ORIGINAL ARTICLE

SERODIAGNOSIS OF DENGUE FEVER IN AN OUTBREAK IN SWAT, PAKISTAN

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ABSTRACT

Background: Dengue is a major health problem around the world and contributes in high rate of morbidity and mortality. The objective of the study was to determine the frequency, time and place distribution of the dengue fever epidemic in District Swat.

Material & Methods: This hospital based, cross-sectional study was conducted in District Head Quarter Teaching Hospital Swat, KPK, Pakistan from August 07 to October 31, 2013, during dengue epidemic. Total of 9032 dengue suspected patients were registered on consecutive sampling technique. Demographic variables were gender, age groups and residence. Research variables were Dengue non-hemorrhagic and Dengue hemorrhagic fever. Blood samples were collected from non-hemorrhagic dengue and dengue hemorrhagic fever patients. Serum was obtained by centrifugation at 3000 rpm for 5 minutes after blood samples were properly clotted. Qualitative detection of dengue virus NS1 antigen was done on commercially available ICT-SD Dengue NS1 kit (Standard Diagnostic, South Korea) following manufacturer instructions. Data analysis was carried out by using SPSS version 19. All variables being categorical were analyzed by frequency and percentages.

Results: Out of 9032 dengue suspected patients serum samples, 8638(96%) were found positive for dengue NS1 antigen. Out of 8638(96%) positive cases on NSI, 5889(68%) patients were males and 2749(32%) were females. The age group wise distribution of the male and female Dengue virus NS1 Antigen positive cases with the age group 21-30 was the modal age group.

Conclusion: The highest incidence of dengue fever was observed in young people. Effective awareness campaigns should be initiated at local, provincial and national level by health departments.

KEY WORDS: Dengue, Non-Structural dengue Antigen, Immunochromatographic technique.

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INTRODUCTION

Dengue fever, also called 'A Break Bone Fever' was first named dengue by American physician Benjaman Rush. It is a Spanish word meaning fastidious or careful.[1] Dengue Fever is the most common arthropods transmitted viral disease.[2] This fever is caused by a member of Flaviviridae family single stranded RNA enveloped virus known as Dengue virus.[3] It has four distinctive antigenically related types; DENV-1, DENV-2, DENV-3 and DENV-4.[4] Clinical manifestations are asymptomatic to milder flu-like symptoms with severe Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) like complications.[5,6] This virus spread through the bite of infected members of genus Aedes mosquito (Aedes aegypti and Aedes albopictus). The habitat of this mosquito is clean domestic human surroundings so known as member of Royal mosquito's family.[7]

This virus was first isolated in 1943 in Japan,[4] then at Kolkata India in 1944[8] and later on in 1960 dengue fever was reported from Singapore, Indone-

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sia, Vietnam, Sri Lanka and Malaysia. Now dengue fever cases have increased many folds in last five decade,[9] this disease spread out to India, French Polynesia, Pakistan and Bangladesh in 1988, 1990, 1992 and 2000 correspondingly.[10] Now about two fifth of world's population i.e. about 2500 million are at risk from dengue fever. Every year approximately 50-100 million dengue, 0.5 million dengue hemorrhagic fever cases and twenty four thousand deaths have been reported.[10,11] More than 70% dengue fever cases have been reported from South East Asia and rest from Africa, Middle East and America.[12] WHO reported that the major of Arboviral disease cases in the world is of dengue virus.[13] It is now the leading public health concern for developing countries all over the world in many tropical regions.[13-15]

Dengue fever is endemic in Indian subcontinent in recent years, the incidence has been increased and is manifesting in the severe form as DHF.[5,15] According to WHO, Dengue fever is a major health problem for Pakistan, Brazil and India.[16] Dengue virus travels throughout the year with a peak incidence in the post monsoon period in Pakistan, but flood makes the situation worse.[12] Seven dengue epidemics have been reported in last two decade from Pakistan.[12,17] According to WHO, dengue fever was first reported from Punjab province of Pakistan in 1982, out of 174 suspected dengue cases 12 patients were declared positive.[18] First epidemic of dengue hemorrhagic fever of serotype DENV-1 and DENV-2 was reported in Karachi in 1994, followed by second episode of dengue epidemic with 800 registered cases of Baluchistan in 1997.[18] In 2005 for the first time dengue endemic was reported with DENV-3 serotype.[4]

