

Article

Outbreak of dengue fever in Haripur, Khyber Pakhtunkhwa, Pakistan

Biomedicine and Surgery

Nasir Habib (1), Muhammad Yaseen Khan (1), Afshan Saleem (2), Aftab Ahmad (3), Riaz Ahmad (4)

(1) Department of Medical Laboratory Technology, University of Haripur

(2) Department of Microbiology, University of Haripur

(3) Department of Forestry and Wildlife, University of Haripur

(4) National University of Medical Sciences (Rawalpindi)

ABSTRACT

BACKGROUND. Dengue fever is caused by single-stranded RNA virus belonging to the flavivirus group. Every year, roughly 2.5 billion people around the world are affected from dengue fever. Current study aimed to evaluate the burden of dengue fever in Haripur and was conducted at the District Hospital and the Department of Medical Laboratory Technology, University of Haripur, KPK. **METHODS.** Three ml of venous blood was collected from patients by venipuncture and immune-chromatographic (ICT) techniques were used. Data was analysed using Excel worksheet. **RESULTS.** Total of 173, 177, 145, 96, 187 and 166 cases in both male and female patients were reported during years 2010, 2011, 2012, 2013, 2014 and 2015 respectively. Out of 173 affected persons in 2010, total 49.1% were males and 36.4% females. Similarly, in 2011, out of 177 penitents, 14.6% were males and 6.7% were females affected by dengue fever. In 2012, out of 145 affected persons, 8.9% were males and 10.3% were females, while in years 2014 and 2015 there were 10.1% males and 12.8% females and 5.4% males and 3.6% females affected by dengue fever respectively. High prevalence was noted from August to October in Pakistan. Higher frequency in males as compared to females was observed in the study area. **CONCLUSION.** Awareness about dengue virus and sensitization should be conducted in affected areas to ensure maximum protection and reduce the morbidity of the disease.

KEYWORDS: Dengue fever; virus, Haripur, Khyber Pakhtunkhwa, human

Correspondence to: Afshan Saleem, Lecturer, Department of Microbiology, University of Haripur
e-mail: afsheesaleem@gmail.com

Date received: November 7th 2017

Date accepted: December 3rd 2017

INTRODUCTION

Dengue fever is caused by single-stranded RNA virus and belongs to the flavivirus group. There are four species known with serotypes: DEN-1, DEN-2, DEN-3 and DEN-4 (1). Humans are infected by mosquito bite (*Aedes aegyptior*, *Aedes albopictus*). Initial days after infection are without symptoms and infection is in acute phase (2). Approximately 2.5 billion people around the world have been affected from dengue (3). As much as 70% of people are at risk in Asian countries (4). In 2013, there were 2.3 million cases of dengue fever, out of which 37,000 cases of sever dengue fever, and in 1200 cases dengue fever lead to death in Latin America (5). Dengue fever was first diagnosed in Sri Lanka in 1900, and the

numbers of dengue fever patients increased every year (6). From 1990 to 1999, dengue fever prevalence was in a uniform range of 2,000 per year, but from 2000 to 2003, the prevalence of dengue cases increased to 3,000 per year, only to rise suddenly to 15,000 in 2004 (7). In 1994 dengue fever was reported in Pakistan during flood (8). In 1995 there were 75 cases reported in the place Hubb Baluchistan, out of which 57 died (9). Dengue epidemic occurred in 2013 in Swat district, with 6,376 dengue fever cases reported and 23 deaths registered (10). In Haripur, 1000 patients were infected with dengue and 7 deaths were registered (11).

DOI: 10.5281/zenodo.2530904

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

MATERIALS AND METHODS

Study was designed at the University of Haripur and conducted at District Hospital Haripur, Khyberpukhunkhawa, Pakistan. Three ml of venous blood was collected from both male and female patients by using routine venipuncture technique. Gel tubes were used and samples were centrifuged to obtain serum for detection of dengue fever and immunochromatographic (ICT) technique was used in this study. Data were analyzed using Excel worksheet. Institutional Review Board (IRB) approval, as well as patients' informed consent, was obtained.

