PREVALENCE OF DENGUE FEVER DURING 2011 - 2012 IN PUNJAB

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ABSTRACT

Pakistan has experienced a number of dengue fever outbreaks since 1992 and becoming most rapidly spreading mosquito born viral disease now a day. In present study prevalence of dengue fever recorded from November, 2011 to May, 2012. Data was collected from nine towns of Lahore. Results showed that total 11,283 dengue cases were reported in different hospitals of nine towns. Highest prevalence 18.3% was recorded in Data GanjBaksh town, whereas in Gulberg and Cant Town was recorded 13.3% and 12.6% respectively. The prevalence in Allama Iqbal and Samanabad towns was found 11.9% in each. The least affected area was Wahga Town, where 1.5% prevalence was recorded. The highest prevalence of dengue fever (DF) with respect to sex was observed in males 89% (1192) in Samanabad town. The DF was more prevalent in females of Shalimar town (35%). The prevalence of DF with respect to age in age group 21 to 30 years was found highest (23.14%) among all age groups. The possible reason for higher prevalence of dengue fever in males and in people falling between 21 to 30 years of age can be attributed to the fact that usually these people spend more time outdoors and thus have more chances of getting affected. It is recommended that keep surroundings of congested areas free from standing water. Potential breeding sites for mosquito needs to be inspected regularly.

Key words: Dengue fever, prevalence, nine towns of Lahore, sex and age group.

INTRODUCTION

Pakistan has experienced a number of dengue fever outbreaks since 1992 and becoming most rapidly spreading mosquito born viral disease now a day. Dengue fever has emerged as a worldwide problem over the last five years (Hassan *et al*, 2013). The World health Organization declared dengue and dengue hemorrhagic fever to be endemic in South Asia. At presently, estimated that there were about 50 million dengue infections worldwide occurred every year (World Health Organization, 2009; Guzman *et al,* 2010). The dengue virus is transmitted by the freshwater mosquito, *Aedesaegypti*. It is a widespread mosquito-borne infection in human beings, which in recent years has become a major international public health problem (Jahan, 2011). Although the factors responsible for the rapid expansion of dengue in South East Asian region are complex, vector-host-virus triad, socioeconomic stresses and climatic variations are thought to have a significant role (Khan and Hasan, 2011). Pakistan has experience a number of dengue fever outbreaks since 1992. In 2005 Karachi outbreak 4,500 dengue cases were registered. The epidemic continued to affect a large number of people in Azad Jammu and Kashmir in 2006 but went largely unreported (Butt, 2011). Over 21,204 people were reportedly infected in the country in 2010 (Khan and Hasan, 2011). In 2012, the massive outbreak in Punjab attracted the attention of the Government of Pakistan, especially the Punjab Government (Khan and Hasan, 2011). This latest outbreak has resulted in 18,000 cases nationwide. Punjab has borne the brunt of the infection with 16,000 cases and 350 deaths of which 14,000 cases and 300 deaths were reported from Lahore alone (Butt, 2011).

Pakistan is prone to large epidemics of various water borne and vector borne diseases (Jahan, 2011). The most rapidly spreading, vector borne viral disease in the world is Dengue fever (World Health Organization, 2009). Over the last few years, Pakistan had faced devastating natural calamities like earthquake, torrential rains and floods that not only destroyed the local infrastructure but also threatened the health status of general public. The causes of spread of dengue fever in Pakistan includes overcrowded cities, unsafe drinking water, inadequate sanitation facilities, huge number of refugees and poor vaccination promoted the spread of infectious diseases and consequently every year a large number of epidemics/outbreaks occur in different parts of the country, which result in increased morbidity and mortality (website 1). The study will help in providing sound basis for the dengue future spread in different age groups, and in various localities of Lahore. The objective of the study was to investigate the prevalence of dengue fever in nine towns of Lahore.

