

## **Illness Characteristics and Treatment Seeking Behavior of Dengue Patients: A Study in Seremban District, Malaysia**

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**Abstract:** In Malaysia, dengue infection is becoming an increasingly important public health problem. Seremban is one of the highly affected districts by dengue in the country. This study, aims to examine illness characteristics and treatment seeking behavior of dengue patients in Seremban, Malaysia. The study also quantifies household's days lost due to dengue and utilization of medical services by the patients in the district. Structured interviews were conducted at household level in order to obtain primary data for the study. A total of 120 patients with confirmed dengue illness were enrolled in the study. It was found that majority (90.80%) of the surveyed patients had a Dengue Fever (DF) while 7.50 and 1.70% of the patients suffered from Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS), respectively. The study revealed that government hospitals/clinics were the facilities most commonly used by the patients (44.2%) for seeking treatment at the initial stage of the disease. However, after the onset of symptoms, a greater portion (42.5%) of the respondents took self-treatment at home without consulting a doctor. The average duration of illness per dengue case was 9.69 days. Consequently, an episode of dengue resulted in a total of 18.73 days lost to the entire household of which school-going patients lost 6.25 days of school and those working (patients and caregivers) lost 12.48 days of work. The findings of the study provide a detailed knowledge or insight about illness characteristics, treatment seeking behavior and household's days lost due to dengue which might assist policy-makers in implementing more effective control strategies for the disease at district as well as national level.

**Key words:** Dengue, illness characteristics, treatment seeking behavior, Seremban, Malaysia

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### **INTRODUCTION**

Dengue is considered to be the predominant vector-borne disease in terms of the number of human infections occurring globally (National Research Council, 2001; Farrar *et al.*, 2007). The global incidence of dengue has grown dramatically in recent decades. Currently, severe dengue affects most Asian and Latin American countries and has become a leading cause of hospitalization and death among children in these regions (Ahmad *et al.*, 2012; Conyer *et al.*, 2012). Particularly, Southeast Asia has the highest dengue incidence of all regions of the world and cycles of epidemics have affected the region since the 1950s with increasing magnitude (Poovaneswari, 1993; Ooi and Gubler, 2009). During World War II, the transmission dynamics of dengue viruses changed dramatically in the Southeast Asia region. Consequently, World War II led to a

significant expansion in the distribution and population of dengue viruses in this region, associated with the movement of equipment and troops (Halstead, 2006; Ooi and Gubler 2009; Guzman and Istituriz, 2010). By the end of the war, most countries in Southeast Asia were hyper endemic due to co-circulation of multiple dengue virus serotypes in the region and a few years later epidemic Dengue Hemorrhagic Fever (DHF) emerged in the region (Gubler, 2002). Subsequently, high population growth and rapid urbanization contributed to massive outbreaks of the disease in some countries of the region (Suaya *et al.*, 2007). In recent years, dengue has become a major international public health concern and likely more important than malaria globally in terms of morbidity and economic impact (Gubler, 2002). The disease causes great economic losses for the affected households and society at large in the endemic regions. In addition, the disease causes a heavy cost burden for the public health system

of a country in terms of management of dengue patients in the health-care systems as well as prevention and control of dengue vector.

Currently, dengue is a highly endemic disease in Malaysia. The disease has been classified as an important health threat to the public in the country (Er *et al.*, 2010; Razak and Jahi, 2012). The first reported dengue case in Malaysia was in 1901 and ever since it has spread throughout the whole country (Poovaneswari, 1993). However, the incidence of dengue fever and dengue hemorrhagic fever in the country has increased steadily during the last decade (Azami *et al.*, 2011). Moreover, there has been a shift in the peak age of incidence of dengue from children to young adults. Changes in climate factors such as temperature, rainfall and relative humidity contributed significantly to high incidence of dengue in Malaysia (Ambu *et al.*, 2003). The disease is predominant in urban areas where majority of the country's total population resides. Seremban is one of the highly affected districts by dengue infections in Malaysia. The district is the greatest contributor to dengue infections in the state of Negeri Sembilan. However, there is lack of research in the assessment of disease burden of dengue in the district.