Karachi was once again targeted by dengue virus in 2005 and victimized 4500 patient while in 2006 an undocumented dengue outbreak was reported from Azad Jammu & Kashmir.[10,19] Another epidemic was reported in 2006 in Karachi and Rawalpindi with 220 documented cases during October and December.[20] In 2010, 1809 confirmed dengue cases with 5 deaths were reported at dengue surveillance unit Sindh.[16] In 2011, Dengue attacked Pakistan in full swing and according to the health department data, approximately 22,562 confirmed cases of dengue with 363 deaths were reported, Punjab was the most affected province with more than 21,300 cases and 337 deaths while about two hundred cases were from Peshawar, Khyber Pakhtunkhwa (KPK). Lahore topped the list with 17493 cases and 290 deaths.[17,21,22] About 13 cases of dengue fever were filed from other areas of Punjab province and 73 from Lahore in February 2012.[12] The objective of the study was to determine the frequency , time and place distribution of the dengue fever epidemic in District Swat.

MATERIAL & METHODS

This hospital based, cross-sectional study was conducted in District Head Quarter Teaching Hospital Swat, KP, Pakistan from August 07 to October 31, 2013, during dengue epidemic. Total of 9032 dengue suspected patients were registered on consecutive sampling technique. Demographic variables were gender, age groups and residence. Research variables were Dengue non-hemorrhagic and Dengue hemorrhagic fever. Dengue non-hemorrhagic patient were categorized by their symptoms like headache, fever, retro-orbital pain, backache, bone and joint pain, weakness, depression and malaise while dengue hemorrhagic fever patients were with the symptoms of restlessness, acute fever, sweating severe abdominal pain, petechiae, ecchymosis, epistaxis and shock. Blood samples were collected from non-hemorrhagic dengue and dengue hemorrhagic fever patients. Serum was obtained by centrifugation at 3000 rpm for 5 minutes after blood samples were properly clotted. Qualitative detection of dengue virus NS1 antigen was done on commercially available ICT-SD Dengue NS1 kit (Standard Diagnostic, South Korea) following manufacturer instructions. Data analysis was carried out by using SPSS version 19. All variables being categorical were analyzed by frequency and percentages.

RESULTS

Out of 9032 dengue suspected patients serum samples, 8638 (96%) were found positive for dengue NS1 antigen. Out of 8638 (96%) positive cases on NSI, 5889 (68%) patients were males and 2749 (32%) were females as given in figure 1.

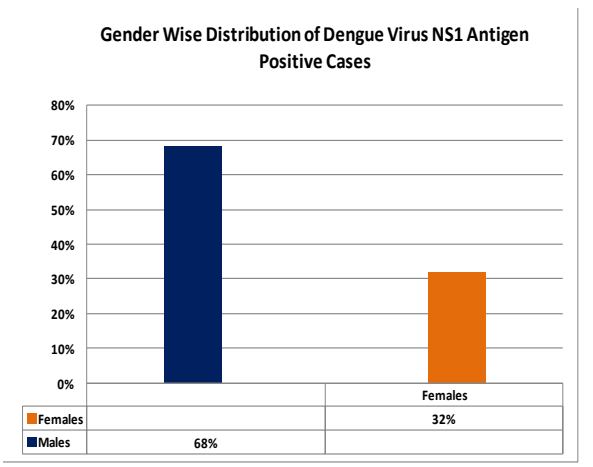
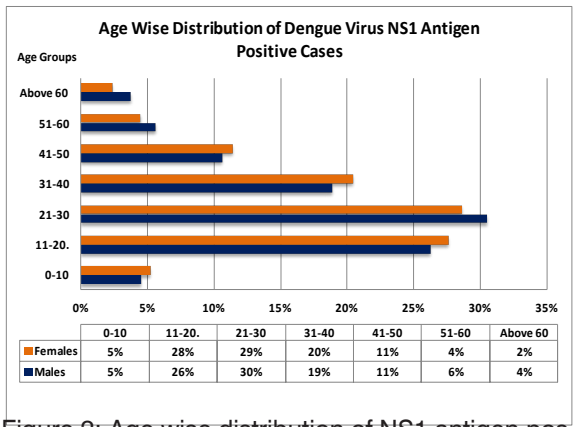


