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Original Research Article

Awareness on dengue haemorrhagic fever prevention in Insein township, Yangon region, Myanmar

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ABSTRACT

Background: Dengue is an epidemic-prone, vector-borne communicable disease found all over the world. Effective prevention and control of Dengue requires vector control and interrupting human-vector contact. Vector control methods can only be effective with community awareness and engagement regarding preventing dengue haemorrhagic fever (DHF). This study aimed to assess the awareness of DHF prevention in an urban township in Yangon, Myanmar.
Methods: A cross-sectional study was conducted among 218 participants in an urban slum in Insein Township, Yangon, Myanmar, from July 2019 to August 2019. The knowledge level of DHF prevention was assessed using a structured questionnaire with face-to-face interviews.
Results: Female respondents accounted for (n=148, 67.9%), and the average age of the respondents was 40.67 years (SD±13.25). The present study indicates that (n=176, 80.7%) had a good knowledge of DHF prevention. Most participants knew that mosquito biting is the cause of DHF, the signs and symptoms of DHF, and individual preventive activities of DHF. The participants (n=129, 59.2%) correctly identified clean water as mosquito breeding sites and a quarter of the respondents (n=56, 25.7%) provided inaccurate information about *Aedes* mosquitos as causal vectors of dengue fever. Some respondents (n=27, 12.3%) provided incorrect responses about the transmission of the daytime biting habit of the *Aedes* mosquito.
Conclusions: The participants had good levels of knowledge, but insufficient knowledge and preventive practices of DHF were noted. Health promotion programs should focus more on correcting incorrect DHF knowledge and improving prevention strategies to enhance vector control and personal protection within the community.

Keywords: Dengue haemorrhagic fever, Awareness, Practice, Community, Township level

INTRODUCTION

Dengue is an epidemic-prone, vector-borne communicable disease found all over the world.[1] The World Health Organization estimated that half of the global population resides in dengue-prone areas across over a hundred countries, while 390 million (284–528 million) dengue infections occur yearly. A surge in dengue cases has been recorded in the Western Pacific Region, including Australia, China, and most of the Southeast Asian countries in 2019.[2]

Myanmar is a developing country where water storage and environmental sanitation methods could be more robust. These factors create more breeding places for mosquitoes. More importantly, there are many challenges in Myanmar's dengue prevention and control activities, including human resource shortages, insufficient materials, low budgets, and weak technical advancements.

Additionally, one of the challenges is the limited community awareness of the dengue disease and its impact on both urban and rural areas in Myanmar, as mentioned in the National Guideline for Clinical Management of Dengue.[3]

The first dengue case was reported in 1960 in Myanmar. Dengue disease has been one of the notifiable diseases in Myanmar since 1964.[3] Dengue haemorrhagic fever (DHF) usually occurs during the rainy season, and DHF cases have largely been detected in children under 15 years old, particularly in individuals aged between 5-9 years and the school-going age group.

Yangon is the largest city in Myanmar. Around 23% of Yangon residents were children under 15 years old in 2014.[4] Yangon had the most significant number of dengue cases (n=3,404) and the highest number of dengue-related mortalities (n=23) in Myanmar from January 2018 to November 2018.[5] Insein Township had the second-highest number of dengue cases (n=254) and the highest dengue mortality in the Yangon Region from January 2018 to November 2018.[6]

The prevention of DHF is simple and involves vector control, primarily environmental and chemical control. Individual adherence to specific preventive activities represents an initial step toward the effective and efficient prevention and control of dengue disease in Myanmar. To be able to practice dengue prevention activities in the communities, they need to have a considerable level of knowledge and awareness. This study aims to assess the knowledge related to DHF prevention among communities living in Insein Township, Yangon Region.

METHODS

This cross-sectional, observational questionnaire-based study was conducted in an urban slum in Insein Township, Yangon, Myanmar, from July 2019 to August 2019. The inclusion criteria were adults of both genders, aged between 18 and 70, who had been residing in Insein Township since the previous rainy season. Fluency in the Burmese language was a requirement for participants to ensure accurate information could be gathered during the study. Exclusion criteria were residents of that slum not giving consent to participate in the study, and the people who were physically and mentally ill. Moreover, the medical personnel, including doctors, nurses, and basic health staff, were excluded from being interviewed to mitigate selection bias in the study.