RESULTS

Total of 173 cases of both male and female dengue fever patients were reported in 2010. Study from 2010 showed that 49.1% male and 36.4% female patients were positive for dengue NS1. In 177 cases from year 2011, there were 116 male patients and the rest were female patients, i.e. 14.6% of males and 6.7% of females were infected. In the year 2012, there were 145 cases of dengue fever reported, out of which there were 98 male and 43 female patients. Therefore, in 2012 there were 8.9% of males and 10.3% of females positive for dengue NS1. Total of 96 cases were reported in 2013, of which there were 64 males and 32 females, accounting for 12.5% males and 6.2% females positive for dengue NS1. In 2014 there were 187 patients (102 male and 85 female patients), with 10.1% males and 12.8% females positive for dengue NS1. Finally, 166 patients were evaluated in 2015 (117 male and 49 female patients). Overall, 5.4% male and 3.6% were positive for dengue NS1.

Distribution of dengue NS1 among male participants is shown in Figure 1 and among female patients in Figure 2.

DISCUSSION

Dengue virus infections are found in almost all tropical areas of the world (12), and are most commonly found in rainy season (13). There is high a prevalence from August to October in Pakistan (14). Present study suggested that frequency of dengue fever is higher in males as compared to females, which is similar to the study conducted in Karachi showing the higher number of male population infected from dengue (13). Another study conducted in Lahore also showed high rate of positive cases in male population (15). In contrast to our study, in Dhaka females were found to be more infected by dengue virus than males (16). In another study by Rashmi K.S. *et al* in 2012, percentage of dengue virus

infection in males was higher than in females (17). Another study was conducted in Shangla Swat, with 56.2% females and 43.8% males positive for dengue (18-20). In our study dengue in males varied during this five years period with slight difference from females so this fluctuation might be due to non-even distribution of participants in sampling that might reflect the actual variation. While difference in frequency may be due to the environmental factors like rainy season and other social and routine work such as males being more exposed while working outside but in some areas females are more affected like in urban areas and the areas where females also participate in field work like farming etc.

Dengue virus infection persistently occurs in our country regardless of the areas and affects both genders non-specifically. Awareness about dengue virus and sensitization must be done specially in rainy seasons to ensure maximum protection and reduce the morbidity of the disease.

REFERENCES

1. Singhi S, Kissoon N, Bansal A. Dengue and dengue hemorrhagic fever: management issues in an intensive care unit. *Jornal de pediatria*. 2007; 83 (2 Suppl): S22-35. doi: 10.2223/jped.1622.
2. Yang HM, Macoris ML, Galvani KC, Andrighetti MT, Wanderley DM. Assessing the effects of temperature on the population of *Aedes aegypti*, the vector of dengue. *Epidemiology and infection*. 2009; 137 (8): 1188-1202. doi: 10.1017/S0950268809002040.
3. Guzman MG, Harris E. Dengue. *Lancet (London, England)*. 2015; 385 (9966): 453-465. doi: 10.1016/S0140-6736(14)60572-9.
4. Hurtado-Diaz M, Riojas-Rodriguez H, Rothenberg SJ, Gomez-Dantes H, Cifuentes E. Short communication: impact of climate variability on the incidence of dengue in Mexico. *Tropical medicine & international health : TM & IH*. 2007; 12 (11): 1327-1337. doi: 10.1111/j.1365-3156.2007.01930.x.
5. Gupta E, Dar L, Kapoor G, Broor S. The changing epidemiology of dengue in Delhi, India. *Virology journal*. 2006; 3: 92. doi: 10.1186/1743-422x-3-92.
6. Kularatne S, Seneviratne S, Malavige G, Fernando S, Velathanthiri V, Ranatunga P, Wijewickrama E, Gurugama P, Karunatilaka D, Aaskov J. Synopsis of findings from recent studies on dengue in Sri Lanka. *Dengue Bulletin*. 2006; 30: 80.
7. Jawad K, Masood S, Tassarwar H, Inam B, Waheeduz Z. Outbreak of dengue hemorrhagic fever in Karachi. *Pak Armed Forces Med J*. 2001; 51 (2): 94-98.
8. Akram DS, Igarashi A, Takasu T. Dengue virus infection among children with undifferentiated fever in Karachi. *Indian journal of pediatrics*. 1998; 65 (5): 735-740.
9. Gubler DJ. Dengue and dengue hemorrhagic fever. *Clinical microbiology reviews*. 1998; 11 (3): 480-496.
10. Paul RE, Patel AY, Mirza S, Fisher-Hoch SP, Luby SP. Expansion of epidemic dengue viral infections to Pakistan. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases*. 1998; 2 (4): 197-201.
11. Strobel M, Lamaury I. [Dengue fever: a review]. *La Revue de medecine interne*. 2001; 22 (7): 638-647.



