Original Research Article

COMMUNITY KNOWLEDGE OF DENGUE FEVER IN YUHANA ABAD, SLUM AREA OF LAHORE, PAKISTAN

Abstract

Objective

This study aimed to assess the current community's perception status of dengue fever in the (Yuhana Abad) slum area of Lahore.

Method

A quantitative cross-sectional study was conducted in Yuhana Abad, a suburb of Lahore, Pakistan. It is the largest majority Christian area in the city with about 200,000 inhabitants. To determine the perception of people a structured questionnaire was used to collect data and 384 households selected through the convenience sampling technique were interviewed.

Result

Male participation in the study was 67% and female 33%, among both gender participants. The literate percentage was 74% and the illiterate 26%. 76% of people knew about dengue fever transmission, 80% knew the consequences of the disease, 64% knew the signs and symptoms, and 90% knew the most frequent mosquito bite time and prevention of the epidemic of dengue fever were good.

Conclusion

We have found a prevalence of sufficient knowledge in our sample population based on knowledge of dengue. However, isolated knowledge on signs and symptoms, mode of transmission, and prevention are adequate, with preventive measures mainly focused on protection from mosquito bites by using mosquito mat/coil/liquid vaporizers.

Key words: dengue fever, Yuhana Abad, Slum area, Lahore, Pakistan

1. Background

Dengue fever is an acute mosquito-borne viral illness of sudden onset with prostration, severe muscle and joint pain, headache, fever, swollen glands and rash (1). Mosquitoes become infected when they bite infected humans, and transmit that infection to other people they bite. There are two main species of mosquito, Aedes aegypti and Aedes albopictus, are responsible for all cases of dengue transmitted (2).

The extrinsic incubation period in mosquitoes is 8 to12 days depending on environmental factors and intrinsic incubation period in humans is 3 to 14 days with an acute febrile phase of infection lasting 3 to 7 days (3).

Vector borne diseases are of public health importance and are still fatal to human mankind. Their incidence is increasing day by day. There are multiple reasons for this increased incidence in tropical and temperate climate countries, some of which are increased amount of urbanization with changed living conditions, virus evolution uncontrolled vectors, and gigantic international travel. Urbanization could be one of the most important factors among above mentioned factors. The travel from one place to another place allows the easy spread of vectors borne infections (4).

Globally dengue is emerging as a serious public health problem with 2.5 billion people at risk and 50 million infections occurring annually including 400,000 cases of DHF (5). Dengue is the most rapidly spreading mosquito borne viral disease in the world. During the last 50 years, incidence has increased 30-fold with increasing geographic expansion and environmental factors to new countries and in the present decade from urban to rural settings (6). There has been an increase of 110 million in the number of persons living in urban areas of the world with a high risk of dengue. Approximately 975 million people live in the urban areas, that is almost half of the global population estimated to be at risk of dengue fever infection (7).

During 2007, Indonesia reported 127,687 cases of dengue fever. Epidemics of DF and DHF start in major cities and spread geographically outwards to rural areas. Low herd immunity, increased mobility, high population density, air travel, and ineffective control programs are thought to have contributed to the reemergence of the virus in south Asia. The epidemic in Brazil between January and April, 2008 resulted in more than 120,000 reported cases, including 647 cases of dengue hemorrhagic fever and 48 deaths (8).

Dengue fever is a mosquito borne infection in humans and in recent years it presented as a major international public health problem. The World Health Organization (WHO) announced dengue and dengue hemorrhagic fever to be endemic in South Asia. The dengue fever is now endemic in more than 100 countries in Africa, South-east Asia, the Western Pacific, the Eastern Mediterranean, and Americas. South-east Asia and the Western Pacific are the most seriously affected (9). Eastern Mediterranean Region with only 8% of the global population contributes to 11% of the global burden of vector-borne diseases (10). Dengue fever is present in both tropical and subtropical areas around the world but tropical areas are more affected (11). Dengue fever is caused by four closely-related but serologically-distinct dengue viruses DENV-1, DENV-2, DENV-3

and DENV-4 (12). All four dengue viruses are circulating in Asia, Africa and the Americas (7).

Many regions are undergoing unplanned urban growth and are lacking water supply, waste disposal and proper drainage, which have created suitable conditions for mosquitoes to breed (13).

Globally epidemiology of dengue and dengue hemorrhagic fever is changing fast (14). The main challenge is prevention and repression of the disease. In the absence of a vaccine, vector control remains the only method for prevention. The most widely method of vector control has been source reduction that is, the elimination of places where the mosquito can lay eggs and larviciding (15). Prevention is usually carried out together with community involvement, education, and mass media campaigns (16).

Dengue infection has been known to be endemic in India for over two centuries. In recent years, the disease has changed its course manifesting in the severe form as DHF and with increasing frequency of outbreaks. Delhi, a city in North India, has experienced seven outbreaks of dengue virus infection since 1967 with the last reported in 2003 (17). The 1996 epidemic in India was mainly due to the virus dengue-2 (18).

Pakistan is at high risk of being hit by large epidemics because of many over crowded cities, lack of awareness, inadequate sanitation, and large number of refugees. These conditions promote 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.

Aedes mosquitoes usually bite during the day time, be sure to take precautions not to bite, especially during early morning hours before daybreak and in the late afternoon before evening, when outdoors in an area where dengue fever has been present (19).

Lahore the second largest city of Pakistan is the economic hub of Punjab with estimated population of 10,000,000 (20). A significant proportion of the people are living in the slum areas, where they don't have proper food, health, sanitation, living and education facilities. Public health experts mostly focus in the urban area and ignore the population residing in the slum areas. The present study will be undertaken among the general population residing in slum area.

Yuhana Abad located on Ferozpur road is a suburb of Lahore, Pakistan. It is the largest majority Christian area in the city with about 200,000 inhabitants (21). It is the major slum area of Lahore. Community participation played very significant role in the prevention and control of infectious diseases. Community can participate only when it has awareness. The current study was assessment of community perception of dengue fever.

