



**THE SUSTAINABILITY OF COMMUNICATION OF BEHAVIORAL  
IMPACT (COMBI) PROGRAM IN PREVENTING AND CONTROLLING  
DENGUE FEVER IN KAMPUNG BATANG MERBAU, TANAH MERAH,  
KELANTAN**

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## ABBREVIATIONS

<b>AI</b>	Aedes Index
<b>BI</b>	Breteau Index
<b>CI</b>	Confidence Interval
<b>COMBI</b>	Communication of Behavioral Impact
<b>DF</b>	Dengue Fever
<b>DHF</b>	Dengue Hemorrhagic Fever
<b>DHOTM</b>	District Health Office of Tanah Merah
<b>df</b>	Degree of Freedom
<b>KAP</b>	Knowledge, Attitude and Practice
<b>MOH</b>	Ministry of Health Malaysia
<b>SD</b>	Standard Deviation
<b>WHO</b>	World Health Organization

## ABSTRACT

**TITLE: THE SUSTAINABILITY OF COMMUNICATION OF BEHAVIORAL IMPACT (COMBI) PROGRAM IN PREVENTING AND CONTROLLING DENGUE FEVER IN KAMPUNG BATANG MERBAU, TANAH MERAH, KELANTAN**

### **Introduction:**

Dengue fever is one of the most important arthropod-borne viral diseases. No doubt that the COMBI program has shown its impact in reducing the prevalence of dengue fever in the affected community. However, the sustainability of the program is still questionable in ensuring the area remains free from the dengue outbreak.

### **Objective:**

To evaluate the sustainability of COMBI program towards prevention and control of dengue fever in Kampung Batang Merbau, Tanah Merah, Kelantan.

### **Methods:**

This study utilized a community intervention design. Residents of Kampung Batang Merbau were taken as the subjects. Sample size was determined by comparing the means between two groups of populations which were paired. A self-guided questionnaire was used. Ethical clearance was obtained prior to the start of the study. The comparison data, which was carried out prior to the start of COMBI program, was

obtained from the District Health Office of Tanah Merah. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 12.

**Results:**

One hundred and fifty residents participated in this study. The mean score of knowledge and practice were higher post COMBI program. Mean score of practice and understanding score of COMBI program was positively, directly, linearly and weakly correlated ( $p = 0.016$ ,  $r = 0.197$ ). No significant association between socio-demographic factors and understanding score of COMBI program.

**Conclusion:**

COMBI program was well sustained in preventing and controlling dengue outbreak in Kampung Batang Merbau up to eighteen months after the withdrawal of external support from Ministry of Health Malaysia.

**Keywords:**

Dengue fever; Social mobilization; COMBI; Vector control; Sustainability; Malaysia.

## ABSTRAK

**TAJUK: KELESTARIAN PROGRAM KOMUNIKASI UNTUK PERUBAHAN TINGKAH LAKU (COMBI) DALAM MENCEGAH DAN MENGAWAL DEMAM DENGGI DI KAMPUNG BATANG MERBAU, TANAH MERAH, KELANTAN**

### **Pengenalan:**

Demam denggi adalah salah satu penyakit yang disebabkan oleh virus. Tidak dinafikan bahawa program COMBI telah berjaya mengurangkan kes demam denggi. Walau bagaimanapun, kelestarian program dalam mencegah wabak denggi ini masih menjadi persoalan.

### **Objektif:**

Matlamat kajian adalah untuk menilai kelestarian program COMBI dalam mencegah dan mengawal demam denggi di Kampung Batang Merbau, Tanah Merah, Kelantan.

### **Metodologi:**

Kajian ini menggunakan kaedah intervensi komuniti. Penduduk Kampung Batang Merbau diambil sebagai subjek kajian. Saiz sampel ditentukan dengan membandingkan perbezaan min antara dua kumpulan yang telah dipadankan. Borang soal-selidik telah digunakan di dalam kajian ini. Kebenaran daripada Jawatankuasa Etika USM telah diperolehi sebelum kajian bermula. Data sebelum program COMBI

telah diperolehi dari Pejabat Kesihatan Daerah Tanah Merah untuk dibandingkan dengan data kajian. Data telah dianalisa dengan menggunakan “Statistical Package for Social Sciences” (SPSS) versi 12.

**Keputusan:**

Seramai seratus lima puluh orang terlibat di dalam kajian ini. Min pengetahuan dan sikap adalah lebih tinggi selepas program COMBI dijalankan. Terdapat hubungan yang linear serta positif antara amalan dan pemahaman tentang program COMBI ( $p = 0.016$ ,  $r = 0.197$ ). Walau bagaimanapun, tidak terdapat sebarang hubungan antara faktor-faktor demografik sosial dengan pemahaman tentang program COMBI.