The aim of this study is to assess illness characteristics and treatment seeking behavior of dengue

patients in Seremban district, Malaysia. The study also quantifies household's days lost due to dengue illness and utilization of health services by the patients in the district. To our knowledge, this study is the first attempt that focuses on the disease burden of dengue at household level in the district.

## MATERIALS AND METHODS

Seremban is one of the seven districts of Negeri Sembilan state in Malaysia. It is the capital of the state and occupies an area of 950.53 square kilometers of land. It is the 16th most populated city in Malaysia with total population of 555,935. The population of the district comprises several ethnic groups viz. Malays and Bumiputeras (52%), Chinese (24%), Indians (16%) and others (8%). The district has a number of public and private health care facilities. There are five hospitals of which one is government and four private. In addition, there are 11 public health centers serving various zones of the district. Seremban is one of the most affected districts by dengue infections in Malaysia. The disease is a major cause of morbidity in the district (Fig. 1).

Structured interviews were conducted at household level in order to obtain primary data for the study. Primary data included socio-demographic information of the

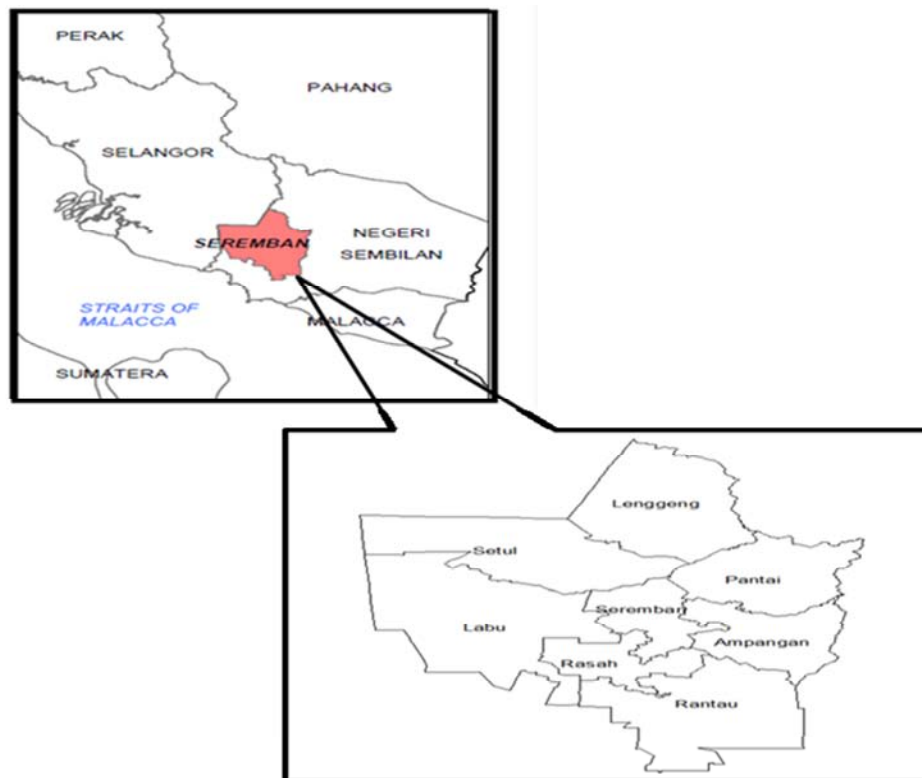


Fig. 1: Location of study area: Seremban, Malaysia (Shamsuddin and Yaakup, 2007)

