

Outbreak of Dengue Fever (DF) in District Peshawar Pakistan

Muhammad*¹, Saadat Mehmood^{1,2}, Jasir Ullah³, Nabeela^{1,2},

Muhammad Rizwan⁴, Muhammad Farooq¹

¹*Department of Microbiology, University of Swabi, Khyber Pakhtunkhwa, Pakistan*

²*Center of Biotechnology and Microbiology, University of Peshawar, Khyber Pakhtunkhwa, Pakistan*

³*Department of Biochemistry, Abdul Wali Khan University Mardan, Khyber Pakhtunkhwa, Pakistan*

⁴*Department of Microbiology and Biotechnology, Abasyn University Peshawar, Khyber Pakhtunkhwa, Pakistan*

Abstract

From last two decades, Pakistan faced devastating challenges due to climate change that not only destroyed infrastructure but also endangered the general public health standard. Dengue fever (DF) is one of the vector borne disease happened so many time in different locations of Pakistan. In current study dengue outbreak in Peshawar were investigated. Questionnaire based study were designed and 155 (100%) dengue patients were interviewed for their symptoms, age, sex, location and travel history. During study, the symptoms of headache were recorded in 127 (81.93%) patients. Furthermore it were noted that males were more infected than females, i.e. 111 (71.6%) and 44 (29.4) respectively. On the basis of location it were noted that most of the patients 61 (39.35%) were residence of Tahkal while the lowest ratio 11 (7.09%) were recorded for Shaheen Town. The patients were distributed based on age groups and found that Group 2: 15-44 years were more vulnerable, i.e. 111 (71.6%) while the lowest ratio was recorded in Group 1: 8 (5.16 %). Furthermore 79 (50.96 %) were recorded marital while all the remaining, i.e. 76 (49.03%) were recorded non-marital. Educationally the dengue infected people were found 90 (58.06%) literate and 65 (41.93%) illiterate. Travel history shows that about 132 (85.16%) individuals were traveled to previously infected areas, e.g. Swat and Punjab. The Government of Pakistan, WHO and other health organization need to give full attention to the problem to prevent the future outbreak of dengue fever in said area to protect human lives.

Key words: Outbreak, Dengue Fever (DF), Questionnaire, District Peshawar

**Corresponding author address:* Mr. Muhammad

Department of Microbiology, University of Swabi, Anbar, Khyber Pakhtunkhwa, Pakistan;

E-mail: muhammad@uoswabi.edu.pk

1. Introduction

From last two decades, Pakistan faced devastating challenges due to climate change, floods, heavy rains and earthquakes, which not only destroyed infrastructure but also endangered the general public health standard. Due to congested cities, insufficient hygienic services, poor vaccination, unsafe portable water, and massive number of migrants, Pakistan is susceptible to huge epidemics of different vector borne diseases and water borne infections [1]. The most swiftly spreading, vector borne viral infection in the world is Dengue fever (DF) [2]. According to WHO estimations, about 50 million dengue viral infections transpire globally each year and two fifths of the world's population is at threat of dengue infection. In Pakistan, the first major outbreak of Dengue fever was documented in 1994-1995 in Karachi [3]. Due to Dengue fever (DF), annually seasonal outbreaks were observed each year prevailing in Pakistan. The state counter signed a major epidemic of dengue fever in Punjab, the vilest affected region with 203 deaths and over 250,000 suspected cases reported from this outbreak in 2011. Another DF was reported from District-Swat (KP) in August 2013, number of cases were 3,177 [4].

Dengue Virus (DENV) is an envelope, positive single-stranded RNA genome of genus flavivirus belongs to family Flaviviridae. DENV devises developed four diverse serologic subtypes; DENV-1, DENV-2, DENV-3 and DENV-4 [5]. Every subtype consumes distinctive genotypes or lineage presenting broad genetic variations of dengue serotypes [2]. The virus is composed of 7 non-structural proteins (NS1, NS2a, NS2b, NS3, NS4, NS4b, and NS5) and 3 structural proteins (core, membrane and envelope) [6]. The vaccine developing against dengue is difficult due to genomic capriciousness as the vaccine should be active against all four subtypes of Dengue virus [7]. Infection of one subtype of DENV results in lifetime defense against the same serover however does not afford complete immunity against other serotypes [8]. Thus an individual getting better from one type of Dengue virus in a prevalent area is probable to get infested through new subtypes as well as this later infection can base of more unadorned and life intimidating disease, two DENV-2 and DENV-3 are associated with severe disease along with secondary dengue infections among 4 serotypes [9, 10]. In Pakistan DENV-1, DENV-2 and DENV-3 serotypes from the recently detected in many cases and combination of DENV-1 and DENV-2 [4].