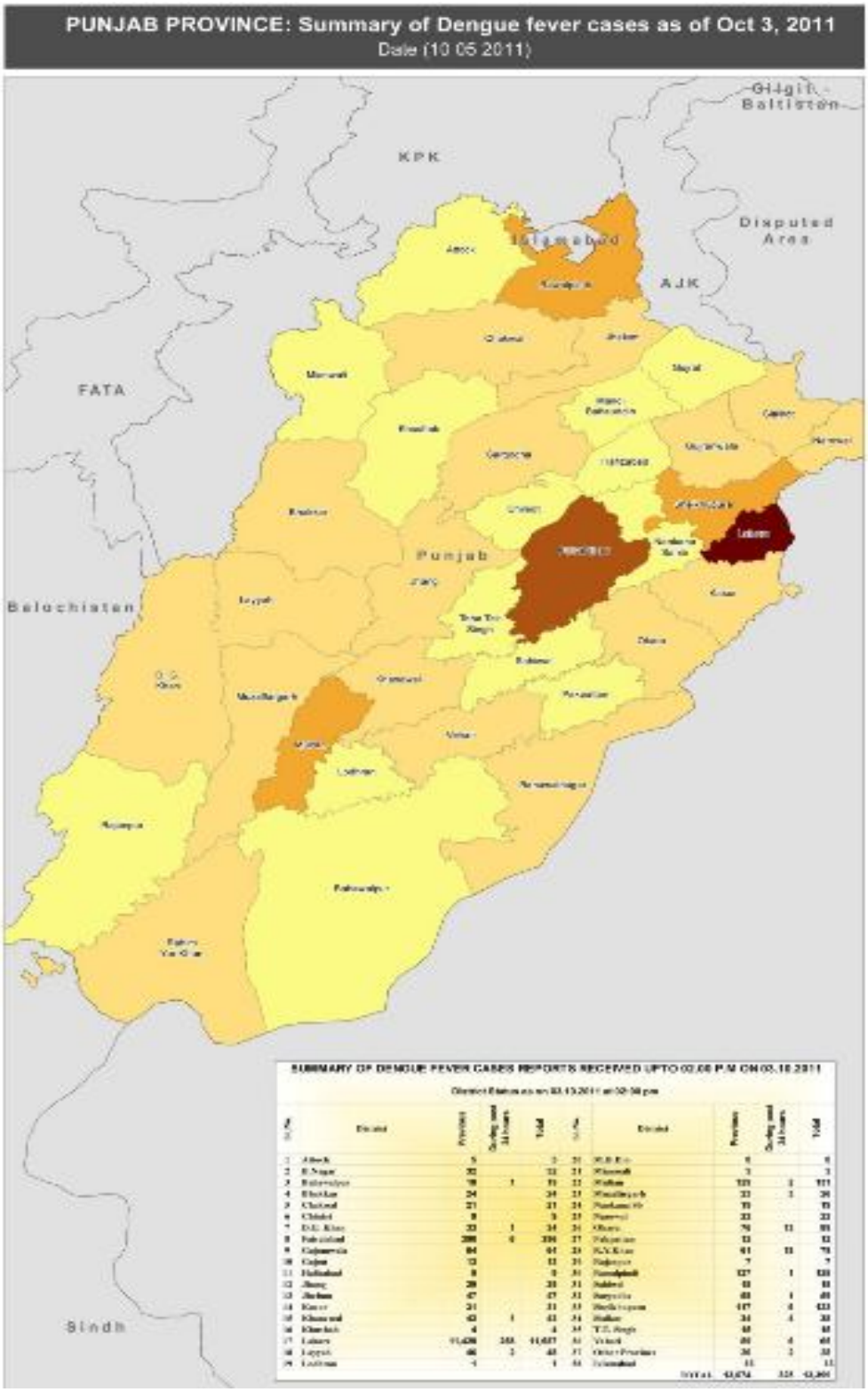


Fig 1: Punjab Province: Summary of Dengue Fever cases as of Oct 3 2011

Dengue fever or dengue hemorrhagic fever is by a bite from an infected Aedes mosquito. It is a fatal disease. Therefore, the global population should pay attention on changing behavior for maintaining community environment, housing and practice for daily living health care. Environmental education aims to increases knowledge, awareness and behavioral change to achieve sustainable development. The local community should closely collaborate with health officials and government to meet success for prevention and control dengue outbreak. According to Koraphat Artwanichakal NT and Tanarat Thiengkamol, human practices have also promoted the vector spreading. Particularly, in Asia the waste disposal of manmade containers like jars, metal drums and concrete cisterns used for domestic water storage, discarded plastic food containers, used automobile tires and other items that collect rainwater. Global population should pay attention on knowledge on disease, vector born, and community environment. In Africa and Asia, the mosquito also breeds in natural habitats like tree holes, and leaves that gather to form "cups" and catch water. In recent years, Aedesalbopictus, a secondary dengue vector in Asia (9, 22).

Enid J. Garcia-Rivera and Jose G. Rigau-Perez studied severe dengue affects all age groups in the Americas. They collect detailed information about dengue fever in all age groups and describe the disease in different age groups. Reviewed suspected dengue case investigation forms submitted with diagnostic samples as well as clinical reports for the period of 1994 through 1999. They assigned the laboratory positive case patients to four age groups, infants (1 year: 554), youth (2 to 18 years: 6 857), adults (19 to 64 years: 9 433), and elderly (> 65 years: 822). This clinical evaluation of patients with dengue fever indicates that the most affected group with dengue fever was adults (23).

A cross sectional study was conducted by Haldar A GU, Majumdar KK, Laskar K, Ghosh S, Sen S on 'Community Perception of Dengue in Slum areas of metropolitan city of West Bengal' in an urban area of Calcutta by National Medical College to determine perception of general population on the disease Dengue. 161 individuals were interviewed regarding the different aspects of the Dengue fever. The result showed that, majority 68.9% had knowledge that fever is the main symptom of the disease, Out of total respondents 83.3% were unaware regarding modes of transmission of disease and the level of awareness is significantly higher among educated group ($p < 0.05$). 69.6% were unaware about the prevention of disease. Regarding awareness about vector control 60% of the respondents belonging to the lower socio economic class were unaware followed by 58.6% of the upper lower class. Only 39.1% had knowledge about breeding places of Aedes aegypti. The main source of information was found to be mass media 65% and 7% of the respondents didn't get any information about Dengue (24).

Phuong HL DVP, Boonshuyar C, Binh TQ, Nam NV and Kager PA to look at risk factors for dengue and community participation in dengue control in Binh Thuan Province, Vietnam conducted a study. Knowledge, perception and preventive practice of dengue were measured by means of a structured questionnaire. A checklist of environmental observations was used to evaluate environmental factors. One hundred ninety households in six communes were included in the study. Several statistically significant differences between low and high incidence communities were identified. The factors associated with a higher risk of dengue fever on the logistic regression were occupation

(farmer) (RR 7.94; 95% CI 2.29-27.55), number of children less than 15 years old in the household (RR 1.54; 95% CI 1.06-2.23), no experience with dengue fever in the household (RR 2.334; 95% CI 1.12- 4.88), a garden near the house (RR 2.22; 95% CI 1.18-4.17) and water containers having mosquito larvae (RR 1.64; 95% CI 1.02-2.62). Television was the most important source of information (25).

A cross sectional survey of 192 parents attending child health clinics in the Parish of Westmoreland was conducted. More than half of the parents 54% had good knowledge about signs, symptoms and mode of transmission of dengue. 47% considered dengue to be a serious but preventable disease. Majority 77% did not use effective dengue preventive methods such as screening of homes and 51% did not use bed nets. Educational attainment (OR, 2.98; CI, 1.23, 7.23) was positively associated with knowledge of dengue. There was no correlation between knowledge about dengue and preventive practices. Radio and TV were the main sources of information about dengue fever (30).

Faisal Hafeez, WaseemAkram, AnjumSohail and Muhammad Arshad conducted a study to appraise the public opinion about dengue and its vectors. A cross sectional study was carried out in which a pre structured and pre tested questionnaire was adopted to determine the knowledge, attitude and practice regarding dengue and its vectors at Lahore and Rawalpindi. Total of 424 respondents (220 urban and 204 rural) were interviewed. 85.5% urban and 76.5% rural people were aware of dengue. TV/Radio was the main source of information (31).

Huma Khawar reported in 2011, dengue fever in Pakistan is rapidly assuming the proportions of an epidemic, specifically in the central province of Punjab and its capital Lahore where, in September 2011, more than 131 people were reported dead and, according to the Punjab Health Department; over 12,000 people have been infected since January this year. However, this season, nearly 500 new dengue cases were reported across the Punjab, with over 300 in Lahore alone (32).

After the literature review, we identified that there are many areas of interests where we can study. The factors involved in a specific study area may differ from the other. We cannot apply all the factors to the other area. The results of different studies were diverse. The different studies have for different and specific area with overlapping the study variables.

