



Prevalence Rate of Dengue in Zamboanga City, Philippines

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ABSTRACT

Zamboanga City is one of the cities in the Philippines that experiences an outbreak of dengue. Dengue is a viral disease that is endemic in the city caused by the bite of dengue carrier mosquitoes. Secondary data analysis was utilized by the researcher to establish the prevalence rate of dengue in the city. Data availability is from 2006 to 2017. It was observed that 2013 has the highest number of dengue cases recorded, while 2006 has the lowest. Within the time frame, highest number of death was recorded in 2014. High case fatality was recorded in 2011. More so, the case fatality rate decreases from 2012 to 2017. It indicates that the strategies used by the city government is effective, which is to encourage every community member to participate in the search and destroy of mosquito habitat. However, there are other strategies that must be considered for implementation in the city such as educating the residents through seminar, radio and social media, encouraging them to observe self-protection measures, invest in research, and develop better health system.

Keywords: *Dengue, Prevalence Rate, Cases Fatality Rate, Secondary Data Analysis*

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INTRODUCTION

Every year, many individuals from urban and rural communities all over the world are suffering from vector-borne diseases. Vector-borne diseases are caused by vectors which are organisms that can transmit infectious disease in human population. Most of the vectors are bloodsucking insects that ingest disease-producing microorganisms during a blood meal from an infected host and later inject them into a new host during their next blood meal [1]. One of the most common vector is the mosquito.

Mosquitoes are considered as one of the deadliest animals in the world. Several types of mosquitoes carry different diseases such as Zika virus, malaria, chikungunya, yellow fever and dengue. Among the mentioned mosquito-borne diseases, the outbreak of dengue is a major health concern in the Philippines [2]. The burden of dengue in the Philippines is almost 10 times higher than estimated for rabies, about twice the burden of intestinal fluke infections, and about 10% of the burden of tuberculosis [3].

Dengue is a viral disease that is endemic to epidemic in nature in tropical and subtropical regions [2, 4]. The dengue virus is a small single stranded RNA virus with four distinct serotypes (DEN - 1 to 4). These serotypes belong to the genus *Flavivirus*, family *Flaviviridae* [5]. According to De Melo *et al* [6] this kind of virus is being transmitted by *Aedes aegypti*, which is the primary vector and *Aedes albopictus* the secondary vector. *A. aegypti* is commonly found in tropical regions and in human residences, while *A. albopictus* is present in subtropical regions since it can survive in cold temperature. Nonetheless both of the mosquitoes are active biters in daytime. More so, these mosquitoes thrive in areas with standing water. Lack of reliable sanitation and regular garbage collection also contribute to the spread of the mosquitoes. Dengue is being transmitted through the bites of mosquito dengue carrier. According to Lee and Rohani (2005) and Espinosa *et al.* (2014), dengue carrier mosquitoes contain the virus for a lifetime and it can be transmitted through ovarium [7]. Thus, it increases the population of dengue carrier mosquitoes that can trigger an epidemic.

In the Philippines, a person infected by dengue may fall under the three clinical classification of the Department of Health. These classifications are: 1.) dengue without warning signs pertains to a previously well person with febrile illness of 2 - 7 days duration with two other symptoms such as headache, body malaise, myalgia, arthralgia, retro-orbital pain, anorexia, nausea, vomiting, diarrhea, flushed skin

and rash; 2.) dengue with warning signs pertains to a previously well person with acute febrile illness of 2 – 7 days duration with any one another symptom such as abdominal pain, persistent vomiting, mucosal bleeding, restlessness and liver enlargement; and 3.) severe dengue pertains to a well person with acute febrile illness of 2 – 7 days duration and any of the clinical manifestations for dengue with or without signs plus any of the following severe plasma leakage, severe bleeding and severe organ impairment [8]. Despite the preventive measures and campaigns made by the Philippine Department of Health, still dengue threatens every Filipino citizens. As early as July of 2019, the Department of Health declared National Dengue Alert due to rapid increase of dengue cases in different regions in the Philippines. The Health Secretary raised the Code Blue Alert. Blue alert signals all concerned agencies to be on stand-by readiness in preparation for a full scale response operation to slow-onset disasters [9]. One of the regions being strictly monitored is the Zamboanga Peninsula. For the second quarter of 2019, Zamboanga City has the highest mortality rate due to dengue among the cities in the region [10]. In this study, a review was made to establish the prevalence rate of dengue in Zamboanga City using the available secondary data. In addition, this could serve as basis on strengthening of preventive measures and practices of individuals and as a community.

