

Patient's Behaviour with Coronary heart disease Viewed from Socio-Cultural aspect of Aceh Society in Zainoel Abidin Hospital

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Abstract. Coronary heart disease (CHD) is a chronic inability of heart to draw an adequate blood on myocardium due to specific problem in coronary artery. When the artery that supplies myocardium is interrupted, thus the heart is unable pumping the blood effectively to fill up an adequate blood perfusion to vital organs and other peripheral tissues. If the perfusion is impaired in time of oxygenation, the patient will threatened by a sudden death. This is a quantitative, analytical and observational research with a design of case study control, in which the subject is CHD patients and the control is non-CHD patients. The research populations were 2318 outpatients with CHD who visited Heart Polyclinic at Zainoel Abidin Hospital Banda Aceh. The sample studied were 92 patients with CHD and 92 patients with non-CHD (control). We used primary and secondary data that processed through editing, coding, entry, cleaning and tabulating. The data was analyzed using univariate, bivariate and multivariate analysis. The results showed that the CHD occurrences are significantly influenced by eating behavior ($p = 0,000$), smoking habit ($p = 0,000$) and sporting habit ($p = 0,000$). Therefore, health workers are expected to increase health promotion in order to improve the quality of life of people, especially in elderly people, by adopting a healthy lifestyle and avoiding CHD risk factors. Moreover, people are also suggested to take regular lipid profile check up and keep off smoking habit in order to do early prevention of CHD.

1 Introduction

World Health Organization (WHO) estimated that about 50% of global populations die from heart and blood vessel diseases each year. According to World Health Statistic Report 2008, 17.3 million of the deaths were caused by Cardiovascular Disease (CVD), representing 30% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. These deaths are predicted to continue to increase up to 23.4 million people in 2030. Over 80% of CVD deaths take place in low- and middle-income countries and more than a half of the deaths were nearly equal

between men and women. Therefore, it has been recognized as the number one killer and causing disability in the world [24].

Heart disease is also the leading cause of the death in America. Each year, 478.000 people die from Coronary Heart Disease (CHD), 1.5 million people have heart attack, 407.000 people experience heart surgery and other 300.000 people undergo an angioplasty. In 2010, the prevalence of CHD was greatest among persons aged ≥ 65 years (19.8%), followed by those aged 45--64 years (7.1%) and those aged 18--44 years (1.2%). CHD prevalence was greater among men (7.8%) than women (4.6%), however the prevalence will be drastically accelerate in postmenopausal women (CDC, 2011). According to American Heart Association (AHA) in Heart Stroke Statistic 2010, it was indicated that every 25 seconds, someone will have coronary event and every one minute one will die [4].

The deaths caused by CHD occurrences in Indonesia are also high, approximately reach 26%. According to National Household Health Survey, it continues to increase within the last 10 years. In 1991, the death rates from CHD were 16% and significantly increased in 2001 to 26.4%. In 2007, the rate was more than double, growing to 59.5%. According to the Basic Health Research (Riskesdas) 2013 issued by Health Research and Development Agency of Health Ministry of Indonesia, the prevalence of CHD based on interview diagnosed by doctor was 0.5% while based on doctors diagnose or symptom was 1.5%. The mortality rate due to the disease in Indonesia reached 7.6 million people per year, while the number of patients of all ages were also significantly increased, from 10,600 people in 2010 to 12.800 in 2013 [12].

In a research conducted by Ismail *et al.* [10] to men and women 14-45 years of age in the South Asia region stated that the risk of myocardial infarct for active smoking was 3.82 higher compared to the control group (OR=3.82; 95% CI=1.47 – 9.94), while for those with an increased serum cholesterol was 1.67 higher than the control group (OR=1.67; 95% CI=1.4 – 2.45). In addition, another research conducted by Smeltzer and Bare [23] found that the CHD risk is substantially increased for 2-4 times in smokers compared to the never smokers. Smoking will reduce the oxygen supply to the heart and body which in turn led to the raise of blood pressure and pulse rate, reduce the cholesterol level (HDL), cause the blood clot to form and damage the endothelial cells. To reduce the risk of CHD, people are recommended to do exercise for about 30 minutes per day. In the research conducted by Harvard Alumni Study in Lipoeto [17] it clearly proved that physical activity/exercise (even in a short term) can significantly reduce CHD risk as it increases the HDL concentration. Women with less physical activity face higher risk of it.

