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Original Article

Household-Based Survey on Knowledge, Attitudes, and Practices towards Dengue Infection and Prevention in a Semi-Urban Area (Ja-Ela MOH Area)

Walgampolage Layoma Sharmini Perera[1,2], Pathirage Kamal Perera[3], Chatura Wijesundara[4], Anjana Mihiranga Ambagahawita[4], Sanuri Uththama Fernando[1], Supun Udara[1,5], Kalpani Omantha Bandaranayaka[5*]

[1]Management and Science Institute, Colombo, Sri Lanka
[2]Management and Science University, Selangor, Malaysia
[3]Institute of Indigenous Medicine, University of Colombo, Sri Lanka
[4]Ministry of Health, Colombo, Sri Lanka
[5]The Open University of Sri Lanka, Nawala, Nugegoda, Sri Lanka

Abstract

Introduction: Dengue is the most prevalent infectious mosquito-borne viral infection in the world. Over time dengue has caused high mortality and morbidity.

Methods: A cross-sectional study was conducted to assess the level of knowledge, attitude, and practice among 510 residents of Ja-Ela MOH area using an interviewer-administered questionnaire. Ethical clearance was obtained from the National Institute of Health Science Kalutara.

Results: The majority (50.8%) of the respondents were females, and the mean age of the sample was 43.7±16.7 years. The study results showed that 56.5% (n=288), 52.9% (n=270), and 50.7% (n=257) of the sample had good knowledge, attitudes, and practices (KAP) towards dengue prevention, respectively. Good knowledge is significantly associated with 41-60 years of age (odds ratio [OR]=2.513, $P<0.001$), secondary education or higher (OR=1.857, $P=0.008$), and a monthly income of LKR 20000–40000 and more than 40000 (OR=0.477, $P=0.016$; OR=0.440, $P=0.015$). Non-Sinhalese nationality (OR=0.180, $P=0.033$) was associated with poor levels of knowledge. Good attitudes towards the prevention of dengue were found in males (OR=2.095, $P=0.001$), unemployed individuals (OR=1.759, $P=0.018$), and individuals with a monthly income of <LKR 20000 (OR=2.393, $P=0.001$). Poor practices towards dengue prevention were found in other nationalities compared to Sinhalese (OR=0.104, $P=0.001$) while Roman Catholics had poor practices towards dengue prevention (OR=0.677, $P=0.041$). The study shows that the experience of dengue is positively associated with better attitudes towards dengue prevention (Mann-Whitney U test; $P<0.001$).

Conclusion: KAPs were not significantly correlated with each other. Targeted health education and promotion programmes provided for specific populations should be considered a priority activity.

Keywords: Dengue, Knowledge, Attitude, Practices, Sri Lanka

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Introduction

Background

Dengue is the most prevalent arboviral disease in the history of humankind (1). It is considered one of the most infectious mosquito-borne viral infections (2) and has caused 5.2 billion infections in 2019 (3). Urbanization, international travel and trade, surging human population, and inadequacy of control strategies are some of the determinants of morbidity and mortality of Dengue (4).

Dengue poses a significant health burden as a vector-borne disease in Sri Lanka. Epidemiological surveillance indicates that two annual peaks are experienced usually from May to August and November to February (5). The association between humidity and temperature seen during the above-mentioned period which coincides with the monsoonal rains in the country triggers the feeding activity, survival, and development of the vectors (6). In the year 2020, a total of 31162 dengue cases were reported while in 2021, 12246 dengue cases have been reported to the Epidemiology Unit from the whole country up to September 15. More than a quarter of the dengue cases reported in 2020 (28.02%) were from the Western province. Gampaha district, which is located in the Western province, had the third highest incidence in 2020. In 2017, a total of 186101 patients were reported from the country, with the second highest incidence being from Gampaha district with 31647 cases.

*Corresponding Author: Kalpani Omantha Bandaranayaka, Email: kalpanee.b@gmail.com

Justification

Every year the Western province has the highest number of dengue patients while Gampaha district is one of the most affected districts in the country.

