ORIGINAL ARTICLE

DENGUE KNOWLEDGE IN INDOOR DENGUE PATIENTS FROM LOW SOCIOECONOMIC CLASS; AETIOLOGY, SYMPTOMS, MODE OF TRANSMISSION AND PREVENTION

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Background: Dengue fever has emerged as an emerging public health issue during last decade bearing significant morbidity and economic burden particularly in third world countries. Current study aims to assess various domains of knowledge of indoor dengue patients. **Methods:** This descriptive cross-sectional study was conducted at Medicine dept. Rawal Institute of Health Sciences Islamabad and BBH Rawalpindi over 6 months. One hundred & twenty-five adult indoor confirmed cases of dengue from lower socioeconomic class were included after ethical approval. The 25-item dengue knowledge questionnaire including aetiology, symptoms, modes of transmission and prevention of dengue was filled. **Results**: Among 125 cases (77% males and 23% females), mean age was 30±13 years. Mean knowledge score was 11±5 points; with excellent knowledge in 6%, good knowledge (22%), moderate knowledge (23%), fair knowledge (34%) and poor knowledge (17%). Mosquito being a vector of dengue was identified by 78%, with peak time in afternoon (48%). Symptoms identified include fever (95%), headache (55%), muscle pain (44%), rash (33%), retro-orbital pain (32%), joint pains (28%) and abdominal pain (18%). Flies and ticks aren't the vectors of dengue according to 61% and 74% respectively, special mosquito is vector (54%), i.e., *Aedes aegypti* (18%) that breeds in standing water (53%). Preventive measures identified were netting (56%), insecticide sprays (54%), covering water containers (38%), removing standing water (36%), mosquito repellents (17%), cutting down bushes (22%) and pouring chemicals in standing water (18%). **Conclusion:** Our patients from lower socioeconomic class, though aware of vector and mode of transmission, have insufficient knowledge of prevention and vector control measures. There is need to strengthen dengue awareness through community-based programs, social media, schools and health care centres for high risk people well before the expected epidemic season about mode of transmission, vector control, screening and early approach to health care facility.

Keywords: Dengue fever; Dengue knowledge; Dengue prevention

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INTRODUCTION

Dengue fever has been recognized by WHO as an emerging public health issue during the last decade.[1] Dengue virus is transmitted by mosquito (*Aedes aegypti*) to humans.[2] According to severity, three stages of dengue have been defined, i.e., Dengue fever (DF), Dengue haemorrhagic fever (DHF) and Dengue Shock syndrome (DSS). The symptoms of dengue include high grade fever, rash, nausea, vomiting, abdominal pain, headache, retro-orbital pain, minor or major bleeds, hypotension and shock as per stage of dengue.[3] Pakistan faced the first epidemic of dengue fever in 1992 in Karachi.[4] Since then frequency of epidemics has been observed to rise with the recent outbreak in fall 2015 in Punjab. Dengue, being an arthropod borne disease is preventable. Vector control remains the mainstay of prevention along with extensive community based educational campaigns as per recommendation of World Health Organization (WHO)[5] and centres for Disease Control and prevention (CDCP)[6]. Itrat *et al* concluded that preventive measures for dengue are associated with dengue knowledge.[7] However Shuaib *et al* found contrary results in his study.[8]

Pakistan, being a developing country has been facing challenges of both the communicable and non-communicable diseases in parallel with large economic burden on our health care system. Khan *et al*[9] in 2006 observed that approx. Three thousand six hundred and forty dengue fever patients were admitted all over the country with forty reported deaths. Since then measures have been taken to facilitate better management of dengue cases during the epidemic resulting in

reduction in mortality. However, because of insufficient preventive measures, we are still unable to achieve appropriate vector control.

There is need to increase awareness and education about dengue fever prevention in community. Despite of availability of guidelines and policy for dengue prevention, little has been observed to be implemented in practical. Current study was conducted to assess various domains of dengue knowledge in patients from lower socioeconomic class. Identifying the high-risk groups and particular domains in which our community lags in dengue knowledge can help us plan community-based education campaigns and measures to be taken at individual and government level.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted at Rawal Institute of Health Sciences Islamabad and Benazir Bhutto Shaheed Hospital Rawalpindi from 1st August 2015 to 31st January 2016 after ethical approval. Total 125 confirmed cases of dengue fever admitted in dengue isolation wards were included after informed consent. Adult cases of both the genders (age ≥18 years) and belonging to lower socioeconomic class were included. Their demographic details, monthly income and educational status were documented. Patients having dengue shock syndrome, critically ill patients requiring intensive care and those who were unable to answer questionnaire due to impaired conscious level were excluded.