MATERIALS AND METHODS

The current study was conducted at Lahore city capital of Punjab, Pakistan. It had an estimated population of 6,318,745 inhabitants in 1998 (District Census Report of Lahore, 1998). In present study prevalence of dengue fever recorded from November, 2011 to May, 2012. For this purpose, the data was collected from nine towns of Lahore. Lahore was declared as City district Government Lahore in 2001 and divided into six towns. In 2005, three more towns were added to CDGL. Now Lahore City District Comprises of nine towns (Aziz Bhatti Town, Data Gang Baksh Town, Iqbal Town, Nishtar Town, Ravi Town, Shalimar Town, Gulberg Town, Samanabad Town and Wahga Town) (Figure 1). Data was collected from eighteen (18) government and private hospitals (Sheikh Zaid Hospital Lahore, Sir Ganga Ram hospital Lahore, Services Hospital Lahore, Jinnah Hospital Lahore, Mayo Hospital Lahore, Children Hospital Lahore, Ittefaq Hospital Lahore, Wapda Hospital Lahore, Shaukat Khanum Memorial Trust Lahore, Omer Hospital Lahore, Chughtais Lahore Lab., Punjab Institute of Cardiology,

Shalimar Hospital Lahore, Faujii Hospital Lahore, Lady Aitchison Hospital Lahore, Ghurki Trust Teaching Hospital Lahore, Nishtar Hospital, Hijaz Hospital Lahore and National Hospital Lahore) of nine towns of Lahore.

Data found in the Logbooks available at the Medical records department of the said hospitals. The researchers sought permission from the MS of the respective hospital through medical records department where the necessary data to be gathered are on file. Upon approval of the letter, the researchers went over records of patients who were diagnosed of dengue fever. Specifically, their demographic characteristics such as: age, gender, place of residence or origin was noted. Lastly, counting the monthly number of dengue fever from the year 2011-2012 was considered. It was collected to assess the prevalence of dengue fever in the population of Lahore with respect to record overall prevalence, prevalence with respect to males and females and in different age groups on the basis of current data, to predict the future trend of dengue fever in study areas. This study utilized descriptive statistical technique as frequency and percentages to describe the important features of the data set in tables.
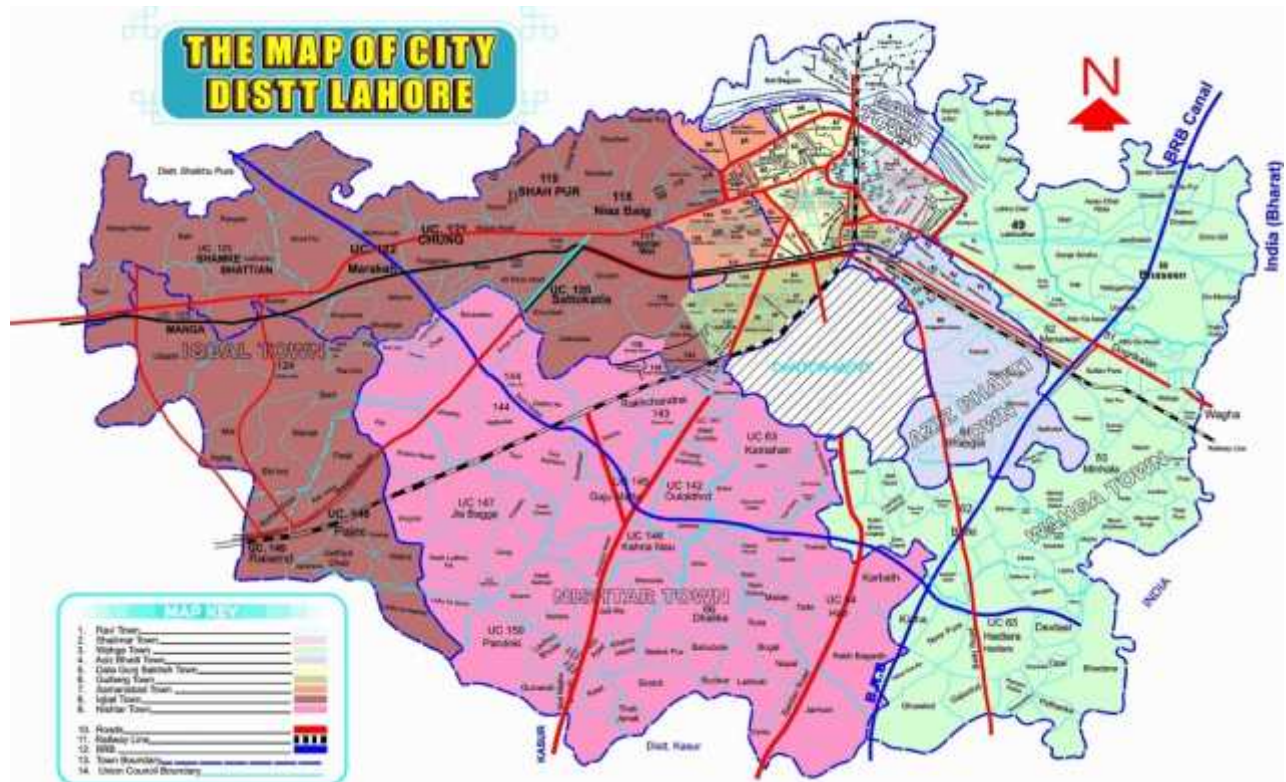

