

## Research Article

# Community-based approach for dengue prevention and control in Sta. Cruz, Laguna, Philippines

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## ABSTRACT

**Background:** Despite having mandated health programs, dengue cases in Sta. Cruz had a marked increase of 106% in the past two years. Dengue ranked first on notifiable diseases in Sta. Cruz with a rate of 520 per 100000 populations. The occurrence of dengue in one barangay is a threat to nearby barangays and its spread intensified due to proliferating trade and travel. Therefore, dengue cannot be controlled if efforts are limited to only a few members of the community. Hence, strengthening the implementation of dengue programs must be pointed out.

**Methods:** The community project aims to decrease the incidence of dengue cases in all the barangays of Sta. Cruz by 30% within one year. The strategic plan is designed that a Core Group has to be made in which the capacity of staff at different levels has to be increased. An assessment of their baseline knowledge, post-test results, return demonstration and field implementation was conducted. Strengthening communication for source reduction was made possible by posting dengue posters in conspicuous places and by sustained advertising of dengue jingle.

**Results:** The Dengue-Rous Core Group acquired the knowledge, skills and capacity to deliver effective dengue prevention at the community level. The awareness and capacity building of each household to regularly practice search and destroy of mosquito breeding and resting places in their community were also enhanced.

**Conclusions:** Our findings highlight the need for further information, education and communication on source reduction of mosquitoes. Identifying barriers to action and to seek ways to translate population knowledge about dengue into positive preventive practices are deemed essential.

**Keywords:** Community, Dengue, Prevention, Philippines

## INTRODUCTION

In the Philippines, dengue is considered to be the 10<sup>th</sup> leading cause of morbidity in 2005. From then on, the cases continue to rise summing up to 59943 cases in 2014.<sup>1</sup> According to the data from the World Health Organization (WHO), Philippines ranks number one in having the most number of Dengue cases and deaths in the Western Pacific Region as of 2010.<sup>2</sup> The dengue problem in the Philippines has been confronting the

country and became one of the tropical diseases inflicting urban and rural areas with increasing mortality. Dengue cases have been reported in several parts of the country even at present and control measures were instituted as necessary.

In relation to this, the Municipality of Sta. Cruz showed an increasing trend of dengue cases for the past three years. Sta. Cruz ranked third among all municipalities in Laguna in terms of increasing dengue incidence. It is for

this reason that this project has been planned - to reduce the incidence of dengue by 30% among the residents of Sta. Cruz after one year of implementation.

The TALSİK Dengue Project is very timely to answer the heart-felt needs of the community on dengue prevention and control. With this, enhancing the capacity of the implementers and encouraging community participation are both deemed essential to resolve the health problem.

## METHODS

The strategic plan is designed that the prevention and control of dengue can be implemented using the existing policy framework of Local Government Unit (LGU) within the available infrastructure and within the umbrella of basic health services as an integral part of the Department of Health National Dengue program. The capacity of staff at different levels such as Registered Sanitary Inspector (RSI), Midwives, Barangay Health Workers (BHWs), Barangay officials and community leaders has to be increased. The development of capacity for the prevention and control of dengue is not an isolated effort but an integral part of strengthening the entire health system for more effective control of vector-borne diseases.

### *The making and training of Dengue-Rous Core Group*

Literature review and networking were done where the best practice and previous interventions were determined. Then, the impact of the previous dengue control measures and Information, Education and Communication (IEC) materials used in previous activities were reviewed and responsible persons at the barangay level were selected for the facilitation of the implementation of the project. The project was launched and then the training of the Dengue-Rous Core Group was conducted.

### *Overall training objective*

1. To enhance the capacity of the Dengue-Rous Core Group on Dengue prevention at the community level.
2. To increase community's participation on search and destroy of mosquito breeding and resting places.

Upon completion of the training, the Dengue-Rous Core Group is expected to:

1. Acquire the knowledge, skills and capacity to deliver effective dengue prevention at the community level with an end-goal of reducing dengue incidence.
2. Enhance awareness and build the capacity of each household to regularly practice search and destroy of mosquito breeding and resting places in their community.

### *Mechanics of the training*

1. Intended participants: Barangay Captain, Barangay Kagawad for Health, Midwife, Barangay Health Workers, Sitio Neighborhood Organization, PTA president, principal and non-government organizations like women's group on the four Barangays of Sta. Cruz namely Bagumbayan, Santisima Cruz, Gatid and San Jose as members of the Dengue-Rous Core Group.
2. Scope and duration: A whole-day lecture plus three-day implementation, and two-day monitoring and evaluation.
3. Learning activities: lecture-discussion, interactive sessions, return demonstration and actual field implementation.