Considering local research, a study conducted in a suburban city in Gampaha district (n = 150) shows that only 50% of the participants had satisfactory knowledge, while satisfactory attitudes and good practices towards dengue were seen in 37% and 81%, respectively (7). The study also concluded that the community is highly engaged in educational intervention programmes conducted and has resulted in a significant positive impact on the knowledge and practices of the study participants. Another study conducted in a suburban community in Colombo District revealed that 58% (n = 202) of the participants in Sri Lanka had "satisfactory knowledge" about the symptoms, management, and transmission of dengue. Further, 37% of the participants showed "satisfactory attitudes" while 85% showed "good practices" towards dengue control and prevention (8). Another recent study done in Kandy district (n = 200) revealed that good awareness was seen among 40% of the participants in four MOH areas except for Kundasale area (9). Moreover, the study reports a low level of knowledge about "morphological features", "life cycle", "active time of dengue vectors" and a low level of practice towards "community participation in the prevention of the disease". In contrast, a higher level of knowledge was recorded in terms of major vectors, preventive measures, and breeding habitats (9). A very recent study from Gampaha (n = 2194) district conducted among school children showed that 2.9% of the students had "excellent", 46.3% had "good" and 42.6% had "moderate" knowledge with limited awareness of "control and prevention practices", and "symptoms and patient care" (10). Following the awareness assessment, the research team conducted an awareness intervention and had a post evaluation. The post evaluation showed a significant increase in awareness, suggesting that implementing awareness programmes among school children can be used as a tool for dengue control, especially in areas with high dengue incidence.

Knowledge, attitudes, practices, and demographic factors have been identified as key determinants of the transmission of dengue around the world (9). Therefore, the present study was conducted to characterize the demographic and socio-economic factors and KAPs (knowledge, attitudes, and practices) status of a selected community in Gampaha district of Western Province, where a high dengue incidence is recorded yearly in Sri Lanka.

Materials and Methods

Study Area

The study setting was the Ja-ela MOH area in Gampaha district. It has a population of 201 521 with an area of 64 km^2. In the Ja-Ela MOH area, there were 51736 family units according to the Department of Census and Statistics in 2013.

Calculation of Sample Size

The sample size was determined using the formula proposed by Lwanga and Lemeshow (1991).

$n = Z^2P\ (1\text{-}P)\ /d^2$

The confidence level was set at 95%, the critical value was taken as 1.96, and the variation expected for the anticipated level of knowledge with a 95% confidence interval was set at 5%. Although several studies have been conducted to assess KAP on dengue in Sri Lanka, the prevalence of poor KAP is highly variable across different studies. Therefore, the prevalence of poor knowledge was considered to be 50% by maximizing the sample size.

Applying the decided values to the equation below the sample size was calculated as 384.

$$n = (1.96 \times 1.96 \times 50 \times 50) / 5 \times 5 = 384$$

With probability proportionate to size, two-stage cluster sampling method was used and the loss of effectiveness by its use was accounted for by considering a design effect of 1.2. Therefore, the sample size adjusted for cluster sampling was calculated to be 460, with an added non-response rate of 10%, and the final sample size was calculated to be 506, which was rounded to 510.

Sampling Technique

The study was a community-based descriptive cross-sectional study. Residents aged 18 years and above in Ja-ela MOH area at the time of data collection were included in the research. Data collection was done for a 12-month period from February 2017 to January 2018.

Probability proportionate to size, a two-stage cluster sampling method, was employed as the sampling technique for this study. The first stage was the selection of primary sampling units from the overall area. Ja Ela MOH area consists of 31 Public Health Midwife (PHM) areas. A PHM area was considered a cluster; therefore, the sampling frame was the population list of all 31 PHM areas in Ja-Ela MOH area. All PHM areas were listed alphabetically, and their respective populations and cumulative populations were calculated for the compiled list.