1.1 Rationale

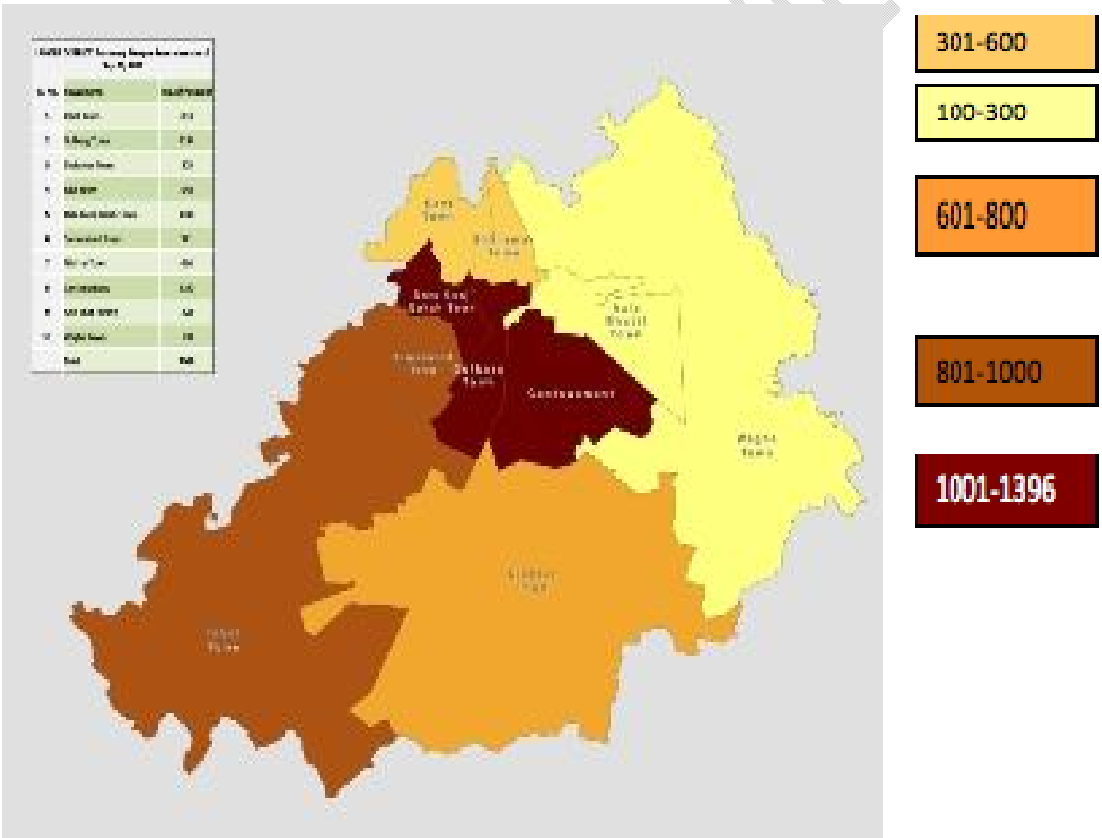
After 2011 outbreak of 'Dengue fever' in Pakistan, there are sporadic out breaks in the country and record showed continuous endemicity in Lahore. Hence, in the slum area of Lahore community participation play very significant role in the prevention and control of infectious diseases. The purpose of this study was to assess the current community perception status of dengue fever in slum area of Lahore.

The purpose of this study was to assess the current community perception status of dengue fever in (Yuhana Abad) slum area of Lahore.

1.2 Research Question

What is the perception of community regarding dengue fever in general population of Lahore.

Figure: 2 SUMMARY OF TOWN WISE DENGUE FEVER CASES



1.3 Dengue fever cases summary reports Punjab, 2011.

Chart 1 Summary

Dengue cases	Total
No. of suspected cases	286,857
No. of confirmed cases	19,688
No. of admitted cases	1,353
No. of cured cases	16,066
No. of reported deaths	217

Table 1: District wise status

District	Total	District	Total
Attock	7	M.B. Din	11
B. Nagar	51	Mianwali	8
Bahawalpur	44	Multan	140
Bhakkar	24	Muzaffargarh	30
Chakwal	23	NanakanaSb	23
Chioniot	11	Narowal	36
D.G. Khan	38	Okara	118
Faisalabad	462	Pakpattan	69
Gujranwala	76	R.Y. Khan	109
Gujrat	15	Rajanpur	7
Hafizabad	14	Rawalpindi	181
Jhang	36	Sahiwal	33
Jhelum	71	Sargodha	88
Kasur	43	Sheikhupura	156
Khanewal	52	Sialkot	58
Khushab	5	T.T. Singh	20
Lahore	**17,431**	Vehari	80
Layyah	55	Other Province	39
Lodhran	8	Islamabad	16
Total			**19,688**

Aim And Objectives

Aim

To assess the current community knowledge status of dengue fever in slum area

Objectives

1. To determine knowledge of people to the modes of dengue fever spread
2. To determine community knowledge of preventive measures for dengue fever
3. To compare the educated and uneducated community knowledge of dengue fever

2. Methodology

Study Design

This study was quantitative cross sectional.

Study Site

The study was conducted in the slum area of District Lahore.

Duration Of Study

This study was conducted in three months after the approval of research proposal.

Study Population

The general population both male and female were Slum area inhabitants.

Data Collection Tool

A structured questionnaire was used to collect data

Sampling Technique

Convenience sampling

Sample Size

The following formula (35) was used to determine the sample size for target population:

$$n = \frac{Z^2_{1-\alpha/2} P(1-P).N}{d^2(N-1) + Z^2_{1-\alpha/2} P(1-P)}$$

Where

N = Number to sample

$Z^2_{1-\alpha/2}$ = (1.96) 2for 95% confidence (i.e. α= 0.05)

P = "Best guess" for prevalence (e.g. ±0.50)

d^2 = Maximum tolerable error for the prevalence estimate (e.g. ±0.50)

$n \cong 384$

Inclusion Criteria

All residing population of both gender and age between 18 to 60 years, slum area of Lahore

Exclusion Criteria

The resident of the slum area of Lahore residing for less than one year

Table: 2: Variables

SOCIODEMOGRAPHIC VARIABLES	STUDY VARIABLES
o Age	o Causative agent of dengue fever
o Gender	o Transmission of disease
o Literacy status	o Treatment
o Condition of house	o Sign and symptoms of disease
	o Prevention and control of Dengue/Dengue hemorrhagic fever
	o Breeding places of vector
	o Vector control measures

Data Collection Procedure

Principal investigator collected the data on structured questionnaire through door-to-door visit. Structured questionnaire was translated into Urdu language. The questionnaire was pre tested in the selected area before collecting the data.

Data Analysis Plan

Data Entry

Data was entered and using SPSS 16 performed Descriptive analysis.

Data Cleaning

All the data collected from the selected study area was entered, frequencies for each variable was run to detect error. The database was cleaned as for as possible using the original raw study Performa's. The final cleaned database was then be used for analysis.

Data Analysis

Frequencies for all the variables cross tabulations and comparison was carried out between existing and defined values.