**Kesimpulan:**

Kelestarian program COMBI dalam mencegah dan mengawal wabak denggi adalah terbukti sehingga lapan belas bulan selepas bantuan daripada Kementerian Kesihatan Malaysia ditamatkan.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Dengue Fever

#### 1.1.1 Global Picture of Dengue Fever

Dengue fever (DF) is one of the most important arthropod-borne viral diseases in terms of human morbidity and mortality. Dengue has become an important public health problem in many countries (Rigau-Pérez *et al.*, 1998). It affects tropical and subtropical regions around the world, predominantly in urban and semi urban areas. Worldwide, an estimated 50 million dengue infections occur annually and approximately 2.5 billion people live in dengue endemic countries (WHO, 2006b).

DF is caused by the infection of dengue virus, a flavivirus in the family Flaviviridae. There are four serotypes of this virus: DEN-1, DEN-2, DEN-3 and DE-4. Infection with one dengue serotype provides lifelong immunity to that specific virus, but there is no long-term cross-protective immunity to the other serotypes (Forattini, 2003). Therefore, a person can potentially experience four separate dengue virus infections in a life time. All four serotypes are found co-circulating in Malaysia with DEN-2 and DEN-3 being the most commonly isolated serotypes. This trend shifted in

recent years with DEN-1 and DEN-2 were alternating as predominant serotype (Chee and Abu Bakar, 2003).

Generally, man is the primary vertebrate host and *Aedes spp* mosquito is the primary vector of infection. Two species of mosquitoes – *Aedes aegypti* and *Aedes albopictus* are responsible for transmission of this disease in humans. Both species are adapting to urban and suburban areas. *Aedes spp* is closely associated with human habitation. Larvae are mostly found in artificial containers that may hold water such as discarded tires, buckets, wading pools, flowerpots and blocked rain gutters. The larvae also can be found in natural sites such as discarded coconut shells and tree holes.

### **1.1.2 Various Degree of Severity in Dengue Fever**

Dengue virus infections may lead to DF, Dengue Hemorrhagic Fever (DHF) or Dengue Shock Syndrome. DHF or Dengue Shock Syndrome can lead to death without proper and adequate treatment (da Fonseca *et al.*, 2002). DF is presented with fever, severe headache, pain behind the eyes, muscular and joint pain as well as rash. DHF presents with dengue-like symptoms in addition to hemorrhagic manifestations; for example, petechial skin hemorrhage, hepatomegaly and circulatory disturbances.



At present, there is no specific treatment for dengue and vaccine is still under research and development. The most important method to reduce the incidence of dengue is by eliminating vectors of dengue virus particularly *Aedes aegypti*.

### **1.1.3 Dengue Vector Surveillance**

Prevention and control of dengue mainly involve control of the main mosquito vector, *Aedes spp.* Traditional *Aedes* surveillance methods were based on entomological surveys of container habitats and the calculation of traditional *Stegomyia* indices i.e. the Breteau, Container and House. The Breteau Index (BI) is the number of positive containers per 100 houses, the Container Index (CI) is the percentage of water-holding containers infested with larvae or pupae, and the House Index (HI) is the percentage of houses infested with larvae or pupae (Focks, 2003).

### **1.1.4 Dengue Fever in Malaysia**

DF was first recorded in Malaysia in 1902 while the first case of DHF was described in 1962 during an epidemic in Pulau Pinang. Since then, it is endemic in Malaysia with frequent epidemics especially in the major urban areas. There were four significant outbreaks which occurred in 1973, 1974 and 1982 (WHO, 2007).

The number of reported DF/DHF cases in Malaysia showed an increasing trend i.e. 33,895 in 2004 to 49,335 in 2008. The incidence rate also showed an upward trend from 44.3 cases/100,000 populations in 1999 to 181 cases/100,000 populations in

2007. The highest incidence rate was among the working and school-going age groups (Mahiran *et al.*, 2008). According to press statement by Director-General of Health Malaysia in January 2009, there was an increase in the number of dengue related deaths, from 98 deaths in 2007 to 112 deaths in 2008.

### **1.1.5 Scenario in Tanah Merah**

There were 159 and 269 cases of DF/DHF which were reported in Tanah Merah in 2006 and 2007, respectively. Kampung Batang Merbau reported one case of DF/DHF in 2006. COMBI was adopted as one of the components to prevent and control dengue when there were eight cases of DF/DHF in 2007 in Kampung Batang Merbau.

AI of the Kampung Batang Merbau for 2007 and 2008 was 0.21% and 0.057%, respectively. Unfortunately, AI for 2009 was increased to 0.62%. BI also showed an increment to 0.48 in 2009 comparing to 0.065 in 2008 and 0.22 in 2007. The number of DF case and entomological indices for Kampung Batang Merbau were shown in Table 1.

