March 2010

Knowledge, attitudes and practices regarding dengue fever among adults of high and low socioeconomic groups

Madiha Syed
Aga Khan University

Taimur Saleem
Aga Khan University

Umme-Rubab Syeda
Aga Khan University

Manal Habib
Aga Khan University

Rehan Zahid
Aga Khan University

See next page for additional authors

Authors
Madiha Syed, Taimur Saleem, Umme-Rubab Syeda, Manal Habib, Rehan Zahid, Atif Bashir, Madiha Rabbani, Madiha Khalid, Asif Iqbal, Ehsen Zawwar Rao, Shujja-ur-Rehman, and Sarah Saleem

Students' Corner

Knowledge, attitudes and practices regarding dengue fever among adults of high and low socioeconomic groups

Madiha Syed,[1] Taimur Saleem,[2] Umme-Rubab Syeda,[3] Manal Habib,[4] Rehan Zahid,[5] Atif Bashir,[6] Madiha Rabbani,[7] Madiha Khalid,[8] Asif Iqbal,[9] Ehsen Zawwar Rao,[10] Shujja-ur-Rehman,[11] Sarah Saleem[12]

Class of 2009, Medical College,[1-11] Department of Community Health Sciences,[12] The Aga Khan University, Stadium Road, Karachi, Pakistan.

Abstract

Objective: To ascertain the knowledge, attitudes and practices of selected adult population in Pakistan regarding Dengue Fever.

Methods: A cross sectional survey was conducted among selected communities with different socio-economic backgrounds in Karachi, Pakistan. A sample size of 440 adults (aged 18 years and above) were interviewed using a pre-tested questionnaire regarding their knowledge, attitude and practices about dengue fever. A composite scoring system, based on the answers given in the questionnaire, was used to establish the level of awareness in the population. The division of the higher and lower socio-economic groups was based on their income and locality; both these variables were determined as a part of our survey.

Results: Data from 400 respondents (244 males, 156 females) was used for primary analysis. About thirty five percent of the sample had adequate knowledge about dengue fever and its vector. Knowledge had significant associations with education (p= 0.004) and socioeconomic status (p=0.02). The high socioeconomic group showed better preventive practices.

Conclusion: Knowledge of dengue is inadequate in the low socioeconomic class. Better preventive practices against the vector are prevalent in the high socioeconomic group. Hence, a greater focus should be accorded to the low socioeconomic areas in future health campaigns (JPMA 60:243; 2010).

Introduction

Dengue virus infection is a escalating health problem throughout the world because of increasing mortality and morbidity and is currently endemic in over 100 countries.[1,2] The rapid geographic expansion of both the virus and the mosquito, regularity of epidemics, and the increasing occurrence of Dengue Haemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) are all causes for great concern;[3] particularly for Pakistan where an increased frequency of the infection has been observed in recent years.

Dengue virus is a flavivirus that affects 50-100 million people annually while DHF cases range from 20,000 to 500,000 per year. The case fatality rate of DHF and DSS is around 5 to 7%.[3,4] In Asia, dengue sprouted from Southeast Asian countries and traveled westward on its geographic trajectory.[5] Multiple outbreaks have been reported from different regions of India, Sri Lanka, Pakistan, and other Asian countries. The first confirmed dengue haemorrhagic fever outbreak in Pakistan occurred in 1994.[6] Epidemic dengue infection was present in southern Pakistan for 2 consecutive years.[7] During 2005-2006, there was an unprecedented ascent in epidemic DHF activity in the country, with a large number of cases being reported from Karachi. More than 3,640 patients with signs and symptoms suggestive of dengue fever were admitted to several referral hospitals in the country, and 40 were reported dead. It was appalling to note that 37 of these deaths occurred in Sindh.[8] Most of the cases were from the east, center and north of Karachi. There is now evidence that co-circulation of DEN-2 and DEN-3 was responsible for the 2006 out-break.[9] In previous studies, significant independent association of male gender with DHF has been observed. A higher mortality rate was however seen in females.[8] A shift in the age distribution of affected individuals has also been noted; children being affected less in later studies.[8,10]

It is unfortunate that no major steps have been taken to promote awareness and precautionary attitude in the community with regards to dengue fever despite the ostensible burden of disease. This is probably because of lack of baseline data on knowledge, attitudes and practices (KAP) of the population regarding dengue fever. Literature search revealed that despite the increasing incidence of dengue fever in Pakistan in recent years, only one KAP on dengue fever has been conducted to date.[11] This study was therefore undertaken to evaluate the knowledge, attitude and practices among different strata of the society regarding Dengue fever.