Dengue fever is arboviral infection transmitted by female mosquitoes *Aedes* particularly *Aedes aegypti*. Other species like *Aedes polynesiensis*, *Aedes albopictus*, and several *Aedes scutellaris* can also transmit the disease person to person. Dengue can also be transferred by organ donations, blood products or blood transfusions and vertical transmission occurs during pregnancy has also been reported [11, 12].

Dengue fever (DF) or break bone fever is a severe pyretic viral infection commonly presenting with bone, joint and muscular pains, headaches, leucopenia rash and rashes [13]. Four major clinical signs

categorize dengue hemorrhagic fever (DHF): hemorrhagic phenomena, high temperature, frequently with hepatomegaly and in some severe cases, signs of cardiovascular failure. Such patients might progress hypovolemic shock causing from plasma leakage can be fatal known as dengue shock syndrome (DSS) [2].

2. Methodology

The current study was conducted at Khyber teaching hospital (KTH) Peshawar after the approval of ethical authority of the respective hospital. Questionnaire based study was selected in which infected individual having Dengue fever was interviewed after the confirmation of IgM, IgG antibodies and NS1 Proteins in serum. In addition, multiple symptoms of Dengue infections such as high fever, headache, joints pain vomiting and Nausea from few days were recorded.

3. Results

The contemporary epidemic of dengue arose in district Peshawar, infected thousands of peoples out of them about 11 peoples lost their lives.

3.1. Frequency of Symptoms.

During interview, multiple symptoms were recorded including fever, headache, joints pain vomiting and Nausea. All the causalities have high fever 155 (100%), headache 127 (81.93%), joint pain 53 (34.19%), vomiting 90 (58.06%) and Nausea 33 (21.29%), table 1.

Table 1: Recorded symptoms of dengue fever patients

Symptom	YES	NO
Fever	155 (100%)	0
Headache	127 (81.93%)	28(18.06%)
Joint pain	53(34.19%)	102(65.80%)
Vomiting	90(58.06%)	65(41.93%)
Nausea	33(21.29%)	122(78.70%)

3.2. Gender wise distribution

The total 155 positive cases were distributed gender wise. These patients confirmed by IgM and IgG test. It were recorded that 111 (71.6%) of the patients were males while 44 (29.4) were females, figure 1.

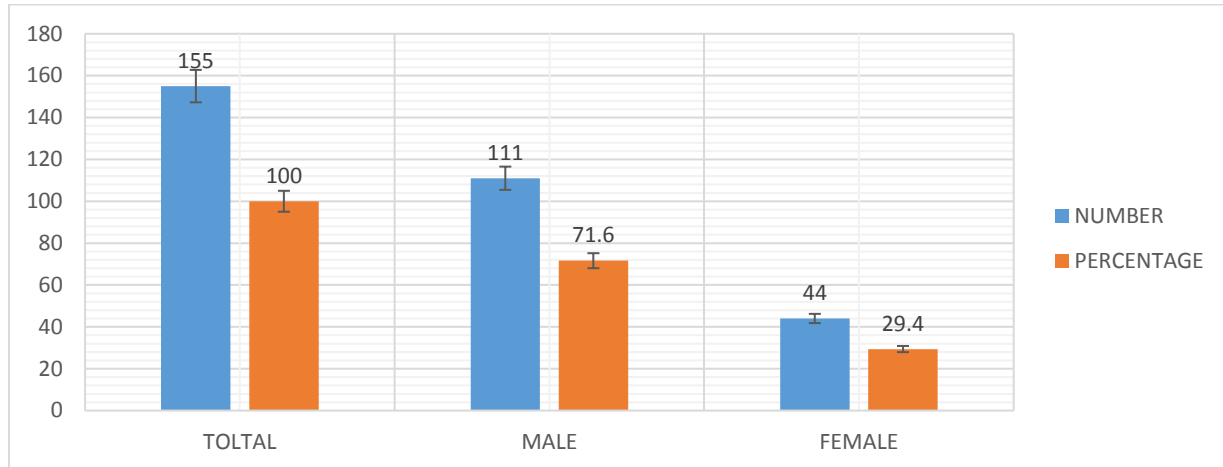


Figure 1: Gender wise distribution of dengue patients

3.3. Location wise distribution

The current outbreak was spread in different location of district Peshawar. The total number of patients were 155 including 61(39.35%) were residence of Tahkal, 33(21.2%) were belongs to Spenawarie, followed by Pistakhara 19 (12.25%) while victims belongs to Arbab road, Pawakai, and Shaheen town were 17(10.96%), 14(9.03%) and 11(7.09%) respectively, figure 2.