Limitations

1. Variables with small number of observations made aggregate data.

2. Due to time and budget constraints conveniently respondents were interviewed.

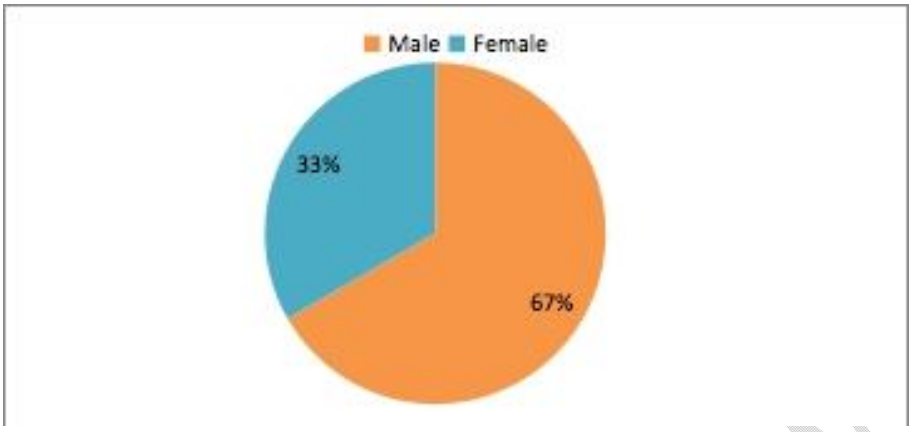
Ethical Considerations

The institutional review board, FPGMI, Lahore, approved the study**;** It was endorsed by Health Department of Punjab. Afterward, the key personal/ focal persons took informed consent and Local NGO's of the concerned study area data was collected. They were informed about the nature and purpose of the study. Participants were purely voluntary with the right to withdraw any time during the study. No benefits or risks were involved in the study and monitory compensation was not provided in this study. The information provided by the participants would remain confidential and their identity would not be disclosed even beyond the completion of study. However the data may be seen by ethical review committee and may be published in the journal and elsewhere without giving the participants name and disclosing their identity.

Results

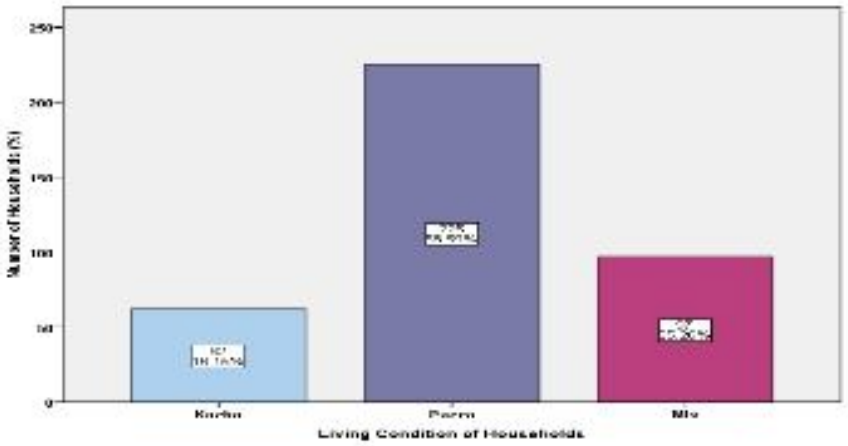
Data collection tool consisted of structured questionnaire, which was developed to check the community knowledge of dengue fever in Yuhana Abad, slum area of Lahore. Investigator and his team members collected data. Key respondents in this study were the general population of both gender, selected slum area with age between 18 to 60 years.

Fig: 3 Gender wise distributions



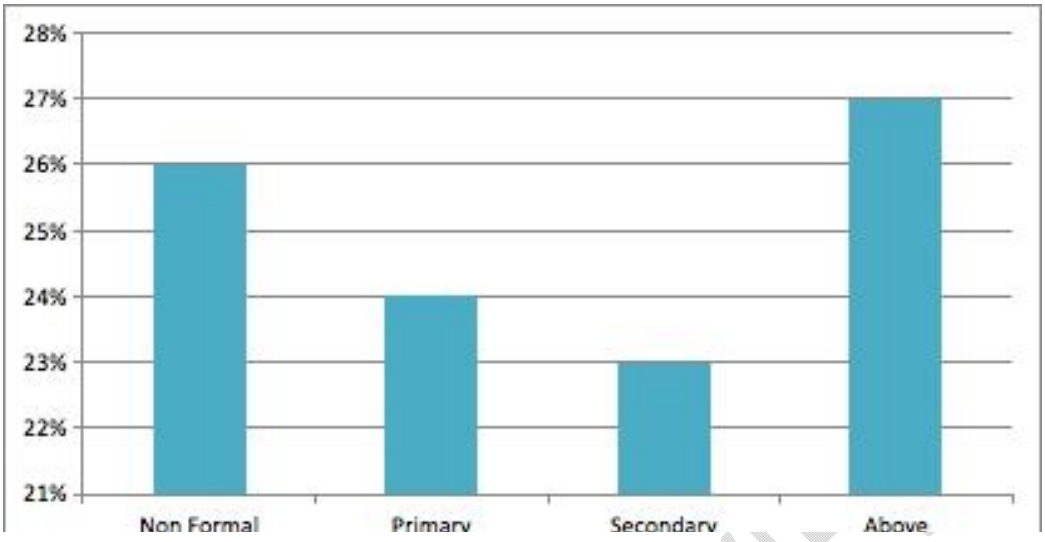
Male participation in this study was 67% and female 33%.

Fig: 4 Living conditions of households



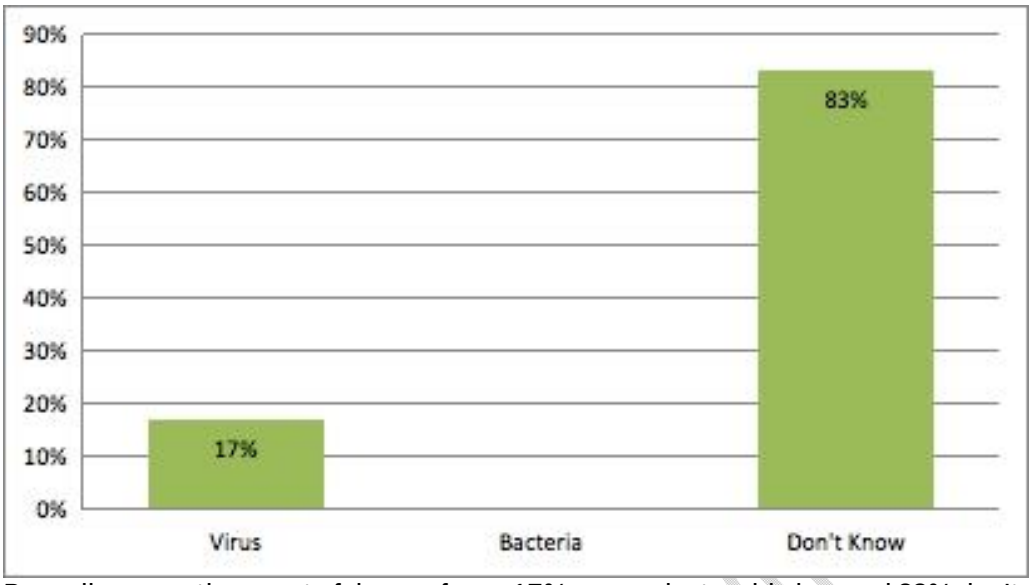
Regarding general appearance of households, 16% lived in Kacha houses, 59% in Pacca and 25% participants lived in mix (Kacha, Pacca) houses.

