A REVIEW OF DENGUE INCIDENCE IN KOTA BHARU, KELANTAN FROM YEAR 1998-2003

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ABSTRACT

Dengue is the most common and widespread arthropod borne arboviral infection in the world today. It is estimated that there are at least 100 million cases of dengue fever (DF) annually and 500,000 cases of dengue hemorrhagic fever (DHF) which require hospitalization. In Malaysia, it has become one of the major public health problems. The incidence rate of clinically diagnosed DF and DHF reported is showing an upward trend from 8.5 cases/100,000 populations in 1988 to 88.6 cases/100,000 populations in 2003. The objective of this analysis was to describe the incidence of dengue fever and dengue hemorrhagic fever in Kota Bharu, Kelantan from year 1998-2003. A total of 4716 dengue cases were notified involving 4476 (94.9%) DF and 240 (5.1%) DHF, which was increasing by years. The highest incidence was in January (701 or 14.9%) while the lowest was in May (188 or 4.0%). Forty percent of cases (n=1890) were in the 15-29 years old group. Majorities were Malays (4062 or 86.1%) and 2602 or 55.2% were male. A total of 4477 cases (95%) were local cases and 4289 or 91% came from urban area. For priority areas, 3772 (80%) were from priority 1. More than half of cases have positive serology result. The mean values for age, temperature, systolic and diastolic blood pressure (BP) were 27.8 ± 15.4 years, 37.9 ± 0.9°C, 115 ± 15.2mmHg and 73 ± 11.1mmHg respectively. The mean value for time interval between onset of symptoms and diagnosis, onset of symptoms and notification and time of diagnosis to notification were 5.1 ± 2.3, 5.9 ± 2.5 and 0.8 ± 1.1 days respectively. All symptoms occurred in more than 96% of cases and fever was the commonest (99.7%). The incidence of dengue in Kota Bharu is comparable to that of in Malaysia. The increase in the number of cases needs to be addressedpromptly with effective surveillance, prevention and control programs.

INTRODUCTION

Dengue is the most common and widespread arthropod-borne arboviral infection in the world today. The endemic areas are Asia, the Pacific Islands, the Americas, Africa, and the Eastern Mediterranean. The highest burden of disease occurs in South East Asia and the Western Pacific, but over the last few years there has also been a rising trend in South America and the Caribbean (CDR Weekly, 2004). It is estimated that there are at least 100 million cases of DF annually and 500,000 cases of DHF which require hospitalization. DHF mortality rates average 5%, with approximately 25,000 deaths each year (WHO, 1999). In Malaysia, DF was first reported in 1902 in Penang and has become a major public health problem, especially since the appearance of the first DHF outbreak in Penang in 1962. Rapid industrial and economic development over the last two decades has brought about massive infrastructure development, creating man-made environment for breeding of Aedes mosquito (Clinical Practice Guideline, 2003). The incidence rate of clinically diagnosed DF and DHF reported is showing an upward trend from 8.5 cases/100,000 populations in 1988 to 88.6 cases/100,000 populations in 2003. Malaysia recorded 19,544 dengue cases in 1997, 37.4% higher than the number reported in 1996 and the highest recorded since the disease was made notifiable in the country. Of 19,544 cases, 806 (4.1%) were DHF with 50 deaths. The case fatality rate (CFR) for DHF is high, ranging 5% to 6% per annum for both children and adults. There are more cases of DF than DHF, with a ratio of 16 – 25:1 over the last 5 years (Clinical Practice Guideline, 2003). The objective of this analysis was to describe the incidence of dengue fever and dengue hemorrhagic fever in Kota Bharu, Kelantan from year 1998-2003.

MATERIALS AND METHODS

This is a secondary data review of all dengue cases notified to Kota Bharu District Health Office, Kelantan from year 1998 to 2003. All the cases were documented in Vekpro (Vector program) database. From that, it was extracted to Microsoft Excel program and later on transferred to SPSS program. The analysis was done using SPSS version 11.0. Summary descriptive

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statistics (mean, standard deviation, frequency and percentage) of characteristics documented for dengue and dengue hemorrhagic fever were tabulated.