With the expectation of completing the data collection of one cluster in one day, the number of study units to be recruited from a cluster (cluster size) was limited to 30. Therefore, the number of clusters (PHM areas) selected for the study was 17. The sampling interval to select the clusters to be included in the study was calculated by dividing the total population in Ja-Ela MOH area (N = 201 521) by the required number of clusters (n = 17), which was equal to 11 854. Next, a random number between 1 and the sampling interval, which was of the same number of digits as the sampling interval, was generated (n = 10 320). The PHM area which had a cumulative population equal to or greater than the generated random number was selected

as the first cluster. The subsequent clusters were selected by the addition of a sampling interval together with the random number and selecting the PHM areas with cumulative populations equal to or greater than the result. This process was continued until the desired number of clusters (n = 17) was selected.

The second stage of the sampling to select the required number of households (n = 30) from the primary sampling units was done using an area-based method. The list of voters of each PHM area was utilized to select a random starting point (index house) of a particular PHM area. Firstly, a page of the list of voters of the Grama Niladhari (GN) division was selected randomly. Next, a pin was dropped on the selected page, and the name closest to the pin head was selected. The selected house was visited to see whether those fulfilling inclusion criteria were available. Thereafter, consecutive houses of the same road/street on the right-hand side of the first house (when facing the entrance) was visited in search of eligible participants. If a junction was reached, the final digit of a Sri Lankan currency note was taken, and the number was divided by four. Based on the balance value, the direction to follow was selected as 0 = North, 1 = East, 2 = South, and 3 = West. This process was continued until 30 eligible participants were recruited from a PHM area.

If more than one eligible participant was present in a particular household, one person was selected using a Kish selection table (Goodman and Kish, 1950). Households were visited during the daytime. When selected subjects were unavailable for the interview, they were visited again at a pre-scheduled time which was convenient for the participants. If the participant was unavailable after two visits and if there were no other adults matching the inclusion criteria, he/she was considered a non-respondent.

Study Instrument

A pre-tested interviewer-administered questionnaire was used. It was developed in the English language and then translated into Sinhala and Tamil languages. The questionnaire was validated through expert opinion. The questionnaire consisted of 5 categories: (a) socio-demographic and economic factors, (b) Knowledge about dengue and prevention, (c) attitudes towards dengue and its prevention, (d) practices towards dengue prevention, and (e) checklist to access practices.

Data Processing and Statistical Analysis

Primary data were entered into Microsoft Excel 2007 and exported into Statistical Package of Social Science (SPSS) for windows version 21.0 (SPSS Inc., Chicago, IL, USA). The levels of KAPs were considered as dependent variables while the independent variables were the variables in part A of the questionnaire. Scores obtained for individual questions on KAPs were summed to obtain a total score for each category. Valid responses for the knowledge section were defined as "correct" (scored as "1") or "incorrect" (scored as "0") based on the current scientific knowledge according to the existing literature. Accordingly, the total knowledge score ranged from 0 to 47. Median splits were used in the division of the knowledge score into "Good" (17-29 scores) and "Poor" (30-42 scores) categories. Further, the knowledge is categorized as knowledge of dengue vector (maximum attainable score of 15), knowledge of dengue infection (maximum attainable score of 13), and knowledge of dengue infection control (maximum attainable score of 25) to assess the knowledge in specific areas. The attitudes questions were in the form of a 3-point Likert scale and were scored as 0, 1, and 2 with higher scores allocated for favorable attitudes, and the maximum total score was 18. Then, the attitude score was categorized as "Poor" (0-15 scores) and "Good" (16-21 scores) considering median . Three different scenarios were considered to assess attitudes towards dengue prevention. Scenario one is when there is no experience of dengue, scenario two is when there is a family member with suspected dengue having high fever, and scenario three is when there is a confirmed dengue patient in the household. The association of the experience of dengue with attitudes towards dengue prevention was assessed using the Mann-Whitney U test considering the above-mentioned categories where the level of self-experience increases in a scenario of "one" < "two" < "three". Practices were also assessed in a similar manner to attitudes through a 3-point Likert scale with a maximum score of 20. Then, the practice score was categorized as "Poor" (3-13 scores) and "Good" (14-18 scores) based on the median value. The checklist to assess practices was scored as "1" and "0" for "yes" and "no" answers, respectively, and a total score was calculated. Descriptive statistical measures were used to describe the level of knowledge, attitude, and practices. Multiple logistic regression was used to predict potential variables having an association with KAPs. Pearson correlation was used to assess the agreement between the practice score and the total score of the checklist to avoid response biases. A P value ≤0.05 was considered as significant.

