

A Tool to Measure Parameters of Sustainable Behavior in Dengue Prevention and Control Activities - A cluster randomized controlled trial

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Abstract

Background: Dengue, dengue fever (DF) dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), is the fastest re-emerging viral public health problem in the world. It has a negative burden on health, economy and environment of individuals and countries. In the recent years, the disease infecting up to 50-100 million people each year worldwide (World Health Organization, 2012b). There has been dramatic increase of cases of dengue in tropical and subtropical regions around the world, especially in South East Asia. Some 2.5 billion people – two fifth (40 %) of the world's population are now at risk of dengue (World Health Organization, 2012a). In Malaysia, dengue cases are increasing each year. Re-emergence of dengue has become global threat to public health. In the absence of an effective vaccine, the only option is vector control to reduce viral transmission of dengue. It is only possible by achieving sustainability in behavior change in dengue preventing practices. The aim of the study is developing a tool to measure parameters of sustainable behavior in dengue prevention and control activities in a cluster randomized controlled trial in rural area of Malaysia.

Methods and design: The study will adopt randomized community trial. One district would be define as one cluster. Among 6 clusters (districts) two clusters will be selected randomly. From each cluster two blocks will be selected respectively, in which the observational units will be 48 houses. The houses will be selected by means of a draw from between approximately 100 houses in two randomly selected districts of Segamat, Johor, Malaysia. The localities of dengue affected areas with urban and rural context would be selected. The urban and rural groups would be identifies on the basis of socio economic conditions of the habitants and access to public services. The 48 houses would be grouped in two blocks, in accordance to type of received intervention: Block (B) urban group will be consisted of 24 houses. Within block (B) 12 houses will be applied environmental health education (EHE) campaign other 12 house will be control group. In Block (A) rural 12 houses would be receiving EHE and remaining 12 houses would not receive any type of treatment (control group). Structural questionnaire will be used at baseline, 3 and 12 month follow ups in order to assess changes in behavior.

Discussion: Many studies have been carried out for sustainable behavior in dengue prevention and control to date, however this would be the first trial to develop a tool to measure the parameters of behavior change.

Key words: Dengue, sustainable behavior, rural, community, interventionu

1. Background:

Dengue, dengue fever (DF) dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), is the fastest re-emerging viral public health problem in the world. It has a negative burden on health, economy and environment of individuals and countries (Gibbons & Vaughn, 2002). In the recent years, there has been dramatic increase of cases of dengue in tropical and subtropical regions around the world, especially in South East Asia. Some 2.5 billion people – two fifth (40 %) of the world's population are now at risk of dengue (World Health Organization, 2012a). The disease infecting up to 50-100 million people each year worldwide (World Health Organization, 2012b). According to health minister of Malaysia, dengue is triple this year as compare to 2013. In the absence of an effective vaccine; the only option is vector control to reduce viral transmission by environment management.

Many social, ecological and biological factors are contributing in expansion of DF. These factors are climate change, globalization, population growth and urbanization. These can be categorized as abiotic (e.g. temperature and rainfall) and biotic (e.g. plants and animals) factors. Human behavior, influenced by these factors can increase or decrease the risk of dengue infection (Heintze, Garrido, & Kroeger, 2007). Others factors like lack of political will to intervene, and limited financial and human resources to implement effective control measures are also responsible for dengue expansion (Erlanger, Keiser, & Utzinger, 2008). Many studies are in consensus that transmission of dengue viruses is due to epidemiological and ecological nature of the disease. Such dengue transmission is result of association of human beings with dengue viruses and ecosystem. The biotic and abiotic factors have both direct and indirect influence on dengue transmission (Bonet et al., 2007). A study which was carried out in rural area of Malaysia showed that dengue is always related with environmental and socio-cultural practices (Shepard, Undurraga, & Halasa, 2013). Furthermore, demographic, societal changes and lack of awareness of prevention practices have contributed to increase dengue outbreak activity. That is why; there is need of behavior change activity for sustainability. A set of environmental and socio demographic parameters can be useful. Investigation into such socio demographic, environmental perspectives to measure can provide in depth understanding of dengue control efforts. The investigation of epidemiology and ecology of disease can provide foresight to identifying the vital drivers that are significantly contribute to dengue transmission

in an environment. The finding of this study would benefit to effective management solutions at policy level in an ever-changing environment.