RESULTS

A total of 4716 cases of dengue fever and dengue hemorrhagic fever were notified to Kota Bharu District Health Office, Kelantan in six years period from 1998 to 2003, involving 4476 (94.9%) dengue fever cases and 240 (5.1%) dengue hemorrhagic fever cases. Figure l showed the total number of cases in years and it showed that the number of cases was increasing by years. The highest number of cases was notified in January (701 or 14.9%) while the lowest was in May (188 or 4.0%). Difference in number of cases both amongst years and amongst months were statistically significant. The highest percentage of cases fell in the age group 15 to 29 years old which contributed to 40.1% of cases (n=1890) (Figure 2). Table 1 showed the descriptive statistics of the cases. Majority of cases were Malays (4062 or 86.1%) and more than half (2602 or 55.2%) were male. Regarding classification of cases, almost 95% of all cases (n=4477) were local cases. It also showed that 91% of cases (n=4289) came from urban area. For priority areas, 3772 or 80% of all cases were from priority area 1. However, nearly 6% of the data was not available. Nearly 50% of the result for dengue serology was not available. Among those that were available (2501 cases), 57.5% of the cases was positive. For classification of priority areas, we referred to classification used by the Section of Vector Borne Disease Control, Ministry of Health.

Among all symptoms, the commonest symptom experienced by the cases was fever (99.7%). As a whole, all symptoms occur in more than 96% of cases. Table 2 showed the results for age, temperature, blood pressure and time interval measured. The mean (standard deviation) for age, temperature, systolic blood pressure and diastolic blood pressure were 27.8 ± 15.4 years, 37.9 ± 0.9°C , 115 ± 15.2mmHg and 73 ± 11.1mmHg respectively. The mean value (standard deviation) for time interval between onset of symptoms and diagnosis, onset of symptoms and notification done and time of diagnosis to notification were 5.1 ± 2.3, 5.9 + 2.5 and 0.8 ± 1.1 days respectively.

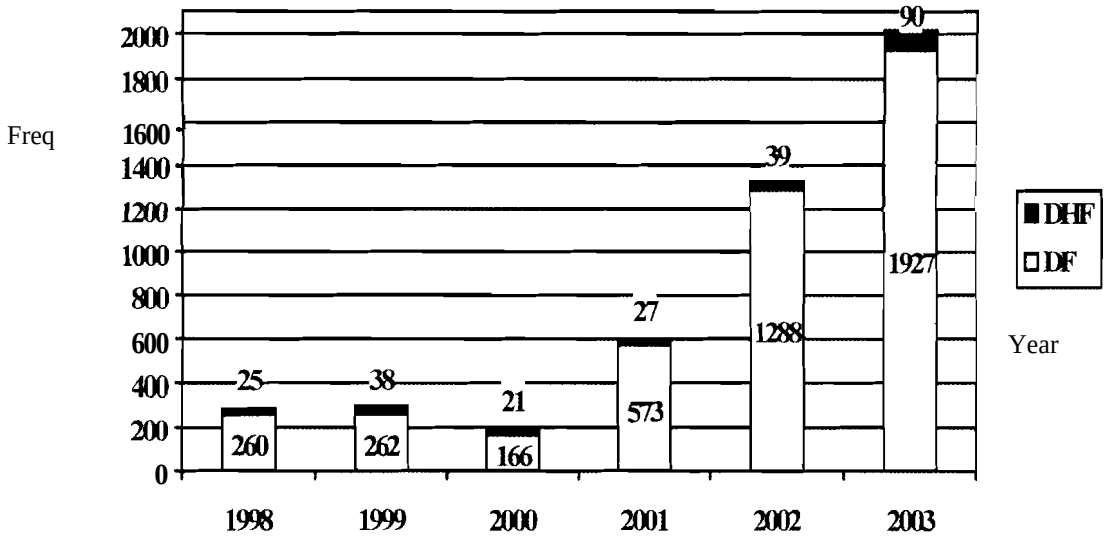

Figure 1: Number of dengue fever (DF) **and dengue hemorrhagic fever** (DHF) **cases by year**
(chi square value was significant with p value 0.0001)

