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CONTENTS

Financial Cost, Salary and the Impact Towards Coronary Heart Disease in Selangor

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ABSTRACT

Coronary heart disease (CHD) is one of the many non-communicable diseases (NCD). The World Health Organization (WHO) had reported that CHD has caused the death of 17.9 million people, representing 31% of global deaths. From this number, 85% are due to heart attacks and stroke. In Malaysia, CHD remained as the principal cause of death in 2018 with 18,627 deaths contributing to 15.6 percent of total deaths in Malaysia. Among the factors that could lead to CHD is hypertension. Chronic stress such as financial distress could lead to hypertension. Recently, the cost of living in Malaysia has increased significantly. This study intended to examine the impact of housing cost, transportation cost, self-education cost and salary towards CHD. The data was gathered by a survey questionnaire with 300 CHD respondents in Selangor. Multiple regression analysis was used for data analysis. The findings indicated that self-education costs and salary have significant a relationship with CHD. This research is expected to benefit policymakers in understanding the cost of living in Malaysia and to the public health department in their future policy and decision making processes on CHD prevention initiatives. Lastly, this study is expected to enrich the literature on CHD and cost of living.

KEYWORDS: Coronary Heart Disease, Housing Cost, Self-education Cost, Transportation Cost, Personal Income

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INTRODUCTION

Coronary heart disease (CHD) or heart attack is one of the many non-communicable diseases (NCDs) and can be categorised as a silent killer, making it the most common cause of death globally including Malaysia (World Health Organisation, 2019, 2020; Murugesan, 2019). NCD is often reported highest in low-income and lower-middle-income countries. An estimated 17.9 million people died from Cardiovascular disease (CVD) in 2016, representing 31% of global deaths. CHD is one of the cardiovascular diseases (CVDs). It is also known as coronary artery disease (CAD) or ischemic heart disease (IHD). CHD happens when there is a reduction of blood flow to the heart muscle due to build up plaque in the arteries of the heart. With the change of environment, lifestyle and demographics, CHD does not only affect adults but also youths. According to the World Health Organization (WHO) data from 2017, the number of CHD deaths in Malaysia reached 30,600, or 22% of total deaths (World Health Organisation, 2017). Statistics on the causes of death in Malaysia for the year 2019 showed that the principal causes of death were CHD with 15.6% in 2018, increasing 1.7% from 2017 (Department of Statistics Malaysia, 2019). Besides age, gender and family background, CHD can also be caused by other modifiable risk factors such as smoking, unhealthy diet, stress, physical inactivity and lifestyles. WHO also reported that modifiable risk associated with CHD contributes the most to life expectancy in high-income countries.

Stress has been identified as one of the factors that could lead to a health crisis including CHD. Even though stress does not directly cause a heart attack, uncontrolled stress could lead to serious hypertension which eventually impacts health conditions (Burch, 2020). People that are facing financial stress due to the high cost of living, excessive financial burden and earning low income might get affected by their health conditions. The increasing cost of living such as housing, transportation and self-education are among the factors that may potentially become a burden to some people. In this study, the researcher categorised housing, transportation and self-education costs as financial costs. Although researches have conducted studies on CHD in Malaysia, there is still a lack of studies that emphasize the impact of the cost of living towards CHD. To the best of our knowledge, this is the first study in Malaysia that examined the relationship between cost of living (i.e. housing cost, transportation cost & self-education cost), salary with CHD.

LITERATURE REVIEW

Coronary heart disease (CHD) in Malaysia

CHD is one of the cardiovascular diseases (CVDs), a group of disorders of the heart and blood vessels (World Health Organisation, 2017). WHO reported that NCD has caused collectively 41 million deaths worldwide in 2016, equivalent to 71% of global deaths. Besides CHD, other diseases that belong to the CVD category include hypertension (high blood pressure), cerebrovascular disease (stroke), peripheral vascular disease, heart failure, rheumatic heart disease, congenital heart disease and cardiomyopathies (World Health Organisation, 2019; 2020). CHD happens when coronary arteries become narrowed by a gradual build-up of fatty material within their walls (Institut Jantung Negara, 2020). When the arteries narrow due to CHD, they cannot deliver the needed amount of oxygen-rich blood to the heart. This will affect the blood vessels as they are damaged and are no longer able to properly pump blood, oxygen, and nutrients from the heart to the rest of the body (Pantai Hospital, 2019). Many risk factors can emerge because of CHD. It can be categorized into two distinct groups, namely modifiable and non-modifiable risks (Ramsay Sime Darby, 2019). Modifiable risks can be controlled by lifestyle interventions while a non-modifiable risk is based on genetics and cannot be changed. The modifiable risks that lead to CHD include hypertension, hypercholesterolemia, smoking, obesity and diabetes. An imbalanced lifestyle including consuming unhealthy food, long working hours which result in lack of exercise and sleep disturbances would lead to stress-filled lives.