Figure 1. Distribution of dengue antigen NS1 in male population.

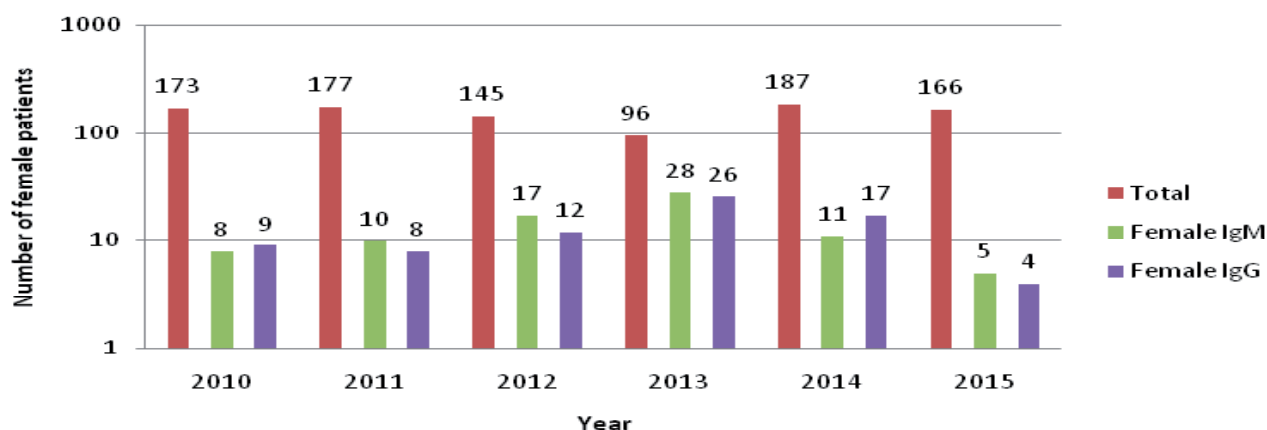


Figure 2. Distribution of dengue antigen NS1 in female population.

12. Keating J. An investigation into the cyclical incidence of dengue fever. *Social science & medicine* (1982). 2001; 53 (12): 1587-1597.
13. Khan E, Siddiqui J, Shakoor S, Mehraj V, Jamil B, Hasan R. Dengue outbreak in Karachi, Pakistan, 2006: experience at a tertiary care center. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007; 101 (11): 1114-1119. doi: 10.1016/j.trstmh.2007.06.016.
14. Khan E, Kisat M, Khan N, Nasir A, Ayub S, Hasan R. Demographic and clinical features of dengue fever in Pakistan from 2003-2007: a retrospective cross-sectional study. *PloS one*. 2010; 5 (9): e12505. doi: 10.1371/journal.pone.0012505.
15. Humayoun MA, Waseem T, Jawa AA, Hashmi MS, Akram J. Multiple dengue serotypes and high frequency of dengue hemorrhagic fever at two tertiary care hospitals in Lahore during the 2008 dengue virus outbreak in Punjab, Pakistan. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases*. 2010; 14 Suppl 3: e54-59. doi: 10.1016/j.ijid.2009.10.008.
16. Farhana R, Awatef KF, Khanum H, Akter T. Prevalence of dengue fevers among the patients of different economic status attended at local hospital in Dhaka. *Bangladesh Journal of Zoology*. 2014; 42 (2): 161-168.
17. Rashmi K, Ravikumar K, Pratibha MJ, Giridhar UP, Arun KR. Serological markers prevalence and trend of probable dengue infection at a tertiary care hospital in Bangalore. *Journal of Evolution of Medical and Dental Sciences*. 2013; 2 (36): 6968-6977.
18. Khan J, Khan A. Incidence of dengue in 2013: dengue outbreak in District Swat, Khyber Pakhtunkhwa, Pakistan. *Inter J of Fauna and Biolo Stud*. 2015; 2 (1): 1-7.
19. Khan J, Munir W, Khan B, Ahmad Z, Shams W, Khan A. Dengue outbreak 2013: Clinical profile of patients presenting at DHQ Burner and THQ Shangla, Khyber Pakhtunkhwa, Pakistan. *Immunity & Diseases*. 2015; 3 (11).
20. Ikhlaq U, Irfan M, Ali S, Ashraf A, Xiao S, Qayyum M. Prevalence of Dengue in Students of Arid Agriculture University Rawalpindi. *PSM Microbiology*. 2016; 1 (2): 62-65.