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Awareness of Children on Dengue Fever in the Core Shelters of Tuguegarao City, Cagayan, Philippines

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Abstract

Dengue is the most rapidly spreading vector-borne disease, caused by a virus that is transferred by mosquito bites in all tropical and sub-tropical climates. The Philippine Department of Health records hundreds of thousands of dengue cases each year and has proclaimed dengue outbreaks several times, with children aged 6-11 being the most vulnerable. The goal of this study was to evaluate the awareness of dengue fever among children in Tuguegarao City's three core shelters, which are located in Barangay Annafunan East, Cataggaman Pardo, and Namabbalan. Data from 103 children from the core shelters were collected using a descriptive study methodology and interview-guided questionnaires. The following categories are included in the questionnaire: awareness of dengue signs and symptoms, transmission, and prevention and control. Statistical analysis was performed on the data utilizing frequency and percentage distributions, along with Cramer's V. The participants were not aware of dengue fever in all categories, according to the results. It also revealed that there is an association between profile variables and dengue awareness. As a result of these findings, the study recommends initiating programs for mothers in educating them to help their children prevent dengue fever, drainage mapping can be used to reduce mosquito breeding sites and also to the children through seminars and the distribution of IECs to increase their understanding of dengue signs and symptoms, modes of transmission, and prevention, also This would provide children in the core shelter areas with information on how to protect themselves against dengue, lowering the prevalence of dengue among children.

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Introduction

Dengue Fever is a disease caused by a virus spread through mosquito bites, specifically by the Aedes aegypti mosquito, standard in all tropical and sub-tropical regions. The disease generally lasts less than a week to develop, it can be asymptomatic in several cases, and in several countries, it has become a significant cause of disease and death, mainly in children.

In recent years, dengue fever has become the most significant vector-borne viral disease of public health importance, particularly in tropical and subtropical countries. It is the fastest spreading vector-borne disease in the world endemic in 100 countries, and among the 10 Association of Southeast Asian Nations (ASEAN), the Philippines ranks fourth (4th) in the number of dengue cases globally to date.

According to the European Center for Disease Prevention and Control (ECDC), the Philippines is one of the five other countries with the most cases worldwide. Dengue is not new to Filipinos as it has been ravaging the country each year all year round.

The Department of Health (DOH) has already recorded hundreds of thousands of dengue cases each year and has already declared dengue outbreaks countless times, notably in 2012, which had a total of 187,031 cases and in 2019, which had a total of 430,282 dengue cases—the worst outbreak in the country which prompted DOH to declare dengue as an epidemic. Meanwhile, in Region 2, from January 1 to August 31, 2019, dengue cases have increased to 10,982 cases and 59 deaths, compared to 6,701 cases and 18 deaths in the same period of the year 2018.

As the COVID-19 pandemic entered the scene in early 2020, the only silver lining to public health was a significant drop in dengue cases from 2019's 430,282 cases to 2020's 59,675 cases which recorded a 78% drop in the death rate from 2019 to 2020. However, despite this sudden drop in cases, these cases remain crucial since it was reported that most children aged 6-11 still have been diagnosed with dengue. Amando Parwan (2020), has highlighted that children are particularly susceptible to dengue because they have weaker immune systems than adults. Also, home quarantines and lockdowns have contributed significantly to these cases; as stated by the study, people who stay home more are exposed to the dengue mosquitoes breeding in the neighborhood—these breeding grounds include ornamental plants, stagnant water, open drainage, and others. Furthermore, a new study with the International Centre for Diarrheal Disease Research identifies various household and community-level risk factors that increase the risk of dengue fever virus infection. Children older than six years of age are more likely to be infected by this mosquito-borne pathogen.

This may be connected to spending more time in places with possible mosquito breeding grounds as they go out playing.

The Philippines' Department of Health (DOH) has already reported a total of 8,110 dengue cases as of March 2022, including 51 deaths. In Tuguegarao City, Barangays Cataggaman Pardo, Anaffunan East, and Namabbalan had a constant increase in dengue cases in 2015-2019 and 2020-2021; most cases are in the ages below 12 years old. There are still more cases of dengue to be recorded as the country braces for the monsoon season. Furthermore, a study conducted by Capili *et al.* (2020), reveals that core shelters are areas in the city that are frequent with flooding, untidy surroundings, and the presence of tall grasses that may aggravate the dengue situation.