dengue patients and their households, duration of illness, use of medical services, days of work and school lost and the types of caregivers. The data were collected through interviewing a total of 120 dengue patients registered at the Tuanku Ja'afar Hospital (formerly known as Seremban General Hospital) in Seremban. Purposive random sampling method was applied to select the samples. The study selected randomly laboratory-confirmed dengue patients without any previous knowledge of the socio-economic and ethnicity status of the patient. Selected patients or legal guardians (if the patient is a child) were contacted primarily via home visits but the telephone was used when available and asked to participate in a face to face interview. All the respondents were interviewed once in person either at the respondent's house or at work. The survey was conducted from November 2010- February, 2011. Summary descriptive statistics viz. summation, mean, standard deviation, percentage, maximum and minimum value and ratios were applied to analyze the data.

**Ethical considerations:** The study was approved the Medical Research Ethics Committee (MREC), Ministry of Health, Malaysia (MREC Code No. NMRR-11-730-9099). The study did not provide any financial or other benefits to the respondents and their families to participate in the survey.

**RESULTS AND DISCUSSION**

**Demographic characteristics of the respondents:** A total of 120 patients with confirmed dengue illness were enrolled in the study. Table 1 shown the demographic characteristics of the respondents. The table shows that nearly two thirds (65.8%) of the study patients were males. More than half of the dengue episodes (56%) occurred among the married persons. Almost all of the households (98%) participating in the survey resided in the urban areas while only a minority (2%) of the patients came from rural households. The majority of the study patients were among the Malays (50%), followed by the Chinese (29%) and Indians (21%). Average family size of the surveyed households was 4.96. An average of 2 members per family was found to be engaged in income generating activities.

The present study figured out some distinct characteristics regarding demographic status of the surveyed patients and their households. The study found the male respondents having a higher incidence of dengue as compared to females. Similarly, the married respondents showed a greater predisposition to dengue infection compared to singles. Almost, all of the study

Table 1: Demographic characteristics of the respondents

Characteristics	No. (n = 120)	Percentage
<b>Gender</b>		
Male	79	65.8
Female	41	34.2
<b>Marital status</b>		
Single	53	44
Married	67	56
<b>Residential status</b>		
Urban	118	98
Rural	2	2
<b>Ethnicity</b>		
Malay	60	50
Chinese	35	29
Indian	25	21
No. of family members	04.96 (mean)	00.183 (SE)
No. of earning members in the family	01.78 (mean)	00.084 (SE)

patients came from urban areas indicating the predominance of dengue infection in the urban localities of Seremban District. It was found that majority of the respondents were the Malays, followed by the Chinese and Indians. Another study conducted on dengue in Seremban District, Malaysia found that 54.3% of the total respondents were male and 45.7% female (Zailiza *et al.*, 2012). It was also reported that among the three major ethnic groups in the District, the Malays were the most commonly affected, followed by the Indians and Chinese. Another study on dengue in Seremban found that most of the reported cases were in urban areas of the district (Ghouth *et al.*, 2012). A multicounty study on dengue illness highlights the socio-demographic attributes of the respondents in eight countries in the Americas and Asia including Malaysia (Suaya *et al.*, 2009). The study reported that 60% of the respondents in Malaysia were males. The study also reported that 98% of the respondents were the urban residents highlighting the fact that dengue is an urban public health problem in Malaysia.

In Can Tho Province, Vietnam, a study on dengue reported that there were no significant difference between males (49.3%) and females (50.7%) (Tam *et al.*, 2012). Another study assessed the epidemiological features associated with dengue patients in Ho Chi Minh City, Vietnam (Anders *et al.*, 2011). The researchers revealed the predominance of male patients (57%) over females in the total number of dengue cases. In Kampong Cham Province, Cambodia, the study by Huy *et al.* (2009) focused on the household socio-economic status and its possible association with health seeking behavior and the ability to pay for the costs of dengue illness. It was revealed that majority (63%) of the participants were males. Ghouth *et al.* (2012) described the epidemiology of dengue outbreak occurred in Hadramout districts, Yemen in 2010. Distribution of the cases according to sex revealed that a significantly high proportion (65%) of