### *Bases for evaluation*

Attendance and active participation	10%
Assessment test	30%
Return demonstration	20%
Field implementation	40%
Total	100%

Certification: A certificate of participation was awarded to the Dengue-Rous Core Group member that satisfies a minimum Passing level of 70% during the launching of the TALSİK Dengue Project at Barangay Bagumbayan, Sta. Cruz, Laguna.

### *Identification and removal of breeding sites and resting places of mosquitoes*

Ocular survey of the selected barangays was accomplished. A search and identification of potential breeding sites and resting places of mosquitoes were performed, and then the households were informed on the identified breeding sites and resting places of mosquitoes.

Identified containers that may serve as breeding sites for mosquitoes were emptied and dried. Unnecessary containers/objects that may serve as breeding sites for mosquitoes were destroyed and disposed properly. Then, gutters, stagnant waters and surroundings were cleaned.

### *Strengthening communication for source reduction*

Communication through posters and jingle were done. A pre-test was first done on the poster then modifications based on the pre-test were also completed. The poster was reproduced and its coverage was assessed. The lyrics of the jingle were based on the Department of Health (DOH) dengue control program. Then the jingle was

recorded and reproduced on CDs. Sustained advertising was accomplished through the use of mobile speakers. The response of the community was evaluated by using a random survey method through house-to-house visits based on the provided Barangay Sitio spot map. There were 30 respondents per four Barangay's of Bagumbayan, Gatid, Santisima Cruz and San Jose for a total of 120 respondents that were asked to fill-up a survey questionnaire.

### Data analysis

Analysis of the data was carried out using Microsoft excel 2007. The information gathered from the respondents was presented using frequency counts, tables, graphs and percentages.

## RESULTS

### The making of Dengue-Rous Core Group

The Core Group was formed by 32 members from different sectors of the four barangays (Figure 1). Their accompanied duties and responsibilities are written below:

1. Barangay Captain
  - Convenes and presides in Dengue-Rous Core Group meetings
  - Attends key activities of Dengue-Rous Core Group
  - Advocates for effectively coordinating the implementation of the dengue prevention program.
  - Ensures that the dengue prevention are integrated in the barangay health plan
2. Barangay Kagawad for Health
  - Supervises the Dengue-Rous Core Group activities at the barangay and Sitio levels
  - Ensures that the planned activities are carried-out
3. Midwife
  - Coordinate with the Barangay Kagawad for Health and Barangay Captain for the implementation of the dengue prevention.
  - Supervise the Barangay Health Workers on conducting advocacy and health promotion campaign
4. Barangay Health Workers
  - Implement the dengue prevention advocacy campaign at the Sitio levels

- Coordinate with Midwife, Sanitary inspectors and Sitio Neighborhood Organization
5. Sitio Neighborhood Organization (SNO)
    - Ensures the active community participation at the Sitio level
    - Conducts surveillance together with sanitary inspectors
  6. Teacher
    - Ensures that adequate information is disseminated among students
    - Coordinate Dengue-Rous Core group activities in School-based Dengue Advocacy Campaign
  7. Sanitary Inspector
    - Evaluates the effectivity of the dengue prevention campaign through consolidation of the activities done by the Midwives and Barangay Health Workers
    - Monitor and evaluate the over-all Dengue-Rous Core Group implementation of Dengue Advocacy and Campaign at the Barangay level
    - Prepares accomplishment reports for the Municipal Health Officer



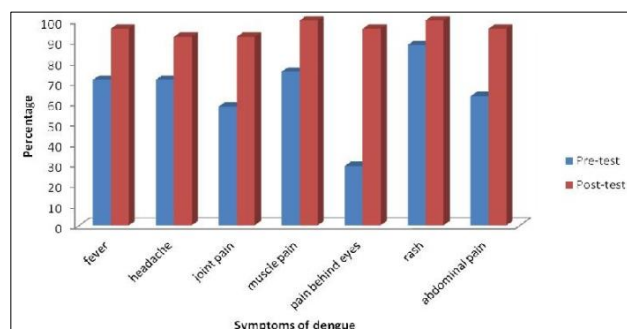
**Figure 1: Dengue-Rous Core Group Organization chart.**

### Results of the training of the Dengue-Rous Core Group

The following graphs showed the results of the Dengue-Rous Core Group pre-test and post-test held at Bagumbayan Elementary School.

