among those > 15 years of age. There were total of 95 patients with dengue, out of the total, 77 (81.1%) were males, showing male prepondrance in the age range of 15-75 years. This was concordant with study carried out by Attiya et al[12], Ashraf Khaskheli et al [13] and Nadeem Afraz et all[14]. In present study all cases (100%) presented with fever. Skin involvement in the form of rash was seen in (80.3%) of the cases. In other studies skin involvement was seen in 83.33% [12], 82%[15], 53.7% [13], 46.8% [16] and 36.4%[11].

Mohammad Wasay et al[18] stated that out of 225 cases of confirmed dengue virus infection, there were 150 males and 75 females. Similar results were seen by Shazia T Hakim, Syed M et al[19] who found out of 459 suspected cases of dengue fever, males were 376 (82%). The results of these two studies showed male preponderance, finding similar to our study.

During this study maximum suspected cases were of the male gender, which may be attributed to the fact that in Asian culture, males spend more time outside their houses and thus are more likely to be exposed when compared to females[15,16]. Ahmed et al have also reported the incidence of dengue more in males than in females[17].

Despite benign nature and low mortality related to dengue infection, the disease is perceived as a serious condition among people. This is probably the reason, why most people go to the hospital quickly when they develop symptoms like fever, headache and rash. A single male patient who presented with Dengue Shock Syndrome (DSS), expired in our study, the rest 94 patients recovered completely. Prolonged shock is associated with metabolic acidosis and disseminated intravascular coagulation (DIC), which may lead to hypoxia and death of the individual.

Understanding male-female differences in infection rates and severity of disease is important for public health control programmes. A few hospital-based studies and surveillance based data show a male –female difference in infection rates and severity of disease. Three independent studies from epidemics in India and Singapore found nearly twice the number of male patients compared to females.[20,21,22] In addition once becoming infected and assuming all other things being equal, there may be biological differences between the sexes such that males may have a more severe outcome to disease relative to their female counterparts. There has been a growing recognition that biological differences between male and female based on genetic, immunological and hormonal factors, may determine the susceptibility to disease and clinical outcome, including for dengue infection.[23,24]Females may mount a more vigourous immune response to infection than males[25].

No studies suggest gender bias in home care and male preferences in health care seeking, still prevalent in many Asian and other traditional societies. It is widely recognized that in many of the Asian communities, lower incidence in women may be statistical artefact related to lower reporting and care seeking for women from traditional practitioners who do not report to public surveillance systems. Also women are less likely to be taken care of at a hospital when ill or are taken at late stages of the disease, when no other options are available. Determining sex differences, both in infection and severity of disease, requires well-designed and targeted studies to capture both biological and social factors that drive disease patterns in a community. At present, dengue control and prevention require awareness of factor beyond those commonly seen in tropical countries. Many of the affected countries are poor and developing. Realistic approaches for their infrastructure are required to be urgently developed.[26] Detailed serological and virological studies of dengue outbreak in endemic areas are required to pinpoint the nature of the outbreak to help to develop effective control measures[26]. Until the Aedes mosquito can be effectively controlled or a cost effective vaccine is developed, dengue fever will remain a public-health concern, especially in South –East Asia. Control at source is one of the keys to combating dengue fever and requires active participation from all sectors of the community.

CONCLUSION

Dengue fever should be considered in the differential diagnosis of febrile patients with or without headache and rash. Health care providers should therefore

have an understanding of the infection, the spectrum of its clinical features, methods of diagnosis and appropriate treatment. Our study showed excess of males suffering from Dengue fever.