Subjects and Methods

A cross sectional study was conducted among

individuals from two groups (high and low socioeconomic status). Different areas with varying socioeconomic backgrounds of Karachi were visited by a team of medical students for the purpose of data collection. The selection of the communities and localities visited for the survey was dependant on a number of factors such as convenience of commute and distance from Aga Khan University Hospital [AKUH] as well as overall accessibility. Consideration was also given to localities where investigators of the project would encounter a large number of people that could be surveyed between 3pm and 9pm at a single locality on any given day. High and low socioeconomic status [SES] was defined on the basis of monthly income (< Rs. 15,000) and locality; both these variables were assessed using our questionnaire. Every individual was given a total score based on these two variables in order to categorize them into high and low socioeconomic groups. Anyone scoring ≥ 50% was categorized as belonging to the high socioeconomic group while people scoring <50% were categorized as belong to low socioeconomic group. This strategy was used because a single variable can't accurately illustrate an individual's socioeconomic status. A sample size of 440 was calculated at 95% confidence interval, 5% sample error, 15% non-response rate and assumption of 50% knowledge and attitudes prevalence.

Convenience sampling was used to draw the sample. All consenting individuals aged 18 years and above encountered in the aforementioned areas between 3 pm to 9 pm were interviewed using a structured, pre-tested questionnaire. This questionnaire was thoroughly discussed beforehand to minimize interviewer bias. Informed consent (verbal or written) was taken from all the respondents and confidentiality was ensured throughout the study. The questionnaire and consent forms were translated into Urdu for the ease of the respondents. Data was entered twice and analyzed using SPSS v. 16.0. Descriptive statistics for the collected data were recorded. Associations were assessed using Chi-square test or Fisher's exact test as appropriate. A p-value <0.05 was considered significant. The study was approved by the Ethical Review Committee as well as the Department of Community Health Sciences, AKUH, Karachi.

Results

A total of 440 individuals were approached for participation in the survey; 220 each from high and low socioeconomic localities. A total of 24 (5.5%) declined to participate in this survey. The response rate for the study was therefore 94.5%. Sixteen people had to leave before completion of the interview. Therefore, 400 respondents were successfully interviewed and data so obtained from these respondents was used for the primary analysis. Coincidentally, an equal number of people were present in the high and low socioeconomic groups after removing incomplete interviews and forms (200 each). Table-1 describes the socio-demographic details of the study population. The majority of our sample was male, self employed and had education uptil graduation or above.

Table-1: Socio-demographic characteristics of study population.

Socio-demographic Variables	Frequency(n= 400)	%
Gender		
Males	244	61
Females	156	39
Mean Age ± Standard Deviation (years)		
Males	33.3 ± 12.8	N/A
Females	36 ± 13.7	N/A
Occupation		
1. Government employee	30	7.5
2. Non-government employee	114	28.5
3. Self employee	140	35
4. Non paid volunteer	7	1.8
5. Student	64	16
6. Home maker	22	5.5
7. Retired	5	1.3
8. Unemployed	18	4.5
Level of education		
1. No formal education	14	3.5
2. Till class 5	21	5.3
3. Till class 10	66	16.5
4. Till class 12	76	19
5. Graduate and above	205	51.3
6. Illiterate	18	4.5

Knowledge of dengue fever was assessed using questions aimed at ascertaining the community's understanding of the disease process (symptoms, transmission, etiology and vector), risk factors (season, time of day, location) and standard preventive strategies (mosquito nets, mats, water storage). These questions were differentially scored and individuals attaining ≥ 55% were regarded as being adequately knowledgeable about dengue fever. Three hundred and sixty nine out of 400 (92.3%) respondents had heard about the disease "dengue"; the distribution was 96.5% (193/200) respondents from high socioeconomic group and 88% (176/200) respondents from low socioeconomic group. We used a multiple response question to assess knowledge of the symptomatology of dengue; respondents reported the following as being most commonly associated with dengue: fever (74.5%), headaches (45.6%), bleeding (35.1%), rash (28.2%), abdominal pain (25.4%) and nausea/vomiting (22.7%).

While 93% people knew that the vector for dengue is a mosquito, almost half of them [177/344 (51. 5%)] were aware that dengue is specifically caused by the Aedes mosquito. Of the 281/369 (76%) people who were aware of the requirement of water for the breeding of the dengue vector, 36% among the high socioeconomic group and 21% among the low socioeconomic group knew that the

mosquito breeds in clean standing water. The most important breeding places for the mosquito were reported as house drains (54.9%), garbage (46.3%), water jars (36.1%) and animal drinking containers (27.4%). Tires and flower pots were reported as important breeding places by only 13% and 8% of the people respectively. With regards to the knowledge of the preventive practices, people were generally aware of spraying (62%), mosquito nets (49%), repellents (38.6%) and disposal of garbage (20.4%). Frequently changing stored water and using fish in stored water were reported by only 18% and 5% of the respondents respectively. Other knowledge parameters regarding dengue fever and its vector have been detailed in Table-2.

