

NO-BITE Strategy – Experiences and Lessons Learnt from a Dengue Fever Action Research around the Klang Valley (12/2014)

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ABSTRACT

Since 2013, Dengue fever in tropical Malaysia has skyrocketed. Effective strategies how to curb the disease that accounted for an annual increment of 246% registered cases in 2014, are still at their infancy stage. To fight the problem at its source, attempts to reduce the breeding areas were not yet ground-breaking. Recently, several awareness initiatives have been allocated by the Ministry of Health with a budget allocation of almost 20 million RM during the past year (Bernama, 2014). Assisting this strategy, the paper presented here tries to reflect and find new practical pathways to decrease Dengue cases. In addition, the author envisages the implementation of a holistic plan how to protect ourselves more effectively against any hazardous or non-hazardous bite. The approach elaborated on here based on action theory focuses on how learn from best practice to anticipate bites.

How do former patients of Malaysia respond to Dengue after the severe disease has been cured? Based on the concept of their everyday life experiences with Dengue, this paper aims to explore the understanding of prioritising measures to anticipate and fight the disease. Based on a referring survey of a total of 477 respondents (including 354 former patients), this contribution identifies the level of awareness to Dengue fever in specific and no-bite strategies in general. The research conducted in the Klang Valley differentiates urban, semi-urban and rural residents. Among 46 students, it then tries to determine the readiness to embark on an anti-mosquito strategy in a 2 months observation without and then with intervention of the best-practice measures presented. As a result, it becomes visible that setting up an integrated array of individually adapted measures in our everyday life can reduce the probability to be bitten significantly by 80-90% without making too many sacrifices in terms of preparation and costs.

Key Words: Awareness, Prevention, Healthy Lifestyle

OBJECTIVES

- To provide practical insights and even guidance how to prevent dengue fever by the No-Bite strategy, based on first hand experiences of the affected population of former Dengue patients and Bachelor students.
- To create awareness by making people affected people concerned to be actively involved in the strive to reduce Dengue fever and mosquito bites as an annoying factor of everyday life at all.
- To explore and pre-examine the viability of measures to cure Dengue fever by alternative treatments

Structure

1. Introduction: What is Dengue?
2. Framework: Situational explanation model
3. Methodology: DMAIC
4. Main Research Findings
5. Best Practice for Prevention and Cure
6. Conclusion and Outlook:

1. INTRODUCTION

1.1. WHAT IS DENGUE?

Dengue fever is a flu-like illness that affects human beings, regardless of their race, age and gender (Singapore Government Agency, 2014). The disease appears as a viral infection transmitted by the bite of an infected female *Aedes* mosquito. Bites of all kinds of mosquitoes are considered a nuisance. They use their salivation to coat the surface of the skin of living mammals including humans to consume their blood, which can cause itchiness, even painful red bumps to appear. There are four distinct serotypes of the dengue virus (DEN 1, DEN 2, DEN 3 and DEN 4). Its symptoms appear within 3–14 days (on average 4–7 days) after the infective bite.

When one of the both dengue-type mosquitoes bites a human who is infected with dengue fever, it is believed that only then the mosquito is also infected and becomes a carrier of the virus. Once the mosquito is a carrier, it spreads the virus to other people when biting them. Hence, the mosquitoes carry the virus for their whole lifespan and may infect whomever they bite (N.N., 2014a).

The underlying symptoms can cause high fever, headaches, joint and muscle pain, vomiting and a rash. Most people with dengue will recover within two weeks. Until then, their treatment entails to drink a lot of water, resting and taking non-aspirin, fever-reducing medicines. However, some deviations of Dengue probably when not taken care of, results in *hemorrhagic fever*, which causes bleeding from the nose, gums or under your skin. This is severe Dengue which implies a potentially lethal complication of less than 0.002%. Clinical diagnosis at an early stage and appropriate clinical and traditional treatment often saves lives.

