

Community knowledge, awareness and preventive practices regarding dengue haemorrhagic fever in Thanlyin Township, Yangon, Myanmar

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Abstract

Recently, incidence of dengue has dramatically increased around the world. In Myanmar, more cases of dengue fever (DF) / dengue haemorrhagic fever (DHF) are being reported yearly. A cross-sectional descriptive study was conducted in Thanlyin Township, during the rainy season of 2016. The aim of the study was to determine community awareness, knowledge and preventive practices regarding dengue fever. Multi-staged systematic random sampling procedure was applied to select the subjects for the study and a face-to-face interview was conducted using a structured questionnaire. Data was analyzed using Stata 11.0. The occurrence of DHF among study population (households) during last year was 3.3% (95% CI - 0.9 to 8.3). Main source of information on DHF that was obtained by the households was through television and 97.5% of the households were aware of dengue occurring in their community. More than 80% of the households had awareness about the spread of dengue and its signs and symptoms. About 17% of the respondents mistakenly believed that DHF could be prevented by chemoprophylaxis or taking medicine. Clean water as a breeding place for mosquitoes was mentioned by 46% of respondents and half of the respondents answered that mosquitoes bite during the day time. More than 70% of the households surveyed practiced covering water storage containers and utilized bed-nets. It was also found that 60% added abate in the uncovered water containers. However, the practice of changing water in containers twice a week was found to be practiced only in 15% of the households. The finding of high vector indices such as House Index (HI), 23.3%, Breteau Index (BI), 71.7% and Container index (CI) 17.7% indicated that there is a high risk of dengue transmission in Thanlyin Township.

Keywords: Community knowledge, awareness and practices, dengue haemorrhagic fever

Introduction

Recently, dramatic increase in the incidence of dengue was seen around the world and 3.9 billion people in 128 countries are considered to be at risk of dengue viral infection¹. Out of 100 countries regarded to be endemic for dengue in the five WHO

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regions globally, South-east Asia Region is one of the most seriously affected regions². The highest dengue incidence and mortality rates are found in countries located in the South-east Asia Region with a mortality rate of 8.49 % during the year 2013³. The first epidemic of DHF was reported in the Philippines in the year 1953-1954, and following this event, outbreaks of DHF with significant mortality have occurred in most of the countries in the South-east Asia Region, including Myanmar⁴. Though DF/DHF started out as a disease in urban of Myanmar, since 1998 more cases have been reported from the rural areas. In Myanmar, the number of dengue cases reported in 2015 is now more than twice that of 2009. Case fatality rate (CFR) was reported as 0.36% in 2012⁵.

Threats of increased occurrence of DHF may be due to climatic change, uncontrolled urbanization, increase in number of mobile and migrant populations in peri-urban areas of large cities and improper disposal of waste such as (plastic paper cups along with improper disposal of used tyres)⁶. In Myanmar, during 2009 when a huge epidemic of DHF occurred, the annual reported incidence rates fluctuated ranging from 4 to 47 per 100,000 populations⁷. However, in the recent years to now, the case fatality rates were not as high as compared to the earlier years before huge epidemic. Geographically, in central and southern regions, there was the highest incidence of DHF cases and timing was one month earlier compared to northern areas of Myanmar each year. Therefore, improving dengue control measures should set priority towards changing climate, increasing urbanization and international trade⁷.

For long-term prevention and control of dengue epidemic, integrated community-based action is required especially for cost-effectiveness and sustainability of action. For community to accept and take responsibility for the prevention of dengue epidemics, the public has to be educated in order for them to understand their principal role in prevention and control of dengue and DHF/DSS⁸. Integrated community-based control strategy requires that every community must be involved in dengue fever control activities under the leadership of the government. A study in China carried out by Hualiang Lin *et al* suggested that an integrated dengue intervention program including the eradication of larval breeding sites, killing adult mosquitoes with pesticides, public health education and community involvement, as well as rigorous administrative leadership has significant effects in prevention and control of dengue outbreak⁹. The study in India revealed the necessity to make villagers and slum people be aware of the different preventive measures and improve application of knowledge in real practices for control outbreaks of DHF¹⁰.