Table-2: Knowledge variables regarding Dengue fever.

Knowledge Variables of Dengue Fever	High SES (n=193) %	Low SES (n=176) %
Most life threatening sign of Dengue (p=0.04)		
Bleeding	31.6	24.4
Fever	21.7	31.3
Low platelets	8.3	3.9
Shock	8.3	0
Don't Know	30.1	40.3
Vector for dengue (p=0.03)		
Mosquito	96.9	89.2
Air droplets	0.5	4.5
Houseflies	0.5	1.8
Don't Know	2	4.5
Mosquito bites people at what time (p=0.39)		
Sunset / sunrise	57	46
Night	32.1	45
Day time	10.9	9
Water required by mosquito to breed (p <0.001)		
Yes	83.4	68.2
No	8.3	30.1
Don't Know	8.3	1.7
Is Dengue fever contagious (p=0.002)		
Yes	24.9	44.5
No	66.8	53
Don't Know	8.3	2.5

Based on cumulative scoring of the knowledge section, only 35.5% of our sample had adequate knowledge about dengue fever and its vector. High socioeconomic group respondents accounted for 68% of these while low socioeconomic group respondents accounted for the remaining 32%. Knowledge scores were found to have significant associations with education (p= 0.004) and socioeconomic status (p=0.02). However, the associations for occupation, gender and age were not significant.

The attitudes of the respondents were assessed using a set of questions regarding perceptions of severity of illness, need for treatment and hospitalization, and responsibility of controlling mosquito breeding. Seventy seven percent respondents in the high socioeconomic group and 71.6% in the low socioeconomic group thought that it is possible to eradicate mosquitoes that cause dengue fever. Attitude towards the severity of the disease in their respective areas was assessed using an ordinal scale of 1 to 4 (1=not serious, 4=very severe). One hundred and sixteen out of 193 (60%) people of the high socioeconomic class rated dengue as a very serious problem in their area. Fifty nine out of 176 (33.5%) people of the low socioeconomic class gave the same rating to dengue for their area. People from both groups (64% and 61%) had a consensus that the government has the prime responsibility to control mosquito breeding. About ninety percent of high socioeconomic group and 68.2% of low socioeconomic group opined that medical help should be sought in case of symptoms of dengue fever. The symptoms most urgently warranting such help seeking behaviour were reported as bleeding (51.2%) and pain (39.4%).

The practices section of the questionnaire contained questions that assessed the usage of preventive interventions as well as a milieu conducive for breeding of mosquitoes. Among the people who reported the presence of open water storage containers in or around their house, people belonging to the high SES changed the water in these items more frequently than people of low SES (once a week versus twice a month). Similarly, garbage disposal was a more frequently undertaken practice in the high SES as compared to the low SES group (twice a week versus 3-4 times a month). A detailed comparison of the practices between the two groups has been shown in Table-3.

Table-3: Practices related to Dengue fever (n=400).

Practice Variables	High SES (n=200) %	Low SES (n=200) %
Open water storage containers in or around the house (p < 0.001)	10.5	31
Presence of flower pots/ vases in or around the house (p=0.014)	35	26
Items in garbage that can contain water (p=0.06)	47.5	51
Screening on windows (p < 0.001)	73	36.5
Sleeping under a mosquito net at night (p=0.035)	18	2
Sleeping under net during day time (p=0.56)	13.5	13.5
Use of mosquito repellants (p=0.072)	43	25.5
Use of mosquito coils (p=0.03)	35.5	17

Discussion

The majority of the respondents in this study had previously heard about dengue fever; the distribution being similar in the high and low socioeconomic groups (96.5%, 88%). A large portion of the sample population could identify the vector as a mosquito but little was known about the species, breeding and feeding habits of this vector. This, in turn, could be the reason leading to poorer protective practices

against the mosquito. A fair level of awareness was seen regarding some of the life threatening signs of dengue fever such as bleeding while knowledge about other important signs such as shock was insufficient. This is an area which needs attention because it is important for the modification of health seeking behaviour by early identification of severe cases and their prompt and timely management. Knowledge of more common symptomatology or disease course also needs to be improved as the majority of the respondents equated fever with dengue.