2 Conceptual Framework

Conceptual framework is a relationship framework among concepts or variables to be studied. Variable is a characteristic that attached to population which is varied from one to another and is investigated in a research. The variables in this research comprised of CHD occurrence (as dependent variable) and dietary, smoking and sporting habit (as independent variables). The conceptual framework of this research is presented as follow:

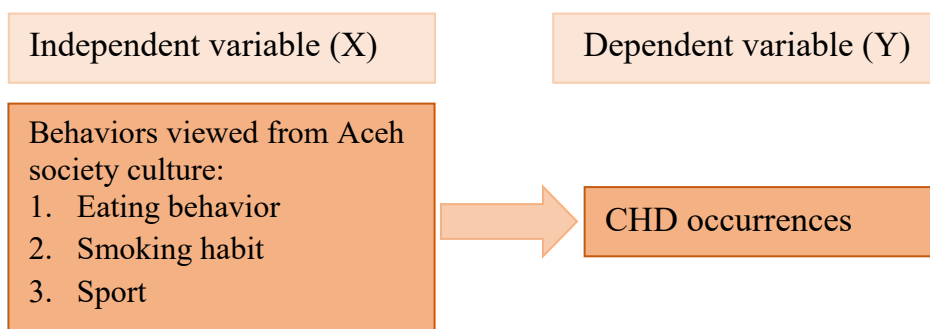


Fig. 1. Conceptual framework of this research

3 Research Methodology

This is a quantitative, analytical and observational research with a design type of case study control, in which the subject is CHD patients and the control is non-CHD patients [15].

This research was conducted in Zainoel Abidin Hospital Banda Aceh from November 2014 to September 2015, began with preliminary research and ended with final oral exam. The populations in this study were 2318 outpatients with CHD who visited Heart Polyclinic at Zainoel Abidin Hospital Banda Aceh. The size of samples needed in this research was determined using the following formula:

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)N}{d^2(N-1) + Z^2_{1-\alpha/2} P(1-P)} \tag{1}$$

where P denotes the subject proportion of previous researches that equals to 0.5, d is the precision level of 0.1, Z is the level of trust of 1.96, n is the number of samples, and N is the number of population of 796.

$$n = \frac{(1.96)^2 0.5(1-0.5)2319}{(0.1)^2(2319-1) + (1.96)^2 0.5(1-0.5)}$$

$$n = 92,26 \text{ people} = 92 \text{ people} \tag{2}$$

The samples to be studied are 92 CHD patients and 92 non-CHD patients (control). The sampling method used was simple random sampling.

The inclusive criteria of the samples are: (1) CHD outpatients who hospitalized at Heart Polyclinic of Zainoel Abidin Hospital Banda Aceh; (2) patients aged >30 years; (3) able to write and read; and (4) willing to participate as respondent. While the exclusive criteria are: (1) CHD patients hospitalized at Heart Polyclinic of Zainoel Abidin Hospital Banda Aceh with complication of heart and kidney failure; and (2) A drastically decreased on health status.

3.1 Operational Definition

Below are the operational definitions of the studied variables in this research.

Table 1. Operational definitions of the studied variables

No.	Variable	Operational Definition	Measurement Scale	Measurement Manner	Category
Independent Variable					
1	Behavior	The CHD patients' response or reaction to the CHD occurrence which is viewed from Aceh society culture, encompassing dietary, smoking and sporting habit.			
2	Eating behavior	The eating/drinking habit of meals and beverages which contain saturated fat, like meat, offal, egg, milk, etc., that consumed daily in a period of time.	Ordinal	Questionnaires and interview	<ol style="list-style-type: none"> 1. Frequently, everyday - 3 times a week. 2. Moderate, 1 – 2 times a week. 3. Infrequently, once a week or never.
3	Smoking habit	The habit/behavior of smoking cigarettes or ever smoking which is measured from the number of cigarettes consumed per day.	Ordinal	Questionnaires and interview	<ol style="list-style-type: none"> 1. Heavy smoker (>20 cigarettes a day). 2. Moderate smoker (10-20 cigarettes per day). 3. Light smoker (<10 cigarettes per day)

4	Sporting habit	Ideally sporting habit is doing a certain exercise with an average time of 30 minute		Questionnaires and interview	<p>1. Never exercise, never doing any exercise.</p> <p>2. Non-ideal exercise, doing a certain exercise less than 3 times a week and 30 minutes a day.</p> <p>3. Ideal exercise, doing a certain exercise at least 3 times a week and 30 minutes a day.</p>
Dependent Variables					
1.	CHD occurrence	Cardivascular disorder is characterized by a typical chest pain— felt like a heavy pressure on chest— and the increased of cardiac enzym. It can be screened using electrocardiography.	Nominal	Questionnaires and interview	<p>1. Yes (if have CHD).</p> <p>2. No (if have no CHD).</p>

Place the figure as close as possible after the point where it is first referenced in the text. If there is a large number of figures and tables it might be necessary to place some before their text citation.

3.2 Data Analysis

Data in this study were obtained from both primary and secondary sources. The primary data were directly obtained from respondents who filled-in the questionnaires, while the secondary data were obtained from available reports and documents owned by the hospital. The data processing was involved a series of following steps, i.e.:

- 1) *Editing*. Recheck and further investigate all the collected data and fix the failures and the shortcomings one in order to improve the quality of data.
- 2) *Coding*. Give numerical codes for the data which consisted of several categories.
- 3) *Entry*. Enter the data into computer to be analyzed in accordance with their respective variables

- 4) *Cleaning*. Identify and correct errors of the entered data by observing the distribution or deployment frequency of each studied variable.
- 5) *Tabulating*. Put the data in a frequency distribution table in order to facilitate the analysis, data processing and conclusions to be made.