Fig: 5 Education statuses of participants



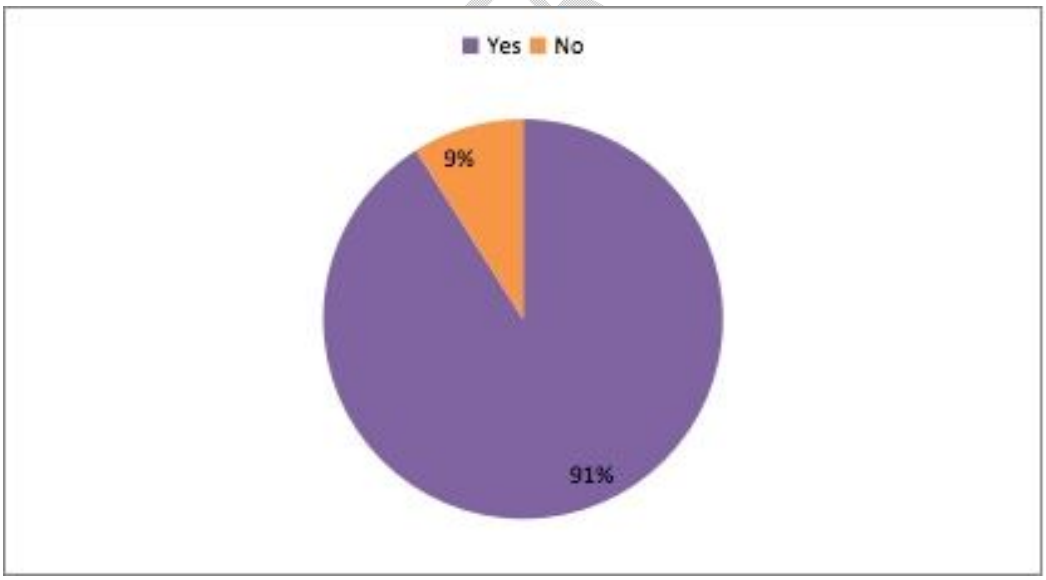
The education status of the participants was 26% non formal, 24 % primary, 23% secondary and 27% above than secondary.

Fig: 6 **Causative agent of dengue fever**



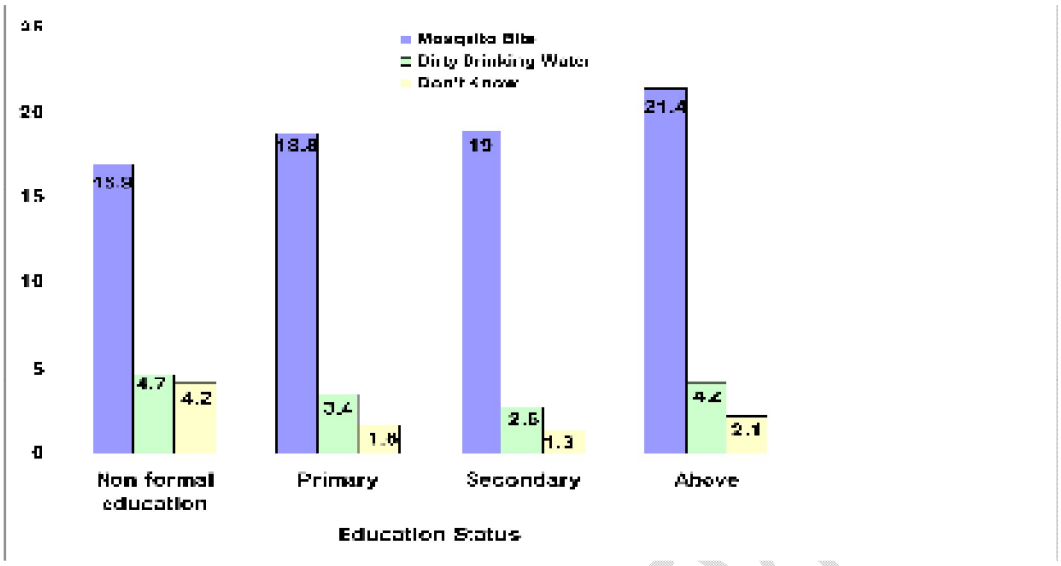
Regarding causative agent of dengue fever, 17% respondents said virus and 83% don't know about the causative agent of dengue fever.

Fig: 7 Is dengue fever communicable?



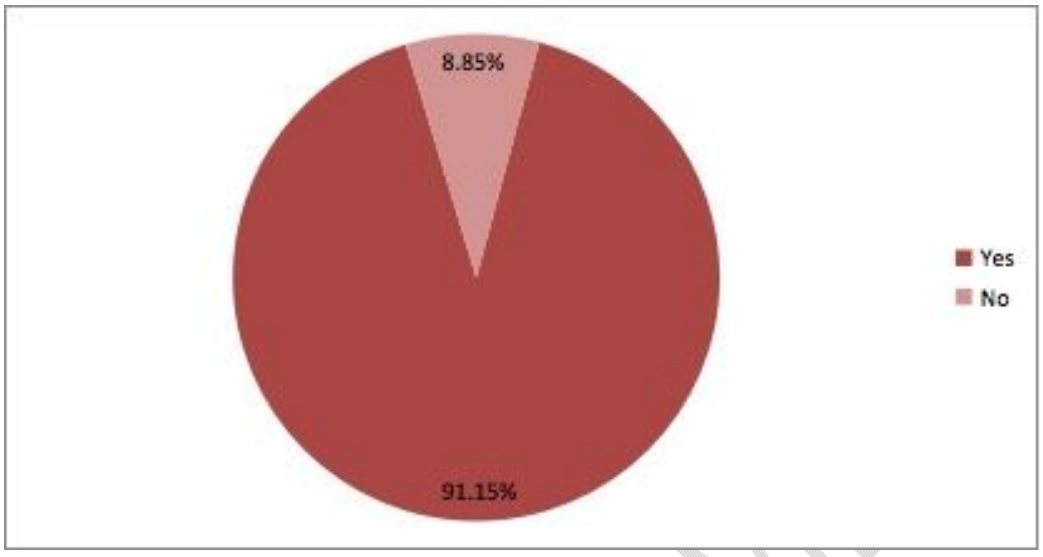
The figure shows, that 91% respondents know that dengue fever is transferable and other 9% don't know transfer of dengue fever.