The specially designed proforma was used based on questionnaire developed by Shuaib *et al*.[8] Questions about aetiology of dengue (2 questions), dengue symptoms (7 questions), modes of transmission (8 questions) and preventive measures (8 questions) were asked. One mark given for each correct answer (scored from 0–25). Patients were classified as having excellent knowledge (score 21–25), good knowledge (score 16–20), moderate knowledge (score 11–15), fair knowledge (score 6–10) and poor knowledge (score 0–5). Data analysed via SPSS version 17, with mean and standard deviation for quantitative variables (age); frequencies and percentages for qualitative variables (gender, education, level of dengue knowledge). Data presented in the form of tables and bar graph.

RESULTS

Among 125 cases, there were 96 (77%) males and 29 (23%) females. Mean age was 30±13 (18–80) years. Mean knowledge score was 11±5 points; maximum score obtained was 22 and minimum 2 out of 25. Regarding aetiology of dengue; 97 (78%) identified that dengue is caused by mosquito bite and 60 (48%) had the knowledge that peak time of mosquito bite is afternoon.

Fever as the symptom of dengue was identified by 119 (95%), headache by 69 (55%) and muscle pain by 55 (44%). Less frequently identified symptoms were rash 41 (33%), retro-orbital pain 44 (32%), joint pains 35 (28%) and abdominal pain 23 (18%). (Table-1)

Eight questions were asked about mode of transmission. Flies and ticks aren't the vectors of dengue was correctly answered by 76 (61%) and 92 (74%) respectively. Sixty-eight (54%) responded that dengue is transmitted by special type of mosquito and 22 (18%) knew that *Aedes Aegypti* is the main vector. Person to person contact, blood transfusion, needle prick and sexual intercourse aren't the modes of transmission according to 52 (42%), 40 (32%), 43 (34%) and 73 (58%) participants respectively.

Eight questions were asked about the preventive measures of dengue. Sixty-six (53%) knew that mosquitoes breed in standing water. Netting and insecticide sprays can reduce mosquitoes according to 70 (56%) and 67 (54%) respectively. However, other preventive measures like covering water containers was identified by 48 (38%), removing standing water by 45 (36%), mosquito repellents by 21 (17%), cutting down bushes/ vegetation by 28 (22%) and pouring chemicals in standing water by 23 (18%).

In current study, 7 (6%) had excellent knowledge of dengue (score 21–25), while 28 (22%) had good knowledge (score 16–20); and 27 (23%) had moderate knowledge (score 11–16). Fair knowledge (score 6–10) was found in 42 (34%) and poor knowledge (score 0–5) in 21 (17%). (Figure-1)

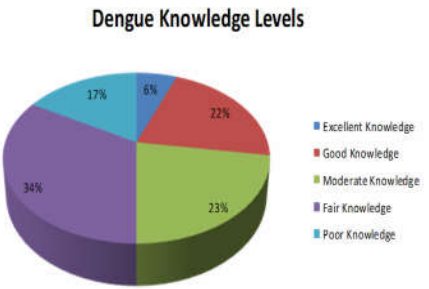

Figure-1: Pie chart presentation of various levels of dengue knowledge among dengue cases from lower Socioeconomic class (n=125).

Table-1: Levels of Knowledge about aetiology, symptoms, transmission and prevention of dengue fever (n=125).