Rather than focusing on detailed medical implications, our study below is not per se about the prevention of Dengue fever. Fogging and awareness campaigns did not yet yield satisfactory results as the disease is still on the rise (N.N., 2014). As humans would not know whether the mosquito that had selected us as their prey as a Dengue-carrier, our study is about an overall strategy of not being bitten at all. For those who suffer from frequent bites, and as a protection just close their doors resulting in hot and low indoor air quality, this work tries to devise a research-based strategy to avoid one of the most obvious annoying time killers which is the mosquito bite.

1.2. HOW IS DENGUE TRANSFERRED INTO HUMANS?

Dengue fever is spread by two types of mosquitoes (Center for Disease Control and Prevention, 2012).

a) The *Aedes aegypti* mosquito is considered the primary vector of dengue. The creature lives in urban habitats and breeds mostly in man-made containers of all sizes. Unlike other mosquitoes, it is hypothesised that the *Aedes aegypti* mosquito is a daytime feeder; its peak biting periods are early in the morning and in the evening before dusk.

b) *Aedes albopictus*, mosquito is easily identifiable by the distinctive black and white zebra stripes on its upper body. As a secondary dengue vector in Asia might follow the same rules as the *Aedes aegypti* type, but the *albopictus* is highly adaptive. Therefore, the *Aedes albopictus* species can survive in colder temperate regions of the Northern hemisphere. Its spread is due to its tolerance to temperatures below freezing, hibernation, and ability to find shelter in microhabitats like logged trees.

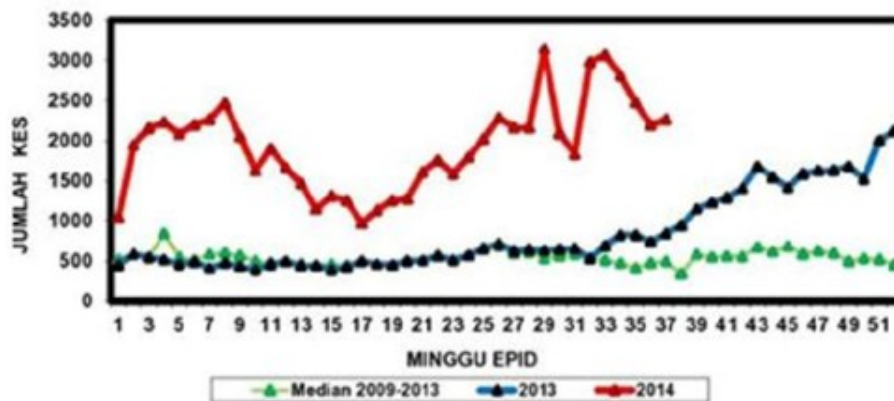
1.3. STATISTICAL DATA

Being an endemic phenomenon of different times in the 19th and early 20th century, the number of Dengue cases has soared dramatically around the world in recent decades. By the resilience of the *Aedes albopictus* 2.5 billion people – over 40% of the world's population – are now at risk of being affected by dengue. The World Health Organization cautiously estimates there may be roughly 50–100 million dengue infections worldwide every year (WHO, 2014).

Not only is the unknown exact number of cases increasing as the disease spreads to new areas. At the same time, probably due to the climate change, explosive outbreaks are occurring. Based on a report by the Malaysian Ministry of Health, the statistics show that in the Western Pacific Region with a whopping increment of 246% compared to the previous year the number of Dengue cases in Malaysia has skyrocketed since 2013. That meant by July 2014, at the tip of the hot season, 46,681 cases had been reported, 87 of them lethal which means almost the same increment of total cases recorded at 222% (Ministry of Health, 2014).