The following formula was used to determine the sample size, where n= the desirable estimated sample size, Z= the standardized normal deviation with 95% confidence interval, p=estimated awareness of DHF prevention=50%, and d=marginal error of estimate 7%.

$n = z_{\alpha}^{2} pq/d^{2}$

Sample size, $n = \frac{(1.96 \times 1.96 \times 0.5 \times 0.5)}{0.07 \times 0.07} = 196$

Add around 10% non-response rate=196+ 22=218.

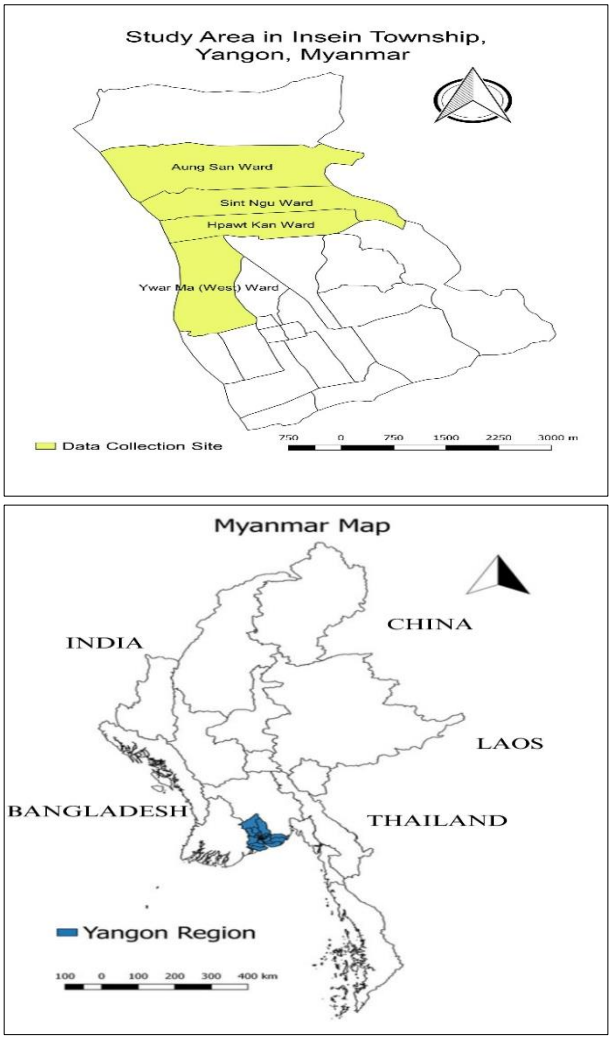

Figure 1: Study areas in Insein Township, Yangon, Myanmar.

However, the sample size increased to 218 in this study, and the target was to complete this sample size. The systematic random sampling method was deployed for the recruitment of participants. Insein Township comprises 21 wards with a population of 305,283 (Figure 1).[4]

Firstly, four wards were randomly selected from the 21 wards. Afterwards, households in each ward were systematically selected by randomly picking household numbers then, every tenth household in a row to recruit a minimum of 54 participants from each ward. The questionnaire includes questions to elicit demographic data sources of DHF prevention information and awareness regarding DHF prevention. Four interviewers were trained by the lead investigator (PSTA), and interviewers were conducted under his supervision.

Statistical analysis was performed using statistical package for social sciences (SPSS) version 23. Descriptive statistics were applied to sociodemographic characteristics, sources of DHF prevention information, and level of DHF knowledge (good level: ≥80% of the total score; poor level: <80%). Crosstab analysis demonstrated the relationships between sociodemographic characteristics and level of DHF knowledge. Chi–square test was used for significance testing, and a p value less than 0.05 was considered statistically significant.