MATERIAL AND METHODS

Study Site

Zamboanga City (6°54'37.01"N, 122°4'26"E) is located in the southernmost tip of Zamboanga Peninsula (Region IX) in the Philippines. It is a first class and highly urbanized city, since it is the commercial and industrial centre of the region. It is considered as the third largest city with a total land area of 142,099.99 hectares or 1,420.99 square kilometres and the sixth – most populous city with a total population of 862 thousand people as reported by Philippine Statistics Authority [11].

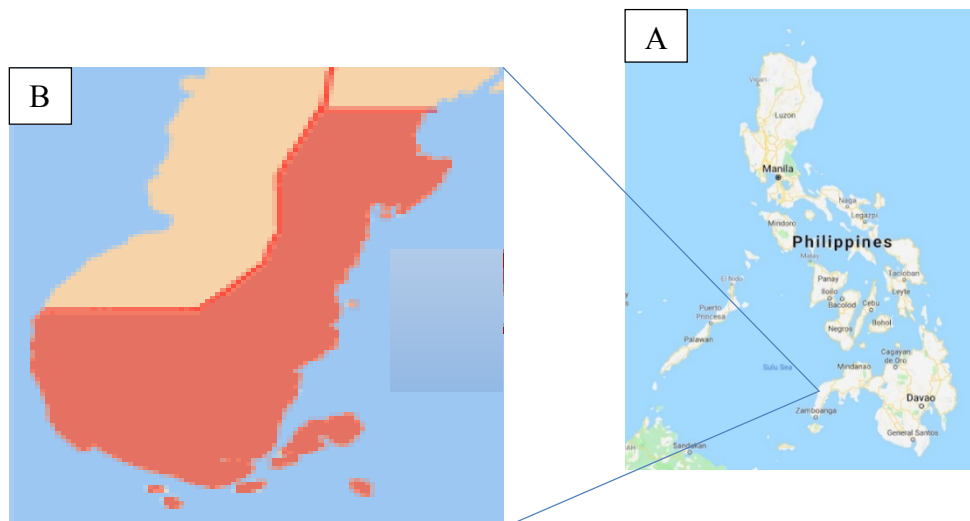


Figure 1. The Study Site A. Philippine Map and B. Zamboanga City

Collection of Data and Analysis

In facilitating the gathering of data to answer the objective of the study, the researcher utilized a secondary data analysis. The secondary data were requested from the Zamboanga City Health Office through a request letter submitted to the office of the City Health Officer Dr. Dulce Amor D. Miravete.

RESULTS

Zamboanga City since then, tend to experience dengue cases. The figure below shows the number of dengue cases per year from 2006 to 2017.

As the data revealed, the highest number of dengue cases in Zamboanga City was recorded in the year 2013 with a total of 4, 811 individuals, followed by the year 2012 with 4, 028 cases and 3, 737 cases. The lowest number of cases was recorded in the years 2006 with 669 cases, 2009 with 1, 029 cases and 2011 with 1037 cases.

In every year, it is not evitable to have recorded of deaths due to dengue. Figure 3 shows the total number of deaths due to dengue per year.