Besides, the high cost of living, financial burden, job issues and family problems are among the factors that could enhance stress-filled lives (Md Kassim, Mohamed, Zainal Azim, Rosli, Abd Rahim & Salleh, 2020). While stress does not directly cause a heart attack, chronic stress can lead to high blood pressure, or hypertension, which is a major risk factor for an individual to get CHD. High blood pressure or hypertension can cause plaque to accumulate in the arteries which will affect the function of the arteries to provide the blood flow to the heart. CHD remained the principal cause of death in 2018 with 15.6% of total death in Malaysia (Department of Statistics Malaysia, 2019). In 2018, based on the data published by the Department of Statistics Malaysia, CHD remained the principal cause of

death for males with 12,510 individuals. Interesting to note is that 12,101 of CHD patients lived in urban areas, amongst them 11,350 patients were Bumiputera, 4243 patients were Chinese, 2,240 patients were Indians while 434 were others including non-citizens. It is also reported in the mainstream local newspaper that cardiovascular-related diseases including CHD have remained the leading cause of death of Malaysians for the past 13 years since 2005 (Jay, 2019; Fong, 2019).The Ministry of Health, Malaysia, reported that a total of 45,684 cases out of 32.4 million Malaysians suffered from CHD up to 2019 (Ibrahim, 2020). This shows that the number of deaths caused by CHD has increased tremendously from just 9,371 in 2010 compared to 18,627 in 2018 (Department of Statistics Malaysia, 2019).

The Cost of Housing and Transportation

Stressful lives can lead to hypertension, which might result in CHD. Besides, financial distress results in negative effects on health. Financial distress is more likely to have an incident on CHD (Moran, Ommerborn, Blackshear, Sims, & Clark, 2019). The main factor which generates a financial burden is due to the increase of cost of living, which is associated with the Consumer Price Index (CPI) that includes housing cost, education cost and transportation cost (Md Kassim et al., 2020). To own houses in the urban area is difficult for a certain group of people especially those with lower (B40) and medium (M40) income (Department of Statistics Malaysia, 2017; EdgeProp, 2018; Bernama, 2018). The increase in the price of houses leads to a high monthly instalment. This instalment sometimes could be a burden on them and indirectly lead to hypertension. Hence, housing cost becomes a financial burden to adults (Rowley, Ong & Haffner, 2015). Nobari, Whaley, Blumenberg, Prelip and Wang (2019) indicated that there was an association between the burden of housing cost and health. Thus, the research proposed hypothesis 1 (H1) as there is a positive relationship between housing cost and CHD.

The cost of transportation is also another aspect that could be burdensome to people (Aruna, 2019). Transportation cost includes monthly instalments, fuel, toll, parking and other associated costs. People living in an urban areas could get public transport easily as compared to those living in a rural area. The federal government is committed to enhance the mobility of Malaysians by reducing transportation costs, improving road facilities

and reducing tolls (Loheswar, 2019). However, not everyone can afford to use public transport such as buses, trains and taxis due to the high cost of public transport fare. To own a car requires people to pay instalments and maintenance costs which is sometimes expensive. This research proposed hypothesis 2 (H2): there is a positive relationship between the cost of transportation and CHD.

The Cost of Self-education and Salary

The rising cost of higher education has received considerable attention recently (Hemelt & Marcotte, 2011). In Malaysia, most students borrow from the National Higher Education Fund Corporation (PTPTN). Study loans also cause financial distress (Wong, Ahmad & Kamisah, 2015). The ability to pay is minimal due to the uncertain income resulting in the number of repayments from graduates being very much lower than expected (Wong et. al., 2015). This imbalanced situation leaves a question mark as to why why graduates are not able to pay their education loans. High tuition fees and the rising cost of living are among the factors that influence students' stress levels (Rachell, P., 2017). Muslim Volunteers Malaysia (MVM) indicated that 96% of respondents said the economic situation was a burden and most of the money they have is taken up by education fees, especially in private universities, and the balance is spread thinly (Williams, 2016). Graduates with debts become a serious issue when many of the graduates face difficulties in repaying not only their education loan but also other debts that they have created since entering the job market (Zainal & Ismail, 2012). Thus research proposed hypothesis 3 (H3): there is a positive relationship between the cost of self-education and CHD.