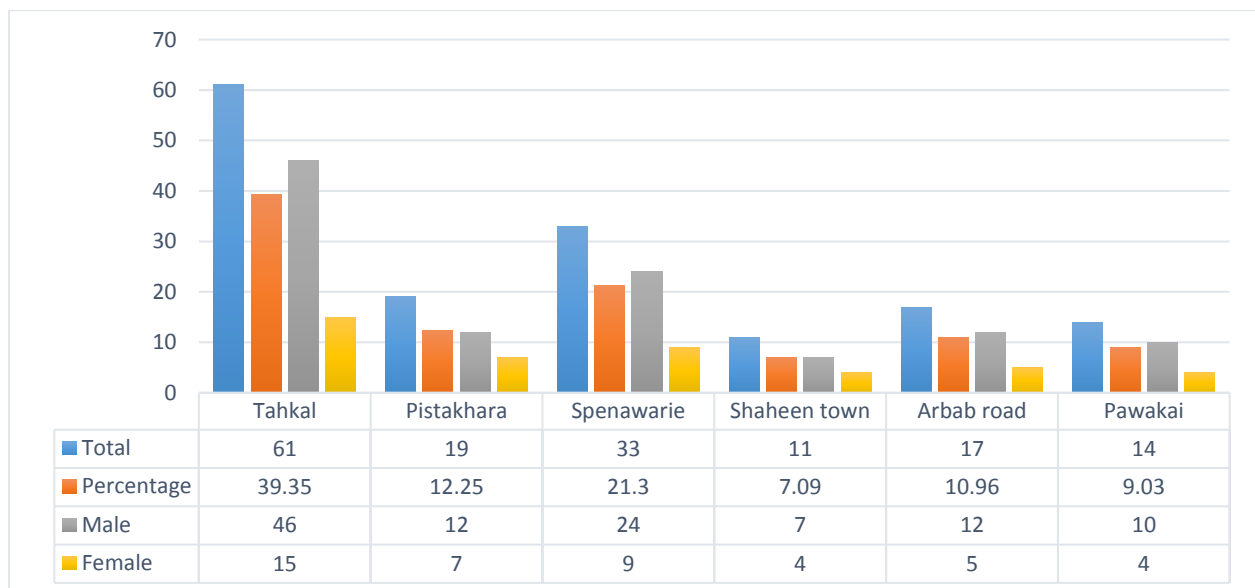


Figure 2: Location wise distribution of dengue patients

3.4. Age wise distribution

According to age wise circulation of septic individuals, the dengue patients were alienated in four groups comprised; Group 1: 1-14 years' Group 2: 15-44 years' Group 3: 45-64 years' and Group 4: >65 years'. Rendering to this flow the most vulnerable was Group 2: 111 (71.61%) including 80 males and 31 females, trailed by Group 3: 27 (17.41%), Group 4: 9 (5.80%) and Group 1: 8 (5.16), figure 3.