Socioeconomic factors such as age shift of occurrence of dengue infection/DHF, secondary infection, and human mobility rather than environmental factors are the most significant factors for dengue infection; and information related to these factors could help the public health sector in planning and action on prevention and control strategies¹¹. A study conducted 10 years ago in Thanlyin Township found that the population density of *Aedes aegypti* increased during the rainy season and the larval indices were quite high¹². Adoption of proper preventive practices needs to be emphasized at the community

level which is essential for reducing vector density and hence controlling the outbreak of dengue fever¹³. It is also important to assess community's awareness regarding the disease, its mode of transmission and breeding sites¹⁰.

Objectives of the study

The study was conducted in urban area of Thanlyin Township, Yangon Region, Myanmar during the rainy season of 2016 (August and September) to determine the awareness, knowledge and preventive practices of community on dengue fever.

Materials and Methods

The research and ethics committee of the University of Medicine 1, Yangon, Myanmar approved the cross-sectional descriptive study. In calculating sample size, the prevalence of awareness among participants on disease transmission was estimated to be 72.6%¹⁰. The sample size of households to be studied was 120 with 95% confidence level.

Data collection was done during the months of August and September of 2016 and multi-staged systematic random sampling procedure was applied. At first, four wards out of ten from Thanlyin Township were selected randomly and then thirty households from each ward were selected using systematic random sampling procedure. Household-heads who gave informed consent to participate in the study were recruited to take part in the study. Data was collected through face-to-face interviews using structured questionnaires and observation methods. There were three parts in questionnaire, the first part was on background information of respondents and second part included questions to assess awareness, knowledge and preventive practices regarding DHF. Educational status was recorded according to the highest educational level achieved and categorized into low (illiterate, monastic schooling and up to grade 5), medium (grade 6 to 11) and high (university level and graduates). The last part was larva survey that was conducted by well-trained data collectors and local health staff. During larva survey all water containers from both inside and outside of the selected household were inspected for the presence of *Aedes aegypti* larvae. Three larval indices such as Breteau Index (BI), Container Index (CI) and House Index (HI) were calculated based on the following WHO standard guideline¹⁴.

Breteau Index = (No. of positive containers / No. of houses inspected) x 100

Container Index = (No. of positive containers / No. of containers inspected) x 100

House Index = (No. of houses with positive container(s) / No. of houses inspected) x 100

The data collected were entered in Epi Data 3.1 and then descriptive analysis was done using Stata 11.0 statistical package.

Findings

Table 1 shows the characteristics of the subjects participating in the survey. The majority of people interviewed in each household were between the ages of 30 to 60 years and all were females. As the study was conducted in urban areas, three-quarter of respondents were found to have obtained medium education level. Nearly 37% of the households had 5 and more family members. History of DHF (reported as grade I) during the past year was reported to be 3.3% of all households. The incidence of dengue was 0.78 per hundred persons. All dengue cases reported were under the age of 15 years. Among the 4 reported cases of dengue, 25% of them were less than 5 years old and 75% were between 10 to 15 year-old.

Table 1. Background information

Background information		
Age (years) of household head (n = 120)	Frequency	Percent
15 - 30	18	15.0
31 - 45	33	27.5
46 - 60	42	35.0
> 60	27	22.5
Sex (n = 120)	Frequency	Percent
Male	37	30.8
Female	83	69.2
Education (n = 120)	Frequency	Percent
Medium	85	70.8
High	35	29.2
No: of family member within family (n = 120)	Frequency	Percent
< 5	76	63.3
5 and more	44	36.7
History of DHF among family during last year (n = 120)	4	3.3 (95% CI - 0.9 to 8.3)
Incidence of DHF within family members (n = 508)	4	0.78 (95% CI - 0.2 to 2.0)
Age of family member who had history of DHF (n = 4)	Frequency	Percent
< 5 year	1	25
10 to 15 year	3	75

As shown in table 2, the main source of information on dengue was television. Almost all of the household respondents (97.5%) were aware of dengue fever and more than 85% of the respondents knew that dengue is spread through the bite of a mosquito. The rainy season is well known to be the dengue season by the respondents and 86.7% of the household respondents considered children to be the most vulnerable group of people. Therefore, this finding showed that the public in Thanlyin Township were aware about the important etiology of DHF. Regarding the symptoms of dengue, more than 80% of respondents knew that fever with coffee ground coloured vomitus was a presenting

feature of dengue fever. However, 16.7% answered that DHF can be prevented by taking antibiotics and 39.2% did not know anything about antibiotics role in DHF prevention but 16.7% of the respondents were aware about the presence of dengue vaccine for prevention.