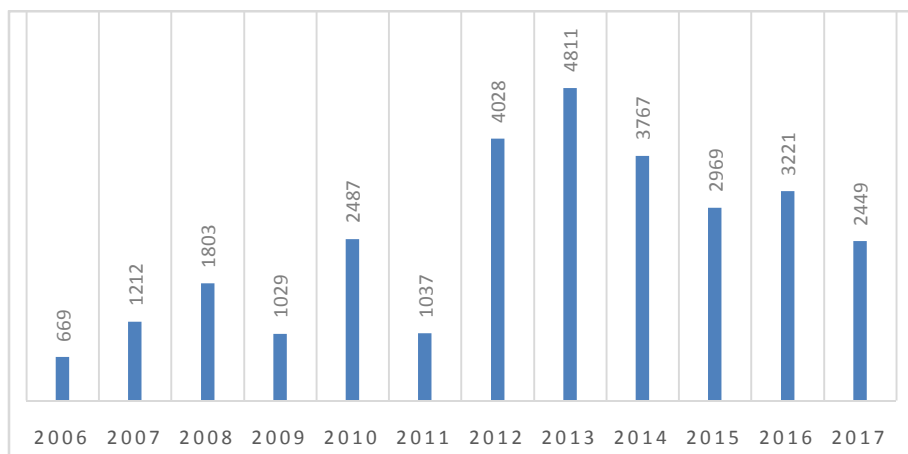


Figure 2. Yearly Dengue Cases in Zamboanga City

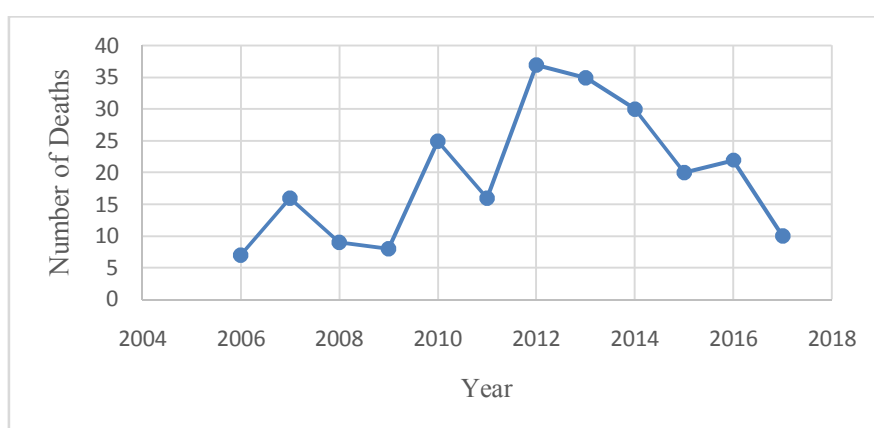


Figure 3. Dengue Related Deaths in Zamboanga City

As noticed, year 2012 has the highest recorded number of deaths which has a total of 37, followed by year 2013 with a total of 35 and the year 2014 with a total of 30. Meanwhile, year 2006 has the lowest recorded number of deaths which has a total of 7, followed by year 2009 with a total of 8 and the year 2008 with a total of 9.

Case fatality rate was determined to establish the proportion of who died due to dengue over the 12 months or 1 year. The table below shows the case fatality from 2006 to 2017.

Table 1. Case Fatality Rate of Dengue in Zamboanga City

Year	Case Fatality Rate
2006	1.046
2007	1.320
2008	0.499
2009	0.777
2010	1.005
2011	1.543
2012	0.919
2013	0.727
2014	0.796
2015	0.674
2016	0.683
2017	0.409

As shown in the table 1, the case fatality rate from 2006 to 2017 ranges from 0.409 to 1.543. Year 2011 obtained the highest case fatality rate followed by 2010 and 2006, while year 2017 has the lowest fatality rate followed by 2015 and 2016.

Since it was noticed that from 2012 to 2017, for 5 consecutive years, the number of dengue cases did not drop below 2, 000. The figure below shows the number of dengue cases per month within these years.

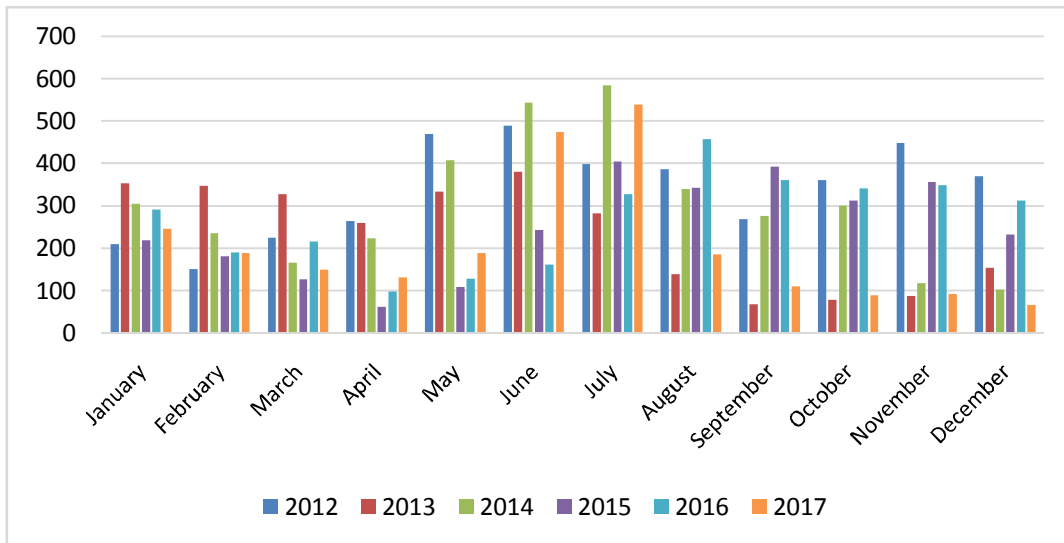


Figure 4. Number of Dengue Cases per Month from 2012 to 2017

On an average, there are more dengue cases during the month of June, July and August. Whereas, the month of March and April has the lowest number of dengue cases. More so, it was observed that in 2013, most of the cases took place from January to March.