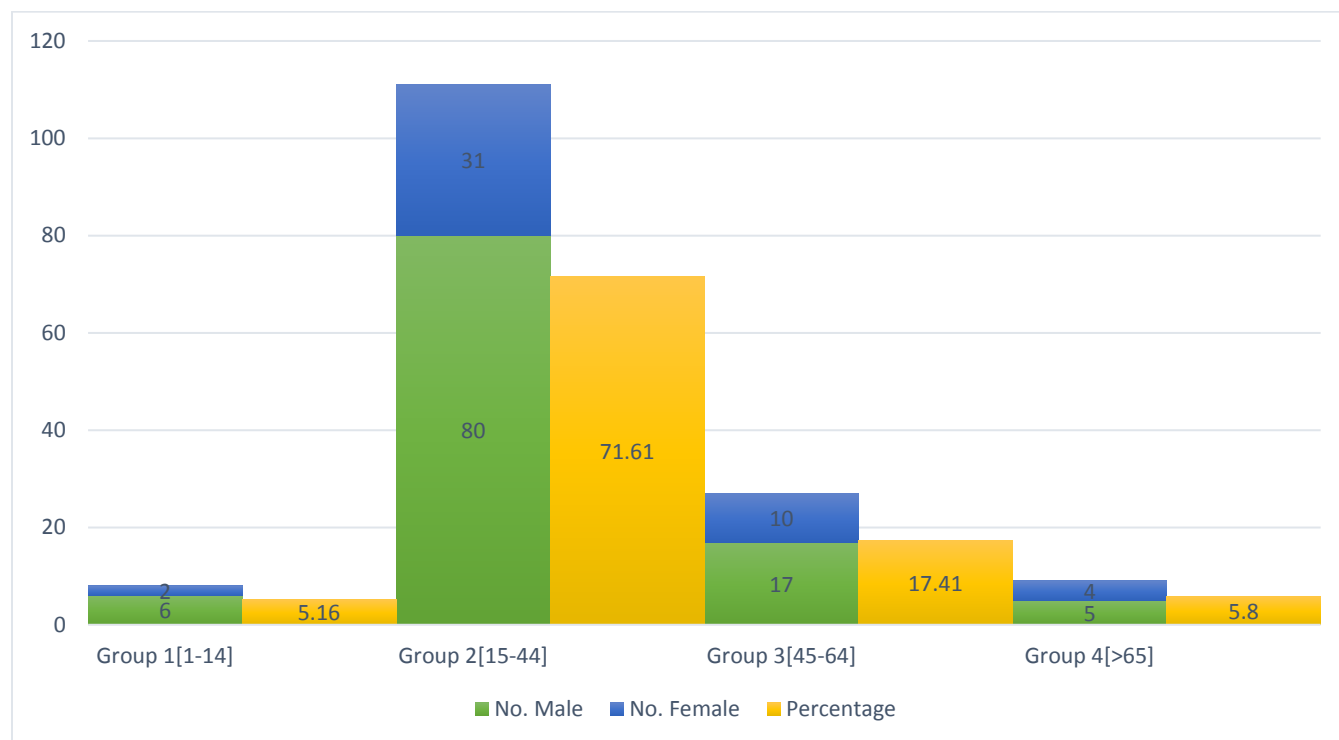


Figure 3: Age groups wise distribution of dengue patients

Out of 155 patients 79 (50.96) were recorded marital including 47 (30.32%) males 32 (20.64%) females while 76(49.03%) were recorded non-marital including 64 (41.29%) males and 12 (7.74%) females. Educationally the dengue infected peoples were found 90 (58.06%) literate including 83 (53.54%) males and 7 (4.51%) females while 65 (41.93%) were illiterate including 28 (18.06%) males and 37 (23.87) females. Travel history shows that about 132 (85.16%) individuals were traveled to previously infected areas, e.g. Swat and Punjab, table 2.

Table 2: Matrimonial status, education and travel history wise distribution of patients

Total			155	
Matrimonial status	Married	79(50.96%)	No. of Male	47 (30.32%)
			No. of Female	32(20.64%)
	Unmarried	76(49.03%)	No. of Male	64(41.29%)
			No. of Female	12(7.74%)
Education	Yes	90(58.06%)	No. of Male	83(53.54%)
			No. of Female	7(4.51%)
	No	65(41.93%)	No. of Male	28(18.06%)
			No. of Female	37(23.87)
Travel history	Yes	132(85.16%)		
	No	23(14.83%)		

3. Discussions

Worldwide Dengue is emerging viral infection harming peoples and challenging disease. In Pakistan numbers of outbreaks arisen in last three decades. The most recent outbreak is ascended in Peshawar. A total of 155 patients were confirmed positive with Dengue virus by detection of IgM, IgG and NS1 (Non Structural 1) proteins same method was used by Muhammad *et al.*,(2013) where 70% of suspected cases were confirmed [14]. In present study the males to female ratio was 2.5:1 similar ratio of 2.5:1 males to females during epidemic DF in Delhi was reported [16]. Comparable with previous outbreak in Swat was 3:1 Muhammad *et al.*,(2013). The male to female ratio of 1.5:1 was reported DF/DHF during an outbreak in Chittagong by the Ministry of Health, Bangladesh [17]. This might reveal greater seriousness of infection in males than females and the alfresco actions male compared to females.