	Statements (with correct response)	**Answered correctly** n (%)
Cause	1. Dengue is caused by mosquito bite **(Yes)**	97 (78)
	2. Dengue mosquito is likely to feed or bite in afternoon **(Yes)**	60 (48)
Knowledge of symptoms	3. Fever is a symptom of dengue **(Yes)**	119 (95)
	4. Joint pain is a symptom of dengue **(Yes)**	35 (28)
	5. Muscle pain is a symptom of dengue **(Yes)**	55 (44)
	6. Abdominal pain is a symptom of dengue **(Yes)**	23 (18)
	7. Retro-orbital pain is a symptom of dengue **(Yes)**	44 (32)
	8. Rash is a symptom of dengue **(Yes)**	41 (33)
	9. Headache is a symptom of dengue **(Yes)**	69 (55)
Knowledge of modes of transmission	10. Dengue is transmitted by flies **(No)**	76 (61)
	11. Dengue is transmitted by ticks **(No)**	92 (74)
	12. Dengue is transmitted by all types of mosquitoes **(No)**	68 (54)
	13. Dengue is transmitted by *Aedes Agypti* mosquito **(Yes)**	22 (18)
	14. Dengue can be transmitted by person to person contact **(No)**	52 (42)
	15. Dengue can be transmitted by blood transfusion **(No)**	40 (32)
	16. Dengue can be transmitted by needle prick **(No)**	43 (34)
	17. Dengue can be transmitted by sexual intercourse **(No)**	73 (58)
Knowledge of prevention	18. Mosquitos breed in standing water **(Yes)**	66 (53)
	19. Window screens and bed nets reduce mosquitoes **(Yes)**	70 (56)
	20. Insecticide sprays reduce mosquitos and prevent dengue **(Yes)**	67 (54)
	21. Covering water containers reduce mosquitoes **(Yes)**	48 (38)
	22. Removing standing water can reduce mosquito breeding **(Yes)**	45 (36)
	23. Mosquito repellents prevent mosquitoes **(Yes)**	21 (17)
	24. Cutting down bushes can prevent mosquitoes breeding **(Yes)**	28 (22)
	25. Pouring chemicals in standing water can kill mosquito larvae**(Yes)**	23 (18)
Score	**Level of Knowledge**	**n (%)**
21–25	Excellent Knowledge	7 (6)
16–20	Good Knowledge	28 (22)
11–15	Moderate Knowledge	27 (23)
6–10	Fair Knowledge	42 (34)
0–5	Poor Knowledge	21 (17)

DISCUSSION

Several outbreaks of vector borne diseases have posed a serious challenge to developing countries. Changes in climatic conditions, rapid urbanization, poor sanitation, over population and poor vector control have led to repeated outbreaks in vulnerable communities.[10] So far, vaccine hasn't been available for dengue fever and integrated approach including host susceptibility and vector control remains the mainstay of prevention.[11]

Majority of affected cases were males (77%) in current study as compared to lesser number of females (23%). Regional study conducted by Shaikh *et al* in Hyderabad Pakistan also had predominance of males (72%).[12] Mean age of thirty years indicates that younger age group was more exposed to outdoor environment and hence they are prone to mosquito bite. Shaikh *et al*[12] also found a comparable mean age of 28 years. Study conducted in Kolkata India shows maximum cases in 11–30 years age group with predominantly males.[13] Possible reason could be that majority of males are exposed to outdoor environment in our region and are responsible to earn for their family in contrary to most of the females that reside indoor.

Mean knowledge score was eleven out of twenty-five. None of our cases answered all the questions correctly. Maximum score obtained was twenty-two. Various levels of knowledge were defined according to score obtained. Only six percent cases had excellent knowledge. Good, moderate and fair knowledge was scored by 22%, 23% and 34% cases. 17% had score ≤5 and were labelled as having poor knowledge. As compared to this the study conducted by Yboa *et al*[14] on rural residents of Philippines showed higher mean score (i.e., 19) with 60% cases having good knowledge and 30% having very good knowledge. None of their cases scored <10 (i.e., fair and poor knowledge category). This indicates that our patients lag behind in dengue knowledge.

A regional study conducted at Agha Khan Hospital by Syed *et al*[15] found adequate knowledge (score >55%) in 34% respondents and also found that knowledge scores in higher socioeconomic class are better than lower. We inducted patients from lower socioeconomic class and this may explain the comparatively low knowledge level in current study. Several Asian studies have found insufficient dengue knowledge.[16,17] However, certain studies conducted in west have shown comparatively good knowledge levels.[18,19] Currently Asian countries are facing frequent epidemics of dengue fever and there is need to make policy and plans to improve the preventive practices in community.

Patients in current study were quite aware of mosquito to be vector of dengue fever. Seventy eight percent cases answered correctly about vector, while twelve percent had various responses (i.e., via housefly, inhalation or don't know). Similarly, studies by Yboa *et al* [14] and Syed *et al* [15] shows >90% correct response to this question.

Almost half of patients (48%) were aware of peak time of mosquito bite. Rest of 52% answered night, day time or don't know. Syed *et al*[15] also found similar response. However, better awareness of peak feeding time of mosquito was found by Yboa *et al*.[14] Unlike other mosquitoes, *Aedes aegypti* has peak biting time in early morning and evening before dusk.[20] Hence, outdoor activities should be avoided at this peak time to avoid exposure to vector.

Regarding symptoms of dengue virus infection, most frequently identified symptom was fever about which ninety five percent cases were aware. Approximately half of the cases were able to identify symptoms of headache and myalgia. Rash, retro-orbital pain and joint pain were less frequently identified symptoms. Only 18% knew that abdominal pain could occur in dengue fever. Yboa *et al*[14] found >80% awareness of all the symptoms except retro-orbital pain. We need to educate our community about symptoms other than fever like rash, retro-orbital pain and abdominal symptoms as well.

