

MJN NATIONAL DENGUE PREVENTION AND CONTROL PROGRAM: A POLICY IMPACT ANALYSIS

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ABSTRACT

This evaluation study determined the impact of National Dengue Prevention and Control Program (NDPCP) in Cebu City. Data collected from interviews on the current practices of the residents and barangays health workers in response to the program implementation, the current status of services provided for dengue, the identified gaps of the program and data gathered on dengue cases from the Region VII, Department of Health and Cebu City Health Department were submitted for analysis. Significant difference on dengue cases in terms of morbidity, mortality and case fatality rate of five years prior and five years during the implementation of the program was computed utilizing Paired *T*-test at 0.05 level of significance using minitab software. Lack of funding, supplies, human resource and weak cooperation of the residents affected the current practices in response to the program. Services provided for dengue in terms of laboratory and hospital facilities need increased capability to accommodate all the dengue patients. Lack of manpower resources, need for training of health personnel, need for the residents to develop a health seeking behavior, weak surveillance system, and a need for the improvement of the dengue contingency plan confirm the gaps of the program. There is a significant difference in morbidity, mortality and case fatality rate in Cebu City showing an increased rate in dengue during the program implementation. The National Dengue Prevention and Control Program in Cebu City have not attained its goals.

Keywords: *National Dengue Prevention and Control Program, Gaps, Morbidity, Mortality, case fatality rate, Impact*

INTRODUCTION

Nowadays Dengue Hemorrhagic Fever (DHF) became a major public health problem internationally. Demographic explosion, rapid growth of urban centers with strain on public services such as potable water led to larger expansion in its geographical distribution over the last 30 years (World Health Organization [WHO] in the Southeast Asia Regional Office [SEARO], 2006). DHF is an acute febrile infection of sudden onset caused by mosquito bites (Center for Disease Control, 2011). WHO estimates that 50 million cases of Dengue occur every year, and 1% required hospitalization (Tomashek, 2011). It has been estimated that at least 100 countries in Africa, America, the Caribbean, Eastern Mediterranean, Southeast Asia and the Western Pacific regions are endemic for DHF and around 40% of the world population (2.5 billion people) located in

tropics and sub-tropics area is at risk (Center for Disease Control, 2011; WHO/ SEARO, 2006). DHF emerged as the leading cause of childhood mortality in several Asian countries (WHO/SEARO, 2006).

The recent increase of infections urges to make Dengue control a priority in the Philippines. The Philippine Department of Health (DOH) launched the National Dengue Prevention and Control Program in 1993. It was introduced in Region VII and the National Capital Region as pilot sites. The program has only been implemented nationwide in 1998 (DOH, 2011). Several activities are being implemented to carry out Dengue control in the Philippines. These are Dengue awareness building sessions for Municipal Health Officers (MHOs) or City Health Officers (CHOs) as part of the

local governmental unit's training sessions on emerging infectious diseases (Lee Suy, 2008). Moreover, the Philippine Department of Health also maximized the Dengue prevention and control campaign. Lee Suy (2008) stated that when a study was conducted to assess individual's knowledge of Dengue and Dengue prevention, close to 96% were aware of the disease and its prevention; but this knowledge was only taken into 50% to 60% in real practice.

The researchers aimed to evaluate the National Dengue Prevention and Control Program of the Philippine Department of Health. This study will utilize CIPP (Context, Input, Process and Product) model by Stufflebeam in 2003.

The CIPP model is composed of features that will assist in a thorough evaluation of the specific aspects of this program. The model defines evaluation as a procedure to guide decision making, support accountability, disseminate effective practices and increase understanding of the involved phenomena (Stufflebeam as cited by Tmemann, 2012). The theory is focused on the policy impact of the National Dengue Prevention and Control Program. Context evaluation will assess the needs and opportunities and help to define, achieve goals and objectives. Input evaluation will assess alternative approaches and budgets and help guide and assess planning. Process evaluation will assess implementation and help guide efforts and interpret outcomes. Product evaluation will assess outcomes and help promote and document success (Stufflebeam, 2003).