The study protocol was approved by the Institutional Ethical Review Committee of the Defence Services Medical Research Centre, Naypyitaw, Myanmar and received approval on 11 June 2019.

RESULTS

Table 1 describes the sociodemographic characteristics of participants. Most participants (n=110, 50.5%) were over 40 years of age. The majority were females (n=148, 67.9%). Concerning the education level of the respondents, (n=112, 52%) possessed a high level of education (High School or above), whereas (n=106, 48%) had a low level of education (below high school). Regarding the family household income, the majority (75.2%) earned less than 300,000 MMK monthly income ranging from 100,000 MMK as minimum and 600,000 MMK as maximum. Most respondents (77.6%) lived in the ward for more than ten years, (84.9%) had less than five family members in the household (HH), and (74.8%) had less than one child under 15 years of age.

Source of information about DHF and respondents' knowledge about preventive practices of DHF

When asked from which source the participants sought information about DHF, the majority received the information from health talks (63.2%) and healthcare personnel (39.8%) (Table 2).

Table 3 presents the percentage of respondents who could answer correctly under each question about DHF knowledge.

Only (7.3%) correctly identified the pupa as the last stage in the *Aedes* mosquito's life cycle about the dengue vector's origin. Regarding the question about the causal vectors of dengue fever (74.3%) provided accurate information. Similarly, questions related to the cause of dengue fever, (59.2%) correctly identified mosquitos breeding in stagnant, clean water. Data collectors asked the question regarding dengue vectors' behaviour of daytime biting, the respondents (87.6%) provided the correct response. Regarding the vulnerable group for dengue fever being children under 15, (89.4%) of the total participants contributed an accurate response. Interviewers received the correct answer from study participants (98.2%) about the causal link of DHF with the rainy season.

Table 1: Sociodemographic characteristics of the respondents (n=218).

Characteristics	Frequency (n)	Percentage
Age (years)		
18-24	34	15.6
25-40	74	33.9
>40	110	50.5
Mean±SD	40.67±13.25	
Min–max	18-70	
Gender		
Male	70	32.1
Female	148	67.9
Current marital status		
Single	142	65.1
Married	56	25.7
Divorced/separated	5	2.3
Widower/widow	15	6.9
Education		
Graduate	28	12.8
High school	84	38.5
Middle school	73	33.5
Primary school	28	12.8
Able to write/read	5	2.3
Main job		
Government employee	10	4.6
Private employee	47	21.6
Business owner	38	17.4
Dependent	88	40.4
Others	35	16.1
Household monthly income (MMK)		
<300,000	164	75.2
≥300,000	54	24.8
Mean±SD	290872±106419	
Min–max	100,000–600,000	
Duration of stay in the ward (years)		
<5	33	15.1
6-10	16	7.3
11-20	67	30.7
>20	102	46.8
Mean±SD	23.5±14.92	
Min–max	2-64	
Number of family members in the household		
<5	185	84.9
5-10	33	15.1
Mean±SD	3.94±1.494	
Min–max	0-9	
Number of children <15 years		
≤1	163	74.8
2-3	50	22.9
>3	5	2.3
Mean±SD	0.87±1.061	
Min–max	0-5	

1,300 MMK~1 USD, SD: standard deviation, min: minimum, and max: maximum.

Table 2: Sources of information about dengue haemorrhagic fever (DHF).

Source of information about DHF	Frequency	Percentage
Social media	15	8.8
Poster	24	14
Journal	8	4.7
Health talks	108	63.2
Health care personnel	68	39.8
Newspaper	18	10.5
Neighborhood	30	17.5

Study participants (92.2%) correctly identified the presence of fever and red spots on the skin as indicative of positive dengue fever. When queried about an additional symptom of dengue fever, (93.1%) of participants correctly recognised coffee ground vomitus as a symptom in DHF patients. The present study revealed that (94%) of respondents correctly answered that dengue fever is transmitted through the bite of an infected mosquito. The respondents (96.3%) recognised that avoiding mosquitoes to reduce human-vector contact is crucial in diminishing dengue transmission. Most respondents (94%) indicated that destroying mosquito breeding sources is the most effective preventive measure against DHF.