Results

Demographic Profile of the Sample

Out of the total sample (n = 510), 50.8% were females (n = 259) (Table 1). The respondents were between 18-86 years of age and the mean age was 43.7±16.7 (Table 1). More than 95% were Sinhalese and 58% were Buddhists. About three quarters of the respondents had at least one child (76.7%). Out of the total sample, 73.3% had completed secondary education or higher (Table 1). Approximately half of the respondents were unemployed (51.4%). A substantial proportion (37.5%) of the respondents had a monthly income of LKR 20 000-39 999 while 20.0% of the respondents had no income at all (Table 1).

Table 1. Demographic Profile of the Respondents in Ja-Ela MOH Area

Variable	Percentage of sample (%) (n)
Gender	
Male	49.2 (251)
Female	50.8 (259)
Age group (y)	
18-40	50.8 (259)
41-60	29.0 (148)
>60	20.2 (103)
Nationality	
Sinhalese	95.5 (487)
Other	4.5 (23)
Religion	
Buddhism	58.0 (296)
Roman Catholic	39.2 (200)
Other	2.7 (14)
Having children	
No	23.3 (119)
Yes	76.7 (391)
Education	
No education or primary education	26.7 (136)
Secondary education or higher	73.3 (374)
Currently employed	
Yes	48.6 (248)
No	51.4 (262)
Income	
No income at all	20.0 (102)
<LKR 20000	18.0 (92)
LKR.20000-39999	37.5 (191)
LKR.40000 or more	24.5 (125)

Knowledge

When categorizing the knowledge, 31 was considered as the median, and in splitting the two categories, "Poor" were ones who obtained scores between 0-31 while "Good" were those who obtained scores between 32-42. Out of 510 respondents, 56.5% (n=288) had good knowledge while 43.5% (n=222) had poor knowledge. The mean total score was found to be 30.58±4.89 with a range of 17-42. The mean score of knowledge about dengue vector was 10.89±2.10 (range=3-13). The mean score of knowledge about dengue infection was 7.18±2.09 (range=2-11) while the mean score of knowledge about dengue prevention was 12.52±2.70 (range=4-20) (Figure 1).

Knowledge about Dengue Vector

Out of 510 respondents, only 10 (1.96%) were unaware that dengue is transmitted by mosquito bites, and 64.3% knew that *Aedes* is the causative vector of dengue. Three fourth of the respondents (75.1%) gave the correct answer for the usual biting time of *Aedes* mosquito and 73.5% of respondents were aware that *Aedes* mosquitos lay eggs in clean and stagnant water.

Knowledge About Dengue Infection

Respondents had fair knowledge about symptoms of dengue infection; in other words, 25.7% of the respondents were aware of at least 6 out of 9 symptoms and signs including high fever, chills, headache, eye pain, enlarged lymph nodes, deep muscle and joint pain, nausea and vomiting, loss of appetite, and extreme fatigue. Additionally, 99.6% (n=508) of the respondents knew at least two symptoms of dengue correctly. When inquired, 58.4% of respondents knew that dengue is a seasonal infection and 62.4% knew during rainy seasons, the number of cases increased.

Knowledge About Dengue Infection Control

Almost half of the respondents (49.8%) knew it is both the government and themselves who are responsible for preventing dengue transmission. However, only 24.1% acknowledged that they would seek immediate medical attention in the event of fever during a dengue outbreak.