Theoretical-Conceptual Framework

The CIPP Model

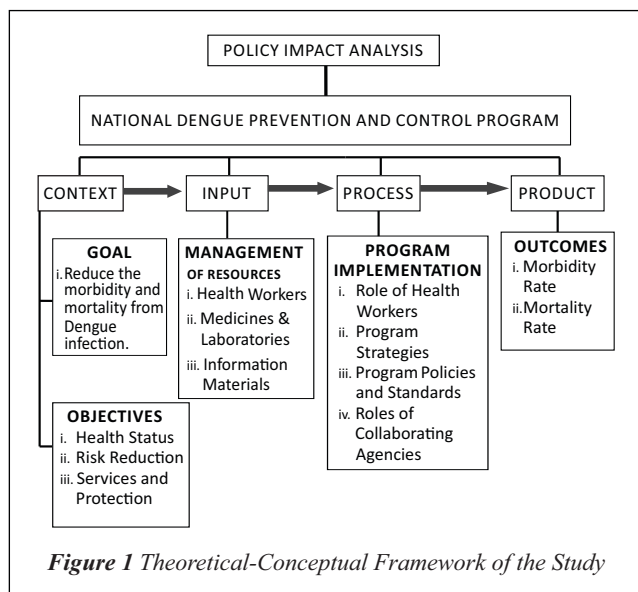
This study is anchored on the CIPP (Context, Input, Process and Product) model by Stufflebeam and Shrinkfield in 1984 (Darussalam, 2010). This theory explains that evaluation is the process of delineating, obtaining and providing useful information for judging decision alternatives (Duran, 2001). The CIPP model evaluates the impact of a program by following the different dimensions and steps. The first step is evaluation of context by setting the goals and objectives of the program to be achieved (Darussalam, 2010). It addresses the needs, issues, "assets and opportunities" in order to clarify "goals and priorities" of a program (Stufflebeam as cited by Tmemann, 2012).

The second step is the evaluation of input that focuses on using various strategies and methods of teaching and learning as the content of the program (Darussalam, 2010). It assists in isolating staffing and budget components of a program, and enables the evaluator to look closely at the "cost-effectiveness" (Stufflebeam as cited from Tmemann, 2012). This would be a very valuable area of the program to examine considering the number of staff involved with various levels of qualifications and specific skills (Tmemann, 2012).

The third step is the evaluation of process that focused on the assessment of a process implementation and existing problems that can circumvent components of the program in the form of context and input (Darussalam, 2010). Therefore, this step focuses on the "implementation plans" in order to inform and "judge program performance and interpret outcomes" (Stufflebeam as cited by Tmemann, 2012). This step would allow the evaluator to generate specific description of the existing process for implementation and execution and connect it and place it side by side against the designed and intended process (Tmemann, 2012). Gaining an understanding of how the program's implementation evolved and changed based on the needs and feedback of the individuals and health workers would add great value and input on the future strategies and activities of the program.

Lastly, the fourth step is evaluation of product that focused on outcomes achievement of one's program (Darussalam, 2010). This places gives an emphasis on the program outcomes to determine if the program successfully met the identified goals. An improved benefit of this dimension of the CIPP model is that it permits for "intended and unintended, short term and long term" outcomes to be flashed out (Stufflebeam as cited by Tmemann, 2012). This step is crucial as it permits the discovery of unexpected findings and conclusions about the program due to other factors that contribute to the success and failure of the program.

The CIPP model supports diverse applications and broad functionality with regards to the variety of programs. It can successfully be used to evaluate: short and/or long term, small or large scale, and across a wide selection "of disciplines and service areas" (Stufflebeam as cited by Tmemann, 2012).



Policy Impact Analysis

Policy impact analysis is presented as a model to assist different fields like health, economics and education in evaluating program policies and standards. According to Morrison (1981), the model provides a framework within which a variety of future research techniques are tied to policy development, implementation, and evaluation. The utility of the model is that it creates communication between those developing information about the future and those responsible for the policy formulation and decision-making in such a fashion that policy-makers can choose among alternative policies based upon the probable impact of each. Policy impact analysis identifies output indicators which are causally linked to outcomes (Shaffer, 2002). To determine the effectiveness of public policies and programs, policy impact analysis is utilized. This helps the legislative policies and standards of public programs to solve public concerns. Moreover, this gives enlightenment to the doubts that emerge if the program components are effective. Venetoklis (2002) stated that program policy evaluation would identify the causal relationships between the treatment (resources, strategies and program implementation) and the effect (the potential impact).