The increase in the cost of living sometimes is not compatible with the salary received. Lower socioeconomic status might also lead to negative health outcomes for women and they tend to have a greater risk of CHD (Backholer et al., 2017). This situation creates financial stress among all income groups (Osman, Madzlan & Ing, 2018). A cross-sectional study that was conducted by Janati et al. (2011) to explore the current economic status of patients with CAD revealed that most of the patients belonged to the low income level. The salary of those working in the private sector is much lower as compared to those in the public sector. With the minimum salary of RM1,100 introduced by the government, it is still not sufficient

to cover all the rising costs (Boo, 2018). In the news reported by Sheralyn (2019), the research discovered that salaries have a direct impact on the number of cardiovascular disease. She added that those whose salaries had been reduced by 50 percent had a 17 percent increased risk of the disease. Eventually, people with financial stress are more likely to eat less nutritious foods. Dhaliwal et al. (2017) stated that financial barriers have a great impact on patients' ability in self-managing their cardiovascular disease, thus leaving them to suffer more in the future. This research proposes hypothesis 4 (H4): there is a positive relationship between salary and CHD.

Research Framework

The research framework of this study is as follows:

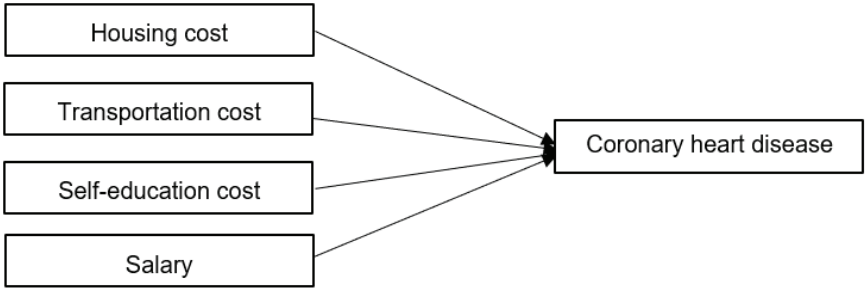

Figure 1: Conceptual Framework
*Financial cost comprises housing, transportation and self-education cost.

METHODOLOGY

This research employed a cross-sectional methodology with purposive sampling of 307 CHD patients in Selangor, Malaysia (Hejazi, Rajikan & Choong, 2015). Selangor reported a high number of CHD patients and deaths in 2019. In this research, self-administered questionnaires were used for data collection. The questionnaire consisted of six parts; Part A on demographic profile while the remaining on the variables tested. A total of 21 items in the questionnaire have been pre-tested for its validity and reliability. The questionnaires were distributed to CHD patients in Selangor from September until December 2019. Selangor is located on the southwest coast of Peninsular Malaysia. The population of Selangor is estimated to be more than 9.5 million in 2019. The researcher approached respondents

from nine different districts in Selangor namely Gombak, Hulu Langat, Hulu Selangor, Klang, Kuala Langat, Kuala Selangor, Petaling, Sepang and Sabak Bernam. Therefore, the data was easily gathered based on disproportionate stratified sampling. The total questionnaire received was 307. However, there were only 300 valid questionnaires used in data analysis.