At the same time, KAP studies are also significant. Dengue KAP surveys have frequently been used to describe knowledge, attitudes and practices of the community towards prevention of dengue (Acharya, Goswami, Srinath, & Goswami, 2005; Itrat et al., 2008; Suwanbamrung, 2012). They identified knowledge gaps, cultural beliefs or behavioral patterns that form barriers for action. The information can assist in the design of promotion activities (Heintze et al., 2007). A review on dengue prevention studies indicates that there is little evidence on how information from KAP surveys was used to plan for subsequent participatory strategies (Heintze et al., 2007). However, they have been used as a tool to assess the effectiveness of health education programs and community based strategies (Espinoza-Gómez, Moises Hernández-Suárez, & Coll-Cárdenas, 2002). While education campaigns have increased people's knowledge on dengue, it remains unclear to what extent this led to behavioral change and actually reduced mosquito populations (Parks et al., 2004).

Moreover, KAP studies indicate that the relationships between determinants of human behavior with bearing on the control of *Ae. Aegypti* are complex (Elder & Lloyd, 2006). Some studies used regression models to examine the direct relationships (Acharya et al., 2005; M.E. Toledo et al., 2007) of human behavior and vector control. However, the challenge is to assess the direct and indirect effects of the determinants on sustainable behavior. Therefore for assessing the behaviors, it is necessary to select by-products of behaviors instead of an observation of behavior (Elder & Lloyd, 2006). Latent variable structural equation modeling provides a tool to assess by-products of behavior. It allows for the quantification and testing of hypothesized relationships among latent and observed variables (MacCallum & Austin, 2000). The study aims to develop an indicator to measure the parameters of sustainable behavior to assess the sustainable behavior by using latent variable structural equation. These indicators will help to measure whether or not the behavior has taken place (Elder & Lloyd, 2006) and to what extent it has been carried out.

In addition, community participation is essential component (Castro et al., 2013; Maria E. Toledo et al., 2011) in vector control programs. Multi-disciplinary approaches using intra sectorial strategies ensuring active participation found to be most effective (Arunachalam et al., 2010; Sommerfeld & Kroeger, 2012). It is growing consensus that community's active

participation and modification of human behavior at house are effective in dengue vector control. WHO has suggested an approach known as COMBI (Communication for-Behavioral-Impact) in the design and implementation of behaviorally-focused social mobilization and communication program(*Planning social mobilization and communication for dengue fever prevention and control*, 2004).The studies (WHO, 2013; Nazir, 2013 ; Muhammad et al, 2010; Muzrorzh, 2010) using COMBI planning tool found successful in getting desired result in short term. It is found that many research studies (Rehman Al Dubai, 2013; Wong 2013; Redman et al 2013) have been carried out to control dengue in Malaysia by using COMBI planning tool. It is claimed that these piloted projects were basically successful in behavior change in dengue control. Expansion of COMBI as a community-based intervention in dengue control is proven to be effective for short-term but the sustainability of behavior by COMBI in long- term remained challenging (Muhammad et al,2010).

It can be conjecture that sustainability continues motivation of health personals and community is needed. The motivation lost with passage of time. There for finding a set of parameters for measuring sustainable behavior is very important. By developing a tool to measure the parameters, would be helpful for health personals and policy makers to identify at which level people relapse to previous practices. It would be helpful for reinforcement for dengue prevention at specific period of time.

2. Aim of Study

Developing a tool to measure parameters of sustainable behavior in dengue prevention and control activities

Objectives

1. To examine the socio-demographic determinants of dengue in communities
 - a. To assess the socio economic and demographic settings in local communities where dengue is highly prevalent
 - b. To investigate the KAPs of community members with regard to dengue control activities
2. To investigate entomological-environmental indicators that impact dengue prevalence in communities
3. To evaluate health promotion educational campaigns in local communities
 - a. What health promotion education programs have so far been implemented?
 - b. When these health programs have been implemented?

