ORIGINAL ARTICLE

Cardiac Related Mortality Trends in Forensic Department of Hospital Serdang, Selangor, Malaysia

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ABSTRACT

Introduction: Cardiovascular disease (CVD) is the principal cause of admission and death in the Malaysian government hospitals. **Method:** The pattern of cardiac related mortality (CRM) cases in Hospital Serdang, Selangor was reviewed to determine the specific trends in ethnicity, age, gender and type of CRM. Data was drawn from the death registry records in Forensic Department of Hospital Serdang from January 2006 to December 2008. This preliminary project was carried out to assess the number of CRM cases and their characteristics to feed the decision to sensibly embark on another project related to atherosclerosis. **Results:** Out of 573 CRM cases, 84.5% were Malaysians out of which the majority were Malays (45.9%), followed by Chinese (30.2%), and Indians (22.1%). The majority were men (78.4%) with a mean age of death at 51.83 ± 14.10 (95% CI 50.52-53.14) years as compared to women (21.6%) with a mean age of death at 57.42 ± 16.92 (95% CI 54.41-60.43) years. Declining mortality trend was observed only in men. The 46-60 years old age group had the highest percentage of mortality and continually increase by year. Ischaemic heart disease (IHD) was the most common CRM type (69.1% in 2006, 66.2% in 2007, and 71.9% in 2008). **Conclusion:** We observed inconsistent trends of CRM in Hospital Serdang in terms of ethnicity, age, gender and type of CRM cases presented. Nevertheless, these findings do not necessarily represent the overall trends of CRM in Malaysia.

Keywords: Trends, Cardiac related mortality, Hospital Serdang, Death registry records, Ischaemic heart disease

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INTRODUCTION

Cardiovascular disease (CVD) is responsible for 30% of all deaths worldwide and remains the most common cause of death in industrialised countries(1). Over the past three decades, CRM statistics had fallen by more than 50% in developed countries such as Finland, United States, Canada, Australia, New Zealand, France, and Japan. Unfortunately, CRM cases in many developing countries, including India, China, Korea and other Asian countries are increasing(2). The National Health and Morbidity Surveys (NHMS) have shown that the average age of people who develop CVD in Malaysia is becoming younger from year to year(3). Several factors, including changes in diet and lifestyle might have contributed to these findings(4).

CVD refers to diseases associated with heart and blood vessels. Examples of CVD include ischaemic heart disease (IHD), hypertensive heart disease, primary myocardial disease and cardiomyopathy(5). IHD contributes significantly to hospital admissions and deaths in Malaysia(6). The incidence of IHD in Malaysia was 37 and 50 persons per day in 2017 and 2018, respectively, and has remained as the principal cause of deaths in Malaysian government hospitals(7,8). IHD is commonly associated with atheroma formation in the inner lining of arteries, interrupting the blood supply to the tissues. Although the mortality cases resulting from IHD has significantly decreased in most developed countries in recent years, the opposite has been observed in many developing countries(9). Many countries in the Asia-Pacific region do not have a comprehensive national

mortality statistic on CRM. Obtaining mortality data is beneficial to predict future trends of CRM in Asia(10).

In Malaysia, there are scanty scientific data on the trends of CRM in our government hospitals. A review by Zambahari (2004) concluded that CVD remains the major cause of hospital admissions and deaths in the Malaysian government hospitals(6). Such data is very important for future use in terms of planning appropriate resources and strategy for treatment as well as to develop guidelines for secondary prevention of CVD based on local evidence. Thus, the present study was conducted to examine the patterns of CRM cases in Hospital Serdang from year 2006 to 2008 in relation to age, gender, and ethnicity to see if they have any apparent trends.

Hospital Serdang is under the Ministry of Health (MOH) Malaysia which commenced operation on December 15, 2005. This government-funded multi-specialty hospital, with a total area of 129,000 square meters, is located in Selangor as well as near Putrajaya, the Malaysian federal government administrative centre. It is built to serve roughly 570,000 populations living around Putrajaya, Bangi, Serdang, Kajang and other surrounding areas. As a reference centre for cardiology, cardiothoracic, urology and nephrology surgery, Hospital Serdang receives many admissions.