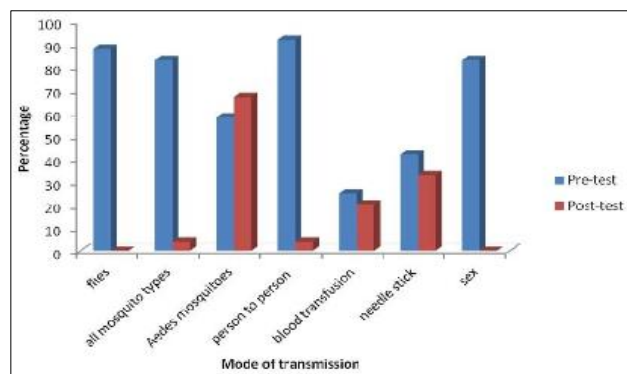
Figure 2 showed the percentage on the knowledge of dengue signs and symptoms among the Dengue-Rous Core Group members. Based on the initial pre-test: rash (88%) was attributed as the prominent sign and symptom of dengue, while the rest are fever, headache, muscle pain, abdominal pain, and joint pain. The least attributed is pain behind the eyes or peri-orbital pain (29%), after

the training it was recognized as a symptom of dengue at 96%. These prominent features of dengue were important to be noted for early detection of suspected dengue cases. In turn, the Dengue-Rous Core Group would be able to explain and impart these to the community.



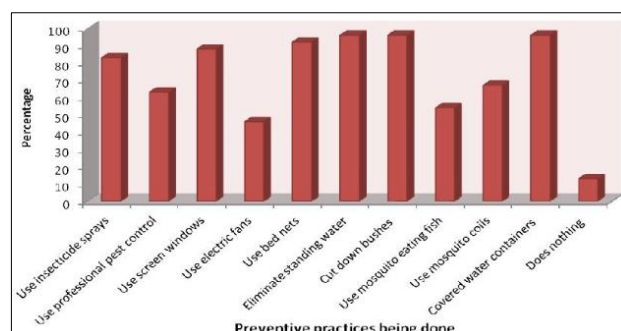
**Figure 2: Percentage of the knowledge on symptoms of dengue among Dengue-Rous Core Group.**

Figure 3 showed the percentage on the knowledge of dengue transmission among the Dengue-Rous Core Group members. Initially, most of them regarded flies, all types of mosquitoes like anopheles, person to person contact, and sex can transmit dengue virus. After, the training most of them noted that *Aedes* mosquitoes (87%) like *Aedes aegypti* are the vectors inside the house while *Aedes albopictus* are outside the house or in the rural areas. This is very important on educating the community regarding dengue, by searching and destroying the breeding and resting places of dengue carrying mosquitoes.



**Figure 3: Percentage of the knowledge on dengue transmission among Dengue-Rous Core Group.**

Figure 4 showed the preventive practices known by the Dengue-Rous Core Group based on a multiple response, most of them noted that use of insecticide sprays (83%), use of professional pest control (63%), screening of windows (88%), use of mosquito bed nets (92%), elimination of standing waters (96%), cutting down of bushes and shrubs (96%), and covering of containers (96%) are ways of preventing dengue-carrying mosquitoes while only 13% has no particular dengue preventive practice.



**Figure 4: Preventive practices against dengue among Dengue-Rous Core Group.**

### **Identification and removal of breeding sites and resting places of mosquitoes**

The response of the community on the TALSIK Dengue project of building community capacity for source reduction through physical removal of breeding sites and clearing of resting places of mosquitoes was evaluated by using a random survey method through house-to-house visits based on the provided Barangay Sitio spot map. There were 30 respondents per four Barangay's of Bagumbayan, Gatid, Santisima Cruz and San Jose for a total of 120 respondents that were asked to fill-up a mosquito source reduction survey of containers and identification of breeding and resting places. A questionnaire was provided that asked them to list: what are the possible breeding sites inside and outside the house and possible natural resting places of mosquitoes.

The survey of containers inside the house done by the Dengue-Rous Core Group during their actual field implementation identified a total of 1139 containers without cover. Most of them listed: bottles (15%), drums (10.3%), jar (9.5%), tin cans, jugs, and flower vase. The barangays of Sta. Cruz has no regular water supply, hence the community store water in containers of which most were without cover. On the other hand, a total of 1,555 containers outside the house with cover and without cover were identified. The types of containers without cover were bottles (29%), followed by tin cans (16%), both tires and drum (12%), flower vase (5%) and jars (4%). Thus, the Dengue-Rous Core Group should be vigilant in the dengue campaign to ensure that all water holding containers present in the surroundings of each household would have covers or at least turn upside down to prevent mosquitoes from laying their eggs. The community on each household should practice the advocacy campaign of the Dengue-Rous Core Group in ensuring containers would not be a source of breeding and resting place for mosquitoes.