Fig.1. Map of administrative towns of Lahore (source: www.lahore.gov.pk)

RESULTS AND DISCUSSION

From November 2011 to May 2012, 11283 dengue cases were reported in different hospitals of nine

towns of Lahore. Out of total dengue proven patients 2069 (18.3%) cases were recorded from Data GanjBaksh town. Highest prevalence 18.3% was recorded in Data GanjBaksh town, whereas in Gulberg and Cant Town

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was recorded 13.3% and 12.6% respectively. The prevalence in Allama Iqbal and Samanabad towns was found 11.9% in each. The least affected area was Wahga Town, where 1.5% prevalence was recorded. The highest prevalence of dengue fever (DF) with respect to sex was observed in males 89% (1192) in Samanabad town. The Dengue fever was more prevalent in females of Shalimar

town (35%). Moderately affected areas were Nishter, Ravi, Shalimar and Aziz Bhatti Town containing about 9.8%, 8.7%, 7.3% and 4.5% cases of dengue respectively (Table 1). The relation between DF and sex was calculated. According to these results the prevalence in males was 69% and in females it was 31% (Fig. 2).
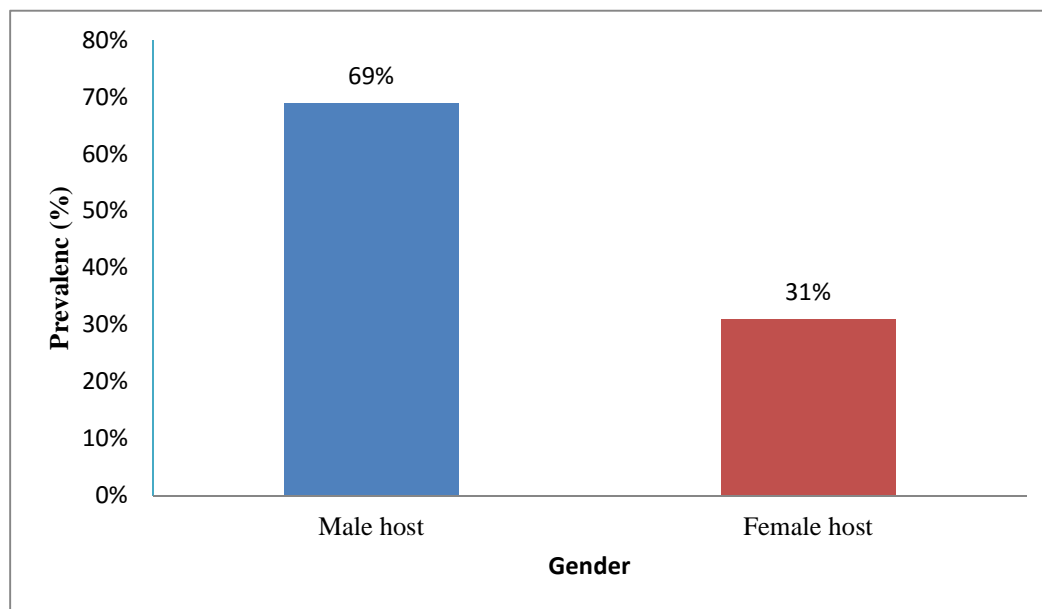