MATERIALS AND METHODS

This was a retrospective study conducted at Hospital Serdang. Mortality data were collected by reviewing death registry records located in the Forensic Department of Hospital Serdang. The study population comprised of CRM cases during a three-year period from January 2006 to December 2008. January 2006 was chosen following the opening of the Forensic Department of Hospital Serdang officially in December 2005. Classification of CRM was based on the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10). In this study, the CRM was classified into four types; IHD (I20-I25), hypertensive disease (I10-I15), other forms of heart diseases for example cardiomyopathy, myocarditis, cardiac tamponade, and congestive heart failure (I30-I52) and finally non-specific cardiac disease which is not clearly classified in the death registry records. The collected data was analysed by using SPSS software for Window® version 16.0.

RESULTS

There were 2,937 deaths registered in the Forensic Department of Hospital Serdang between 2006 and 2008. Out of this, there were 573 (19.5%) CRM comprising 449 men and 124 women. In 2006, CRM accounted for 19.6% of total death (136/693), followed by 1.7% increment in 2007 (21.3%, 216/1,016). However, the CRM cases declined to 18.0% in 2008 (221/1,228). Table I shows the distribution of CRM cases according to gender, age, ethnicity, and nationality from 2006 to 2008. Among Malaysians, the majority of the CRM cases were Malays (45.9%) followed by Chinese (30.2%), and Indians (22.1%). Other ethnic groups which consist of Bumiputra Sabah, Sarawak and Orang Asli only accounted for 1.9% of the total CRM. Meanwhile, non-Malaysians which include Indonesians, Singaporeans, Nepalese, Bangladeshis, Myanmarians, Vietnamese,

Table I: CRM cases according to gender, age, ethnicity, and nationality during the three-year period (2006 to 2008)

	Number of cases (n=573) (%)
Gender	
Male	449 (78.4)
Female	124 (21.6)
Age (in year)	
15 and below	2 (0.3)
16-30	35 (6.1)
31-45	129 (22.5)
46-60	240 (41.9)
61-75	123 (21.5)
76 and above	44 (7.7)
Nationality	
Malaysian	484 (84.5)
Malay	222 (45.9)
Chinese	146 (30.2)
Indian	107 (22.1)
Bumiputra Sabah/Sarawak/Orang Asli	9 (1.9)
Non-Malaysian	89 (15.5)

Sri Lankans, Pakistanis, Cambodians, and Egyptians had contributed to about 15.5% of deaths during the study period. Overall, the CRM were significantly affected by gender [95 percent confidential interval (CI)]. CRM cases were more prevalent in men at 78.4% with a mean age of 51.83 ± 14.10 (95% CI 50.52-53.14) as compared to 21.6% in women (mean age 57.42 ± 16.92 (95% CI 54.41-60.43). However, factors such as age group, ethnicity, and nationality did not significantly affect the trends of CRM. CRM was most common among the 46 to 60 years old age group (41.9%).

A decreasing CRM trend was seen in men whilst an increasing trend was seen in women over the three-year period. CRM cases decreased from 81.6% in 2006 to 78.2% and 76.5% in 2007 and 2008, respectively in men (Table II). The age group between 46 to 60 years old showed the highest percentage of mortality and continually increase throughout the years. Malays showed an increasing percentage of CRM cases from 47.1% in 2006 to 50.3% in 2007 but decreased to 40.8% in 2008. The Chinese, Indians, Bumiputra Sabah, Sarawak, and Orang Asli showed a steady increase in mortality cases from 2006 to 2008. There were inconsistent trends in mortality observed in Malaysians and non-Malaysians within the study period.

Table II: CRM cases according to gender, age, ethnicity, and nationality in year 2006, 2007, and 2008

	Number of cases (n) (%)		
	(n=136)	(n=216)	(n=221)
	2006	2007	2008
Gender			
Male	111 (81.6)	169 (78.2)	169 (76.5)
Female	25 (18.4)	47 (21.8)	52 (23.5)
Age (in year)			
15 and below	0 (0)	0 (0)	2 (0.9)
16-30	10 (7.4)	11 (5.1)	14 (6.3)
31-45	41 (30.1)	42 (19.4)	46 (20.8)
46-60	49 (36.0)	93 (43.1)	98 (44.3)
61-75	32 (23.5)	48 (22.2)	43 (19.5)
76 and above	4 (2.9)	22 (10.2)	18 (8.1)
Nationality			
Malaysian	104 (76.5)	189 (87.5)	191 (86.4)
Malay	49 (47.1)	95 (50.3)	78 (40.8)
Chinese	31 (29.8)	52 (27.5)	63 (33.0)
Indian	24 (23.1)	38 (20.1)	45 (23.6)
Bumiputra Sabah/ Sarawak/Orang Asli	0 (0)	4 (2.1)	5 (2.6)
Non-Malaysian	32 (23.5)	27 (12.5)	30 (13.6)

Distribution of CRM from 2006 to 2008 according to International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10-CM) showed that IHD is the highest cause of CRM (Fig. 1).