DISCUSSION

As shown in Figure 2, the year 2013 has the highest recorded number of dengue cases from 2006 to 2017. Most of the cases took place from the months of January, February and March. In the Philippines, this is considered as cool dry season [12]. Risk of dengue is high that can lead to an outbreak since it is associated with elevated temperature [13, 14]. *Aedes aegypti* exhibits shorter periods of development in all stages of their life cycle as temperature increases. Thus, the population of a dengue carrier mosquito increases [15].

Moreover, more than 1, 000 dengue cases were recorded in Zamboanga City from 2007 to 2017. It was suggested that the increase of dengue cases is due to growing population, increasing urbanization, improvements in surveillance and the limited success of vector control measures [2]. More so, the presence of stagnant water in the indoor drainage holes, the presence of indoor larvae and the presence of nearby buildings under construction were independent determinants of the occurrence of dengue [16]. Nonetheless, many dengue cases took place within the month of June, July and August. This is the beginning of the wet season in the Philippines [12]. Within wet season, the amount of rainfall increases and is being associated with the increase of dengue cases [7, 13].

The year 2014 recorded with highest number of deaths from 2006 to 2017. One of the factors that may attribute is the occurrence of 2013 Zamboanga Siege that displaced thousands of individuals and were housed in an overcrowded, unsanitary, and unsafe evacuation centres [17]. Another factor to be considered is the underdeveloped health system, since Philippines is a third world country. Countries with underdeveloped health system increases the challenges in dealing dengue cases [18].

Year 2011 has the highest case fatality rate from 2006 to 2017, which is 1.543. This indicates that the actions adopted by the city government to combat dengue is less effective. Nonetheless, as noticed from 2012 to 2017, the case fatality rate is decreasing. This denotes that the strategies against dengue conducted by the city government is effective. Based on the Zamboanga City Health Office Report, encouraging every community member to participate in the search and destroy is the best strategy to lessen the number of dengue cases [19].

Since dengue vaccines became controversial in the Philippines, it is advisable that the city government of Zamboanga should destroy the habitat of the vectors by encouraging every community members to practice search and destroy. The following activities can be implemented to destroy breeding places of mosquitoes: 1.) cover all water containers at all times; 2.) cover holes around the house with soil or sand; 3.) remove old tires, can and plastic bottles that can collect water; 4.) clean and replace water in flower vases once a week and 5.) clean and remove water in dish racks and other items that can hold water [20]. There are several ways on how to combat dengue cases in Zamboanga City. One of the best method is to continue educating every citizen about dengue. This can be done by conducting seminars in schools and community, distribution of reading materials and advertisement through social media, radio and

television. Another method is to improve the health system in the city, fund researches relevant to controlling and mapping of dengue and to invest on ovitrap and mosquiTRAP.

More so, the city government should encourage every community member to adopt self – protection measures against mosquito, which includes the use mosquito repellants to exposed skin, wear long sleeves or cloth, mosquito nets when sleeping, installing screen on windows and door and apply household insecticides.

If a person will have a fever, it is advisable to seek early consultation to immediately identify the disease. Thus, it may require the patient to intake more fluid especially oral rehydration solution [20]. This mechanism will avoid possible patient to experience severe dengue. And if outbreak was declared in the community, allow the fogging to be done by City Health Office personnel.

An outbreak of dengue can lead to economic loss in Zamboanga City [21]. Since dengue cannot be totally eradicated in Zamboanga City, but practicing the different recommended strategies may lessen the cases. Thus, implementation of these strategies will reduce case fatality rate and the city government will have its savings.

CONCLUSION

Dengue is one of the concerns in Zamboanga City. Based on the secondary data gathered, 2013 has the highest dengue cases recorded, while in year 2006 has the lowest. In addition, 2014 has the highest rate of death while 2006 has the lowest. It was observed, that from 2012 to 2017 on average, the months of June, July and August has the highest number of dengue cases. The case fatality rate of the city from 2012 to 2017 is decreasing, which denotes that the strategy “Search and Destroy” implemented by the city government of Zamboanga through the community members is effective. Educating every community members through the use of different platforms, investments on health system and researches, search and destroy the mosquito habitats, adopting self – protection measures, seek early consultation and saying yes to fogging if outbreak will take place are the best strategies to reduce the number of dengue cases and case fatality in the city.

LIMITATIONS OF THE STUDY

The researcher recognized the following limitation of the study: 1.) secondary data must cover 2018 and 2019 and 2.) demographic profile of dengue cases must be presented. However, these data is not yet available in the office.

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