4. To develop additional or supplementary educational material for Health Promotion in local communities.
5. To investigate the effect of educational campaigns on larval indices in community based dengue prevention programs
6. To evaluate differences in key parameters responsible for behavior change over a period of time

3. METHODOLOGIES

. Method

This study will use a mixed methods (Tashakkori & Teddlie, 2003) design. It is a procedure for collecting, analyzing and “mixing” both quantitative and qualitative data at some stage of the research process within a single study, to understand a research problem more completely (Creswell, 2002). The rationale for mixing is that neither quantitative nor qualitative methods are sufficient by themselves to capture the trends and details of the situation, such as social context, community dynamics, and eco system characterization. The study will adopt randomized community trial (Espino et al., 2012a; Kamali et al., 2002). It has already been implemented in one of the South East Asian countries (Philippine), having the similarities in environmental conditions and demographic factors as Malaysia (Espino et al., 2012b). One district would be defined as one cluster (Arunachalam et al., 2010). Among 6 clusters (districts) two clusters will be selected randomly. From each cluster two blocks will be selected respectively, in which the observational units will be 48 houses (Espino et al., 2012b). The houses will be selected by means of a draw from between approximately 100 houses in two randomly selected districts of Segamat, Johor, Malaysia. I will select the localities of dengue affected areas with urban and rural context. The urban and rural groups would be identified on the basis of socio economic conditions of the habitants and the access to public services. The 48 houses would be grouped in two blocks, in accordance to type of received intervention: Block (B) urban group will be consisted of 24 houses. Within block (B) 12 houses will be applied environmental health education (EHE) campaign other 12 house will be control group. In Block (A) rural 12 houses would be receiving EHE and remaining 12 houses would not receive any type of treatment (control group).

. Research Design

The study will be in two stages. First stage would be situational analysis. Second stage would be design as an intervention strategy.

Flow Chart of Randomized Selection of Observation Units

Rural Area		
n=6		
Randomized		
2 clusters		
Block 1		Block 2
Observation Units 48 Houses		
allocated	Experimental group 24 houses	Control group 24 houses
Intervention	EHE 24 houses	No intervention 24 houses
Follow up	KAP 24 house	KAP 24 houses

STAGE 1 (Surveys and Focus Group Discussion)

Baseline surveys (entomological survey and KAP survey) will be carried out in both blocks (A, B). Focus group discussions (FGDs) would be carried out in both blocks with experimental groups.

- **Entomological Survey**

An entomological survey/House Index (HI) for surveillance of the *Aedes aegypti*, as recommended by the Pan American Health Organization, will be conducted. In which a trained staff members will use pilot tested instrument for data collection (Arunachalam et al., 2010). Inspection will be done in rooms, bathrooms and patios, looking for any type of receptacle with water, with the help of a hand lantern. Only wet containers will be registered and the presence of at least one larva, in any instance, will be considered positive in a nominal form. Of the positive containers, a sample of larvae will be taken to determine the specie and to confirm the presence of *Aedes aegypti*. All data will be recorded in form (Appendix A).

- **House hold survey**

Simultaneously to the entomological survey, a demographic, knowledge, attitude and practice survey will be carried out. As KAP have been used to evaluate communities knowledge attitude practice and demographic information (Sommerfiled, 2012; Lloyed,1992) and to evaluate educational campaigns(Espinzo, et al 2002). Questionnaire would be developed (Appendix B) and piloted, in accordance with the outlines recommended by Rosembaun. After pilot testing the questionnaire , the corrections will be done if found necessary, and agreed on final version will administered to the most senior household member in both Blocks (AB). The interviewers will use the structured questionnaire to obtain information on interviewees' demographic characteristics, their knowledge about dengue and its prevention, and their perceptions of and attitudes towards dengue risk and current dengue prevention efforts. There will be also questions about environmental factors. An observational checklist will also be used to gather additional information.

Every respondent will be interviewed with a predesigned questionnaire. Informed consent (written) will be taken from all the respondents and confidentiality will be ensured throughout the study. Prior to use of the KAP questionnaire, the questionnaire will be translated into local language (Malay, chines and Tamil) by a research assistant and then back-translated to English by experts, who are fluent in the English and local languages. The experts who are fluent in local languages and English compared the two English versions and resolved any discrepancies by editing the translated version to match the original English version. Face-to-face interview will be based on a pretested questionnaire which is divided into five sections which included: 1) socio-demographic characteristic 2)source of information about dengue 3) knowledge about dengue infection 4) attitudes towards dengue fever 5) preventive practices

against dengue and . Modified Kuppuswamy scale (Bairwa ,2013) will be used to ascertain the socio-economic status of the family (Appendix C). People who failed to respond to all questions or who left before completing the interview will be excluded. To ensure reliability, the questionnaire will be thoroughly discussed with the interviewees before collecting data.

Statistical Analysis

Data will be stored and analyzed using R program. Data cleaning will be performed.