Hence, this study aimed to evaluate the existing awareness of dengue among a selected group of children, and the results of this study will be the basis for intervention-like programs for increasing awareness among children in the locale. Further, it will be the basis for creating programs and policy briefs for dengue prevention in children. Furthermore, the study results would be valuable to decreasing the dengue incidence through public awareness, especially for those who are most vulnerable: the children

Methodology

Research design

This study employed a descriptive correlational design as it determined the association between the profile variables and the awareness of dengue fever. The design was utilized to investigate the nature of the relationship between and among variables to examine whether a change in one or more variables is related to the change in another variable/s (Walker, 2005).

Respondents

The respondents of the study were 103 children who are in 6-11 years of age in the core shelters of Tuguegarao City specifically 45 in Annafunan East, 26 in Cataggaman Pardo, and 32 in Namabbalan. Of these respondents, 47% are female and 53% are male. The majority of them are between the ages of 9-11 years old Children under five years old and 12 years old above and those children with disabilities are being excluded from the study.

Locale of the study

The sites of this study were the three core shelters located in Barangay Annafunan East, Cataggaman Pardo, and Namabbalan of Tuguegarao City in the province of Cagayan. The locale of this study is based on the results of the study conducted by Capili *et.al.* (2020) where they found out that there are several cases of dengue in the core shelters in Tuguegarao City. Furthermore, these areas in the city are known to be flood-prone all year round; swamps and marshy areas aggravate the dengue situation.

Research Instruments

The questionnaire used in this study was patterned from the study by Labrague & Yboa (2013) and was subjected to the standard validation and pilot-testing methods. It was also tested for internal consistency (reliability) using Cronbach's alpha test [α>0.71] prior to the use of the questionnaire. The result of Cronbach's alpha was 0.722, thus proving the questionnaire reliable. The questionnaire was translated into the respondents' local language to facilitate a better understanding of the questions among the respondents.

The first section of the questionnaire is about the demographic, occupation of the parent/guardian, history of dengue profile, and the sources of information of the respondents. The second section was done by asking YES/NO questions concerning the disease's signs, and symptoms, transmission, and prevention and control.

Data gathering procedure

The letters were sent to the Barangay Captains of the core shelters is given to ask permission to conduct the study. Further, to assist and support the researchers in the conduct of the study such as seeking the help of the barangay health workers of the corresponding shelter during the study.

Ethics Clearance was sought from R2TMC before the conduct of the study. The Inter-Agency Task Force (IATF) protocol guidelines were strictly followed in data collection, and the researchers have undergone an RT-PCR test before going to the core shelters. The informed consent was sought from the Legally Authorized Representative (LAR). A parent or legally authorized representative of each child shall provide the necessary consent for the participation of the child. Aside from the informed consent sought from the LARs, assent from minors are also be obtained to participate in the study without coercion. The child was asked verbally if he/she agrees to participate in the study; For children age 6, no formal assent was done as long as there is no manifestation of dissent and for children 7-11 years old, a verbal assent would be asked and documentation of the verbal assent was done in the form of a written description of the process and witness. The respondents freely granted informed consent after the researchers have explained the nature and aim of the study, and strict confidentiality was maintained throughout the study. A guided questionnaire interview was done at the respective homes of the randomly selected children together with their BHWs *(Barangay Health Workers)* and LAR (*Legally Authorized Representative*). Before the actual interview, the

researchers made sure that the participants and their parents are wearing PPE (*Personal Protective Equipment)* such as face masks and face shields. In case the participant and/or the parents are not wearing PPEs, the researchers provided for them. Next, the researchers took their temperatures and sprayed their hands with alcohol—before and after the interview. The researchers first explained the nature and purpose of the study to the parents/LAR as the Informed consent was voluntarily given to them. Once the parents' consent form is signed, the researchers also explain the nature and purpose of the study to the children and inform them that strict confidentiality is assured throughout the conduct of the study. The researchers asked the parents to stay and assist the researchers to guide their children for further clarification of questions and for the establishment of comfort in answering. The interview started with the researcher's self-introduction, followed by the profiling of the participants and asked questions about their awareness of dengue. The researchers also showed some relevant pictures to the participants for them to visualize and understand each question that was asked. The questionnaires were checked for completeness and consistency. And then, the researchers analyzed and interpreted the data.