Cumulative knowledge scores of respondents in the sample were consistent with the findings from an earlier study done in Pakistan[10] which reported 38.5% of the sample to possess sufficient knowledge of dengue. However, it should be kept in mind that the previous study used slightly different knowledge variables. This study reports a slightly lower prevalence of knowledge scores which can probably be attributed to the difference in the study setting. This survey was conducted in the community setting whereas the prior study focused on patients encountered in two tertiary care hospitals of Karachi. Patient population can be expected to have better knowledge which could have been assimilated during multiple encounters with different health care providers or fellow patients in the waiting areas of outpatient units. It can be seen that the high socioeconomic group fared better with regards to cumulative knowledge scores. This is probably because of greater access to print and electronic media, better education facilities and contact with well informed individuals.[11] This knowledge harboured by the high socioeconomic group was also seen to translate into better preventive practices. A knowledge and attitudes survey in Brazil showed that areas with better social and urban conditions scored higher in terms of knowledge compared with other neighborhoods.[12] A KAP survey together with an extensive entomologic survey was conducted in two sub-districts of Kamphaeng Phet province, Thailand.[13] This study also showed a direct link between knowledge on dengue prevention and container protection practices.

Unbridled urbanization is among one of the factors that is making Pakistan more receptive to dengue epidemics.[8,10] The poor living conditions in the low socioeconomic areas and slums not only contribute to the spread of the disease but also make it difficult for health services to curtail the vector population effectively in these areas. In this study, people of high socioeconomic class showed a greater concern for dengue by rating it as a more severe problem while citizens of low socioeconomic areas regarded dengue as less of a problem. This differential attitude could also stem from a lack of awareness or be a corollary of it.

It should be noted that people are largely unaware of tires and flower pots as being important breeding places for mosquitoes. Similarly, knowledge and use of interventions such as use of fish that prey on mosquito larvae is rare. Many studies have reported encouraging results about the biological control of dengue vectors by fish and have recommended using this intervention in the community.[14,15] A study from Brazil on the public knowledge and attitudes concerning dengue found a gap between knowledge and practices about vector prevention.[16] Another study from Northeast Thailand identified several barriers towards dengue control including insufficient control agents and inadequate knowledge of control methods.[17]

Another important finding is that both the groups place the burden of responsibility of controlling mosquitoes on the government. While the government can erect an initial framework to eradicate the disease, capacity building measures of the community and initiatives for self help can go a long way in sustaining prevention of dengue. Swaddiwudhipong W et al have suggested that health education can induce the people to accept themselves as being responsible for Aedes control programs.[18] A study done in Puerto Rico regarding attitudes towards dengue prevention revealed that participants insisted that "neighbours" needed to control larval habitats, and the Government had the responsibility to fumigate.[19]

Based on our findings, it is recommended that future campaigns should involve more aggressive health education in liaison with health workers and community schools. Audiovisual media can also be used as a tool to disseminate mass awareness.[20] However, it must also be realistically borne in mind that all good knowledge doesn't necessarily lead to all good practices. For example, certain practices like water storage for domestic use are an essential part of community norms and may not be easily modified through education. Health education programmes should, therefore, deliver information in a more compatible socio-cultural context for a friendlier and effective reception.[17] Capacity building measures are also essential for successful community participation.[21]

This study not only provides important baseline information about different segments of society but can also help identify areas that can be targeted in future campaigns. The knowledge obtained from this study may thus be used to monitor the effectiveness and progress of dengue prevention campaigns. This study provides evidence supporting differential allocation of resources for combating dengue in the high and low socioeconomic areas. Different campaigning strategies need to be tailored for upper and lower socioeconomic areas as the gap between knowledge and practices between these strata of society are different. However, the following limitations of this study are acknowledged including the possibility of interviewer bias, drawbacks of convenience sampling, use of an un-validated questionnaire and computation of arbitrary

knowledge scores for dengue fever.

Conclusion

Knowledge about dengue and its vector is generally inadequate with only 35.5% of the sample having adequate knowledge about dengue fever and its vector. The knowledge scores had significant associations with education (p= 0.004) and socioeconomic status (p=0.02) of the individuals; the high socioeconomic group fared better in the knowledge domain. Also, the high socioeconomic group showed better preventive practices. This provides some evidence supporting differential allocation of resources for combating dengue in the high and low socioeconomic areas.

Acknowledgments

We are thankful to the Department of Community Health Sciences, Aga Khan University for providing support for undertaking this project.