Fig: 8 Mode of transmission of dengue fever



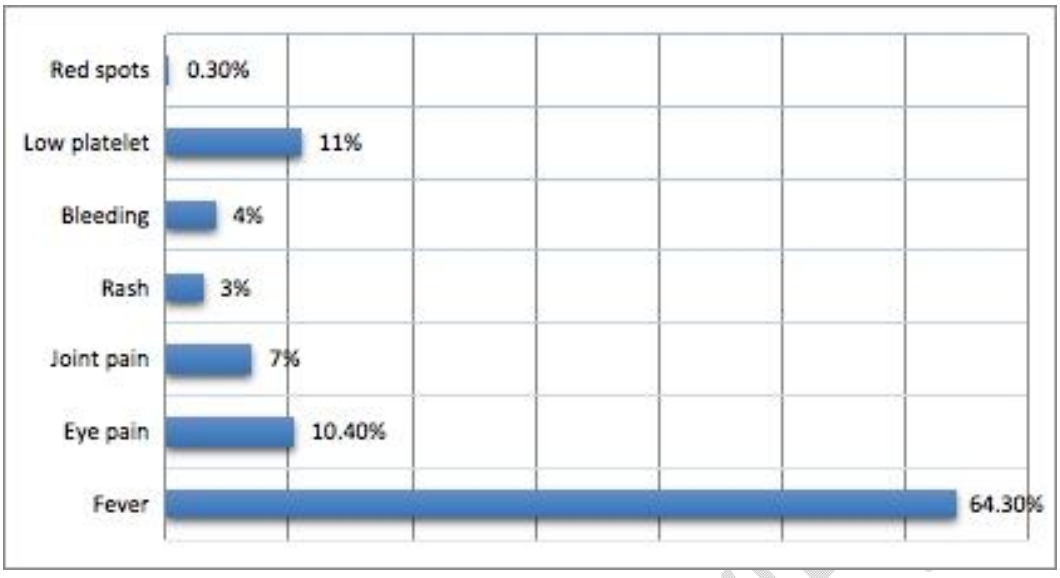
The figure shows that the mode of transmission of dengue fever due to mosquito bite is 16.9%, 4.7% with drinking dirty water and 4.2% don't know, 18.8% by mosquito bite, 3.4% by drinking dirty water and 1.6% don't know, 19% by mosquito bite, 2.6% by drinking dirty water and 1.3% don't know,21.4% by mosquito bite, 4.2% by drinking dirty water and 2.1% don't know with the education status Non formal education, primary, secondary and above respectively.

Fig: 9 Knowledge about sign and symptoms of dengue fever



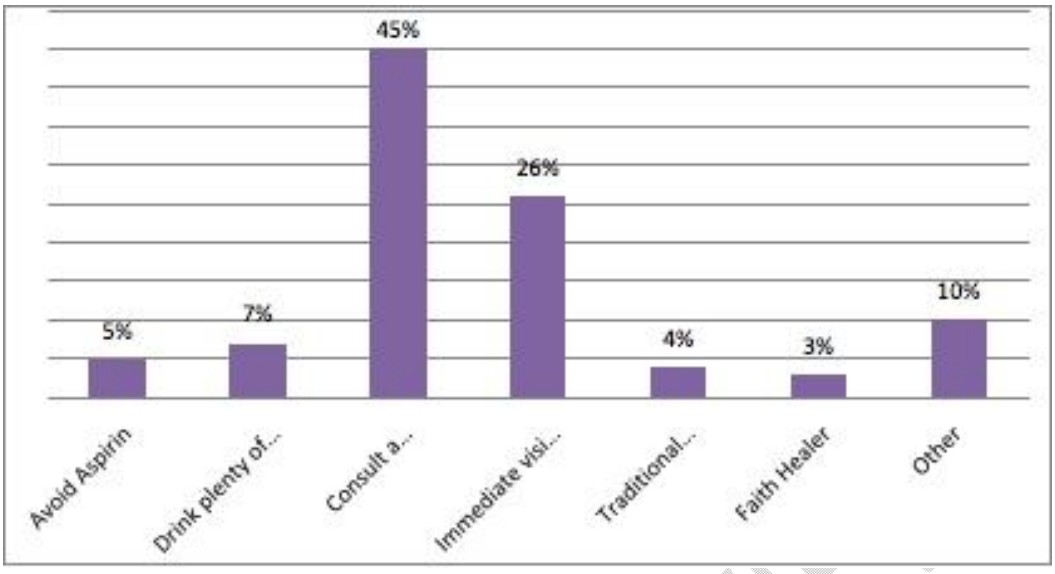
This figure shows that 91.15% respondents know and only 8.85% don't know the sign and symptoms of dengue fever.

Fig: 10 Sign and symptoms of dengue fever



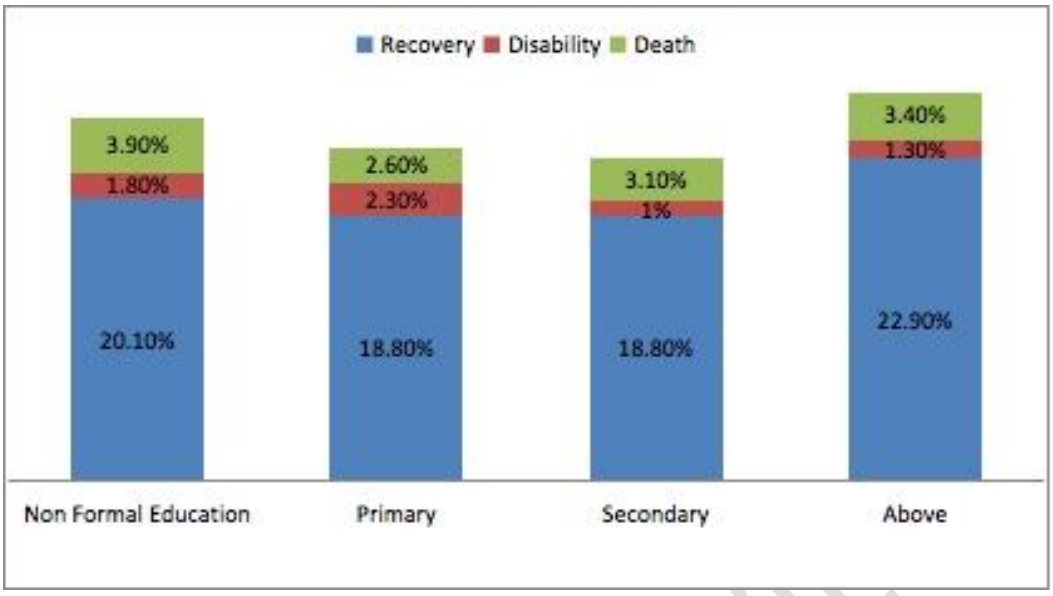
The figure shows that the respond regarding sign and symptoms of dengue fever is 64.30% fever, 10.40% sever eye pain, 7% joint pain, 3% rashes on body, 4% mild bleeding, 11% low platelet count and 0.30% red spots on skin.

Fig: 11 Knowledge about dengue fever treatment



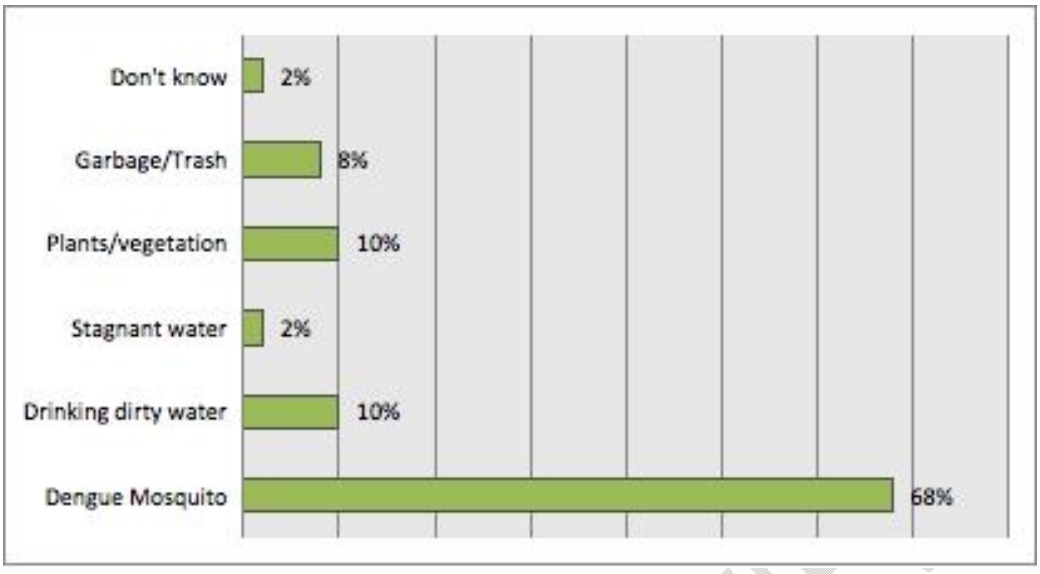
The figure shows the knowledge about dengue fever treatment which represent the behaviour of respondents, 5% avoid medicine containing aspirin, 7% drinking plenty of fluids, 45% consult a physician, 26% immediate visit hospital, 4% traditional medicine, 3% faith healer and 10% others.