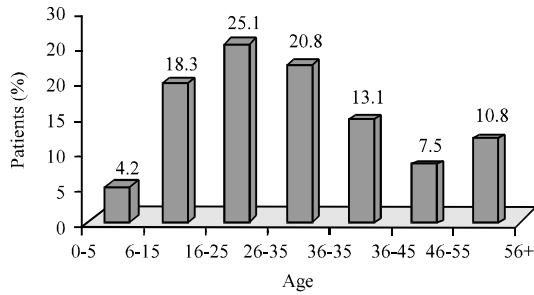


Fig. 2: Age distribution of the respondents

cases were the males. And the highest proportion (92%) of the cases was from urban residences of the districts. Khan *et al.* (2010) examined demographic and clinical features of dengue patients in Karachi, Pakistan. The study found nearly two times the number of male patients compared with females. It was also found that a substantially high proportion (91%) of the cases occurred in Karachi.

**Age distribution:** Age distribution of the study patients is shown in the Fig. 2. The findings reveal the lowest incidence rate (4.2%) among the infants of the 0-5 year's age group. However, dengue infection was more prevalent among the school-going children (6-15 years) (18.3%) as compared to infants. It was found that the age-specific incidence rate was highest (25.1%) in the young adult of the 16-25 years age group. The age group of 26-35 years (i.e., adult group) had the second highest incidence rate (20.8%), followed by the age group of 36-45 years which consisted of 13.3% of the total respondents. However, the study found that a significantly lower proportion (7.5%) of the study participants were the people of middle-age group (46-55 years). On the other hand, the proportion of dengue infection among the older aged people (56 years and above) was higher (10.8%) as compared to the middle-age group.

The present study revealed that the young adults (i.e., 16-25 years of age) were mainly affected by dengue in Seremban District. It is also important to note that on a collective basis, majority of the study patients (67%) were income generating and potentially income generating people (16-55 years of age). The other studies on dengue in Malaysia obtained almost similar findings regarding age distribution of dengue patients. For example, Ghazali found that dengue affected all age groups, particularly the young adults and males in the state of Negeri Sembilan, Malaysia. The mean age of the dengue patients was 32.2 years and most were young adults of  $\geq 15$  years old. Similarly, the study by Suaya *et al.* (2009) figured out

Table 2: Illness characteristics and treatment seeking behaviour of study patients

Particulars	No. (n = 120)	Percentage
<b>Patient recruited as</b>		
Hospitalized	94	78.3
Ambulatory	26	21.7
<b>Notified diagnosis of the patient</b>		
Dengue Fever	109	90.8
Dengue Hemorrhagic Fever (DHF)	9	07.5
Dengue Shock Syndrome (DSS)	2	01.7
<b>Initial treatment seeking after onset of symptoms</b>		
Self-treatment	51	42.5
Visiting herbalist	1	00.8
Visiting private hospital/clinic	15	12.5
Visiting public hospital/clinic	53	44.2

that majority (70%) of the study participants were  $>15$  years of age. These findings suggest that the young adult and the adult people are the most vulnerable to dengue infection in Malaysia. The study conducted in Can Tho Province, Vietnam reported that majority (36.8%) of the respondents was the young adults of 10-15 years of age (Tam *et al.*, 2012). Another study in Ho Chi Minh City, Vietnam found that adults represented an increasing proportion (66%) of the dengue patient population in the city (Anders *et al.*, 2011). However, the study in Kampong Cham Province, Cambodia found no significant difference in age distribution of the respondents (Huy *et al.*, 2009). In Hadramout districts of Yemen, it was found that a greater portion (58.5%) of the dengue cases were the adults (15-34 years age group) in 2010 (Ghouth *et al.*, 2012). The study in Karachi of Pakistan reported that there is evidence for increasing infection rates among the adults (74%) which is contrary to the popular belief that dengue is a pediatric disease (Khan *et al.*, 2010). The study found that median age of the patients was 24 years.