Regarding the preventive knowledge of dengue fever, (92.2%) answered that dark places such as under tables, cupboards, chairs, and hanging clothes are common resting sites for dengue mosquitoes in their homes and residences. When interviewers inquired about knowledge of larva control measures, the largest group of respondents (89.4%) replied that changing water in flower vases weekly in their homes is essential for larva control. Additionally, respondents (97.7%) stated that covering domestic water storage is also a method of larva control. Adding abate to uncovered overhead tanks is a recommended preventive practice for larva control, most respondents (93.6%) gave correct answers.

Table 3: DHF knowledge among participants (n=218).

Correct awareness of DHF prevention among participants (n=218)	Frequency (N)	Percentage
1. The last stage in the life cycle of a mosquito	16	7.3
2. *Aedes* are the kind of mosquito vector for DHF	162	74.3
3. The vector breeds in stagnant, clean water	129	59.2
4. Dengue vector is daytime biting	191	87.6
5. DHF vulnerable group is children under 15 year	195	89.4
6. DHF cases are mostly seen in the rainy season	214	98.2
7. Fever with red spots on the skin	201	92.2
8. Patient with coffee ground vomitus	203	93.1
9. Transmitted by infected mosquito bite	205	94
10. Avoiding mosquito bites will prevent dengue infection.	210	96.3
11. Mosquito breeding sources destruction is the most effective way of preventing DHF	205	94
12. The resting sites of mosquito is dark places under tables, cupboard and chairs, hanging up clothes	201	92.2
13. A good larva control measure is changing the water in the flower vases one time per week	195	89.4
14. One Preventive measure vector is covering the domestic water storage	213	97.7
15. Uncovered overhead tanks should be added with abate powder	204	93.6

Table 4 provided information about the knowledge level of Dengue Fever among respondents. The level of knowledge was categorised into three groups based on a number of correct answers from the 15 questions that assess DHF knowledge in Table 3. A high level of knowledge indicates that respondents provided more than 11 correct answers. A moderate level of knowledge signifies correct responses ranging between 8 and 11, while a low level indicates less than eight correct answers. In this survey, (n=176, 80.7%) demonstrated a high level of knowledge about dengue haemorrhagic fever. In contrast, (n=42, 19.3%) exhibited insufficient knowledge levels (moderate and low) about DHF.

The association between sociodemographic characteristics and knowledge levels among participants

Table 5 presents the association between sociodemographic characteristics and the level of DHF knowledge. Chi-square test showed that there was a significant association between education and DHF knowledge levels among the participants (p value=0.024).

Further, a statistically significant was observed among gender (p value=0.043) and knowledge levels regarding DHF at p value <0.05.

Table 4: Knowledge level of DHF among respondents.

Knowledge level of respondents	Frequency	Percentage
Low knowledge <8	8	3.7
Moderate knowledge 8-11	34	15.6
Good knowledge >11	176	80.7

Grouping by Bloom's taxonomy theory, good level: ≥80% of the total score; poor level: <80%

Table 5: The association between sociodemographic characteristics and knowledge levels among participants.

Descriptions	Good		Poor		P value
	N	%	N	%	
Age (years)					
18-24	26	76.5	8	23.5	
25-40	61	82.4	13	17.6	0.765
>40	89	80.9	21	19.1	
Gender					
Male	51	72.9	19	27.1	0.043*
Female	125	84.5	23	15.5	
Marital status					
Single	116	81.7	26	18.3	0.625
Married	60	78.9	16	21.1	
Education					
High school and above	97	86.6	15	13.4	0.024*
Middle school and below	79	74.5	27	25.5	
Occupation					
Employed	79	83.2	16	16.8	0.425
Unemployed	97	78.9	26	21.1	
Monthly family income (MMK)**					
<300,000	130	79.3	34	20.7	0.339
≥300,000	46	85.2	8	14.8	