There were five variables in the questionnaires; housing cost, transportation cost, self-education cost, salary and CHD. In relation to CHD, five (5) statements were designed and adapted from Rahman, Akter, Zohora, and Shibly (2019), Yang, Wang, Wang, and Gong (2019) and Hertz et al. (2019). Each section examined the perception of CHD patients towards CHD, housing cost, transportation cost, self-education cost and salary. The statements were measured using an interval Likert-scale ranging from strongly disagree = 1 to strongly agree = 5. Higher scores indicate a serious condition of CHD. All data were analysed using the Statistical Package for the Social Sciences (SPSS) version 25.0, and all tests were two-tailed with a 5% level of significance. Descriptive and multiple regression analysis are provided for discussion. A multiple regression analysis was adopted to examine the relationship between the predictor variables included in the analysis. They were housing cost, transportation cost, self-education cost and salary towards CHD. The proposed multiple regression model can be expressed as follows:

$$CHD=\beta_0 + \beta_1 HC + \boldsymbol{\beta}_2 SeC + \boldsymbol{\beta}_3 TC + \boldsymbol{\beta}_4 S + \varepsilon$$

Where,

CHD	=	Coronary heart disease
β_0	=	Intercept
$\beta_1 HC$	=	Beta coefficient for Housing cost
$\beta_2 SeC$	=	Beta coefficient for Self-education cost
$\beta_3 TC$	=	Beta coefficient for Transportation cost
$\beta_4 S$	=	Beta coefficient for Salary
ε	=	random error term

RESULT AND DISCUSSION

Descriptive statistics

Table 4.1: Demographic Information

	Frequency	Percentage		Frequency	Percentage
Gender			Locality		
Male	181	60.3	Gombak	38	12.7
Female	119	39.7	Hulu Langat	25	8.3
Age			Hulu Selangor	20	6.7
20 and below	1	0.30	Klang	98	32.7
21-35	41	13.7	Kuala Langat	15	5.0
36-45	34	11.3	Kuala Selangor	33	11.0
46-55	105	35.0	Petaling	42	14.0
56-65	88	29.4	Sepang	23	7.7
66 and above	31	10.3	Sabak Bernam	6	2.0
Education level			Current working status		
Non-formal education	38	12.7	Government sector	60	20.0
Secondary school	122	40.7	Private sector	82	27.3
Pre university program and diploma	57	19	Self-employed	64	21.3
Degree and higher	72	24	Unemployed	53	17.7
Others	11	3.7	Pensioner	38	12.7
Range of current income per month			Others	3	1.0
RM0 - RM2,999	1	.3	**How long have you had heart disease?**		
RM3,000 and below	179	59.7	Less than 5 years	189	63.0
RM3,001 - RM7,000	101	33.7	More than 5 years	111	37.0
RM7,001 and above	16	5.3			

A total of 300 respondents were involved in this research. Table 4.1 indicates that male respondents predominantly constituted 60.3% of the total sample. The highest age group affected by the CHD is 46-65 years with 64.4%. This is also consistent with the report issued by the Department of Statistics Malaysia showing that the highest CHD death is between people of 41-59 years. As mentioned in the previous section, CHD could be due to modifiable risk. This risk can be minimized by having the right work-life balance, controlled food consumption and stress control. Individuals with strong educational background are supposed to have extra knowledge on personal care matters. From the data, individuals with secondary education

including Sijil Pelajaran Malaysia (SPM), Penilaian Menengah Rendah (PMR) and Sijil Rendah Pelajaran (SRP) recorded the highest number of patients at 122 (40.7%). In Malaysia, the income range is categorised into B40 (less than RM4,000), M40 (RM4,000 – RM8,000) and T20 (more than RM8,000). Those individuals with an income of RM7,000 and below were higher contributors at 93.7% compared to those with a higher income (Department of Statistics Malaysia, 2019). As reported in the media, B40 and M40 income groups are always facing difficulties with their cost of living (Sazili, 2019; Mahfar, 2018). Three urban districts; Klang, Petaling and Gombak recorded the highest number of 178 respondents. Those living in urban areas are more stressed compared to those living in rural areas. 80% of the total respondents consisted of private employees, pensioners, self-employed and others. These groups of people are usually the people getting CHD today and always face the issue of unstable salary and low income (Dunya, 2019; Mahmud, 2019). Therefore, there is a tendency for them not to be able to face the high cost of living.