**Illness characteristics and treatment seeking behaviour of the patients:**

Table 2 shows illness attributes of the patients interviewed and their treatment seeking behaviour during the episode of illness. The findings show that 78.30% of the study patients were hospitalized for at least 1 day. Approximately, 22% of the respondents were treated in ambulatory settings. Laboratory testing was performed on all cases participated in the study. It was found that majority (90.80%) of the study patients had a clinical diagnosis of dengue fever. And a significantly lower portion of the respondents found to have a more severe form of the disease-dengue hemorrhagic fever (7.50%) and dengue shock syndrome (1.70%). Table 2 shows that all the respondents received medication within 24 h from the onset of symptoms. It was found that the government hospitals/clinics were the facilities most commonly used by the study patients (44.2%) for seeking treatment at the

Table 3: Utilization of health services and household's impact (days affected)

Items	Hospitalized cases	Ambulatory cases	All cases
<b>Utilization of health services, mean (SD)</b>			
Stay in hospital, days	05.63 (1.23)	NA	05.63 (1.23)
Number of ambulatory visits	NA	03.12 (0.65)	03.12 (0.65)
Duration of illness, days	10.14 (1.75)	08.03 (1.43)	09.69 (1.89)
<b>Days affected (patient and caregivers), mean (SD)</b>			
Days of school lost	07.20 (1.09)	04.67 (0.58)	06.25 (1.58)
Days of work lost (patient)	08.11 (1.34)	06.47 (1.46)	07.66 (1.55)
Days of work lost (caregiver)	05.08 (1.32)	03.78 (1.09)	04.82 (1.37)
Total days lost	20.39 (1.55)	14.92 (1.37)	18.73 (1.42)

SD = Standard Deviation; NA = Not Available

initial stage of the disease. However, a greater portion (42.5%) of the respondents took self-treatment (mainly medication for fever) at home without consulting a health care provider. Only one of the participants visited an herbalist after the onset of symptoms. And a total of 12.5% of the study patients went to private hospitals/clinics for seeking treatment care in the first instance of the disease.

Findings of this study reveal that a greater portion of the patients were admitted to hospital and had a clinical diagnosis of dengue fever. Accessibility to health facilities is a major factor affecting treatment seeking behaviour of patients (Bhavsar *et al.*, 2010). The present study found that majority of the surveyed patients visited health care facilities in the first instance of the disease. With growing urbanization and economic development, the numbers of hospitals and clinics serving the Seremban District are also increasing. This affects the treatment seeking behavior of people as hospitals or clinics are available in the vicinity and, in urban areas transportation to them is also easily available. This could explain why most patients went to health care facilities and received treatment within 24 h from the onset of illness.

**Utilization of health services by the patients and household's days lost:** Table 3 shows the use of medical services by the study patients and burden (days affected) placed on the patient's households. It was found that a hospitalized patient spent, on average, 5.63 days in the hospital. On the other hand, each ambulatory patient recorded an average of 3.12 visits in the outpatient department/ward of the hospital. On average, an illness episode lasted for 10.14 days in case of hospitalized patients. In contrast, ambulatory patients reported an average of 8.03 days of illness. Consequently, dengue illness episodes affected school attendance and other productive activities of the patients and household members. Findings of the study show that the hospitalized patients who were studying in school at the time of illness lost an average of 7.20 days of school. On the other hand, the school-going ambulatory patients lost an average of 4.67 days of school. Similarly, the

hospitalized patients who were working at the time of illness lost, on average, 8.11 days of work. In contrast, the episode of dengue resulted in, on average, 6.47 days of work lost for the ambulatory patients who were working at the time of illness.