Descriptive statistics:

Normally distributed quantitative data will analyzed by means and standard deviation. Data that are not normally distributed will be reported by median and inter quartile range. Qualitative data will be reported by frequency distributions and percentages.

Multivariate analysis:

Our primary goal is developing tool to measure parameters of behavior by comparison of experimental and control group. As the study involves a pretest, repeated measures and clustering, data will be analyzed with latent variable structural equation.

- **Focus Group Discussions (FGD) (Appendix F)**

A focus group discussion (FGD) is an in depth field method that brings together a small homogeneous group (usually six to twelve persons) to discuss topics of a specific study. A FGD would be conducted in both blocks. The purpose of this discussion would be to use the social dynamics of the group, with the help of a moderator/ facilitator, to stimulate participants to reveal underlying opinions, attitudes, and reasons for their behavior towards dengue prevention practices.

The discussion will be conducted in a relaxed atmosphere to enable participants to express themselves without any hesitation. Participants would be member of a target subgroup. The discussion will be led by a trained moderator/facilitator, assisted by an observer who will take notes and arranges any tape recording.

- **Ethics Statement for FGD**

Participation in this study will be on voluntary and all participants will be provided written informed consent. All information will be collected anonymously and the outcomes will be used for research purposes only.

- **Study Sample**

A sample of multi-ethnic Malaysian citizens with diverse educational and socio-economic backgrounds (six to twelve) will be recruited in one group. Twelve focus group discussions, six in each block will be conducted for complementing the information obtained from individual interviews. Combining complementary information from varied sources will ensure a high level of internal validity providing more reliable results. The first step will be the recruitment of focus group participants through personal contacts by research assistants'. The target participants will be selected based on the convenience sampling method from both blocks (AB). Participants will be recruited by eligibility using the following inclusion criteria:

- i) Aged 18 years or over
- ii) Willing and able to provide written informed consent
- iii) Living in the Segamat
- iv) Malaysian citizen

Subsequently, the focus group participants will be asked to help in approaching us to other participants, they know who also meet the inclusion criteria, such as their friends or relatives via snow balling sampling method.

Study Design

Stage 1(base line survey)				
Activities	Time	Control group	Intervention group	Who does it
Entomological survey	Three weeks	Yes	Yes	Entomological team
House hold survey	Three weeks	Yes	Yes	Volunteer groups
FGD	Two weeks	Yes	Yes	Volunteer groups
Stage 2 (intervention)				
EHE	Six Months	No	Yes	Volunteer groups
Stage 3 (follow up)				
KAP	Three months	Yes	Yes	Volunteer groups
KAP	Three months	Yes	Yes	Volunteer groups

Data Collection

Type of data	Sources of verification	Objectively verifiable indicators	Expected outcomes
Pre intervention Entomological survey	Field collections/observation	No of mosquitoes present in observation units	To check the density of adult mosquito
Post intervention Entomological survey	Field collections/observation	No of mosquitoes present in observation units	Reduced the density of adult mosquito
FGD	semi-structured focus group guide	Scores of semi-structured focus group guide	To know the knowledge and practices of community on dengue control
Pre intervention Household survey KAP	Questionnaire	Scores of interview questionnaire	To know the community's knowledge and practices on dengue control
Post intervention Household survey KAP	Questionnaire	Scores of interview questionnaire	To know the community's knowledge and practices on dengue control

- **Data Collection (FGD)**

A semi-structured focus group guide (Lloyd, 1994), corresponding to the research questions will be developed under the supervision of experts (Appendix F). This semi-structured guide will allow the researcher to pose questions that flowed from one issue to the next. The guide will be consisted of questions about

- i) the meaning of DF and general knowledge about dengue prevention and treatment, 2) attitudes about dengue with probes on perceived severity and susceptibility of dengue, 3) prevention practices and barriers to prevention and sustainable behavior 4) Environmental management 5) health promotion educational campaigns 6) What health promotion education programs have so far been implemented? 7) When these health programs have been implemented? 8) Developing EHE materials

Discussion probes will be developed to facilitate discussion on barriers to prevention and sustainable behavior. Focus group discussions (FGDs) will be conducted in community settings and at places that will be convenient for the participants, such as their home or workplace. Groups will be separated into the three main ethnic groups of Malaysia, Malay, Chinese and Indian and will be conducted in the local languages of the participants. Besides ethnic diversity, participants representing a broad array of socio-economic backgrounds within each ethnic group will be recruited to allow exploration of differences in groups from different socio-economic backgrounds.