Figure 1: Gender wise distribution of NS1 Antigen positive cases of dengue in District Swat.

The age group wise distribution of the male and female Dengue virus NS1 Antigen positive cases is given in figure 2, with 21-30 being the modal age group.



	0-10	11-20.	21-30	31-40	41-50	51-60	Above 60
Females	5%	28%	29%	20%	11%	4%	2%
Males	5%	26%	30%	19%	11%	6%	4%

Figure 2: Age wise distribution of NS1 antigen positive cases of dengue patients in district Swat

DISCUSSION

In this current study a total of 9032 dengue suspected patients with DF symptoms were enrolled at DHQ hospital Swat during dengue endemic between August and October, 2013. All suspected serum samples were exposed to dengue NS1 antigen rapid ICT test. Out of 9032 patients 8638 (96%) cases were declared positive for DF. It was the biggest epidemic ever reported anywhere from Pakistan however a dengue epidemic in Lahore in 2011 caused 82.37% DF cases.[23] Dengue is noticed an urban disease and the deadly disease partially attributed to gradually more populated towns in rural areas as well and post-monsoon season is a suitable time for DF attributable to the high humidity which provides enough breeding sites for mosquitoes.[4]

The outbreak occurred mainly in the urban areas of Swat, with 95% of cases registered in union councils of the urban Babuzai Tehsil (Mingora Municipality – population 0.6 million) and 5 % were reported from all over the Swat. Babuzai tehsil of district Swat became high risk area for dengue fever endemic. This endemic was limited to 11 high and 10 low risk union councils.

We found that the frequency of DF was higher in male patients 5889 (68%) in contrast to female 2749 (32%) similar results were reported by a study conducted in 2011 in KPK that the male are more susceptible to get disease as compared to female.[4] Gupta et al., (2006) reported high number of cases in male population as compare to female population.[5] The possible reason for high number of cases in males is that they work in the field not fully covered and have more chance of infection as compared to female.[4] The high prevalence of DF in male among older adolescents may be due to the greater exposures of male to dengue infected mosquitoes at the workplace or while traveling to and from work.[24] A study in Manila and Philippines also showed similar results of males predominance.[7] In contrast a study in South America reported more number of effected females than males.[25] Many other studies have also reported a greater prevalence of DF in males than females.[26-29]

Regarding age wise distribution the present study revealed that the maximum number of cases in both males (1795;30%) and in females (786;29%) were in age group of 21-30 years. Second highest incidence of DF was observed in age group 11-20 years in both females and males, 758 (28%) and 1544 (26%) respectively. As reported by Ali A, et al. (2013) that the most significant dengue affected age is 21-30 years in both sexes.[4] This high prevalence of DF in our study in the young age is congruent with studies conducted in (Chandigarh) Northern India and Singapore's different endemic localities.[30,31] However Yew YW, et al. (2009) reported that in Singapore higher prevalence was noted in older aged people.[32]

CONCLUSION

The highest incidence of dengue fever was observed in young people of both genders. Effective awareness campaigns should be initiated at local, provincial and national level by health departments. The vector control is the key element in preventing dengue outbreaks.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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None declared.

AUTHORS' CONTRIBUTION

Conception and Design:	AA, AAK, ZU
Data collection, analysis & interpretation:	AA, UAA, ZUR, SUZ, HK
Manuscript writing:	AAK, ZU, AH