Almost 2/3rd cases knew that flies and ticks don't transmit dengue. Though 78% cases identified mosquito as the vector for dengue, however only 18% knew the name of species (i.e., *Aedes Aegypti*) as compared to higher figure of 80% by Yboa *et al*.[14] 42% were aware that person to person contact can't transmit dengue. 1/3rd cases had the knowledge that dengue can't be transmitted by needle prick or blood transfusion. 2/3rd cases responded that it's not sexually transmitted disease. Though major route of transmission is vector borne, other rare non-vector borne routes have been reported that include blood products transfusion, vertical transmission, transplant related and needle prick.[21] We should focus to educate our community about the major route that is vector borne. Though, healthcare personnel should be aware of non-vector borne routes as well.

The knowledge about prevention of dengue was assessed by eight questions. Almost half of cases identified that mosquitoes breed in standing water. Regional study by Syed *et al* found correct response in 76%[15] and Yboa[14] *et al* in 61%. WHO recommends Integrated Vector management (IVM) for dengue prevention. IVM is defined as vector control by optimal use of resources. This aim is to achieve control by strategies that are cost effective, sustainable and ecologically sound.[22] In view of the limited resources and socioeconomic constraints, we need to plan and implement cost effective and practically applicable measures for vector control.

Half of cases were aware that netting and insecticide sprays can reduce the mosquitoes. 1/3rd knew that that containers containing water should be covered and that standing water should be drained to prevent the breeding reservoirs of the mosquitoes. Fewer cases were aware of other measures like mosquito replants (17%), cutting down bushes or vegetation in domestic area (22%) and pouring chemicals in standing water (18%). Study by Yboa *et al*[14] found >85% correct response to all these preventive measures. Arunachalam *et al*[23] and Horstick *et al*[24] recommended that public response to dengue control should extend beyond larviciding and spraying; and close interaction between community and municipal vector control services is required.

Despite of the awareness campaigns at government and community levels, recurrent epidemics have been observed during the last decade. There is need to identify the pitfalls and hurdles that have hampered the efficacy of measures against dengue. Santamaria *et al*[25] in an Asian and Latin America based study found that for implementation of dengue control and management there is inaccessibility, lack of training and insufficient staff. Current study shows that the affected people are well aware of the aetiology and symptoms of dengue. However, they lag in knowledge about preventive measures. Individuals have better knowledge of personal protection like netting, repellents and sprays. However, they are deficient in knowledge of measures that control reservoirs and breeding sites of mosquitoes, i.e., cutting bushes, draining the standing water and pouring chemicals in standing water. Educational campaigns should include participation of people from vulnerable areas of community.[26]

Several studies have been conducted to assess knowledge about dengue fever; however most of these have included healthy people from community, students, physicians or health care providers. Most of the studies have assessed the knowledge in literate subjects from educational institutes and healthcare system. We have included the clinically and serologically confirmed cases of dengue fever from low socioeconomic class and in this aspect; this is a unique regional study that provides the knowledge status of those who are affected by dengue in the background of illiteracy and poverty. This provides the regional data that can be compared with community-based studies as well as international studies.

Certain limitations of this study are the lack of randomization as consecutive cases were taken from dengue isolation wards. Also, there is smaller sample size as compared to community-based studies, the reason being that this study targets the confirmed cases of dengue rather than healthy people. Results of this study should be interpreted carefully as cases were inducted from the lower socioeconomic class having lower literacy and limited resources that may have led to underestimation of knowledge level. Authors suggest that sampling should be done from multiple hospitals during the epidemic so that patients from all age groups and socioeconomic class can be included.

CONCLUSION

Our patients from low socioeconomic class having low literacy and poverty should be considered high risk for dengue in view of insufficient dengue knowledge. Despite of awareness about the vector, modes of transmission and common symptoms; there is insufficient knowledge about prevention and vector control measures. Thus, suggesting the need to educate our community about mode of transmission, vector control, screening and early access to health care facility. There is need to strengthen our dengue awareness campaign by providing precise and comprehensive information in local language at health care centres, community education campaigns, social media and schools well ahead of expected epidemic season to achieve appropriate vector control.

AUTHORS' CONTRIBUTION

NS and SA contributed to methodology, data collection, data analysis, discussion and referencing. NY, WA, NK and SF contributed to data collection, literature review, critical analysis and discussion.

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