Fig.2.Relationship between gender and dengue fever in residents of Lahore

Table 1. The overall prevalence and relation between sex and Dengue fever recorded in different hospitals of towns of Lahore

Name of towns	No. of male patients (n)	No. of female patients (n)	Total patients (n)	Prevalence in males (%)	Prevalence in females (%)	Overall prevalence (%)
Allama Iqbal	923	420	1343	68.7	31.2	11.9
Aziz Bhatti	355	161	516	68.8	31.2	4.5
Data Gung Baksh	1347	722	2069	65.1	34.8	18.3
Gulberg	976	525	1501	65.0	34.9	13.3
Nishtar	755	352	1107	68.2	31.7	9.8
Ravi	649	335	984	65.9	34.0	8.7
Samanabad	1192	146	1338	89.0	10.9	11.9
Shalimar	527	296	823	64.0	35.9	7.3
Wahga	123	53	176	69.8	30.1	1.5
Cantt	951	475	1426	66.6	33.3	12.6
Total no.	**7798**	**3485**	**11283**			

The most affected area of Lahore was found to be Data Gung Baksh Town which is more congested area than other Towns. The relation between different age groups in humans was calculated, the results are presented in figure 3 and table 2. According to these results the prevalence was highest in age group 21 to 30

years (23%) and lowest in age group of 91 to 100 years 0.053%.

Figure 4 shows the highest frequency of dengue fever in age groups 21-30 years to be from Data GanjBaksh Town i.e. 450-518 patients. The fewest number falling in the range of 48-75 patients in age groups 21-30 were reported from Wahga Town.
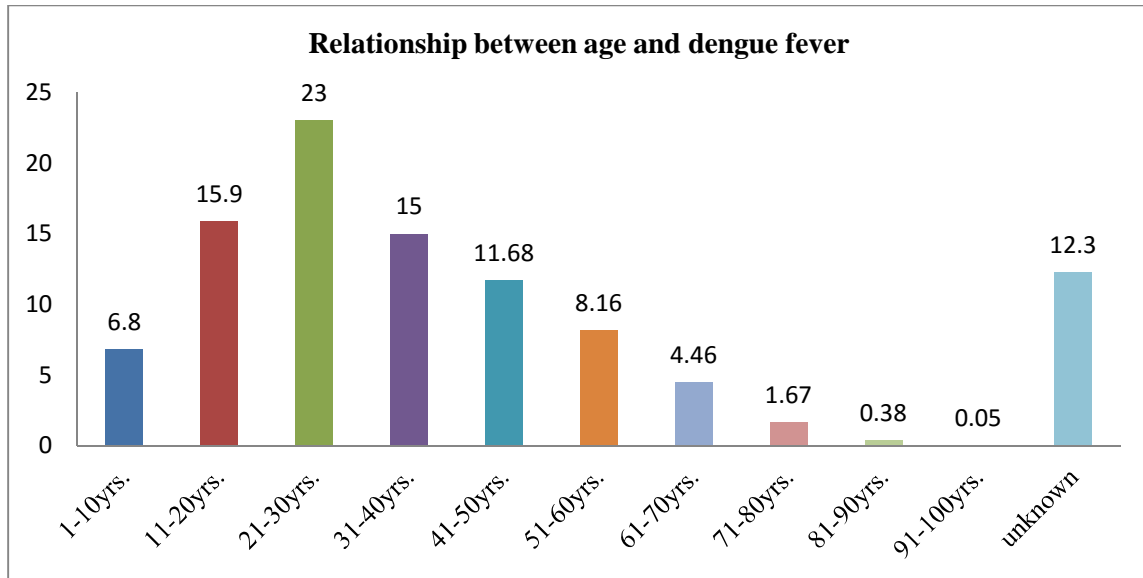
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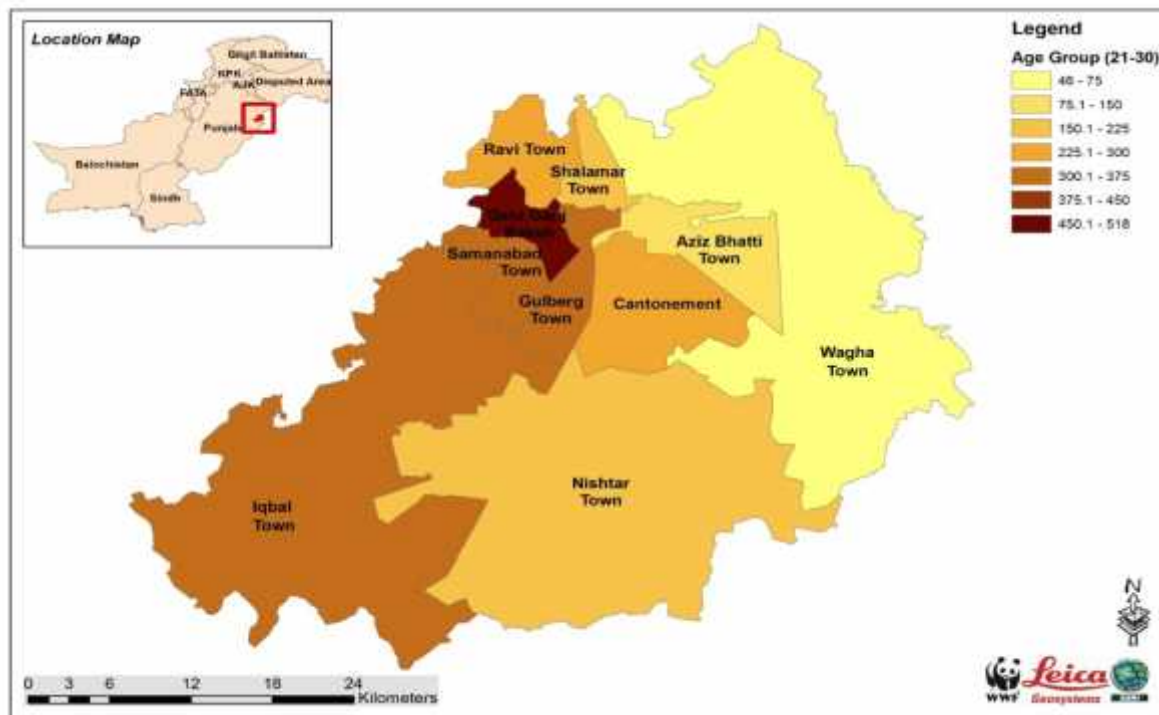**Fig.3. Relationship between age and dengue fever in humans of Lahore**