Data analysis

Frequency and percentage distribution were used to present the profile of the respondents in terms of demographic profile, socio-economic profile, history of dengue profile, sources of dengue information and to assess the awareness of the respondents on dengue. Cramer's V was used to quantify the association between two variables (*profile variables and the dengue awareness)* that are nominal and cannot be ordered (*or are not measured or treated as ordered*). Therefore, it is suited to determine the significant relationship between the profile of the respondents and their awareness of dengue. It ranges from 0 to 1;0 indicates no association and 1 indicates perfect association. V of 0-1-0.3 is a weak association, 0.4-0.5 is a medium association, and greater than 0.5 is a strong association. Chi-square Test was used for the relationship between unpaired variables that are nominal. A *p*-value of lesser than 0.05 means that there is a significant relationship between variables. The analysis was run using Stata version 14 software.

Results

Table 1 shows the frequency and percentage distribution of the profile variables in terms of their dengue awareness of signs and symptoms. It reveals that both sexes (female; 36=75% male; 4=74%) and most of the respondents in each core shelter are not aware of the dengue signs and symptoms. Both ages 6-8 years old and 9-11 years who are in Grades 4-6 are also not aware. The majority of the respondents who didn't have a history of dengue; and whose sources of dengue information came from Institutions; also, whose parents/guardians are self-employed are not aware. It was also revealed that there is a moderate association between awareness of dengue signs and symptoms and the core shelter location with a Cramer's V of 0.3211 and degrees of freedom = 2. At a 95% level of significance, there is sufficient evidence that there is a link between the two variables (p=0.002). Table 2 shows the frequency and percentage distribution of the profile variables in terms of their dengue awareness transmission. It reveals that both sexes (female; 35=72% male; 43=78%) and from the three core shelters, respondents who live in Annafunan East and Cataggaman Pardo are not aware of the dengue signs and symptoms. Both ages 6-8 years old and 9-11 years who are in Grades 4-6 are also not aware. Majority of the respondents who didn't have a history of dengue; and whose sources of dengue information came from Institutions; also, whose parents/guardians are self-employed are not aware. It was also revealed that there's a strong association between awareness of dengue transmission and core shelter location with a Cramer's V of 0.5372 and degrees of freedom = 2. There's also a weak association between awareness of dengue transmission and occupation of the parent (Cramer's V of 0.2929 and degrees of freedom = 2) and also between awareness of dengue transmission and history of dengue (Cramer's V of 0.2024 and degrees of freedom = 2).

Table 1. Cross-tabulation of profile variables and awareness of dengue signs and symptoms.

Variables	Aware	Not aware	Cramer's V	*p*-value
Sex			-0.0052	0.958
Female	12 (25.00)	36 (75.00)		
Male	14 (25.45)	41 (74.55)		
Core shelter location			0.3211	0.002*
Annafunan East	4 (7.69)	48 (92.31)		
Cataggaman Pardo	8 (24.24)	25 (75.76)		
Namabbalan	14 (38.89)	22 (61.11)		
Age, in years			0.1331	0.177
6-8	13 (32.50)	27 (67.50)		
9-11	13 (20.63)	50 (79.37)		
Grade level			0.1331	0.177
1-3	13 (32.50)	27 (67.50)		
4-6	13 (20.63)	50 (79.37)		
Occupation of the Parent			0.1400	0.365
Blue-collar worker	15 (31.25)	33 (68.75)		
Self-employed	10 (19.23)	42 (80.77)		
Unemployed	1 (33.33)	2 (67.77)		
History of dengue			-0.0510	0.605
Yes	8 (22.22)	28 (77.78)		
No	18 (26.87)	49 (73.13)		
Sources of information			0.5049	0.777
Digital Media	9 (24.32)	28 (75.68)		
Institutions	11 (23.40)	36 (76.60)		
Others	6 (31.58)	13 (68.42)		

*significant at alpha=0.05.