Table 2. Awareness on dengue spread, symptom and prevention (n = 120)

Awareness	Frequency	Percent (95% CI)
Source of information*		
Radio	30	25 (17.5 to 33.7)
TV	79	65.8 (56.6 to 74.3)
Newspaper & Journal	58	48.3 (39.1 to 57.6)
Health personal	39	32.5 (24.3 to 41.7)
Internet	13	10.8 (5.9 to 17.8)
Awareness of dengue		
Yes	117	97.5 (92.9 to 99.5)
No	3	2.5 (0.5 to 7.1)
Is Dengue Transmissible?		
Yes	102	85.0 (77.3 to 90.9)
No	18	15.0 (9.1 to 22.7)
Mode of spread		
Mosquito bite	104	86.7 (79.3 to 92.1)
Others	12	10.0 (5.3 to 16.8)
Don't know	4	3.3 (0.9 to 8.3)
DHF widespread season		
Summer	1	0.8 (0.02 to 4.6)
Rainy	113	94.2 (88.4 to 97.6)
Winter	2	1.7 (0.2 to 5.9)
Don't know	4	3.3 (0.9 to 8.3)
Most vulnerable person		
Women	7	5.8 (2.4 to 11.6)
Children	104	86.7 (79.3 to 92.3)
Adult	2	1.7 (0.2 to 5.9)
Don't know	7	5.8 (2.4 to 11.6)
Symptoms of DHF		
Fever and coffee ground vomiting	97	80.8 (72.6 to 87.5)
Cough	1	0.8 (0.02 to 4.6)
Diarrhoea	4	3.3 (0.9 to 8.3)
Don't know	18	15.0 (9.1 to 22.7)
Can be prevented by taking antibiotics		
Yes	20	16.7 (10.5 to 24.6)
No	53	44.2 (35.1 to 53.5)
Don't know	47	39.2 (30.4 to 48.5)
Can be prevented by vaccination		
Yes	20	16.7 (10.5 to 24.6)
No	55	45.8 (36.7 to 55.2)
Don't know	45	37.5 (28.8 to 46.8)

* multiple response

Table 3 shows the knowledge about dengue among the household respondents. It was found that 58.3% did not know about vector of DHF. Nearly 46% knew that the mosquito that carries dengue virus breeds in clean water and more than half of the respondents answered day time as the time when the mosquito bites. Nearly 80% of household respondents knew about the right measures to reduce larva density. Although three-quarter knew abate (insecticide used to kill larva), nearly half of respondents did not have knowledge about biological control measures.

Table 3. Knowledge about vector and preventive measures (n = 120)

Knowledge	Frequency	Percent (95% CI)
Mosquito carry agent of DHF		
Anopheles	5	4.2 (1.4 to 9.5)
Aedes	43	35.8 (27.3 to 45.1)
Culex	2	1.7 (0.2 to 5.9)
Don't know	70	58.3 (48.9 to 67.3)
Mosquito breeding places		
Clean water	55	45.8 (36.7 to 55.2)
Running water	11	9.2 (4.7 to 15.8)
Dirty water	42	35.0 (26.5 to 44.2)
Don't know	12	10.0 (5.3 to 16.8)
Most frequent mosquito biting time		
Day time	61	50.8 (41.6 to 60.1)
Night	24	20.0 (13.3 to 28.3)
Both	7	5.8 (2.4 to 11.6)
Don't know	16	13.3 (7.8 to 20.8)
Knowledge on preventive measures		
By covering, pouring, changing and filtering water	95	79.2 (70.8 to 86.0)
Releasing larvivorous fish in uncovered water container	61	50.8 (41.6 to 60.1)
Adding abate in uncovered water container	87	72.5 (63.6 to 80.3)

Table 4 shows the preventive practices of households. Majority of the families followed good preventive practices. The proper disposal of discarded things such as old tyres and disused containers to prevent water source for DHF vector was found in 90% of households and more than 70% of households were practicing correct preventive methods for dengue control such as covering of water storage containers and opening windows during the day to get enough daylight. Utilization rate of bed nets during day time was high (71.7%). Nearly three-quarters of the respondents had a habit of changing water in the storage tanks/container and 84.2% changed the water from flower vases once a week. Regarding adding of abate, only 60.8% followed this practice.