METHODOLOGY

This study utilized an evaluation design. This

includes data mining and quantitative approach with follow up interview of the health providers and the residents of the top 3 Barangays with most number of Dengue cases and the last 3 Barangays with the least number of Dengue cases in terms of their practices in the implementation of the program. It evaluated the National Dengue Prevention and Control Program in Cebu City through the utilization of CIPP model. The study was conducted in Cebu City, the capital of Cebu Province, under Region VII. It is the second highly urbanized city in the Philippines. The city has 80 Barangays (CHD, Cebu City, 2011). The program was implemented nationwide in 1998 (Dominguez,1997). The respondents were composed of two groups. The researcher utilized the purposive sampling. The respondents interviewed were selected with the following criteria: the first group was the residents and the Barangay health workers of the top three (3) Barangays and last three (3) Barangays in terms of the number of Dengue cases. An interview guide was used to find out the current strategies and components implemented in the program. Based on the objectives, resources, implementation and policies of the National Dengue Prevention and Control Program, a researcher made interview guide was used adapted from the Program Evaluation Study of Duran (2001) and DOH Dengue Prevention and Control Program Module IV for Program Management (1998). The interview for the health workers was in English and in dialect while those for the Barangay residents were mostly in dialect. Ethical issues are considered in this study. The researchers and research assistants secured consent from the participants and explained the aim and purpose of the study.

RESULTS AND DISCUSSIONS

This chapter presents the analysis and interpretation of the data collected from the interview of the respondents from the top six (6) Barangays and the data gathered from the City Health Department, Department of Health for the Dengue morbidity and mortality rates in Cebu City of 5 years prior and 5 years during the implementation of the National Dengue Prevention and Control Program (Auza et al., 1988)

The current practices in the implementation of the program in the six Barangays based on the health status are evaluated in terms of the following components:

reducing the incidence rate, reducing the case fatality rate and detecting and containing all epidemics.

To reduce the incidence rates and case fatality rates and to detect and contain all epidemics, the Barangay health workers of Barangays 1, 2 and 3 are tasked by the nurses of each Barangay to conduct epidemiological investigation or monitoring of fever cases, sudden deaths which started as fever with bleeding and presence of confirmed Dengue cases and entomological investigations or surveillance of mosquito and larva on breeding sites. In Barangay 1 (the first in rank among the top 3 Barangays in terms of morbidity rate before the implementation of the program), the epidemiological and entomological investigations are done once a month during the implementation of the program. But when Dengue cases in Barangay 1 are high, epidemiological investigations are then done once a week. But as validated by the residents, Barangay health workers cannot visit all the households because of lack of time and the distance away from the health center. In addition, the sanitary inspector seldom visits the Barangay to check for breeding places of mosquitoes and to assess the sanitation of the place. Furthermore, the Barangay health workers of Barangay 2 (the second in rank in morbidity rate before the implementation of the program among the top 3 Barangays), conduct epidemiological investigations once a week and every day when the number of Dengue cases reported for the past days are high. They also stated that they conduct entomological investigations once a month. But as validated by some of the residents, Barangay health workers cannot meet them at home because of their job and their children's classes during daytime. On the other hand, Barangay 3 (the third in rank in morbidity rate before the implementation of the program among the top 3 Barangays), conduct epidemiological and entomological investigations through the Barangay health workers daily, but as validated by the Barangay residents, not all households are visited in a day because of the many households handled by one Barangay health worker.

The practices in the manpower resources and logistics in terms of medicines and campaign materials are vital to reduce the incidence rates and case fatality rates and to detect and contain all epidemics. The following discussions describe the manpower resource

and logistics of the top 3 and last 3 Barangays in relations to their practices.