References

1. Guzmán MG, Kourí G. Dengue: an update. Lancet Infect Dis 2002; 2: 33-42.
2. Gubler DJ. Epidemic dengue/dengue hemorrhagic fever as a public health, social and economic problem in the 21st century. Trends Microbiol 2002; 10: 100-3.
3. Ahsan T. Dengue fever: a regular epidemic? J Pak Med Assoc 2008; 58: 1-2.
4. Porter KR, Beckett CG, Kosasih H, Tan RI, Alisjahbana B, et al. Epidemiology of dengue and dengue hemorrhagic fever in a cohort of adults living in Bandung, West Java, Indonesia. Am J Trop Med Hyg 2005; 72: 60-6.
5. Guha-Sapir D, Schimmer B. Dengue Fever: new paradigms for a changing epidemiology. Emerg Themes Epidemiol 2005; 2:1.
6. Rai MA, Khan H. Dengue: Indian subcontinent in the line of fire. J Clin Virol 2007; 38: 269-70.
7. Paul RE, Patel AY, Mirza S, Fisher-Hoch SP, Luby SP. Expansion of epidemic dengue viral infections to Pakistan. Int J Infect Dis 1998; 2: 197-201.
8. Khan E, Siddiqui J, Shakoor S, Mehraj V, Jamil B, Hasan R. Dengue outbreak in Karachi, Pakistan, 2006: experience at a tertiary care center. Trans R Soc Trop Med Hyg 2007; 101: 1114-9.
9. Khan E, Hasan R, Mehraj V, Nasir A, Siddiqui J, Hewson R. Co-circulations of two genotypes of dengue virus in 2006 out-break of dengue hemorrhagic fever in Karachi, Pakistan. J Clin Virol 2008; 43: 176-9.
10. Akram D S, Ahmed S. Dengue Fever. Infect Dis J 2005; 14: 124-5.
11. Itrat A, Khan A, Javaid S, Kamal M, Khan H, et al. Knowledge, Awareness and Practices Regarding Dengue Fever among the Adult Population of Dengue Hit Cosmopolitan. PLoS ONE 2008; 3: e2620.
12. Donalisio MR, Alves MJ, Visockas A. A survey of knowledge and attitudes in a population about dengue transmission--region of Campinas São Paulo, Brazil-1998. Rev Soc Bras Med Trop 2001; 34: 197-201.
13. Koenraadt CJ, Tuiten W, Sithiprasasna R, Kijchalao U, Jones JW, Scott TW. Dengue knowledge and practices and their impact on Aedes aegypti populations in Kamphaeng Phet, Thailand. Am J Trop Med Hyg 2006; 74: 692-700.
14. Seng CM, Setha T, Nealon J, Socheat D, Chantha N, Nathan MB. Community-based use of the larvivorous fish Poecilia reticulata to control the dengue vector Aedes aegypti in domestic water storage containers in rural Cambodia. J Vector Ecol 2008; 33: 139-44.
15. Nam VS, Yen NT, Holynska M, Reid JW, Kay BH. National progress in dengue vector control in Vietnam: survey for Mesocyclops (Copepoda), Micronecta (Corixidae), and fish as biological control agents. Am J Trop Med Hyg 2000; 62: 5-10.
16. Gonçalves Neto VS, Monteiro SG, Gonçalves AG, Rebêlo JM. Public knowledge and attitudes concerning dengue in the Municipality of São Luís, Maranhão, Brasil, 2004. Cad Saude Publica 2006; 22: 2191-200.
17. Phuanukoonnon S, Brough M, Bryan JH. Folk knowledge about dengue mosquitoes and contributions of health belief model in dengue control promotion in Northeast Thailand. Acta Trop 2006; 99: 6-14.
18. Swaddiwudhipong W, Lerdlukanavonge P, Khumklam P, Koonchote S, Nguntra P, Chaovakiratipong C. A survey of knowledge, attitude and practice of the prevention of dengue hemorrhagic fever in an urban community of Thailand. Southeast Asian J Trop Med Public Health 1992; 23: 207-11.
19. Pérez-Guerra CL, Seda H, García-Rivera EJ, Clark GG. Knowledge and attitudes in Puerto Rico concerning dengue prevention. Rev Panam Salud Publica 2005; 17: 243-53.
20. Gupta P, Kumar P, Aggarwal OP. Knowledge, attitude and practices related to dengue in rural and slum areas of Delhi after the dengue epidemic of 1996. J Commun Dis 1998; 30: 107-12.
21. Hairi F, Ong CH, Suhaimi A, Tsung TW, bin Anis Ahmad MA, Sundaraj C, et al. A knowledge, attitude and practices (KAP) study on dengue among selected rural communities in the Kuala Kangsar district. Asia Pac J Public Health 2003; 15: 37-43.