Even recently, in week 37 2014 there has been a 3.3 % increase in the number of dengue cases compared to the previous week. As of 13th September 2014, the cumulative number of reported cases in 2014 accounts for 72,603 cases. The death toll reported is 136 (0.002%). Graph 1 below shows the number of dengue cases by

week comparing 2009-2013 with the recent alarming figures since September 2013-September 2014:



Graph 1: Number of dengue cases by week, Department of Health, Malaysia

2. Towards a Practical Framework: SITUATIONAL EXPLANATION MODEL

The following model presents the variables that enable and encourage mosquitoes to bite human beings. It is expected for our study that by “knowing our enemy” we can get aware and anticipate the danger by multiples more effectively rather than just being victims who “should have known better” to protect themselves. Hence, the author will be using the P-E-S-T-scheme to come up with a model that could relate back into a contingency plan “how to avoid to be bitten at all” at a later stage of the research.

P(erson): Likelihood and frequency of being bitten depends on the person’s attractiveness to the mosquito. For a layman it is not visible whether it is also a matter of blood type, or a skin’s light complexion which is a rather apparent bite enabler. Some of our respondents report that they believe they have a mosquito-friendly skin, and are bitten immediately, while others often remain bite-free. Furthermore, it might still have to be tested during the observation **if a person is once bitten, several other bites are likely to follow during the next days**. Conversely, if there are longer mosquito-bite free periods of time, the person will not face the problem.

E(quipment). A no-bite life costs a small amount of money which nonetheless stands in no relationship not only with the time and costs spent for treatment. Costs also stand for sleepless night hours also in case of dengue-free bites. The interplay of a whole array of tools and gadgets referred to in 5. 46 respondents opined that 69 % of 1,289 bites counted within 2.5 months of self-observation are evitable at normal practice with a minimum of precaution. Systematic relentless BEST EASY PRACTICE might reduce the probability of being bitten (hence proportionally to diminish the spreading of the disease!) by 80-90%.

S(pace): As we will check through our sample, mosquitoes are fond of greeneries and will prefer open air restaurants near to bushes and rivers rather than those in the city's concrete jungle. Back inside our private four walls, if a room is huge, mosquitoes become more uncontrollable rather than in a small room. If the space is airtight, mosquitoes face a hard time to move in especially when the occupants are not in. If it is not, mosquitoes preferably hide themselves in toilets or on dark clothes in sleeping rooms. Even if they do not bite, as they prefer the dark, they seem to creep in to erroneously open bedrooms luring for the occupants to go to sleep. If they have not yet "checked in" during the daytime, lots of air leakages will enable the mosquitoes to pay their free-rider visit during the night especially through the usual gaps at the bottom of the doors from the hallways. Even this is not the main focus, space is considered also a matter of providing or denying breeding ground via stagnant water PLUS decaying leaves or algae. With increasing altitude, upper floors of condominiums might be linearly less exposed to in-flying mosquitoes. Still some make it up, and open-window experiments in 23rd and 29th floors of condominiums tell that mosquitoes do not solely use the lifts.

T(ime). According to our study below, it can not be verified that mosquito bites - including those caused by Dengue- occur primarily during dusk and dawn (cf. Abdul Malik, 2010). Biting mosquitoes at all are undoubtedly more night animals, but will seize any opportunity to bite during the daytime as well. With their basic instincts, they make reckless use of the predominant habit in residential areas to open houses during daytimes with the effect that apart from mosquitoes any kind of unwanted visitor can come in to non-airtight houses (spiders, scorpions, snakes, cockroaches and flies). Even during the dry spell period with more than 7 weeks without any significant precipitation, according to the statistics the number of cases increased.

3. METHODOLOGY

Consisting of a population of 7.2 million inhabitants, as the sample frame we chose the Klang Valley as by far the biggest urban and sub-urban area in Malaysia. The valley with its character as a megalopolis is less a topographically conceivable area at the clear-cut bottom of surrounding hill sites or mountainous ridges. It is rather the name for the only metropolitan area in the country.