Table 1. *Manpower Distribution and Number of Residents of the Six Barangays*

Barangay	1	2	3	80	79	78
Health Providers						
Doctor	1	0	1	1	1	0
Nurse	1	1	2	0	0	0
Midwife	1	1	7	1	1	1
BHW	5	8	12	3	2	4
Sanitary Inspector	1	2	1	0	1	0
Medical Technologist	1	1	1	0	0	0
Number of Residents	9,355	11,564	26,917	1,474	1,541	2,490

Overall, the manpower resource of the top three Barangays are composed of at least 1 trained doctor, 1 to 2 public health nurses, 1 to 7 midwives, 1 to 2 sanitary inspectors, and 5 to 12 Barangay health workers catering a population of 9,355 to 26,917 (City Health Department Epidemiology and Surveillance Unit, Cebu City, 2012). On the other hand, the last three Barangays are composed of one doctor who visits once a month, 1 midwife who leads the Barangay health workers, and 2 to 4 trained Barangay health workers catering a population of 1,474 to 2,490 (City Health Department Epidemiology and Surveillance Unit, Cebu City, 2012). These show that the manpower resources of the top 3 Barangays and last 3 Barangays are lacking for fully implementation of the program. The manpower distribution and number of residents of the six Barangays implies that it has to be considered that high capacity of manpower resources is important to reduce the incidence rates and case fatality rates and to detect and contain all epidemics. These are essential for the positive outcome of the program implementation.

The following discussions are about the practices of the 6 Barangays for risk reduction such as reducing the risk of exposure to Aedes bites, increasing the percentage of households practicing removal of mosquito breeding places and increasing awareness of DF/DHF.

The practices done by Barangay 1 (the first among the top 3 Barangay) to reduce human exposure to Aedes bites are application of salts and oils on stagnant waters. In Barangays 2 and 3, larviciding utilizing chemicals for Dengue mosquito is conducted by the sanitary inspector once a year as validated by the implementers and residents. In Barangays 80, 79 and 78, the Barangay health workers conduct entomological investigation to

reduce the risk of human exposure to Aedes bites. They conduct larviciding by putting Chlorine on stagnant waters. Barangay 78 also conducts clean up drive every Saturday as validated by the residents. These imply that the 6 Barangays are practicing larviciding however, only Barangays 2 and 3 are utilizing the larvicide specified for Dengue mosquitoes which are more expensive than salts, oils, and chlorine. Thereby, most of these Barangays did not receive a supply of larvicide from the City Health.

The following discussions about the services and protection of National Dengue Prevention and Control Program in Cebu City in terms of establishing a Dengue reference laboratory capable of ELISA tests for Dengue surveillance, increasing the percentage of primary and secondary level government hospitals with laboratories capable of platelet counts and hematocrit and ensuring surveillance and investigation of all epidemics.

The Cebu City has no Dengue Reference Laboratory capable of performing IgM capture ELISA tests for Dengue Surveillance. Instead, tertiary and secondary hospitals are utilizing Dengue NS1 Antigen Test with price ranging from P 600.00 for public hospitals to P 2,500.00 for private hospitals.

Moreover, there is an increase in primary and secondary level government hospitals and Barangay health centers with laboratory clinics capable of platelet counts and hematocrit levels. The city government of Cebu together with the City Health Department and Department of Health provide laboratory satellite clinics in all Barangays in Cebu City. These laboratories conduct tests on complete blood count, platelet counts and hematocrit levels to aid in diagnosing Dengue infection. However, some of these laboratories provide delayed results because of increase number of patients and lacking manpower. This shows that more number of medical technologists and assistants are needed in the laboratory clinics for faster release of results. This is important for the timely treatment and intervention to the patients. This also aids in the decision-making, if patient with decreased platelets needs to be admitted to the hospital.

There is surveillance and investigation of all epidemics that are being conducted in every Barangay but the trained personnel who are trained to do the job is lacking. There are no regular sanitary inspectors visiting Barangay 80 and 78 to institute vector control. The number of sanitary inspectors in Barangays 1, 2, 3

and 79 are not enough to monitor and survey the entire Barangay. The numbers of Barangay health workers are also not enough to cater to all the population or households.

The following discussions present the outcomes of the program in terms of morbidity and mortality rates.