Fig. 4. Prevalence of Dengue fever in age group (21 -30 years) in towns of Lahore

According to table 2 the highest frequency of DF in age groups 1-10 years was observed in Data GanjBaksh and Ravi Town 117 to 126 patients respectively. The least affected people (n=18) exist in this age group were recorded in Wahga Town. The relation between different age groups ranging from one year old to 100 years old age group was calculated in all towns as shown in table 2.

Figure 2 shows the distribution of dengue patient in Lahore per unit area. The highest frequency per unit area was found to be Data GanjBaksh town. That is ranging from 54.01 to 67.57%. In Samanabad dengue cases per unit area reported about 45.01 to 54.00%. And lowest percentage was observed in Allama Iqbal, Nishter, Wahga, and Aziz Bhatti i.e. (0.38 to 9.00%).

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Table 2. The relationship between age and dengue fever in humans of Lahore

| Towns name	01-10yrs.	11-20yrs.	21-30yrs.	31-40yrs.	41-50yrs.	51-60yrs.	61-70yrs.	71-80yrs.	81-90yrs.	91-100yrs.	Unknown	Total no.
Allama Iqbal Town	68	186	310	222	186	150	82	21	7	-	111	1343
Aziz bhatti Town	32	83	148	88	72	38	14	8	-	-	33	516
Data Gung Bakhsh Town	126	380	518	342	219	130	56	28	4	-	266	2069
Gulberg Town	67	216	330	213	183	150	94	45	7	1	195	1501
Nishtar Town	102	142	212	168	97	60	33	8	4	1	280	1107
Ravi Town	117	178	238	125	89	52	33	6	4	-	142	984
Samanabad Town	75	221	325	215	176	124	68	18	1	1	114	1338
Shalimar Town	74	159	189	127	93	57	30	15	3	-	76	823
Wahga Town	18	31	46	28	17	11	7	1	1	-	16	176
Cantt	92	196	296	206	186	149	87	39	12	3	160	1426
Total no.	771	1792	2612	1734	1318	921	504	189	43	6	1393	11283
Prevalence (%)	**6.833289**	**15.882301**	**23.149871**	**15.368253**	**11.68129**	**8.1627227**	**4.4668971**	**1.6750864**	**0.3811043**	**0.0531773**	**12.346007**	
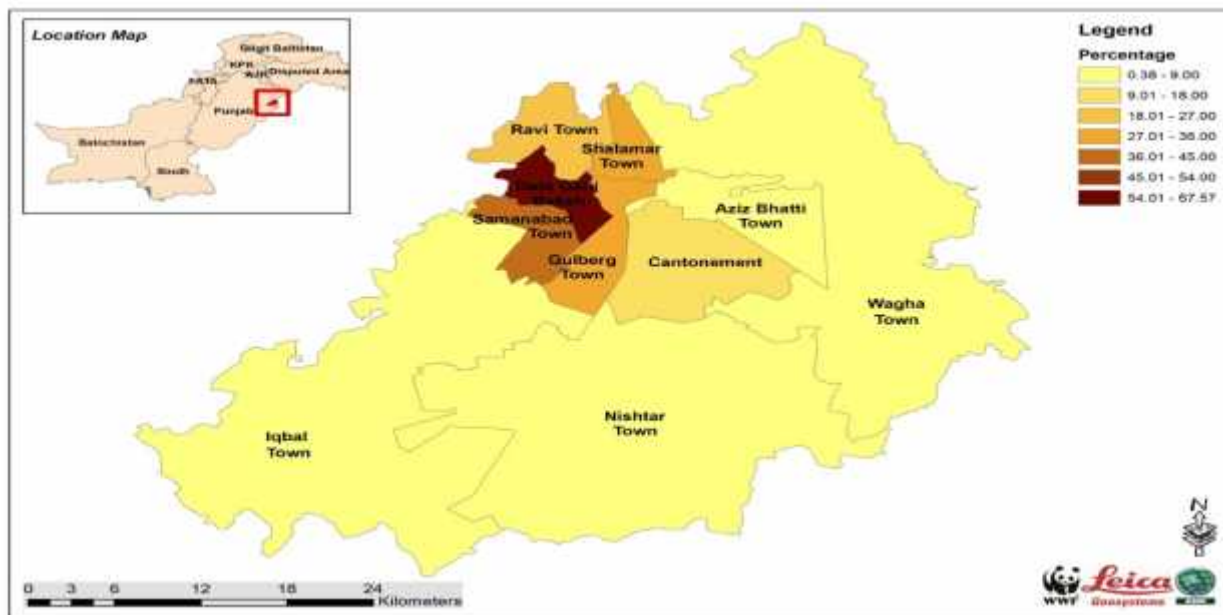
Fig.5. Distribution of Dengue cases in towns of Lahore (Cases per unit area)

In present study prevalence of dengue fever recorded from 2011-2012 in nine towns of Lahore. This study will help in providing sound basis for the dengue future spread in different age groups, and in various localities of Lahore. A higher number of male patients (69.11 %) were observed than female patients (30.88 %) in Lahore. Mehmood*et al*. (2009) observed an overall male to female ratio of 1.25:1 in Pakistan while Tahir *et al.* (2010) also observed more prevalence of Dengue fever in males (58.55%) than in females (41.44%) in Lahore area.

The prevalence of DF in different age groups was studied in towns of Lahore. According to this study the frequency of dengue fever in age groups one to 10 years was found to be 6.83% in all towns of Lahore whereas 15.88 % affected belonged to the age group of 11to 20 years. The percentage of dengue fever patients in age group 21 to 30 years was found to be the highest among all age groups as it was recorded 23.14 %. Similarly the percentage of patients belonging to age group 31 to 40 was 15.36%, those belonging to age group 41 to 50 years had a frequency of 11.68% and those falling between 51 to 60 years were affected with a percentage of 7.78%. The prevalence in age group 61 to 70 years old was recorded 4.46 % while those belonging to 71 to 80 years of age were affected at a frequency of 1.67%. The least number of DF patients were recorded in the age group of 81to 90 and 91 to 100 years (0.38% and 0.05 % respectively). Therefore, the age of DF affected 12.34 % cases were not known. Thus it was observed that in Lahore, the least affected people belonged to age group 1 to 10 and 61 to 100 while the high level of prevalence was observed in younger people ranging 21 to 30 years of age.