In current report entire cases presented with Fever (100%), headache (81.93%), Joint pain (34.19%), Vomiting (58.06%) and Nausea (21.29%), Similar studies was previously reported in Lahore, Pakistan all dengue diseased people bare fever (100%) headache (54.17%), vomiting and Nausea (62.5%) [18]. another study in Faisalabad also present similar symptom Fever (100%) and vomiting (34%) [15].

5. Conclusion

It is concluded from the present study that dengue fever affected peoples of almost all age groups in said area. The ratios of infections were found more in males than females. Awareness regarding dengue

fever infection, knowledge, preventive measure and early treatment is necessary for its control. In this regard, we recommended a further detail study.

6. Acknowledgements

The authors are thankful to the Khyber teaching hospital (KTH) staff Peshawar for providing facilities for this study.

7. References

1. Jahan F. Dengue Fever (DF) in Pakistan. Asia Pac Fam Med. **(2011)**, 10 (1), 1.
2. World Health Organization. Dengue: Guidelines for diagnosis, treatment, prevention and control. New Edition. WHO & Special Programme for Research and Training in Tropical Diseases (TDR). **2009**.
3. Chan YC, Salahuddin NI, Khan J, Tan HC, Seah CL, Li J. Dengue haemorrhagic fever outbreak in Karachi, Pakistan, 1994. Trans R Soc Trop Med Hyg, **(1995)**, 89, 619-2.
4. World Health Organization, Epidemiological Monitor Volume 6 Issue 37 Sunday 15 September 2013
5. <http://www.denguevirusnet.com/dengue-virus.html>
6. Raja NS, Singh NN, Mehmood T, Sethi H, Raja NH, Janjua KA. Dengue Viral Infections. A Major Public Health Issue. International journal of Pathology. **(2009)**, 7, 4-12.
7. Dengue Fever World Health Organization Fact Sheet No.117. **(2009)**. <http://www.who.int/mediacentre/factsheets/fs117/en/>
8. Shu PY, Huang JH. Current Advances in Dengue Diagnosis. Clin Diagnost Lab Immunol. **(2004)**, 11(4), 642-50.
9. Leitmeyer KC. Dengue virus structural differences that correlate with pathogenesis. J Virol. **(1999)**, 73(6), 4738-47.
10. Messer WB. Emergence and global spread of a dengue serotype 3, subtype III virus. Emerg Infect Dis. **(2003)**, 9(7), 800-809.
11. World Health Organization (WHO). Dengue Hemorrhagic Fever, Diagnosis, Treatment, Prevention and control. 2nd Edition. **(2010)**, 4-45.
12. Ali N, Nadeem A, Anwar M, Tariq WU, Chotani RA. Dengue fever in malaria endemic areas. J Coll Physicians Surg Pak. (2006), 16, 340-2.
13. Gubler DJ. Dengue Viral Infections. Mahy BWJ, Van Regenmortel MHV. **(2010)**. Desk Encyclopedia of Human and Medical Virology. Boston 2010; Academic Press. ISBN 0-12-375147-0 <http://books.google.com/books> (Cited 2011. December 9)
14. Muhammad, Rahmat A., Sadeeq A., Imran K, Tauseef A. **(2014)**. Outbreak of Dengue in Khwazakhela District Swat during August-November 2013. Bull. Env. Pharmacol. Life Sci. 3 (2), 26-28.
15. Sajid A, Ikram A, Ahmed M. **(2012)**. Dengue Fever Outbreak 2011: Clinical Profile of Children Presenting At Madina Teaching Hospital Faisalabad. JUMDC. 3(1).
16. Wali JP, Biswas A, Handa R, Aggarwal P, Wig N, Dwivedi SN. **(1999)**. Dengue haemorrhagic fever in adults: a prospective study of 110 cases. Trop Doct, 29, 27-30.

17. Rasul CH, Ahasan HA, Rasid AK, Khan MR. **(2002)**. Epidemiological factors of dengue hemorrhagic Fever in Bangladesh. Indian Pediatr, 39, 369-372.
18. Mahboob A, Iqbal Z, Javed R, Taj A, Munir A, Munir, A. **(2010)**. Clinical characteristics of patients with dengue fever report of 48 patients in 2010. J Ayub Med Coll Abbottabad, 22(4), 120-123.