Attitudes Towards Dengue

Out of 510 respondents, 52.9% (n=270) had good attitudes while 47.1% (n=240) had poor attitudes towards dengue and its prevention. The mean attitude score was 13.8±4.3 (Figure 2). Three different scenarios were included to assess attitudes towards dengue prevention. The mean score obtained for the first scenario was 2.6±1.2 and for the second scenario, it was 4.7±1.7, while a mean score of 5.1±1.4 was obtained for the third scenario having the highest mean score among the scenarios. In the three scenarios, the mean attitude score significantly increased with the increase of dengue risk among family members, making individuals have positive attitudes towards preventive measures when there are potential/confirmed dengue patients in the household (Mann-Whitney U test; $P<0.001$; Table 2).

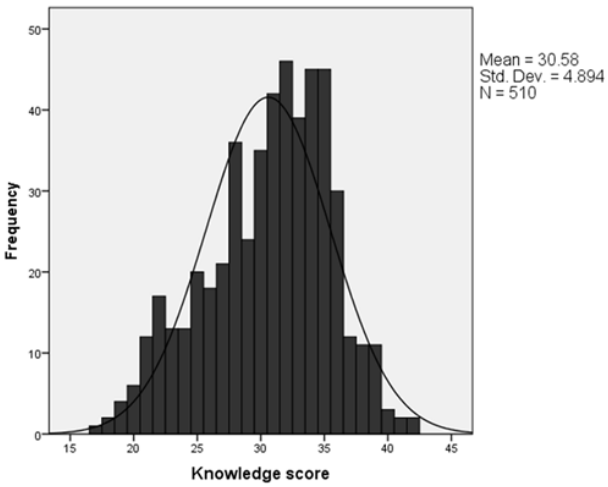

Figure 1. Total Knowledge Score of the Respondents in Ja-ela MOH Area.

Table 2. Association of the experience of Dengue With Attitudes towards Dengue Prevention (Mann-Whitney U Test)

Parameter	Mann-Whitney U Score	*P* Value
Scenario 1 vs. scenario 2	41002.5	<0.001
Scenario 2 vs. scenario 3	112785.0	<0.001
Scenario 1 vs. scenario 3	26497.0	<0.001

Scenario 1. when there is no experience of dengue.
Scenario 2. when there is a family member with suspected dengue having high fever.
Scenario 3. when there is a confirmed dengue patient in the household.

When respondents were asked whether they are confident that they could convince people to keep their surroundings clean during a normal season, the majority (53.3%) were moderately confident. Considering the same scenario, the respondents were inquired about their confidence to inform the local health authorities, and the majority (48.0%) were extremely confident. Moreover, 55.5% of the respondents were extremely willing to attend lectures about health promotion and education activities, while 13.7% were not at all willing to attend.

In the second section of the questionnaire, when the respondents were inquired whether they are willing to confidently inform a neighbor to remove the water container if they see a water container filled with mosquito larvae during a dengue outbreak in the village scenario, the majority (68.2%) of the respondents were extremely confident. During the same scenario where there is no dengue outbreak, the majority (60.6%) of the respondents were extremely confident that they could convince the neighbor to devote 10 minutes a week to search and destroy potential breeding sites in the surroundings. During the same scenario whether the neighbor refuses to destroy the container, 66.5% of the respondents were extremely confident of reporting them to the local health authorities.

When the same set of questions was inquired during the season when their village did not have a dengue outbreak but a nearby village had an uncontrolled dengue outbreak with one of the family members in the respondent's family having dengue fever, 73.7% of respondents were extremely confident of asking the neighbor to remove the water container.

Practice of Dengue Control

The mean practice score was 12.9±2.7. Out of 510 respondents, 50.4% (n=257) had good practices while 49.6% (n=253) had poor practices (Figure 3). The majority (59.6%) of the respondents tend to change the water in plant pot trays occasionally, and 34.3% willingly did it every week. The majority cleared the drain blockage occasionally (56.5%) and tightly covered all the water containers inside and outside the house (51.6%). When respondents were inquired how willingly they convince their children to always put garbage into closed bins, it was identified that 58.4% willingly did it. The majority of the respondents (81.6%) willingly visited a doctor immediately if they or their family members fall sick. Additionally, 53.7% of the respondents changed the water in the container under the refrigerator occasionally, only 32.4% did it willingly, and 13.9% of the respondents did not change it at all. Out of all respondents, 70.0% willingly allowed health authorities to inspect their houses at any time. However, 66.3% of respondents did not use larvicides in all unnecessary water containers.