Fig: 12 Consequence of the dengue fever



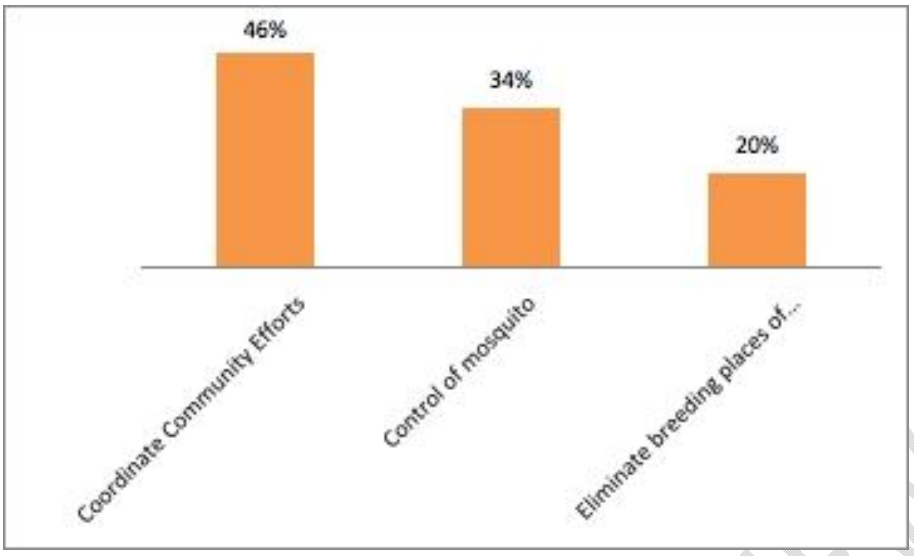
This figure illustrates that 384 sample size, recovery due to dengue fever by education status is 20.10%, 18.80%, 18.80% and 22.90% Non formal education, primary, secondary and above respectively. Like that disability is 1.80%, 2.30%, 1% and 1.30% answered by Non formal education, primary, secondary and above respectively. Death is 3.90%, 2.60%, 3.10% and 3.40% answered by Non formal education, primary, secondary and above respectively.

Fig: 13 Where can outbreak of dengue fever occur?



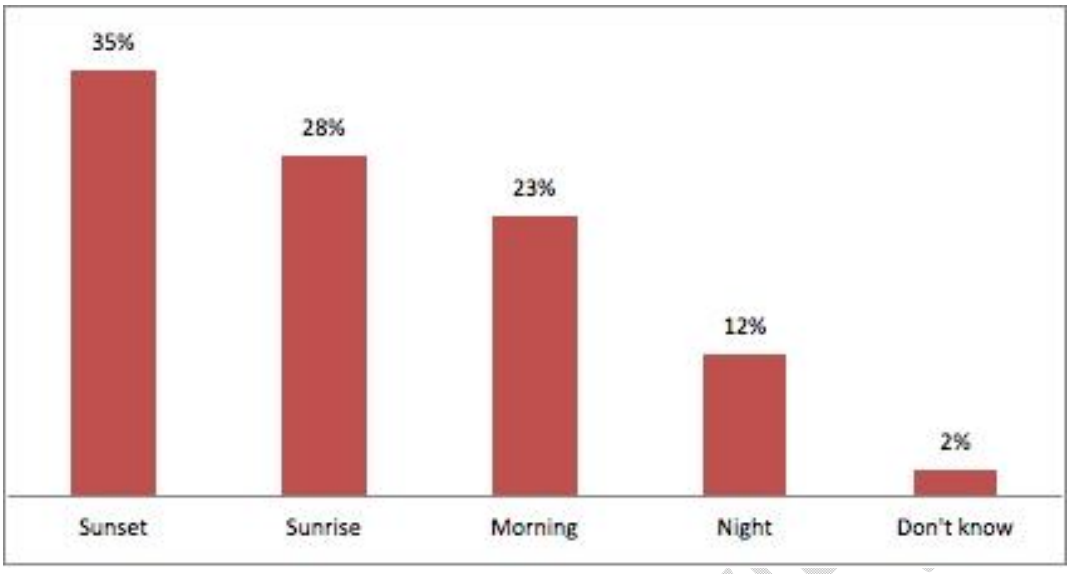
This figure shows that the outbreak of dengue occur due to dengue mosquito is 68%, drinking dirty water 10%, stagnant water 2%, plants/vegetation 10%, garbage/trash 8% and 2% don't know.

Fig: 14 How prevent epidemic of dengue fever?



Regarding this figure, 46% prevent epidemic of dengue fever through coordinate community efforts, 34% through control of mosquito and 20% through eliminate the breeding sites of dengue mosquito.

Fig: 15 Most frequent bite time of dengue mosquito



This figure illustrate that the 35% mosquito bite time is sunset, 28% sunrise, 23% morning, 12% night and 2% don't know the mosquito bite time.

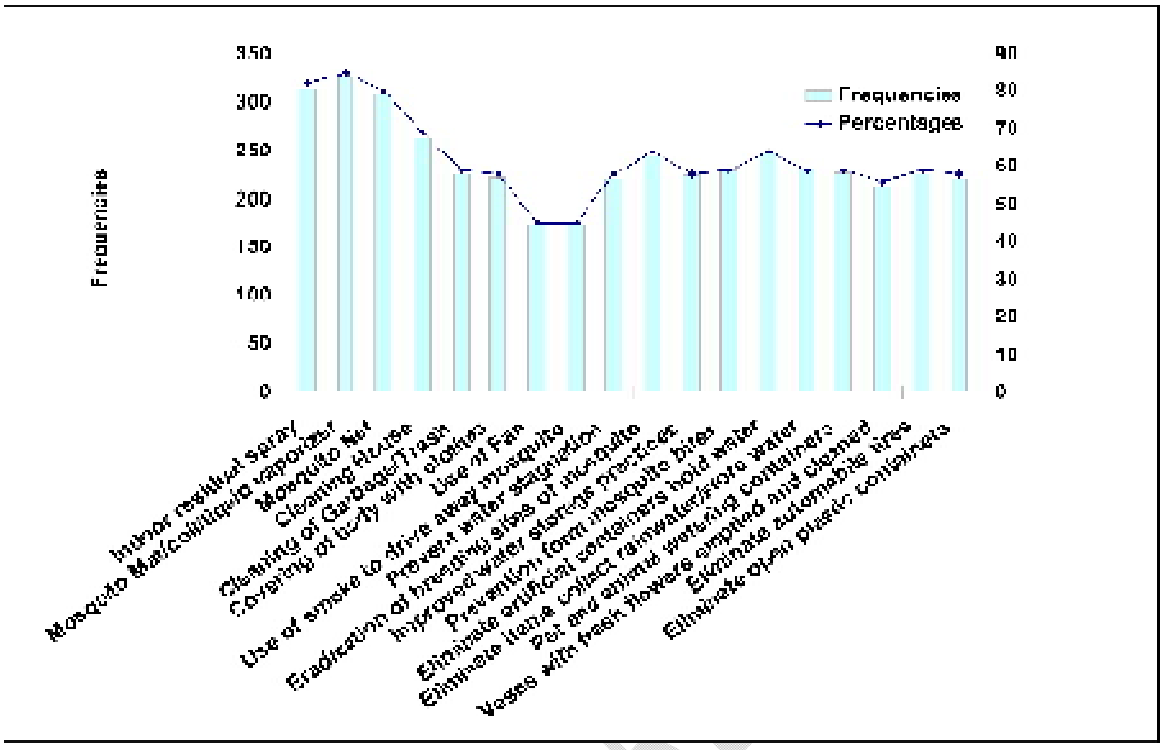


Fig: 16 Preventive measures of dengue fever

Table: 3 How will take care of dengue patient?