**1,300 MMK~ 1USD; degree of freedom for chi-square test = 1; *significance at p<0.05.

DISCUSSION

Just over half of the participants (50.5%) were aged over 40 years, while nearly half of the respondents (49.5%) fell within the age range of 18 to 40 years. The participants' average age in the study was 40.67 years (SD±13.25). Similarly, a study conducted in Cambodia reported that participants' ages ranged from 17 to 88 years, with an average age of 33.9 (SD±11).[7] In contrast, a dengue study conducted in the Philippines in 2013 mentioned that the majority of respondents (60.99%) were in the younger age group of (18-23) years out of a total of 394 participants.[8]

In Yangon, the male and female population (≥18 years) is 46% and 54%, respectively; however, in our study, around two-fifths of the participants (67.9%) were females, more than twice the number of male participants (32.1%) according to 2014 Population Census in Myanmar.[4] This is because females often took on the role of family caretakers and were available at home when the interviewers went and invited them to participate in the study. Similarly, a knowledge, attitude, and practices study conducted in Indonesia in 2018 revealed that nearly three-quarters of the participants (n=428, 70.3%) were females.[9]

More single participants (65.1%) than married participants (34.9%) were involved in this study. This marital status pattern was reversed to the percentage of Yangon's general population's marital status, which is much more married (64%) than single (36%).[4] Over half of the respondents (51.3%) had attained an education level above high school. This study's percentage distribution in educational level is the same as Yangon general population's education, which is around 50% each in higher-level education (high school and above) and lower-level education (below high school).[4] Similarly, an Indian study conducted by Basole et al in 2017 indicated that out of 400 study participants, just under one-third (n=127, 31.75% of the total) had higher levels of education.[10]

The largest participants (63.2%) received information about DHF through health talks by health volunteers and community health workers. This could be because there is reduced donor and community interest in Myanmar's Dengue Prevention and Control Program. The social media and electronic media about DHF information need to be efficient and effective to raise awareness of the disease. Similarly, a study conducted by Mayfong et al in Laos between 2009 and 2012 found that healthcare workers were the primary source of dengue information, accounting for (36.9%).[11]

Only (7.3%) correctly identified the pupa as the last stage in the life cycle of the Aedes mosquito in the current study. This could be attributed to the fact that most respondents were aware that the larva stage is the sole phase in the life cycle of Aedes mosquitoes. Nearly half of the respondents (n=89, 40.8%) incorrectly identified mosquito breeding places. A quarter of the respondents (n=56, 25.7%) provided inaccurate information about Aedes mosquitos as the causal vectors of dengue fever. Regarding dengue vectors' behaviour of daytime biting, (n=27, 12.3%) provided the incorrect response. This might be because most respondents are aware of the *Anopheles* mosquito-causing malaria disease information through their mobile phones and television.

Our study showed that there was a significant association between the education and knowledge levels of DHF prevention. Few participants, especially those with a low formal education level, lack satisfactory knowledge. Females tend to have better knowledge of DHF prevention than their male counterparts since there was a significant association between gender and knowledge levels of DHF prevention.

A similar study conducted in Indonesia mentioned that higher levels of formal education were associated with better knowledge of DHF. Specifically, individuals pursuing a diploma were almost seven times more likely to have good knowledge than illiterate individuals, and those with a higher education level were nearly fourteen times more likely to possess better understanding than those without formal education.[9]

The current study was conducted in 4 wards out of 21 wards in Insein Township. Although the study was conducted in systematic ways, some bias will be present due to the time constraint and design effect of the cross-sectional study. The findings from the present study had limited generalization for the entire population of Yangon residents in Myanmar. The relationship found in this study can be expressed as an association between each variable. Further qualitative study will be required to explore the barriers and challenges to the preventive practices of DHF.

CONCLUSION

The participants had good levels of knowledge, but insufficient knowledge of preventive practices of DHF was noted. Moreover, education and knowledge levels of DHF prevention had a significant association. Mass campaigns using electronic and printed media are needed to spread awareness of DHF. Health promotion programs should focus more on correcting incorrect knowledge and improving prevention strategies to enhance vector control and personal protection within the community.

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