Moreover, the household members (e.g., caregivers) lost, on average, 5.08 and 3.78 days of work for caring the patients in the hospitalized and ambulatory cohorts respectively. Therefore, an average dengue episode was associated with a total loss of 20.39 and 14.92 days for the entire household in the hospitalized and ambulatory cohorts respectively.

An ambulatory patient in this study had on average, 3.12 visits in the outpatient department/ward of the hospital and an average of 8.03 days of duration of illness. A hospitalized patient had, on average, 5.63 days of hospital stay with 10.14 days of illness episode. Not surprisingly, hospitalized patients had greater duration of illness than ambulatory patients as evidenced by their more severity of illness and consequently more days affected. However, the average duration of illness per dengue cases (9.69 days) was more or less similar to those described by other studies on dengue (Clark *et al.*, 2005; Huy *et al.*, 2009; Suaya *et al.*, 2009; Kongsin *et al.*, 2010). Dengue illness affects not only school attendance and other productive activities of the patients but also daily activities of other household members who provide care to the patients. The present study found that a dengue episode resulted in a total of 18.73 days school and work lost by the household. Other studies on dengue also obtained almost similar result (Armien *et al.*, 2008; Suaya *et al.*, 2009; Kongsin *et al.*, 2010). As expected, households of the hospitalized patients had more days of school and work lost than the households of ambulatory patients. This may be explained by comparatively longer illness episode of the hospitalized patients and consequently more days affected or lost by patients plus family members. The relatively higher share of involvement of family members to the hospitalized patients reflects the custom and need for a family member to stay full time with the patient while hospitalized and subsequently during the rest of the illness (Suaya *et al.*, 2010).

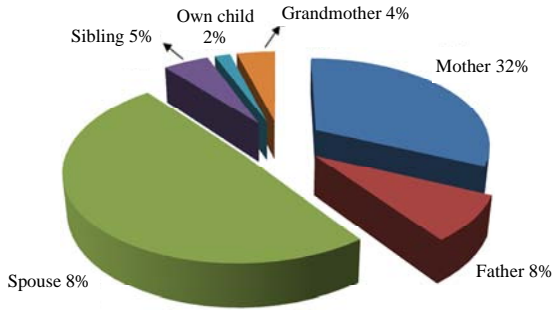


Fig. 3: Type of caregiver of the study patients

**Type of caregiver of the patients:** Figure 3 highlights the types of caregivers of the study patients. It can be seen that all of the patients participated in the study were cared solely by their family members. However, almost half (49%) of the caregivers were spouses of the patients. A total of 32% of the patients were cared by their mothers during the illness episode. But, a significantly lower (8%) portion of the caregivers were fathers of the respondents. The proportion of siblings and grandmothers who took participated in caring the patients was 5 and 4%, respectively. And only 2% of the study patients were cared by their own child at the time of illness.

### CONCLUSION

This study examined illness characteristics and treatment seeking behavior of dengue patients in Seremban, Malaysia. The study also quantified household's days lost due to dengue illness and utilization of health services by the patients in the district. Findings of the study showed that majority (90.80%) of the surveyed patients had a clinical diagnosis of Dengue Fever (DF) while the patients with Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) represented 7.50 and 1.70%, respectively. A greater portion (44.2%) of the patients visited government hospitals/clinics for seeking treatment after the onset of symptoms. However, the proportion of the patients taking self-treatment at home without consulting a doctor was also significantly higher (42.5%). It was found that an illness episode lasted on average, 10.14 days for hospitalized patients and 8.03 days for ambulatory patients. Consequently, a dengue episode resulted in a total loss of 20.39 and 14.92 days for the entire household in the hospitalized and ambulatory group respectively. The findings of the study provide a detailed knowledge or insight about illness characteristics, treatment seeking behavior and household's days lost due to dengue which might assist policy-makers in implementing more effective

control strategies for the disease at district as well as national level. Moreover, policy-makers should take initiatives at the grass root level so that every dengue patient can access the public health facilities and seek treatment at the early stage of the disease.

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