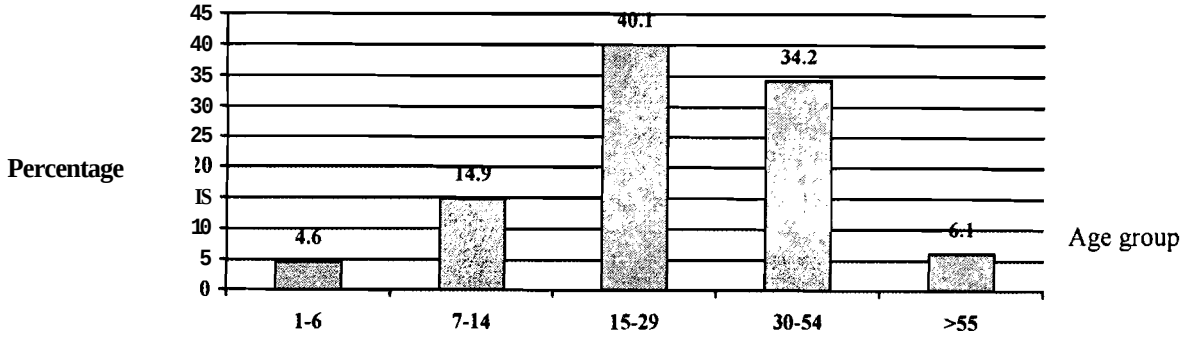

Figure 2: Percentage of cases according to age groups

Table 1: Descriptive statistics of dengue cases notified in Kota Bharu from 1998-2003

Variable	Frequency	Percentage
Race		
Malay	4062	86.1
Chinese	572	12.1
Indian	29	0.6
Others	53	1.1
Sex		
Male	2602	55.2
Female	2114	44.8
Classification		
Local cases	4477	94.9
Import cases	239	5.1
Area		
Urban	4289	90.9
Rural	427	9.1
Priority areas		
I	3772	80.0
II	603	12.8
III	26	0.6
IV	37	0.8
Unknown	278	5.9
Dengue serology result		
Known	2501	53.0
Unknown	2215	47.0
Known result		
Positive	1437	57.5
Negative	1064	42.5

Table 2: Summary of age, temperature, blood pressure (BP) and time interval measured in cases

Variables	Mean	Standard deviation	Minimum value	Maximum value
Age (years)	27.8	15.4	1.0	85.0
Temperature (°C)	37.9	0.9	30.0	42.0
Systolic BP (mmHg)	115.2	15.2	50.0	237.0
Diastolic BP (mmHg)	73.1	11.1	28.0	130.0
Time interval (days)				
onset-diagnosed	5.1	2.3	0	19.0
onset- notified	5.9	2.5	0	22.0
diagnosed-notified	0.8	1.1	0	13.0