To confirm the practices of respondents, a checklist was followed which consisted of a list of practice observations. According to the observed results, when checked for the presence of eggs and larvae in the environment, 446 (87.5%) households did not have breeding places while the remaining 64 (12.5%) households had larvae and eggs in plant pot trays. Even though most of the houses did not have suspected breeding sites, 20.4% of households did not change the water in plant pots while 38.0% did not cover all water containers. A considerable majority (68.0%) had closed garbage bins and 70.0% of the respondents have cleaned the water containers of the refrigerator recently. The use of Larvicides for the containers inside the house was followed only by 24.3% of respondents. More than

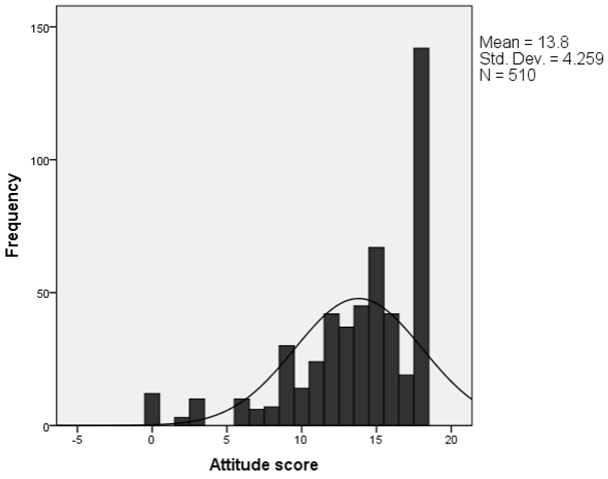

Figure 2. Total Attitude Score of Respondents in Households of Ja-ela MOH Area.

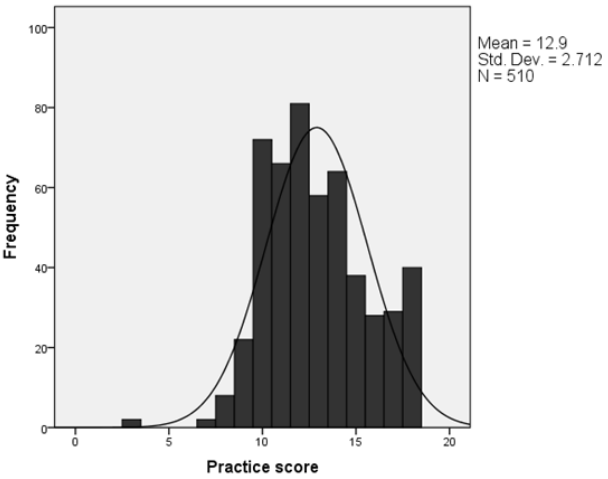

Figure 3. Total Score of Practice Regarding Dengue Prevention Activities of the Respondents in Households of Ja-ela MOH Area.

90% of households had at least one mosquito net at home (90.6%) and did not have plants which collect water in the leaf axilla (90.4%).

The checklist was used to reduce the response bias in the practice score. The maximum score one could obtain was 10 and the scores obtained by the participants ranged from 2 to 9. The mean score was 8.78. There was a positive correlation between practice scores and checklist scores.

Correlation between Knowledge, Attitude, and Practice

The results of Pearson correlation test indicated that there was a statistically significant correlation between knowledge and practice (r = 0.163, $P = 0.000$) as well as attitude and practice (r = 0.096, $P = 0.031$). However, knowledge and attitude were not significantly correlated (r = 0.065, $P = 0.145$).