Multiple Regression Analysis

Table 4.2: Multiple Regression Analysis

Model B		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Std. Error	Beta			
1	(Constant)	3.031	.222		13.668	.000
	Housing cost	.089	.050	.124	1.778	.076**
	Transportation cost	.030	.059	.036	.508	.612
	Self-education cost	-.118	.044	-.160	-2.692	.008*
	Salary	.113	.048	.137	2.367	.019*

a. Dependent Variable: CHD
*significant level at 5% (p<0.05)
**significant level at 10% (p<0.1)

Table 4.2 provides the multiple regression analysis for hypothesis testing. Hypothesis 1 (H1) states that there is a relationship between cost of housing and CHD. Table 4.2 exhibits that coefficient=0.89, t=1.778, and p=.076 because the p-value is more than 0.05 of the rejection area. Hypothesis 2 (H2) proposed that there is a relationship between transportation cost and CHD. Based on the result, the significance level of transportation cost falls out of the acceptance area with coefficient=.030, t=.508, and p=.612. Hence, H1 and H2 were not supported. This study focused specifically on

respondents living in Selangor. It can be seen that both costs do not affect CHD much. Selangor is the state with the highest gross domestic product (GDP) in 2018. As the richest state in Malaysia, the state government of Selangor provides many initiatives to help people in the lower and medium income group. The government provides the option to buy a house at a lower and affordable price. On top of that, the transportation infrastructure ranges from buses, metro rail transit and light rail transit at a lower fare helps the public. The government of Selangor also provides free shuttle buses in selected locations in their effort to reduce the financial cost of the public. These may have influenced the respondent's responses to both variables.

The third hypothesis (H3) proposed that there is a relationship between self-education cost and CHD. Table 4.2 exhibits that coefficient=-.118, t=-2.692, and p=.008 because the p-value is less than 0.05 of the rejection area, hypothesis 3 is supported. This finding is consistent with previous research that indicated the cost of higher education has been seen as a burden which brings to financial distress among people (Hemelt et. al., 2011; Wong et. al., 2015; Rachell, P., 2017; Williams, G., 2016). As stress could lead to hypertension, it possibly can result in people getting CHD. The last proposed hypothesis (H4) was there is a relationship between salary and CHD. From the table above , the significance value is 0.019 (coefficient=.113, t=2.367), which is less than 0.05 of the rejection area, thus hypothesis 4 is supported. Salary is always associated with lifestyle and work background. People who earn high salaries tend to have an unbalanced work life. They keep doing their job without considering their health and sometimes they become physically unfit. With an unbalanced lifestyle, those with high income tend to consume outside food which is commonly unhealthy. This finding is also consistent with previous studies (Md Kassim et al., 2020; Nobari, 2019). Lastly, the final model that is based on the multiple regression result is CHD=3.031-0.118SeC+0.113S.

CONCLUSION

The total death reported due to CHD is becoming more serious. The number is increasing every year (Department of Statistics Malaysia, 2019). The reasons for people getting CHD today are not only due to genetics, but other contributing risk factors such as lifestyle which could also lead people to

this serious disease. This study focussed specifically on the financial costs comprising of housing cost, self-education cost and transportation cost, whether they can influence CHD. The income element was also tested to look for the relationship to CHD as well. The finding of this research reveals that self-education costs and salary have a significant relationship with CHD. People that having high costs to finance their education would face financial distress and eventually lead them to hypertension which is one of the symptoms of getting CHD. Those with high salaries sometimes have a lack of personal time and live unhealthily due to the much attention and focus given to their career. Despite many costs associated with financial distress, this study found that both housing and transportation costs have a weak relationship with CHD. Perhaps this is because of the sample taken is in Selangor, where accommodation is well provided by the government. However, housing cost is still open for debate in future research.

This study is not without limitations. The sampling for this study focussed on Selangor with 300 samples. Thus, the finding of this study might not be generalised to the whole Malaysian CHD situation. Perhaps future research might increase the number of the sample by either using cluster sampling by including other states that also have CHD. There are many other financial cost factors that can lead to stress and hypertension such as the cost of food, medical cost, cost of raising kids, personal expenses and others could also be investigated in future research. Future research may consider other types of data collection such as focus group interviews with potential or CHD patients to get their overview of the cost of living. On top of that, interviews with authorities such as the Ministry of Health Malaysia and other bodies such as the National Heart Institute of Malaysia may help researchers understand the emergence of CHD. This study focussed on the financial cost and salary as a predictor to CHD makes it different from prior studies that just looked at CHD. This research is expected to benefit government agencies in understanding the impact of the cost of living on public health in Malaysia. In addition, the finding of this study is also significant to the public health department to develop public health policies and prevention initiatives for CHD. Besides, other interested parties also might get information about CHD. Lastly, the findings of this research would enhance the current literature on CHD that specifically focusses on cost of living and income.

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