Table 3 shows the frequency and percentage distribution of the profile variables in terms of their dengue awareness prevention and control. It reveals that the majority of the respondents are male (48=81%) and from the three core shelters, respondents who live in Annafunan East and Cataggaman Pardo are not aware of dengue prevention and control. Both ages 6-8 years old and 9-11 years who are in Grades 4-6 are also not aware. The majority of the respondents who didn't have a history of dengue; and whose sources of dengue information came from Institutions; also, whose parents/guardians are self-employed are not aware. Referring to the table above, a Cramer's V of 0.2781 and degrees of freedom = 2 indicates a strong association between awareness of dengue prevention and sex.

Discussion

Based on the results, it was revealed that the majority of the respondents are not aware of all the categories of dengue; signs and symptoms, transmission, and prevention and control. Most of them who are not aware are male and between the ages of 9-11 years old and are in Grades 4-6. According to Kittigul et al. (2007), dengue is an important public health problem and mainly occurs in children less than 15 years of age a study by Alera et al. (2016) has concluded that Dengue is primarily a pediatric disease affecting most children ages ranging 15 years below because children of these age groups are due to their tendency to stay and play in areas where mosquitoes usually breed.

Table 2. Cross-tabulation of profile variables and awareness of dengue transmission.

Variables	Aware	Not aware	Cramer's V	p-value
Sex			0.0613	0.534
Female	13 (27.08)	35 (72.92)		
Male	12 (21.82)	43 (78.18)		
Core shelter location			0.5372	<0.01*
Annafunan East	1 (2.22)	44 (97.78)		
Cataggaman Pardo	6 (23.08)	20 (76.92)		
Namabbalan	18 (56.25)	14 (43.75)		
Age, in years			0.1529	0.121
6-8	13 (32.50)	27 (67.50)		
9-11	12 (19.05)	51 (80.95)		
Grade level			0.1529	0.121
1-3	13 (32.50)	27 (67.50)		
4-6	12 (19.05)	51 (80.95)		
Occupation of the Parent			0.2929	0.012*
Blue-collar worker	18 (37.50)	30 (62.50)		
Self-employed	7 (13.46)	45 (86.54)		
Unemployed	0	3 (100.00)		
History of dengue			0.2024	0.040*
Yes	13 (36.11)	23 (63.89)		
No	12 (17.91)	55 (82.09)		
Sources of information			0.0832	0.700
Digital Media	8 (21.62)	29 (78.38)		
Institutions	11 (23.40)	36 (76.60)		
Others	6 (31.58)	13 (68.42)		

*significant at alpha=0.05.

From the three core shelters, it appeared that majority of respondents who live in Annafunan East and Cataggaman Pardo are not aware. As per the physical observation of the researchers, the three core shelters have many potted plants in the residents' houses as growing plants has been a famous trend during the pandemic.

The presence of scattered old tires—perhaps as a consequence of one of the most popular occupations in the community which is tricycle driving—these store stagnant water which further contributes to the proliferation of mosquitoes in the community. According to Potter *et al*, mosquito breeding grounds include standing water, old tires, buckets, aluminum cans, plastic sheeting, potted plants, or other refuse that can hold water. It is also stated that adults of some mosquito species remain near their breeding sites. Unfortunately, many children play beside these highly potential breeding grounds for mosquitoes as per the observation of the researchers during their visit to the core shelters. Furthermore, a study by Capili et al. (2020) reveals that one of the most common infection-related problems in the three core shelters of Tuguegarao City is dengue. It is explained that the factors for the incidence of this disease include lack of drainage systems, frequent flooding, and the existence of tall grasses in the location.