Table 2 Outcomes of the Program in Terms of Mortality and Morbidity Rate

Morbidity Rate				
Top 3 Barangays	Average Morbidity Rate 1993 to 1997	Average Morbidity Rate 2006 to 2007	Difference	Interpretation
1	3.84	2.95	0.89	Decreased
2	2.41	2.36	0.05	Decreased
3	2.23	2.78	-0.55	Increased
Last 3 Barangays				
78	0	0.33	-0.33	Increased
79	0	0.13	-0.13	Increased
80	0	0	0	No case
Mortality Rate				
Top 3 Barangays	Average Mortality Rate 1993 to 1997	Average Mortality Rate 2006 to 2010	Difference	Interpretation
1	0	0.02	-0.02	Increased
2	0.06	0.08	-0.02	Increased
3	0.04	0.05	-0.01	Increased
Last 3 Barangays				
78	0	0	0	No case
79	0	0	0	No case
80	0	0	0	No case

As shown in table 2, in 1993 to 1997, before the implementation of the program, the average morbidity rate of Barangay 1 is 3.84. It decreased to an average of 2.95 during the implementation of the program in 2006 to 2010, having a difference of 0.89. In Barangay 2, the average morbidity rate from 1993 to 1997 is 2.41. It decreased to an average rate of 2.36 in 2006 to 2010, with a difference of 0.05. On the other hand, Barangay 3 has an average rate of 2.23 from 1993 to 1997 which increased to 2.78 in 2006 to 2010. This shows a difference of -0.55. In addition, the morbidity rate of Barangays 80 remained 0 prior and during the

implementation. It is the only Barangay which reported 0 case until 2010. Barangay 79 has an increased average morbidity rate in 1993 to 1997 from 0 to 0.13 in 2006 to 2010, with a difference of -0.13. Barangay 78 also increased its average morbidity rate from 0 in 1993 to 1997 to 0.33 in 2006 to 2010, showing a difference of -0.33. The decrease in the morbidity rate of Barangay 1 and 2 during the implementation of the program may imply that health workers are effective in the implementation of the program. However, because of the unreliable diagnosis of Dengue cases, it may also imply that reported Dengue cases prior to program implementation are high because of clinically diagnosed cases due to lack of diagnostic tool. Barangays 3, 78 and 79 have increased morbidity cases because of the

surging trend of Dengue despite the strategies of the program. However, the procedures used as basis to diagnosis the illness of Dengue in Cebu City are also not reliable due to some late admission of suspected Dengue patients in the hospital which cannot be detected anymore by NS1 antigen test. Other cases are only diagnosed based on platelet count and hematocrit results in the laboratory clinic of the Barangay. For Barangay 80, the maintained 0 Dengue case may imply that all residents in the Barangay are cooperating in the prevention of Dengue infection. Maintenance in environmental sanitation, disposing breeding places of mosquitoes and the characteristic of the Barangay having a less number of residents with spread households also play roles in the control of dengue.

Figure 2 Mean Morbidity Rates of the 6 Barangays Before and During the Implementation of the Program in Cebu City

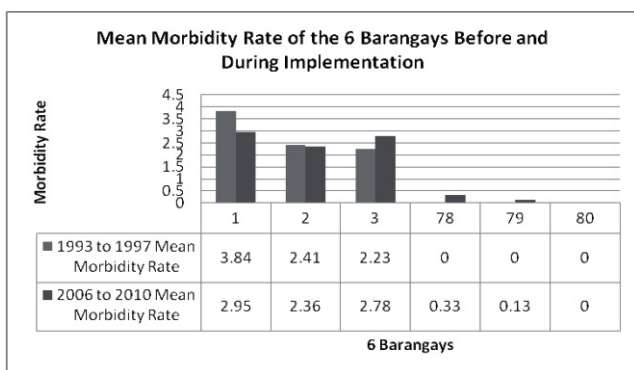
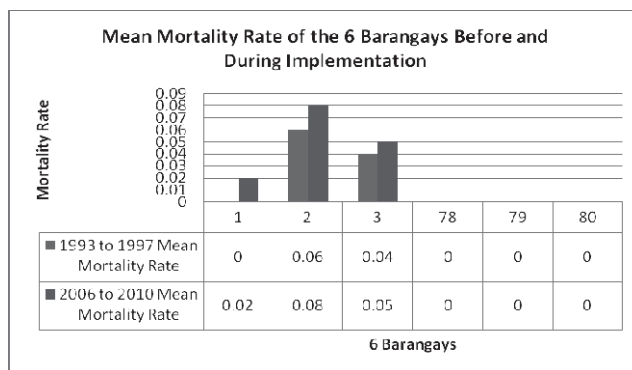