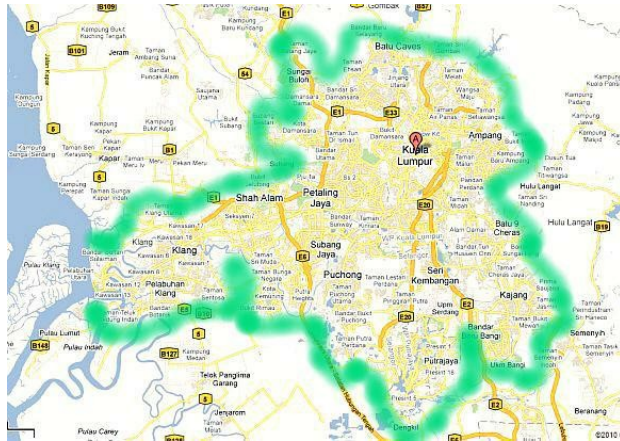


Figure 2: Dilation and Demarcation of the Klang Valley

Within the Klang Valley, the author mobilised 77 students at the School of Business of UniKL to target five to ten respondents for their assignments in their subject “Business Research Methods”. The access to private households as representative sample for our population which is normally an insurmountable stumbling block for many researchers on the ground was simple. The reason is that our students targeted relatives, neighbours and friends. This means a pre-selection that can lead into the argument of being biased as well. After conducting a pilot run and a pre-test based on qualitative interviews (05/2014), we derived a predominantly structured quantitative questionnaire with 21 variables. The response rate was 100% of those students who delivered their assignments totalling in 477 filled-in usable questionnaires with 354 ex-patients of dengue fever. According to the common methodological standard, this study with this size of population can claim representing 65,000 samples in the overall population with the common significant error rate of 5% (Krechie & Morgan, 1976).

By default, as our students’ homes were scattered all over the Klang Valley, we were also able to cluster the respondents into three different main areas (urban, sub-urban and rural). Hence, we received this **clustered view of the whole Klang Valley**:

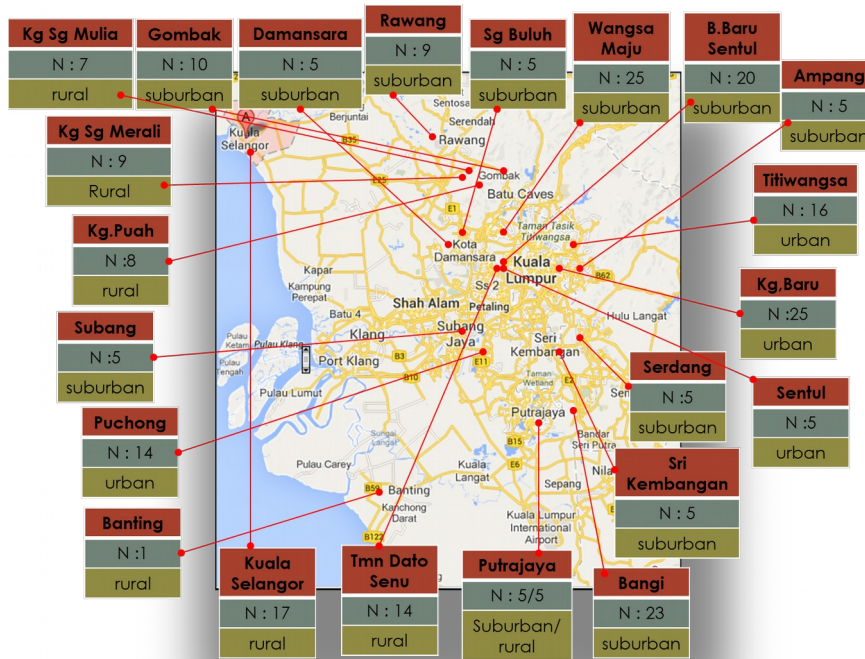


Figure 3: Dengue Fever Research Clusters in Klang Valley

4. Main Research Findings