DISCUSSION

Dengue tever is one ot the main communicable diseases in district of Kota Bharu since 1996. Kota Bharu area contributed almost 70 percent of the dengue fever cases in Kelantan (Kota Bharu Weekly Dengue Report, 2003). The overall incidence of dengue cases for six years notified to Kota Bharu District Health Office showed that the ratio between DF: DHF was 18.65:1. This number was lower than those reported by the Ministry of Health (MOH), Malaysia. The ratio of dengue fever and dengue hemorrhagic fever for the year 1996 and 1997 were 25.7:1 and 23.2:1 respectively (Malaysia Weekly Epid Record, 2003). The number of cases was significantly increasing by years in Kota Bharu except for a slight reduction in 2000 in which there was a 37.7 % reduction of all cases as compared to 1999. Result from the MOH, Malaysia also showed that from 1988 the number of cases reported showed an upward trend until 1998. One of the reasons for this increase was due to the period of rapid urbanization and industrialization after 1988, which gave rise to increased breeding areas for the Aedes mosquitoes. In 1999 there was a drop in incidence rate to 43.8 per 100,000 populations from 123.4 per 100,000 populations in 1998. One of the reasons for the drop in incidence rate was due to the success of 'National Cleanliness and Anti Mosquito Campaign' launched in April 1999 (Annual Report, 2000). Similar report showed that a total of 7118 dengue cases along with 37 dengue related deaths were reported throughout 2000. This again showed a decrease .of 3028 cases or 29.8% compared to the number of cases reported in 1999. The reduction was a result of the anti mosquito and hygiene campaigns that are still on going since they were launched. The month that recorded three highest numbers of cases was January followed by February and December. These months were rainy seasons in Kelantan. Probably there was an increase in breeding site during those months due to accumulation of water in containers and construction sites. The increase in dengue cases was also due to the public's failure to ensure cleanliness. Indiscriminate throwing of rubbish and dirty home surroundings contributed to the breeding of Aedes mosquitoes, especially during the rainy seasons. Report from MOH (2000) said that the high incidence of dengue was probably the result of the increase in breeding places at construction sites. Epidemics of dengue have shown an association with activities of construction and construction sites. There was a decrease in number of cases reported during months of April to June, which were dry seasons in Kelantan. However when we compared with the report from MOH (2000), it showed that the number of cases reported was low in the months ot January to April. In the report, the following months showed a gradual increase in number of cases with a peak in the months of July till August. This trend of seasonality is related with water collection. The start of light rainfall after the dry season in January to April and rainfall before the monsoon season increased the breeding places of Aedes (Annual Report, 2000). This difference may be due to different monsoon seasons between the West coast and East coast of Peninsular Malaysia. Majority of cases in this analysis were Malays. This is because majority of people in Kota Bharu and Kelantan generally are Malays. This was differed from MOH report (1996). Among the ethnic groups, Chinese constitutes the majority of cases of dengue with 43.0%, followed by the Malays (39.1%), Indians (6.3%), Bumiputera Sarawak, Bumiputera Sabah and others. However there was an increase in the number of cases among the Malays and Indians. This was the result of the expansion of urban areas and migration of Malays from the villages to the urban and sub urban areas. The occurrence of incidence between male and female reported from this study was 1.2:1 (55.2 % versus 44.8 %). Our finding was similar compared to a report from MOH (1996), in which males showed a greater predisposition to dengue compared to females with the ratio ranging from 1.1:1 to 1.3:1 for the year 1990-1995. This study showed that almost 95% of all cases were local cases. This possibly showed that we still have a lot of breeding places in the community and the populations are at a high risk to get dengue infection from their surroundings. Dengue was considered as an urban public health problem and the result obtained from this analysis supported this as 90.9% of cases came from urban area. In MOH report (1996), for the period of 6 years (1990-1995), the percentage of cases reported from the urban areas ranged from 73.5% to 87.6%. The same trend was shown for the years 1975-1982 where the urban areas contributed 82.85% of notified cases. For priority areas, 80% of cases were from priority 1 meaning that majority of cases occurred in localities where an outbreak or a case of dengue has occurred in the past. This result was expected as priority area 1 is that having a concentration of cases and/or a high vector density. However, it reminded us that special attention should be more focused on dengue surveillance and control in that area so that we can further reduce the spread of dengue and reduce its incidence. This analysis also showed that half of the data on the result for dengue serology was not available. This may be due to several reasons. First, may be the investigation was not done and the diagnosis of