Table 4. Preventive practices against dengue fever (n = 120)

Preventive practices	Frequency	Percent (95% CI)
Cover water storage container	92	76.7 (68.1 to 83.9)
Disposed discarded things	109	90.8 (84.2 to 95.3)
Changing water in storage tanks/container	88	73.3 (64.5 to 81.0)
Changing frequency of water from flower vases		
once per week	101	84.2 (76.4 to 90.2)
twice per week	18	15.0 (9.1 to 22.7)
once per two week	1	0.8 (0.02 to 4.6)
Opening windows to get enough daylight	94	78.3 (69.9 to 85.4)
Use of mosquito nets during day time	86	71.7 (62.7 to 79.5)
Adding abate into water container at least once a year	73	60.8 (51.5 to 69.6)

Table 5 shows the larval positivity and indices observed in this study where House index (HI), Container index (CI) and Breteau index (BI) were 23.3%, 17.7% and 71.7% respectively.

Table 5. Status of larval positivity and indices

Variables (n)	No. of larval positivity	Percent (95% CI)
Houses (120)	28	23.3 (16.1 to 31.9)
Containers (485)	86	17.73 (14.4 to 21.4)
House index - 23.3%, Container index - 17.7%, Breteau index - 71.7%		

Discussion

The incidence of dengue in the present study was 0.78 per hundred persons which was higher than the Yangon regional figure reported in 2015⁶. The most vulnerable groups of DHF found in this study were not so different from that of 2015 where age distribution of cases were reported to be 29% in under five and 65.7% in ten to fifteen years old⁶.

As the main source of information on dengue was television, important messages about DHF must be continuously released via mass media to promote community participation for prevention and control measures. In such a community early case detection of disease will be favourable as more than 80% of respondents had awareness on DHF symptoms. Based on WHO recommendations, there are no specific drugs for DHF treatment⁴. Therefore, message about antibiotics and vaccination for DHF are required to inform in health education sessions.

Community might be educated in layman terms e.g. tiger mosquito rather than scientific name of dengue vector, because more than half did not know DHF vector. Regarding breeding places, there was lower knowledge compared to that in an urban community of Delhi (46% Vs. 54.7% regarding clean water)¹³. However, more than half of the respondents answered day time as mosquito biting time which was the reverse from the finding of Indian study where 64.7% of slum dwellers believe the night as *Aedes*

mosquito biting time¹⁰. Nearly 80% of household respondents knew the right measures to reduce larva density, which was better than study in urban residents of south Delhi, 46.5%¹⁵. WHO guideline for dengue prevention and control involved application of larvivorous fish and one per cent temephos sand granules as chemical larviciding⁴. However, nearly half of respondents did not have knowledge about biological control in this study.

Utilization rate of bed nets was high (71.7%) than that observed in other studies from India^{10, 13, 15}. Habit of changing water in storage tanks/containers and flower vases was better than that of study conducted by Priya Arora and *et al*¹³: frequency of changing water is better, up to twice a week. The practice of adding of abate (only 60.8%) was lowest compared to other preventive practices. Therefore, this activity should be promoted by cooperation of health and other related sectors together with community participation for eliminating the source of newly-emergent adult mosquitoes.

The larval indices observed in this study were lower than those conducted in same area during 2006 to 2007¹² but higher than that of 2014¹⁶ except House index (HI). $HI \geq 10$ and $BI \geq 50$ can be classified as high Risk of DHF transmission in an area¹⁷. Therefore, this urban area of Thanlyin Township could have high risk of dengue transmission.

Conclusion

Community awareness of DHF was good enough according to this study. For application of proper knowledge in daily practices, continuous information and education should be enhanced. To reduce the incidence and risks of dengue transmission in Thanlyin Township, practices regarding frequent change of water from open containers and adding abate are needed to be improved by further campaigns focusing on community participation.

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