Written informed consent will be obtained from all participants prior to the FGDs. All discussions lasted approximately 40 minutes, and were audio-taped and transcribed verbatim. FGDs conducted in languages other than English will be forward translated into English. Notes taken by the moderator and note taker will supplement the audio-taped transcripts to glean details from the discussion. After group discussion, a brief questionnaire will be administered to participants to gather information regarding their demographic backgrounds. EHE activities would be developed after getting information through surveys to developing positive attitude. It is expected that these activities result as positive change in dengue prevention practices which will followed as reduction in the number of cases of dengue.

- **Data Analyses (FGD)**

The sampling process, data collection and analyses will be continuous and iterative. All group discussions will be immediately analyzed and compared with the analysis of the previous discussions, which, in turn, further will shape the subsequent sampling, data collection and analysis. The FGDs will continue until data saturation will reach or no new information will uncover. After transcription and cleansing, the transcripts will be converted to rich text format and imported into NVivo software for coding and categorizing (Richards, 1999)

A directed content analysis approach will be used to analyze the data and to identify key themes. Open coding will be employed to identify themes emerged under the concept, and more specific axial codes will thereafter develop from the open codes (Strauss et al, 1998). The codes will be analyzed using an interpretive descriptive method, where interpretive description goes beyond a mere description and aims to provide an in-depth conceptual understanding of a phenomenon (Neergaard et al, 2009). Coding will be performed by a single coder. Finally, the data will be interpreted and presented using the participants' own words as illustrations.

- **STAGE 2**

Intervention in Block A&B

In both blocks community involvement will be certain through environmental health education (EHE) activates for six months. The need base environmental friendly activities will be design after situation analysis and group discussion. The analysis will be guided by the five criteria proposed by Rifkin for appraising community participation. Environmental health education (EHE) strategies will be formulated with coordination of community. The role of the EHE will be to make people aware of the signs and symptoms of dengue, its mode of transmission and how to avoid infection. This enables residents to complement the vector control activities by reducing mosquito breeding sites. The EHE will be implemented by volunteer groups in community.

Objective

To increase the awareness of the community about prevention and control of dengue.

Activities

Development of a training forum and the production of training materials for community-based vector control projects.

1. Expected results:

- EHE materials developed and disseminated to target groups by volunteers.
- increase awareness in the community of dengue and active participation in prevention and control activities
- change in behavior regarding dengue prevention
- sustainability in behavior
- reduction in Aedes indices
- reduction in the number of cases of dengue
- **Evaluation and Monitoring Indicators:**

For monitoring and evaluation, KAP survey will be carried out after three months and follow up will be done after six months of the anti-dengue campaign.

KAP questionnaire and entomological survey will be administered again to check the effectiveness of intervention in terms of sustainability in behavior in both blocks after six months. For monitoring and evaluation, tools would be developed according to the guidelines of

DFID (2002). All tools will be piloted before administering them in actual population (WHO, 2004).

4. Ethics Statement

Participation in this study will be on voluntary. All participants will be provided written informed consent. Information will be collected anonymously. It will be make sure that the outcomes will be used for research purposes only. The study will be approved by SEACO, Monash University. It is further asserted that while conducting the research study; I will follow the guidelines of the Ethical Review Committee (ERC) of the University.

5. Discussion

To our knowledge, this is the first trial develop a tool to measure a set of parameters measure the sustainable behavior of dengue fever. The study area is fairly suitable for the current study as the diseases is currently prevalent in the selected communities. We are also familiar with the study area. It was decided to set the trial in rural area for several reasons: rural areas are often neglected in terms of national health policies which is reflected in reports on global rural-urban disparities for access to safe water and improved sanitation (WHO, 2013); dengue control primarily takes place in urban areas, although dengue transmission is also a problem in rural areas (Schmidt et al., 2011; Vong et al., 2010)

In addition to that it would be make sure that health education material and strategies would be practical, and their messages consider actual conditions of communities that are recipients of the materials. When introducing dengue vector control strategies, in communities participating in research, approaches need to be adaptable. Community responses of cluster A and B might be as varied as their social and environmental characteristics and community priorities. Engaging communities of different social and economic backgrounds to participate in dengue vector control activities is a skill that would be considered during implementing dengue control program. It's worth noted that this perspective would be integrated into the frame work of behavioral models in dengue disease control. The key is to understand the context of the behavior and to respond adequately.