dengue was done based on clinical judgement. Other than that, the result **may** not be available due to lack of tracing done by the officer in health office. From this analysis, all symptoms occurred in more than 96% of cases. This was very high if we compared with other study. A study done in Palau, Western Pacific (Ashford *et al*, 2003) reported the symptoms range from 7-100%. The highest symptom was also fever, which reported by 100% of cases, followed by headache in 91% of cases. The lowest percentage of symptom reported was bleeding (7%). The mean age of cases was 27.8 years old. For age group, when we compared the result from Ministry of Health (MOH) and result produced from this study, it was not different. MOH Annual Report 2000 also showed that according to age groups, the 15-29 age groups showed the highest incidence rate for dengue, which was similar to our study. This showed a different trend compared to the epidemics of the 70s and 80s in which the majority of cases were children below 15 years old. The mean temperature was 37.9°C, which was mildly elevated. The means for systolic and diastolic blood pressure were 115mmHg and 73mmHg respectively. It showed that the overall means for blood pressure were within the normal range. It was possible that very few patients had abnormal BP that the effect was diluted because most cases had BP within the normal limit. For time intervals calculated from the cases reported, most of them were around five days. Mean days from the onset of symptoms to diagnosis of dengue were 5.1 days. This showed delayed in diagnosis of cases. By 5-6 days usually fever already subsided in DF and .in DHF cases, the hemorrhagic manifestations have manifested. Report from WHO 1999 stated that DHF/DSS usually develop around 3-7 day of illness. Furthermore the mean days from onset of symptoms to notification of cases to the district health office was nearly six days. This delay would allow the spread of disease to the community. According to the Prevention and Control of Infectious Disease Act 1988, dengue fever and dengue hemorrhagic fever are diseases that need to be notified within 24 hours to the nearest district health office. From this study it showed that time interval from the diagnosis to notification was less than one day and this was complied with the act. It showed that the medical officer or personnel in charged were aware about the importance of urgent notification of disease after the diagnosis of dengue was done. This would be more beneficial if there was an improvement in the time of diagnosis of dengue cases. Hopefully this would help the district health office staffs to do early intervention and control program. In doing this analysis we had several limitations. First of all, our data were obtained from the notifications made by medical officers over a period of 6 years. Misdiagnosis and misclassification of DHF and DF cannot be excluded. Furthermore we relied on the data that was keyed in by staffs from the health office. We cannot check for the problem of wrong data entry and missing value.

CONCLUSION

The analysis showed that the incidence of dengue in
Kota Bharu is comparable to that in Malaysia even though we can see the difference in some aspects. The increasing trend of cases reported need to be addressed promptly. Effective prevention and control programs will depend on improved surveillance designed to provide early warning of dengue epidemics. Virologic surveillance should be considered the most important element in any such early warning system. Dengue virus transmission should be monitored to determine which serotypes are present, their distribution, and the type of illnesses associated with each.

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REFERENCES

Academy of Medicine and Ministry of Health Malaysia. 2003. ***Clinical Practice Guideline: Dengue Infection in Adults.***

Annual Report. 2000. Ministry of Health, Malaysia.

Anonymous. Dengue and Dengue Hemorrhagic Fever. ***Malaysia Weekly Epidemiological Record*** 1998; 73 (24): 182-183.

Anonymous. Dengue Fever - Worldwide Update 2002/2003. ***CDR Weekly*** 2004; 14 (3).

Ashford D.A., Savage H.M., Hajjeh R.A. ***et al.*** Outbreak of dengue fever in Palau, Western Pacific: Risk factors for infection. ***Am. J. Trop. Med. Hyg.*** 2003; 69 (2): 135-140.

Weekly Dengue Report. 2003. Kota Bharu Health Office, Kelantan, Malaysia.

WHO Regional Office for SEA. 1999. ***Regional Guidelines on Dengue/Dengue Hemorrhagic Fever Prevention and Control***