The source reduction survey of natural containers such as plant axils, trees, coconut husks, bamboo and other natural containers at the four identified barangays was also done by the Dengue-Rous Core Group during their actual field implementation. A total of 708 natural



containers were identified. The types of containers without cover are mostly plant axils (57%), followed by coconut husks (19%), bamboo stumps (11%) and tree holes. This showed that the natural containers like coconut husks are the likely breeding and resting place of mosquitoes. It has implications as dengue-carrying mosquitoes abound outside the house, especially during different weather conditions. Thus, the Dengue-Rous Core Group should be vigilant in the Dengue campaign in each Sitio on activities like Brigada Kiti-Kiti, Sabayang Linisan, and Four o'clock habit to search and destroy the natural containers of dengue-carrying mosquitoes.

### Strengthening communication for source reduction

#### A. Response of the community on the dengue poster

The poster (Figure 5) was designed as simple as possible for easy understanding and reproduction. It showed two individuals being attacked by dengue carrying mosquitoes with a caption "*Sa isang Kagat ng lamok, Pwede kang matigok*" (In just one mosquito bite, you can die). The Dengue Poster was unique, easy to recall and can convey the message effectively on dengue awareness and prevention. It was initially pre-tested during the training done in Bagumbayan Elementary School, with minor modifications done, prior to reproduction of the actual poster for dissemination during the actual Sitio visits.



Figure 5: The Dengue Poster.

Table 1 showed the response of the community on the dengue poster. Most of the respondents wrote the message that mosquito bites can kill (50%), keep the environment and surroundings clean (23%), brought by dirty environment (10%) and others. The dengue message on the fatality it can bring would cause the community to act in unison on preventing dengue by cleaning the environment with source reduction of mosquito breeding and resting places.

Table 1: Response of the community (n=120) on the dengue poster.

Response	Frequency	%
<b>What is the message conveyed by the poster?</b>		
Mosquito bites can kill	60	50
Keep the environment clean	28	23
Dirty environment	12	10
Others	20	17
Total	120	100
<b>What are the things you should do after knowing the message?</b>		
Clean the surroundings	53	44
Throw the garbage properly	28	23
Keep away from mosquitoes	10	8
Find breeding places of the mosquitoes	8	7
Wear long sleeves and pajamas	6	5
Others	15	13
Total	120	100

Table 2: Response of the community (n=120) on the dengue jingle.

Response	Frequency	%
<b>What is the message conveyed by the jingle?</b>		
Keep the surroundings clean	66	55
Dengue prevention	48	40
Search and destroy	4	3
Dengue can kill	1	1
Always use bed nets	1	1
Total	120	100

With the regards on the things you should do after knowing the message, most of them responded by cleaning the surroundings (44%), throwing garbage properly (23%), keeping away from mosquitos (8%), finding breeding places of mosquitos (7%), and wearing long sleeves and pajamas (5%). Based on the results, the community regard that a clean environment would have less dengue-carrying mosquitos. Thus, the Dengue-Rous Core Group should increase the Dengue advocacy campaign on finding the breeding places of mosquitos as provided in the first - S or search and destroy Kontra Sa Dengue of DOH, and keeping away from mosquitos like wearing of long clothings on the second - S or self-protection measures.

#### B. Response of the community on the dengue jingle

Table 2 showed the percentage response of the four Barangays of Bagumbayan, Gatid, Santisima Cruz, and San Jose on the message conveyed by the Dengue jingle after a random survey of respondents was done. The respondents were asked to write down all their ideas and opinions upon hearing the Dengue jingle most of them wrote keep the surroundings clean (55%), dengue prevention (40%), search and destroy, dengue can kill, and always use bed nets. The dengue message can bring

the community to act in unison on preventing dengue by cleaning the environment with source reduction of mosquito breeding and resting places.

## DISCUSSION

The Dengue-Rous Core Group members were determined based on a multi-sectoral team approach on dengue prevention.<sup>3,4</sup> We noted based on our readings that dengue requires community participation to effectively combat the factors that propagate dengue such as cleanliness, sewerage, household protection and community's knowledge and awareness on dengue prevention that is practiced regularly.<sup>5,6</sup> Hence, the Barangay Captain, Barangay Kagawad for Health, Midwife, Barangay Health Workers, Sitio Neighborhood Organization, PTA president, Principal and Non-government organizations like women's group were tapped to be members of the Dengue-Rous Core Group, in order to increase community's participation on Dengue prevention.