**Tables 1: Case of Dengue Fever and Entomological Indices**

Variables	Number of Case	Aedes Index (%)	Breteau Index
2005	0	0.27	0.33
2006	1	0	0
2007	8	0.21	0.22
2008	0	0.06	0.07
2009	0	0.62	0.48

## 1.2 Approaches to Dengue Fever and Vector Control

There are two ways to approach dengue fever and vector control in term of reducing the source of transmission. The first and second approaches are vertical and horizontal programs, respectively (Elder and Lloyd, 2006). COMBI is a horizontal program which involves community to participate actively in certain activities. On the other hand, communities are not active partners in the vertical program but rather are passive participants or recipients of the control efforts.

Traditional approaches to dengue prevention and control have been inherited from the vertical program that targeted vector elimination in domestic habitats. Physical (e.g. destruction or other physical manipulation of water-holding containers), chemical (e.g. use of larvicides, spraying with systemic insecticides) and biological

(e.g. use of fish) control methods can be successful if adequate administrative and political support are provided. However, such efforts often result in short-term control as the areas become reinfested in a fairly short period of time. With a few exceptions, subsequent vertically structured dengue vector control programs have been unsuccessful, largely due to poor implementation and inefficient control methods.

Thus, *Aedes spp* control programs shifted from large-scale spraying to community-based programs in 1990s. Breakdown of vertical control programs in the region, decentralization of health services and the lack of technical personnel also contributed to the shift of community-based dengue control (Gómez-Dantés and Willoquet, 2009). *Aedes spp* control programs based on active community participation have been developed in numerous countries, and to date, these integrated approaches appear to be the most effective and cost-effective strategies (Baly et al. 2007).

## **1.3 COMBI**

### **1.3.1 Principle of COMBI**

COMBI is a social mobilization directed to mobilize individual and family towards an appropriate action. It is a process which assimilates varieties of communication interventions to engage individuals and families. COMBI recommends healthy behaviors to the participants and then encourages the adoption and maintenance of those behaviors (WHO, 2006a).

It is an approach well suited for achieving behavioral impact in the prevention, control and elimination of many communicable diseases. WHO has applied COMBI in the design and implementation of behaviorally-focused social mobilization and communication programs for the dengue prevention and control in Malaysia, prevention of lymphatic filariasis in Zanzibar and India, elimination of leprosy in India and Mozambique, and prevention and control of Tuberculosis in Bangladesh and Kenya.

### **1.3.2 COMBI in Malaysia**

Following the success of pilot study of the COMBI program in Johor Bahru in 2001, the program was expanded to other states in Peninsular Malaysia. Malaysia adopted COMBI in 2003 as the national approach to social mobilization and

communication for prevention and control of DF. According to Minister of Health Malaysia, there were 598 localities and 11,892 community volunteers or promoters actively involved in the prevention of the spread of dengue through the COMBI in 2008.

In Kelantan, COMBI was started as an approach for dengue fever prevention and control in 2003 at Kampung Tujoh, Tumpat. Then, the program was widened to another nine districts following the success of the program in Kampung Tujoh. There were 16 localities and 437 volunteers that involved with COMBI in 2008. COMBI for dengue prevention and control was started in Tanah Merah at Kampung Kuala Tiga in 2007. Then, COMBI was implemented at Kampung Batang Merbau in 2008. Currently, Kampung Kelisar in Tanah Merah is running COMBI as one of the component to control dengue outbreak.

#### **1.4 Justification of the Study**

Even though, there were many studies have been carried out to look at the effectiveness of COMBI, but none of them try to look into the sustainability of the program. This study aim is to evaluate the sustainability of COMBI program in preventing and controlling DF in Kampung Batang Merbau, Tanah Merah, Kelantan.

Rationale of this study is to fill in the research gap since there was limited study to evaluate the sustainability of COMBI program towards prevention and control of DF, particularly in Malaysia. Hopefully, this study will help to reduce the incidence of DF in Malaysia.

## CHAPTER TWO

### LITERATURE REVIEW

There is limited published study that evaluates the sustainability of the COMBI or similar community-based vector control for preventing and controlling DF in long period of time. Many studies evaluated the effectiveness of COMBI program immediately post intervention. Those studies agreed the effectiveness of community-based dengue control. Knowledge, attitude and practice (KAP) pre and post project and classical entomological indices such as Breteau, House or Container were used to monitor and evaluate the intervention.

#### **2.1 Evaluation on the Sustainability of Community-Based Dengue Control**

(Heintze *et al.*, 2007) evaluated community-based dengue control programs out of 1,091 papers. They study highlighted that; there was no study that assessed program sustainability until March 2005. They also concluded that community-based dengue control programs with or without other control activities were weak in term of strengthening the effectiveness of dengue control programs.

Then, (Toledo Romani *et al.*, 2007) evaluated the sustainability of the community-based dengue control in Santiago De Cuba two years after the withdrawal of external support. The study found that the intervention effects, which were