Most of the respondents whose parents/guardians are self-employed are also not aware. It also implies that the majority of the respondents' parents/guardians do not have stable occupations and are in the lower socio-economic bracket. This may affect the dengue awareness of their children as the parents/guardians would focus more on the financial problems of the family than on health-related issues of the family. Mulligan et al. (2015), they have found that nine of

the twelve studies looking into the association between dengue and poverty, demonstrated some positive associations that were measured through income, education, structural housing condition, overcrowding, and socioeconomic status. Thus, there is a connection between poverty to the high incidence of dengue in a community. The occupation of the parents/guardians of the respondents may also give a hint on how it affects their children's dengue awareness or any health-related awareness.

Table 3. Cross-tabulation of profile variables and awareness of dengue prevention and control.

Variables	Aware	Not aware	Cramer's V	p-value
Sex			0.2781	0.005*
Female	21 (43.75)	27 (56.25)		
Male	10 (18.18)	45 (81.82)		
Core shelter location			0.5003	<0.01*
Annafunan East	1 (1.92)	51 (98.08)		
Cataggaman Pardo	11 (33.33)	22 (66.67)		
Namabbalan	19 (52.78)	17 (47.22)		
Age, in years			-0.0885	0.369
6-8	10 (25.00)	30 (75.00)		
9-11	21 (33.33)	42 (66.67)		
Grade level			-0.0885	0.369
1-3	10 (25.00)	30 (75.00)		
4-6	21 (33.33)	42 (66.67)		
Occupation of the Parent			0.2866	0.015*
Blue-collar worker	21 (43.75)	27 (56.25)		
Self-employed	10 (19.23)	42 (80.77)		
Unemployed	0	3 (100.00)		
History of dengue			0.1405	0.154
Yes	14 (38.89)	22 (61.11)		
No	17 (25.37)	50 (74.63)		
Sources of information			0.3252	0.004*
Digital Media	12 (32.43)	25 (67.57)		
Institutions	8 (17.02)	39 (82.98)		
Others	11 (57.89)	8 (42.11)		

*significant at alpha=0.05.

Furthermore, those who didn't have a history of dengue and whose sources of dengue information come from Institutions, are also not aware. Interestingly, it was observed by the researchers that those who have had dengue before were more expressive and confident about their answers during the interview; in comparison to those who haven't contracted dengue before whose answers were mostly based on what they learned in school or from their guardians, as observed through their frequent use of the Filipino word "daw" which is a grammatical particle meaning the information being conveyed is secondhand. According to Zoppi (2020), once a person experiences dengue firsthand, they would know more about the disease. Thus, this implies that those who have experienced dengue before can serve as important relayers of essential information about dengue. Institutions play a very important role in the dengue awareness of the respondents. Among those that fall into the institutions' category, schools and health centers were the main sources of their awareness. It is assumed that education and the availability and accessibility of health centers aim at increasing the awareness of the respondents. According to Radhika *et al.* (2019), implementing school-based educational programs is very effective in raising awareness and translating knowledge into sound practice to control dengue disease epidemics in communities where dengue is prevalent. In the communities' schools and health centers, dengue-related information is being taught through the execution of the curriculum, programs, and activities

such as Dengue Awareness month held every June as per Proclamation No. 1204 series 1998. However, it is seen that there are many respondents—whose major source of dengue-related information is the Institutions, who were not aware. Thus, it can be inferred that there is a problem with the transmission of dengue-related information from the institutions to the children.

Conclusion

Based on the findings, it is concluded that children in the core shelters of Tuguegarao City face challenges with greater access to correct information in all the categories of dengue awareness: the signs and symptoms, transmission, and prevention and control. Notably, Institutions, being the main source of the children's dengue-related information, reveals a problem with how the dengue-related information is delayed. It is recommended that the government authorities and non-governmental organizations need to develop programs for mothers to increase awareness and time spent informing their children about dengue signs and symptoms, transmission, and prevention. Drainage mapping can be used to reduce mosquito breeding sites. Information, education and communication (IECs) materials may be provided in areas like schools and health centers—since according to the results, the children get most of their information about dengue in institutions—making it more accessible for them to obtain. Infographics, comic books, coloring books, etc. about dengue signs and symptoms, transmission, and prevention may be provided in schools, health centers, and core shelters.

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