Figure 3 Mean Mortality Rate of the 6 Barangays Before and During the Implementation of the Program



As shown on figures 2 and 3, the top 3 Barangays have more Dengue cases than the last 3 Barangays, though Barangays 1 and 2 has decreased their rate during the implementation. These imply that aside from the lack of manpower in the top three Barangays, the characteristic of these Barangays having increased number of slums with overcrowding and poor

environmental sanitation which affects the number of Dengue cases. The last 3 Barangays has lesser number of cases compared to the top 3 Barangays because their location is on mountain areas, with spread and lesser households and lesser population. Overcrowding of the place makes the spread of Dengue infection faster.

Figure 4 Morbidity Rate of the 6 Barangays from 1993 to 1997 and 2006 to 2010

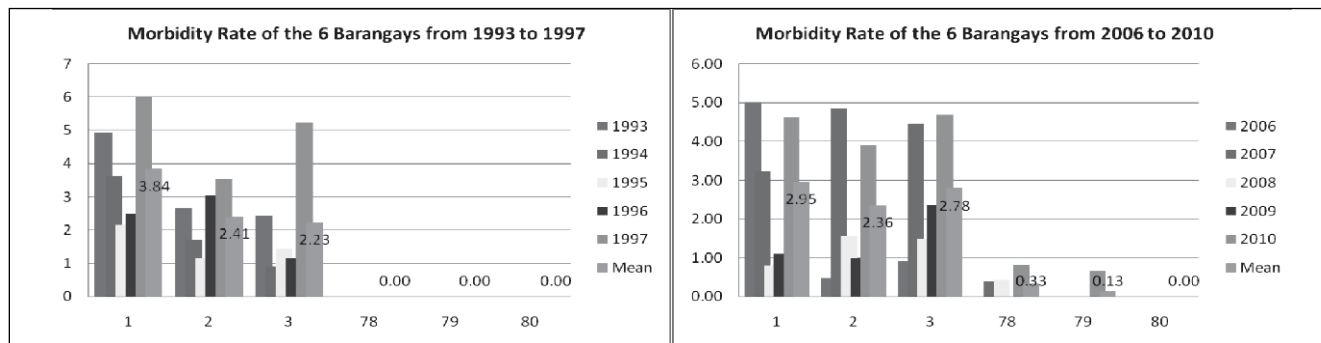
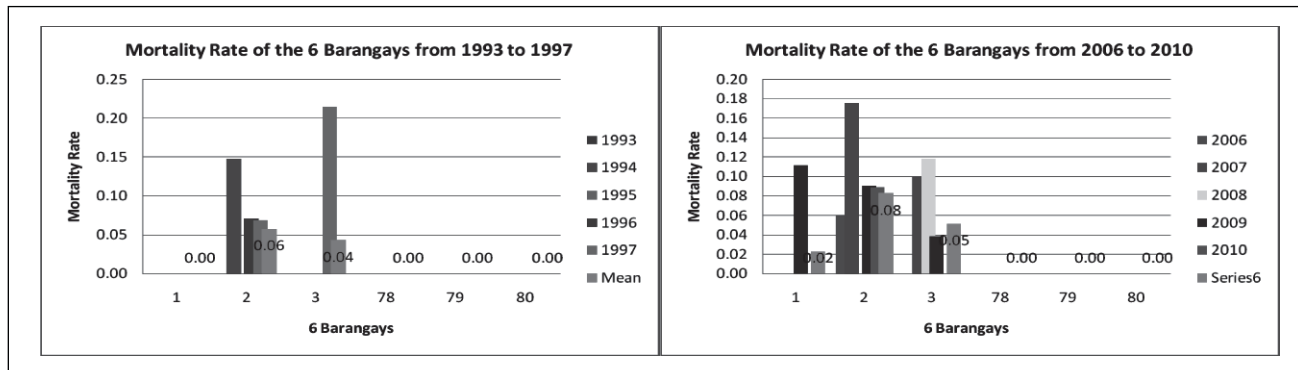