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STAGE 1 APPENDIX

Appendix A

Guidelines for dengue vector surveillance

1. Vector Surveillance

The main purpose of dengue vector surveillance (pupae) is to obtain information regarding dengue vectors, which can be used to control dengue transmission.

The objectives of vector surveillance activities are;

1. To determine the major breeding sites in the environment
2. To utilize data on vector densities and breeding sites to plan and implement control activities.

This survey can be carried out by entomological team and would be entered into a format shown in Table 1. All collected pupae should be identified by Entomological Assistants into species. The Breteau Index, Container Index and House Index should be calculated for each survey carried out.

Indices used for larval surveys

One of the three commonly used indices to measure *Ae. Aegypti* and *Ae. abopictus* will be implemented

a. The House (premises) Index (HI)

Presence of houses or premises positive for *Aedes* larvae. The HI is calculated as follows

$$HI = \frac{\text{No. of houses positive for Aedes larvae}}{\text{No. of Houses inspected}} \times 100$$

No. of Houses inspected

b. Container Index (CI)

Presence of water holding containers positive for *Aedes* vector larvae.

$$CI = \frac{\text{No. of positive containers}}{\text{No. of water holding containers inspected}} \times 100$$

No. of water holding containers inspected

c. Breteau Index (BI)

Number of *Aedes* positive containers per 100 houses in a specific locality

$$BI = \frac{\text{No. of Aedes positive containers}}{\text{No. of houses inspected}} \times 100$$

No. of houses inspected

Activities to be undertaken by surveillance teams during vector surveillance

These surveillance units would be organized in the following manner.

This unit should consist of one Public Health Field Officer and 2 Labourers/Spray machine operators

- i One surveillance unit should survey 25 houses per day.
- ii. Duration of one round should be 2 days. (that means each house is surveyed once in 3 month)
- iii. All relevant information of each house would be included in a data form (already this form has been designed).
- iv. At the end of the week (Saturday) data would be summarized and a weekly report would be prepared.

Special activities

These activities should be carried out by Entomological Teams. Data collected from these activities will help control personnel identify effective control strategies.

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ENTOMOLOGICAL INVESTIGATION

Report of Larval surveys

----- District

Locality:-----

MOH area-----

Date:-----

Address:-----

Type of premises	No of examined	No. positive for Ae.aegypti (A)
Houses		
Commercial sites		
Dumping Yards		
Buliding side		
Others		
Summary of container		
Type of container		
INDOOR Flower vases		
Discardes receptacles		
OUT DOOR		
Tyres		
Water storage tanks		
Water storage barrels		
Ornamental		

Natural palnts		
Roof gutters		
Others		
Index		
House Index		
Container Index		
Breauteu Index		

APPENDIX B

Questionnaire

Part I: Socio-Demographic Characteristics

01. Age.....

02. Gender

Male

Female

03. Marital Status

Married

Divorced

Single

Widow

04. Education Level

Primary Secondary Graduate Postgraduate

05. Employment Status

Employed

Unemployed

Economically Active

06. Occupation

07. Position

Senior ()

Middle ()

Junior ()

08. Income (Ringgits)

() None () 900-1500 () 1500-300 () Above 3001

09. How much total tax are you paying per annum?

10. How many members in your house.....

11. How many children younger than 15yrs of age.....

12. Have you had dengue fever in the last 2yrs?

() Yes () No

13. Any member in your family had dengue fever

() Yes () No

Part II: Source of information about Dengue Fever

11. Have you ever received any information about dengue () Yes () No

12. Select the sources from which you got the information

() T.V () Radio () Newspaper () Magazines

() Leaflets () Friends () Family () others.....

Part III: Knowledge about dengue infection

STATEMENTS	YES	NO
01. The principal mosquito vector for dengue fever is Aedes aegypti.		

02. Dengue fever is a severe, flu-like illness that affects infants, young children and adults		
03. Dengue patients have chills, headache, pain upon moving the eyes, and low backache		
04. Rainy season is the only epidemic season for dengue infection.		
05. Mosquitoes transmitting dengue infection bites only during day time		
06. The mosquito that transmits dengue infection lays its eggs in dirty sewage water.		
07. Empty stagnant water from old tires, trash cans, and flower pots can be breeding places for mosquitoes.		
08. Dengue viruses are transmitted to humans through bites of infective female Aedes mosquitoes		
09. Only method of controlling dengue infection is to combat the vector mosquitoes.		
10. There is no specific treatment for dengue infection and the drug of choice is paracetamol.		
11. Abate sand can be beneficial in killing the mosquito larvae.		
12. Abate sand, if put in the standing water, can help to prevent the mosquito breeding for 3 months.		
13. Stored water containers/tanks for drinking water without being covered should be cleaned every 7days.		
14. I am afraid of getting it dengue fever If one of my family members has DF.		