Association between Knowledge, Attitude, Practices, and Socio-demographic Factors

Good knowledge is significantly associated with 41-60 years age group (OR = 2.513, $P < 0.001$), secondary education or higher (OR = 1.857, $P = 0.008$) and a monthly income of LKR 20000–40 000 and more than LKR 40 000 (OR = 0.477, $P = 0.016$; OR = 0.440, $P = 0.015$) (Table 3). Non-Sinhalese nationality (OR = 0.180, $P = 0.033$) was associated with poor levels of knowledge. Good attitudes towards the prevention of dengue were found in males (OR = 2.095, $P = 0.001$). Unemployed individuals had good attitudes (OR = 1.759, $P = 0.018$) (Table 3), and the individuals with a monthly income of < LKR 20000 had good attitudes (OR = 2.393, $P = 0.001$; Table 3). Poor practices towards dengue prevention were found in other nationalities compared to Sinhalese (OR = 0.104, $P = 0.001$) while Roman Catholics had poor practices towards dengue prevention (OR = 0.677, $P = 0.041$) (Table 3).

Discussion

This study revealed that the majority of the participants (56.5%) had good overall knowledge about dengue. This is consistent with other studies conducted in Sri Lanka (11) as well as other Asian countries (12-14). The majority of respondents (64.3 %) in this study were aware that *Aedes* mosquito is the causative vector of dengue infection. The same finding has been obtained by studies conducted in other countries (15,16). The ability to recognize symptoms and signs is important in the early

Table 3. Socio–Demographic Factors Associated With Knowledge, Attitudes, and Practice Scores

Socio–Demographic Factors Considered	Good Knowledge			Good Attitudes			Good Practices		
	OR	95% CI	*P* Value	OR	95% CI	*P* Value	OR	95% CI	*P* Value
Age (y)									
18-40	1.000			1.000			1.000		
41-60	2.513	1.536, 4.111	<0.001	1.111	0.692, 1.785	0.663	1.019	0.642, 1.619	0.935
>60	1.308	0.769, 2.216	0.322	0.655	0.385, 1.113	0.118	0.794	0.471, 1.336	0.384
Gender									
Female	1.000			1.000			1.000		
Male	1.218	0.789, 1.880	0.373	2.095	1.354, 3.242	0.001	0.468	0.965, 2.232	0.073
Employment status									
Employed	1.000			1.000			1.000		
Unemployed	1.356	0.852, 2.159	0.199	1.759	1.103, 2.805	0.018	1.910	1.215, 3.002	0.005
Monthly income (LKR)									
No income at all	1.000			1.000			1.000		
<20000	0.970	0.489, 1.922	0.930	2.393	1.227,4.667	0.010	0.693	0.516, 1.837	0.935
20000-39999	0.477	0.261, 0.873	0.016	1.012	0.595, 1.798	0.969	1.272	0.788, 2.473	0.253
40000 or more	0.440	0.226, 0.854	0.015	0.652	0.344, 1.238	0.191	1.210	0.373, 1.323	0.274
Educational status									
No education or primary education	1.000			1.000			1.000		
Secondary education or high	1.857	1.177, 2.928	0.008	1.511	0.963, 2.372	0.073	1.171	0.757, 1.812	0.479
Nationality									
Sinhala	1.000			1.000			1.000		
Others	0.180	0.037, 0.869	0.033	0.914	0.273, 3.056	0.884	0.104	0.028, 0.382	0.001
Religion									
Buddhist	1.000			1.000			1.000		
Roman catholic	0.891	0.603, 1.316	0.563	0.720	0.489, 1.059	0.095	0.677	0.465, 0.985	0.041
Others	6.040	0.983, 37.093	0.052	1.119	0.251, 4.998	0.883	0.717	0.233, 2.207	0.562

diagnosis of dengue infection, thereby minimizing the risk of complications such as dengue haemorrhagic fever (17). In the current study, participants had fair knowledge about the symptoms and signs of dengue; in other words, 25.7 % of the participants were aware of at least 6 out of 9 symptoms and signs and 99.6% knew at least 2 symptoms correctly. Studies from other Asian countries reported that about 80% of the people knew at least a single symptom of the dengue (13,18).