Figure 5 Mortality Rate of the 6 Barangays from 1993 to 1997 and 2006 to 2010



As shown in figure 4, there is increase in the morbidity rate of Barangays 3, 78 and 79 while in figure 5, there is increase in the mortality rates of Barangays 1, 2 and 3. These followed the trends in the surge of Dengue activity or increase in Dengue cases in different countries in 2006 to 2010 such as Galapagos, Easter Island, Madagascar, Nepal, Bhutan and many others. Other countries also reported new Dengue cases in areas that had small number of cases or were previously unaffected before 2006 (Nathan, 2008). Even Singapore, a country with leading experts in the field and adequate resources to tackle an epidemic, also dealt with a worrisome outbreak of its own in 2007, reporting an average of 400 cases per week (Ehrenberg, 2008). Nathan (2008) added that despite all the issues with surveillance and reporting systems in 2000 to 2007, there is a very definite increase in the number of Dengue cases worldwide. He added that the Dengue problem is a big and growing fast problem which needs to focus on vector control. The gaps in the implementation of the program also affected the surging morbidity and mortality rates of Dengue cases.

The following discussions present the identified gaps of the program implementation in Cebu City as compared on the standard/ideal program based on the World Health Organization for South-East Asian countries and Western Pacific Regions on September 8 to 11, 2008 in New Delhi.

Based on the interviews and the data gathered from the 6 Barangays, Department of Health and City Health Department, the capability of the Barangays in monitoring the trends of confirmed Dengue cases and reducing the number of individuals infected with Dengue is weak. There is no enough trained health workers who will carry the appropriate duties and

responsibilities as validated by the residents. These imply that the manpower of the healthcare system in each Barangay health center is not enough to fully implement the Dengue prevention and control program. The city lacks the capacity to implement effective integrated vector control management due to lacking number of trained sanitary inspectors. There is also lacking fund to support the supplies and chemicals needed for vector eradication.

The other gaps observed are the human resources need for improvement. This implies that regular trainings in the City Health Department should be conducted for the health workers. Each health worker should be made aware of their responsibilities in the implementation of the program. The midwife should perform her responsibilities in assisting the public health nurse in the Barangay health center in monitoring and supervising the Dengue related activities. Updated training manuals and guidelines should be provided to every Barangay health worker. Program planning and management should also be exercised in every Barangay health center including logistics and supply monitoring in terms of medicines, BP cuff, flyers and leaflets. There is also less collaboration with some Barangay health centers and city health department due to political issues. This results to lesser force in Dengue program implementation due to lack of funds and supplies to support the Dengue related activities.

Another gaps identified are the need for the Barangay residents' health seeking behaviors to be improved, especially the residents of the highly-urbanized and over-crowded Barangays. These imply that residents need to be more motivated to exercise what they learned about the program strategies on how to prevent and control the occurrence of Dengue such as

proper eradication of mosquito breeding places and maintaining environmental sanitation. Information materials such as flyers, leaflets, posters and tarpaulins are not enough in number to be distributed to the Barangay residents therefore production of educational materials must be increased.

CONCLUSIONS

Based on the findings presented in each component, the National Dengue Prevention and Control Program in Cebu City in terms of health status in some Barangays reduced the incidence rate and case fatality rate of Dengue cases. However, there is weak detection and containment of infection. For risk reduction, exposure to Aedes bites is not totally reduced, there is lesser percentage of households practicing removal of mosquito breeding places but the awareness of the residents for Dengue Fever and Dengue Hemorrhagic Fever increased. For services and protection, primary

and secondary government hospitals are developed with laboratories capable with platelet counts and hematocrit. However, the services need improvement to be able to cater to all the patients and give faster results. Surveillance and investigation of all epidemics need to be improved to provide reliable data report, detect cases earlier and confine infection to prevent outbreak. The outcomes of the program in terms of morbidity and mortality rates showed an increased number of Dengue cases in some Barangays of Cebu City, especially those that are located in the urban and overly-crowded places. Despite the implementation of the program, because of the presence of gaps, cases are surging up. These call for a need to improve the implementation of the program based on the identified gaps such as but not only lack of trained implementers, lack of medical and chemical supplies, lack of information materials and absence of Dengue Reference Laboratory capable of performing IgM capture ELISA tests for Dengue surveillance.

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