Education Status	How will you take care of dengue patient?			
	As a normal fever patient	Avoid direct contact	Isolate the patient	Total
Non formal education	7	8.6	10.2	**25.8**
Primary	8.6	5.5	9.6	**23.7**
Secondary	10.7	5.2	7	**22.9**
Above	14.1	5.2	8.3	**27.6**
Total	**40.4**	**24.5**	**35.1**	**100**

This table illustrates that 7% Non-formal educated persons take dengue patient as a normal fever patient, 8.6% avoid direct contact and 10.2% isolate the patient. 8.6% primary educated persons take dengue patient as a normal fever patient, 5.5% avoid direct contact and 9.6% isolate the patient. 10.1% secondary educated persons take dengue patient as a normal fever patient, 5.2% avoid direct contact and 7% isolate the patient. 14.1% above educated persons take dengue patient as a normal fever patient, 5.2% avoid direct contact and they took it as a contagious disease and 8.3% isolate the patient.

Discussion

Aziz Bhatti town is a major slum area of Lahore's Community participation play very significant role in the prevention and control of infectious diseases. Community can participate only when it has awareness.

Respondents showed some similarities in the basic demographics. Education level for the total sample did not reflect the national average since a significant proportion (~80%) of Pakistani population is considered illiterate (36). However, sample comprised 26% of illiterate people, while 76% literate and overall the sample could be considered representative for the slum area.

It was observed that all of the respondents had heard of the word "dengue". Even though many respondents were familiar with dengue being a communicable disease, which spreads by mosquito vector, yet several misconceptions were identified. According to WHO guidelines on dengue (2), the Aedes aegypti mosquito typically bites during the day. A considerable proportion of respondents 76% know the mode of transmission pattern of dengue fever. This is most likely due to high level of media campaigns against dengue mosquito in Pakistan, the knowledge about which is generalized to the dengue mosquito by the common person. Despite the fact that

majority of the people had heard about dengue somewhere, a small proportion did possess deficiencies in their knowledge about the disease. A large number of people 91% considered dengue to be contagious or transmissible and only 9% were not sure whether it has person-to-person transmission. These findings are consistent with similar studies done in the South Asian region, .

Our sample showed considerably good knowledge about the symptoms, 64.3% identified the most common symptom of fever, 10.4% sever eye pain, 7% joint pain, 4 % rashes, 11% low platelets count and 0.3% red spots on the body correctly accounted. Adequate knowledge on dengue symptoms has been reported in similar studies done in India and Brazil. Based on these findings, one could propose that dissemination of knowledge about symptoms was sufficient and effective. Knowledge about the treatment of dengue fever was also prevalent. 5% of respondents replied, avoid medicine-containing aspirin, 7% drinking plenty of fluid, 45% consult a physician and 26% immediate visit hospital as being important, the majority were aware. Preventive measures preferred were use of mosquito sprays and coils. Several studies have reported these methods to be most effective means of prevention. Preventive measures, indoor residual spray, mosquito mat/coil/liquid vaporizer, mosquito net, cleaning house, cleaning of garbage, covering of body with clothes, use of fan, smoke to drive away mosquito, prevent stagnant water, eradication of breading sites of mosquito, improved water storage, eliminate artificial containers hold water, eradicate items store water and rain water, pet and animal watering containers, vases with fresh flowers emptied and cleaned, eliminate automobile tires and eliminate open plastic containers which serves as local breeding sites were popular techniques in use. This is in accordance with studies done in Thailand, which reported a significant reduction of dengue vectors and dengue haemorrhagic fever cases in areas having clean-up campaigns before and during rainy seasons.

Domestic water container covers can reduce insecticide densities of dengue vectors and potentially affect dengue transmission. These results displayed that the study population was using adequate preventive methods aimed at controlling both the vector's breeding and its spread.

We asked individuals have the source of information on dengue. The city administration had enacted billboards on dengue; mass awareness campaigns or steps taken to spread information for the general public on dengue, all sources disseminating knowledge about the disease were a recent reaction of government of Punjab and public to the current outbreak. The sources of information, a comprehensive knowledge of the disease was being provided. Most important role seemed to be played by media including television and newspapers. Television viewership had increased among the masses, and this may be the reason why the majority considered it the source of information. The role of newspapers was also important, which is inconsistent with the country's population.

Assessing demographic features with the knowledge did lead to particular trends. Level of education, people who had received at least one certificate of education had significantly better knowledge but recently Government of Punjab has started different

programs against dengue fever knowledge which improve the knowledge of the community. Dengue had been a cause of concern in Yuhana Abad at the time of our interviews and since media was giving enough airtime to this particular disease, we had assumed a high prevalence of sufficient knowledge in our sample.

The above observations may be true only for the study population because of convenience sample and cannot be generalized to other populations belonging to different socioeconomic or cultural backgrounds. Local studies are needed to provide the true picture about awareness regarding dengue fever so that appropriate specific action can be taken for control of disease. The aim of the study was to evaluate the community perception regarding dengue fever.

Conclusion

We have found a prevalence of sufficient knowledge in our sample population based on knowledge of dengue. However, isolated knowledge on sign and symptoms, mode of transmission and prevention is adequate, with preventive measures mainly focused towards protection from mosquito bites by using mosquito mat/coil/liquid vaporizers. Without the active community participation and enhance the community knowledge, it's difficult to control the outbreak of dengue fever. However, the available evidence from Pakistani population is limited and there is a need for a nationally representative survey to assess the knowledge and attitudes regarding dengue and any misconception in the general population.

Recommendations

- Environmental management initiatives can major changes in a community, installing water systems with direct connections to residences and replacing water storage containers, which can be mosquito breeding habitats.
- Community initiate on smaller scale environmental changes can also be effective and to eliminate mosquito eggs and larvae.
- People can reduce the risk of mosquitoes entering their homes by using door screens, windows and by keeping their doors and windows closed.
- The Government and Centres for Disease Control recommends and ensure availability of mosquito repellents as the active ingredients and cheap retail price.
- Government should provide mosquito protection bed net free or on easy instalments to the slum area community.
- Government should start media campaign on national level and community participation programs to eliminate the dengue mosquito on village/mohallah level.
- Government should use ovitraps, this is the method of reducing_Aedes aegypti mosquitoes.
- Government and other organizations should start program on continuous base to enhance the knowledge of community regarding elimination of the dengue mosquito.

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