REFERENCES

1. Fact sheet N 117, Dengue and dengue haemorrhagic fever, March 2009. Geneva, World Health Organization.
2. Dengue in the Western Pacific. Manila. World Health Organization regional office for the Western Pacific.
3. Eong OF. Changing patterns of dengue transmission in Singapore: Dengue Bulletin, 2011, 25:40-44
4. Kaplan JE et al. Epidemiologic investigations of dengue infection in Mexico, 1980. American Journal of Epidemiology, 1983, 117:335-343.
5. Lin CC et al. Characteristics of dengue disease in Taiwan. 2002-2007. American journal of Tropical Medicine and Hygiene, 2010, 82(4):731-739
6. Huy R et al. National dengue surveillance in Cambodia 1980-2008: epidemiological and viriological trend and impact of vector control. Bulletin World Health Organization, 2010, 88(9):650-657.
7. Strobel M, Lamaury I. [Dengue fever a review] Rev Med Interne, 2001, 22:638-647
8. Akram DS, Igarashi A, Takasu T. Dengue virus infection among children with undifferentiated fever in Karachi. Indian Journal of Paedriatic. 1998; 65:735-740
9. Paul RE, Patel AY, Mirza S, Fisher Hoch SP. Expansion of dengue viral infection to Pakistan. Internatioanl Journal of Infectious diseases. 1998; 2:197-201
10. Jameel B, Hassan R. Zafar A, Berley K et al. Dengue virus serotype 3, Karachi, Pakistan. Emeg Infectious Disease. 2007; 13:182-183
11. Khan E, Hassan R, Mehraj V, Nasir A, Siddiqi J et al. Co- circulations of two genotypes of dengue virus in 2006 outbreak of dengue haemorrhagic fever in Karachi, Pakistan. Journal Clinical Viral. 2008; 43:176-179.
12. Attiya Mehboob Zafar et al. Clinical characteristics of patients with dengue fever. Journal Ayub Medical College, Abbottabad. 2010;22(4)
13. Ashraf Khaskhelli Nasreen et al. J LUMHS Sept-Dec. 2010;vol:9 No3
14. Nadeem Afraz, Surriya Amber et al. Prevalance of dengue fever in Rawalpindi-Islamabad. A cross sectional study: BMJ 2002; 324:1563-1566
15. Qureshi Ta, Notta N, Salahuddin N, Zaman V. Khan JA: An epidemic of dengue fever in Karachi, associated clinical manifestations. J Pak Med Assoc. 1997; 47:178-181
16. Rathore K,Misra B, Khaur J, Kakkar N et al. An outbreak of dengue fever in periurban areas of Channdigarh, India with special reference to entomological and climatic factors. Indian Journal of Medical . 2005;59:518-526
17. Ahmed S, Arif F, Yaha Y, Rehman A, Abbass K, Ashraf S et al. Dengue fever outbreak in Karachi 2008-a study profile and outcome of children under 15 years of age. J Pak Med Assoc. 2008;58:4-8
18. Mohammad Wasay, Roomasa Channa et al, Changing patterns and outcomes of dengue infection, report from a tertiary care hospital in Pakistan, Journal of Pak Med Assoc 58; 488-490
19. Shazi T Hakim, Syed M et al. An experience of dengue in Pakistan. An expanding problem. Ibnosina J Med 2011, 3(1):3-8
20. Agarwal R, Kapoor S, Nagar R, Misra A, Tandon R,Mathur A et al: A clinical study of the patients with dengue haemorrhagic fever during the epidemic of 1996 at Lucknow, India. Southeast Asian J Trop Med Public Health 1999, 30:735-740
21. Go KT, Ng SK, Chan YC, Lim SJ, Chua EC: Epidemiological aspects of an outbreak of dengue fever/dengue haemorrhagic fever in Singapore. South east Asian J Trop Med Public Health 1987, 18:295-302
22. Ray G, Kumar V, Kapoor AK, Dutta AK, Batra S: Status of antioxidants and other biochemical abnormalities in children with dengue fever. J Trop Pediatr 199, 45:4-7
23. White horn J, Simmons CP. The pathogensis of dengue vaccine; 2011. 29:7221-7228
24. Ander KL et al. Epidemiological factors associated with dengue shock syndrome and mortality in hospitalized dengue patients in Ho Chi Mint City, Vietnam. The American Journal of Tropical 2010. 33:278-284
25. Klein SL.et al. The effect of hormones on sex difference in infection from genes to behavior. Neuroscience and Bibehavioral Reviews, 2000. 24:627-638
26. Guha- Sapir D, Schimmer B Dengue fever. New paradigms for a changing epidemiology. Emerg Themes Epidemiol. 2005:201-205.