Out of a total of 15040 patients (63.2% male and 36.8% female), 3952 (26.3%) tested positive for dengue IgM antibody. A total of 209 patients including 132 males (63.2%) and 77 females (36.8%) with a median age of 25617 years were hospitalized at AKUH during the defined study period. The most common age group affected in the recent years was 11to 25 years. A progressive increase in the proportion of children affected with dengue was also observed. Older people were less affected as were younger children (0 to 10 years of age). It was however, observed in study of Kittigul*et al.* (2007) that mostly dengue affected people were children aged less than 15 years (80.8 %) while fewer cases were reported among the adults 19.2 % while the results of this study show more prevalence of dengue in young people (21 to 30 years of age). In Thailand DF mainly affects the younger age-groups of less than 15 years with the highest proportion of cases occurring in the age-group five to nine years, followed by the age-group 10 to 14 years. In Sri Lanka the age distribution shows that 70% of the cases were related to those less than 15 years of age with the peak being seven years; more men (57%) than women (43%) were affected. DF is increasingly becoming serious public health problems in Myanmar, especially among the 5-10 and 11- 15-year-old age-groups and, as noted above, a vast majority of the cases occur in the 5-8-year-old age group (Prasittisuk*et al,* 1998).

Indonesia the larval surveys carried out in 1992 showed that the vector premise index in schools was 32.40% and that the incidence of dengue among schoolchildren 5-14 years old was 46.40% in 1993 and

40.40% in 1994. In India the attack rates in the outbreaks reported have ranged from 20% to 80% of the population in affected localities. All age-groups have been affected by DF. Climate trends have been changing all over the world. Pakistan also is vulnerable to impacts of climate change which can lay stress on the already decreasing resources. Ecosystems can also be disturbed while an increase in the frequency of extreme events (droughts and floods) is feared. An increase of 2.9 % in atmospheric temperature in boreal Asia has been observed over the last century and in Pakistan also, annual mean surface temperature have been consistently rising since the beginning of 20th century (Farooqi*et al*, 2005). Similarly precipitation trends have also been changing with 10 to 15% decrease in both winter and summer rainfall in coastal belt and hyper arid plains and 18 to 32% increase in rainfall in monsoon zone especially the sub humid and humid areas. Increase in precipitation can result in sub-tropical conditions which can favor the spread of dengue in many areas (Naseem*et al,* 2005). If the temperature and precipitation trend in Pakistan during the last century is viewed, an increase in rainfall with a -2.0 to $0.0^{o}C$ decrease in temperature in the monsoon belt can be observed. These areas are more affected with dengue fever as compared to others. The possible reason for higher prevalence of dengue fever in males and in people falling between 21 to 30 years of age can be attributed to the fact that usually these people spend more time outdoors and thus have more chances of getting affected. In contrast females, small children and older people generally spend more times indoors and thus have fewer chances of getting affected with dengue fever. So it is the need of hour to remove all sources of stagnant water and adopt more effective precautions to avoid the attack of dengue mosquito (*Aedesaegypti*).

Conclusion: The most affected area of Lahore was found to be Data Gung Baksh Town which is more congested area than other Towns. So it is the need of hour to remove all sources of stagnant water and adopt more effective precautions to avoid the attack of dengue mosquito (*Aedesaegypti*). It is recommended that keep surroundings of congested areas free from standing water. Potential breeding sites for mosquito like flowers vases and plot plates, pails, water-storage jars, basins, discarded receptacles, chocked roof gutters, unused toilet bowls and cisterns, concrete drains, artificial containers needs to be inspected regularly as well as natural recourses i.e. trees holes, bamboo stumps leaf axial, fallen leaves and ground depressions. All these sites require constant inspection.

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