The training is based on a competency need of the Dengue-Rous Core Group and its effectiveness in enhancing community's appreciation of the need for a multi-sectoral approach on combating dengue. Hence, knowledge and awareness is transformed into practice. The training methods are deemed necessary to effectively grasp the information and time for clarification such as open forum is encouraged. Sharing of inputs and experiences with advocacy campaign is also noted. The evaluation of the training is based on an administered pre-test and post-test after the conduct of training.<sup>7,8</sup> Results showed an increase in the knowledge of the participants. A return demonstration activity was also done in order to determine if the concept can be properly applied in the actual setting such as Sitio visits for the larval survey, search and destroys of mosquito breeding and resting places. The conduct of advocacy campaign on dengue was also observed.

The implementation phase served as the actual and regular activity of the Dengue-Rous Core Group of effectively conveying the Dengue training at the community level. This was done per Sitio in order to increase its reach to the remote locality. Hence, people's participation on activities with regard to dengue such as Brigada Kiti-Kiti, four o'clock habit, Sabayang Linisan, search and destroy at the household level can be regularly done.

The aim of the dengue poster and jingle to strengthen communication for source reduction was successfully met. This can be supported by the positive response of the community to these mediums of communication. People in the community were empowered to act right away and showed willingness to support the advocacy of the Dengue-Rous Core Group.

Our findings must be interpreted in the light of several potential limitations. The most apparent of which may be the fact that a cross-sectional survey assesses relationships based on one point in time and it does not account for the dynamics of relationships between variables evaluated. Besides, it is possible that since the survey was random based on the spot map provided the sample size  $n=120$  might be small for the total household population. Also the use of survey questionnaires, some participants would provide socially desirable responses to some questions. Thirdly, the small sample size may have limited our ability to detect associations that were small and moderate in magnitude and yielded responses that lacked precision.

Furthermore, the time constraints of the field practice during its actual implementation would affect the results since behavioral changes like strengthening the capacity of the Dengue-Rous Core Group would take time as well as on enhancing community's practice on source reduction of mosquitoes.

In conclusion, we submit that in spite of our study limitations our findings highlight the need for further information, education and communication on source reduction of mosquitoes. Identifying barriers to action and to seek ways to translate population knowledge about dengue into positive preventive practices that would ultimately reduce the transmission of dengue-carrying mosquitoes are deemed essential.

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## REFERENCES

1. WHO Representative Office. Dengue in the Philippines, 2015. Available at: [http://www.wpro.who.int/philippines/areas/communicable\\_diseases/dengue/continuation\\_dengue\\_area\\_page/en/](http://www.wpro.who.int/philippines/areas/communicable_diseases/dengue/continuation_dengue_area_page/en/). Accessed 14 May 2015.
2. World Health Organization Western Pacific Region. Emerging disease surveillance and response, 2015. Available at: [http://www.wpro.who.int/emerging\\_diseases/annual\\_dengue.data.wpr/en/](http://www.wpro.who.int/emerging_diseases/annual_dengue.data.wpr/en/). Accessed 14 May 2015.
3. Parks W, Lloyd L. Planning social mobilization and communication for dengue fever prevention and control: a step-by-step guide. World Health Organization, 2015. Available at:

- [http://www.who.int/immunization/hpv/communicate/planning\\_social\\_mobilization\\_and\\_communication\\_for\\_dengue\\_fever\\_prevention\\_and\\_control\\_who\\_cds\\_wmc\\_2004.pdf](http://www.who.int/immunization/hpv/communicate/planning_social_mobilization_and_communication_for_dengue_fever_prevention_and_control_who_cds_wmc_2004.pdf). Accessed 20 May 2015.
4. World Health Organization. Report of the informal consultation. Strengthening implementation of the global strategy for dengue fever/dengue hemorrhagic fever prevention and control, 2015. Available at: <http://www.who.int/csr/resources/publications/dengue/whocdsdenic20001.pdf>. Accessed 20 May 2015.
  5. Lennon J. Students' perceptions about mosquito larval control in a dengue-endemic Philippine City. *Dengue Bull*. 2004;28:196-206.
  6. World Health Organization and Special Programme for Research and Training in Tropical Diseases. Dengue guidelines for diagnosis, treatment, prevention and control, 2009. Available at: <http://www.who.int/tdr/publications/documents/dengue-diagnosis.pdf>. Accessed 22 May 2015.
  7. Shuaib F, Todd D, Campbell-Stennett D, Ehiri J, Jolly P. Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. *West Indian Med J*. 2010;59(2):139-46.
  8. Ahmed I, Abdullah K, Sunniya J, Mahwash K, Hassan K, Sannia J, et al. Knowledge, awareness and practices regarding dengue fever among the adult population of dengue hit cosmopolitan. *PLoS One*. 2008;3(7):e2620.

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