The majority of participants (62.4 %) in the present study were aware that during rainy seasons, the number of dengue infection cases increased, and 73.5 % knew that *Aedes* mosquitos lay eggs in clean and stagnant water. Same findings have been obtained by studies conducted in Malaysia (13) and Kandy, Sri Lanka (11). About half of the participants (49.8%) in the current study have taken the responsibility of dengue prevention on themselves while knowing it is a responsibility of the government too. One-third of the participants (35.5%) believed it is the responsibility of the government only. However, other studies indicated that more than half of the respondents thought it was their own responsibility at least partially, while < 10% thought of it as the government's responsibility (13,18,19).

In multivariate analysis, it was found that good knowledge about dengue infection was associated with being middle-aged (41-60 years), low monthly income, and being educated up to secondary level or higher. Being non-Sinhalese was associated with poor knowledge levels. Many studies revealed a significant association between knowledge of dengue infection and higher education levels (20,21). The relationship between good knowledge and a higher income has been established in other studies (22,23) while in the current study, the low income is significantly associated with good knowledge. Increased age was also found to be associated with good knowledge in a study conducted in Malaysia (21).

In the current study, 52.9% of the participants had a good attitude score. Males had significantly higher attitude scores than females ($P < 0.001$) reflecting the norm of male-headed households where the decision-making is done by the male (24,25). Having an education up to secondary level or higher and having a low income were also significantly associated with having high attitude scores, but this finding is not consistent with other studies (12,26).

Additionally, 50.4% of the participants had "good" practices. There was no significant difference in the mean practice scores between males and females. It may reflect the culture in Sri Lanka regarding sharing household responsibilities in the same manner for males and females. Participants with nationalities other than Sinhalese and Roman Catholics had poor practices. When considering practices, since the current study was an interviewer-administered questionnaire, there was a high possibility of providing socially desirable responses by the respondents. Therefore, the presence of the checklist was used to confirm the practices of respondents. Therefore, the checklist has minimized the bias and has given a chance of recognizing the realistic situation regarding practices towards dengue, especially the preventive measures.

Conclusion

The levels of "good" KAPs are seen in 56.5%, 52.9%, and 50.4% of the respondents, respectively. There was no significant correlation between KAPs. Further, it is noted that the experience of dengue is positively associated with better attitudes towards dengue prevention. Poor knowledge and practices are found among non-Sinhalese nationals who are the ethnic minorities in the country. Poor knowledge and attitudes are seen to be associated with low levels of education. Targeted interventions focusing on high-risk groups would be required to further strengthen the KAPs. The education of children through school-based activities should
be prioritized.

Authors' Contribution

Conceptualization: CR Wijesundara, KO Banadranayaka, PK Perera, AM Ambagahawita; Methodology: CR Wijesundara, KO Banadranayaka, PK Perera, AM Ambagahawita; Validation: CR Wijesundara, KO Banadranayaka, PK Perera, AM Ambagahawita Formal Analysis: WLS Perera, CR Wijesundara, KO Banadranayaka, PK Perera; Investigation: WLS Perera, CR Wijesundara, KO Banadranayaka; Resources: PK Perera, YMS UDARA, PSU Fernando Data Curation: WLS Perera, CR Wijesundara, YMS Udara, PSU Fernando; Writing—Original Draft Preparation: WLS Perera, YMS Udara, PSU Fernando; Writing—Review and Editing: CR Wijesundara, KO Banadranayaka, PK Perera; Visualization: WLS Perera, CR Wijesundara, KO Banadranayaka, PK Perera; Supervision: CR Wijesundara, KO Banadranayaka, PK Perera; Project Administration: KO Banadranayaka; Funding Acquisition: N/A as self funded by the first author

Conflict of Interests

In this study, we declare that we have no conflict of interests.

Ethical Issues

Ethical clearance was obtained from the Ethics Review Committee of the National Institute of Health Sciences (ERC no: NIHS/ERC/17/03-R). Information sheet was provided with all the necessary information for the participants. Participants were given the opportunity to ask questions and clarify doubts. Participants had the right to withdraw from the study at any time during the interview without giving reasons. Informed written consent was obtained prior to the administration of the questionnaire.

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