Part IV: Attitude Towards dengue fever

	Statements	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
1	DF is a disease that cannot be prevented					
2	Eliminating the breeding places is the responsibility of the public health staff and health volunteer.					
3	Only method of controlling or preventing dengue and DHF is to combat the vector mosquitoes					
4	Only smogging is enough to prevent mosquito and no need for other ways. *					
5	Everybody has a chance to be infected with dengue virus.					
6	Person who once got dengue infection cannot get dengue infection again. *					
7	07. It is possible to recover completely from dengue infection.					
8	08. Elimination of larval breeding sources is a waste of time and very complicated					
9	Restricting and checking the availability of potential breeding habits should be conducted every 1-2 times/year.					
10	Strong and healthy person will not get dengue infection.					
11	Sleeping in mosquito net can prevent dengue infection.					

12	You are one of the important people in preventing dengue fever					

Part V: Preventive Practice Regarding Dengue Infection

S.No	Statements	Yes	No	Don't have
1	Do you cover water jars after using immediately?			
2	Do you have a cover in your water tanks?			
3	If there is a mosquito larva in your water tank, do you ever do anything to get rid of it. Which method?			
4	Do you ever examine the mosquito larvae in the flowers pots. How often?			
5	Do you change the water of the indoor plants every week.			
6	Do you ever drain off the water in the plates of the flower pot. How often?			
7	Do you examine any discarded thing that can hold water around your house.			

8	If yes, do you ever put them in the garbage or dispose them.			
9	Do you use mosquito net/mosquito coils in your house. When?			
10	Do you participate when your community has been sprayed fog?			
11	Do you participate in any campaigns of dengue infection in your community?			
12	Do you ever examine the mosquito larvae in water containers in the toilet?			
13	Do you check and clean your roof gutters in the rainy season			

APPENDIX E
OBSERVATION CHECK LIST

S.No	Items	Yes	No	Larva present
1	The housing environment is kept neat and tidy			
2	Dirty water in the flower vases or indoor plants			
3	Water collection on the plates supporting flower pots at home.			
4	Any kind of stored water containers inside the toilet.			
5	There are coconut shells, discarded bottle, cans or anything that can hold water around the house			
6	Dirty water in the containers for pet			
7	Stored water containers/tanks and all the water jars are covered.			
8	Any kind of stored water container in surrounding area e.g unused tyres of vehicles			

APPENDIX F

(Focus Group Discussion)

The 20 open-ended questions that were used to guide the group interviews to identify knowledge and attitudes regarding dengue prevention

1. Usually there are problems in the community that the residents would like to solve. In your community, what would be the most important problems?
2. How do people define an “important problem”?
3. What health problems are important for you?
4. How do you describe dengue, and why?
5. What do people think about or have they heard about dengue in your community?
6. What do you know about dengue hemorrhagic fever?
7. How does the *Aedes aegypti* mosquito relate to dengue and dengue hemorrhagic fever?
8. What do you think when you hear the word “prevention”?
9. How do people think that they can prevent dengue?
10. How does the *Aedes aegypti* mosquito relate to garbage and to containers with stagnant water?
11. How do you define the word “garbage”?
12. What would be the most common containers that could serve as mosquito breeding sites in your community?
13. How could those containers be taken care of or eliminated to avoid mosquito breeding sites?
14. Who would be the persons responsible for taking care of or eliminating those containers?
15. Do you remember previous dengue campaigns? What do you think about them?
16. What kind of message could motivate people to take care of and pick up or eliminate the containers that are breeding sites for mosquitoes?

17. To whom do you think this messages should be directed, and why?
18. Who do you think should be the spokesperson to motivate the community to prevent dengue?
For example, a community person, an actor/actress, a health professional, etc.?
19. What would be the best media to deliver the message, and why? For example, radio, TV, movies, newspapers, magazine, etc.?
20. What would be the best time of the day to deliver the message?
21. What health promotion education programs have so far been implemented?
22. When these health programs have been implemented?

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