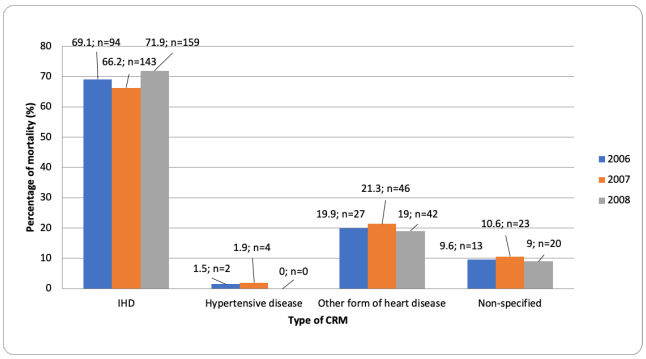

Fig. 1 : Total deaths due to CRM in three years period (from 2006 to 2008)

DISCUSSION

Mortality data from cardiac-related diseases provides a good estimation of CHD trends. The death registry of these cases included both in-hospital and out-of-hospital deaths which consisted of both Malaysians and non-Malaysians.

CRM cases were higher in men compared to women throughout the three-year period. Although women had less CRM cases compared to men, the number of cases increased over the years. The Department of Statistics Malaysia in their press release has also shown a similar trend. Among all cardiac disease, IHD was the most common cause of CRM in Hospital Serdang. About 20.1% of the total cardiac deaths were due to other forms of heart diseases. These include cardiomyopathy, myocarditis, cardiac tamponade, and congestive heart failure. However, the observed number of hypertensive diseases are far too low which only account for 1.0% of total CRM. Statistics on Causes of death, Malaysia 2019 reported that IHD remained the principal cause of death at 15.6 percent followed by pneumonia (11.8%), cerebrovascular diseases (7.8%), transport accidents (3.7%) and chronic lower respiratory diseases (2.6%). In 2017 and 2018, IHD remained as the principal cause of death for males (11.7% and 17.8%, respectively) in Malaysia. The 46-60 years old had the highest percentage of CRM cases which is in agreement with the reports from Statistics on Causes of death, Malaysia 2019 by Department of Statistics Malaysia.

The Malays had the highest CRM cases in the three-year study period. It is possible that these results are due to Malays making up the majority population in the country. Furthermore, it was reported that the Malays, compared to Indians, experienced the highest prevalence of CVD risk factors in Malaysia (11). However, a study done in Singapore by Lee and colleagues in 2001 had shown that Asian Indians had a higher CVD cases compared to other ethnic groups(12).

Hospital Serdang is situated in the Sepang district, the same district where the Kuala Lumpur International Airport (KLIA) and Low-Cost Carrier Terminal (LCCT) are located. Apart from that, the Hospital Serdang surrounding areas include Cyberjaya, Putrajaya, Seri Kembangan and others where many expatriates live. These expatriates are here as diplomats, house maids, labourers, contract professionals or simply as students. The nationalities include Indonesian, Singaporean, Nepalese, Bangladeshi, Myanmarian, Vietnamese, Sri Lankan, Pakistani, Cambodian, and Egyptian. In the vicinity, there are Universiti Putra Malaysia, Limkokwing University, Kuala Lumpur Infrastructure University College (KLIUC), Nilai International University College, as well as Nottingham University Malaysian Campus. Any casualties or medical attention needed by people from these two terminals as well as the vicinity area are referred to this hospital. This could be the reason why from this study there was slightly high percentage of death (15.5%) from non-Malaysians in Hospital Serdang.

CONCLUSION

The purpose of the current study was to determine the trends of CRM in Hospital Serdang. These findings suggested that the Malays have the highest cases of CRM followed by Chinese and Indians. Men with mean age 51.83 ± 14.10 showed higher percentage of mortality as compared to women. The age group between 46 to 60 years old showed the highest percentage of mortality and continually increase by year. IHD represents the highest percentage of death among all cardiac related deaths registered in Hospital Serdang. Nevertheless, these trends do not represent the overall trends of CRM for all Malaysian in the general population. This report is an important head start that gave an overview idea of the number and characteristics of CVD cases and CRM trends in Hospital Serdang

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Ethics approval

This project is a part of research study which has been approved by Medical Research Ethics Committee (MREC) from Ministry of Health, Malaysia and Ethics Committee from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM), Malaysia.

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