The collected data were processed using computer software and further analyzed to see the distribution overview of each variable, as well as to test the research hypothesis for observing the relationship between independent and dependent variables and finding a fit model for CHD occurrence detection. A series of analysis carried out in this research are as follow:

- 1) *Univariate analysis*. Analyze each of research variables in order to find out their distribution [22].
- 2) *Bivariate analysis*. Examine the relationship between two variables, independent and dependent, using chi-square test [9]. In this research, the analysis was also used in selecting potential independent variables to be included into further analysis, that is variables with $p < 0.25$ (Mickey and Greenland in Hosmer and Lemeshow, 2000). It was also used further in obtaining OR value and 95%CI as well as in making decisions with significance level of 0.05 ($\alpha=5\%$) according to the following provisions:

- If p value is ≤ 0.05 , the relationship is significant;
- If p value is > 0.05 , the relationship is insignificant.

- 3) *Multivariate analysis*. Simultaneously observe the relationship between several independent variables and several dependent variables. In this research, the multivariate analysis used in analyzing the data was Multiple Logistic Regression Test. The intention of this test is to obtain the most appropriate model which illustrates the influential determinants on CHD occurrences (Ariawan, 2008). The regression formula is as follow:

$$\gamma = \ln \frac{p}{1-p} = \beta_0 + \beta_1 x_1 + \dots + \beta_i x_i \tag{3}$$

where p denotes CHD occurrences.

$$p = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \dots + \beta_i x_i)}} \tag{4}$$

where $\beta_i = 0, 1, 2, \dots, n$ denotes the parameters of logistic regression model and $x_i = 1, 2, 3, \dots, n$ denotes independent variables observed.

4 Results and Discussion

4.1 Univariate Analysis

Characteristic of Respondents

Table 2. Distribution of characteristic frequency of respondents

No	Characteristics	Case		Control	
		N	%	n	%
1	Age				
	- 30-45 years old	19	20.7	32	34.8
	- 46-60 years old	60	65.2	43	46.7
	- 61-75 years old	13	14.1	17	18.5
	Total	92	100	92	100
2	Level of Education				
	- Low (Elementary School)	20	21.7	13	14.1
	- Middle (High School)	50	54.3	65	70.7
	- High (University)	22	23.9	14	15.2
	Total	92	100	92	100
3	Type of Occupation				
	- Farmer	17	18.5	22	23.9
	- Entrepreneur	52	56.5	58	63.0
	- Civil Servant	23	25.0	12	13.0
	Total	92	100	92	100

The underlying characteristics of respondents in this research were classified based on three categories, i.e.: age, level of education and type of occupation (Table 2). According to the table, CHD cases mostly occurred in age 46-60 years (65,2%). Similarly, the control group were also found to be vulnerable for people aged 46-60 tahun (46,7%). With regard to level of education, both CHD and control group were found to be mostly experienced by those who were with middle level of education, respectively 54,3% and 70,7%. It happened the same to type of occupation, where the CHD and the control group were mostly had by those who work as entrepreneur, respectively 56,5% and 63,0%.

Respondents Behaviors and CHD Occurrence

Table 3. Influence of respondents' behaviors on CHD occurrence

No	Respondents Behaviors	Case		Control	
		N	%	N	%
1	Eating behavior				
	- Frequently	62	67.4	20	21.7
	- Moderate	18	19.6	37	40.2
	- Infrequently	12	13.0	35	38.0
	Total	92	100	92	100
2	Smoking habit				
	Heavy smoker	71	77.2	23	25.0
	Moderate smoker	15	16.3	32	34.8
	Light smoker	6	6.5	37	40.2

Total		92	100	92	100
3	Sporting habit				
	Never exercise	68	73.9	27	29.3
	Non-ideal exercise	17	18.5	36	39.1
	Ideal exercise	7	7.6	29	31.5
Total		92	100	92	100

The table 3 above presents the influence of respondents' behaviors on CHD occurrence amongst the outpatients at Heart Polyclinic Zainoel Abidin Hospital using univariate analysis. The behaviors are relevant to eating behavior, smoking habit and sporting habit. In regard to eating behavior, the case group was dominated by people who have frequent meals (67.4%) while the control group was dominated by those with moderate eating habit (40.2%). Regarding the smoking habit, 77.2% persons in the case group were identified as heavy smokers, while in the contrary, 40.2% persons in the control group were identified as light smokers. To the sporting habit, mostly people (73%) in the case group were known to had never exercises, while in the control group mostly of them (39.1%) were had non-ideal exercise.

4.2 Bivariate Analysis

The Influence of Respondents Behavior on CHD Occurrence

Table 4. Influence of respondents behavior on CHD occurrence

No	Respondents Behavior	Case		Control		p value
		N	%	N	%	
1	Eating behavior					
	- Frequently	62	67.4	20	21.7	0.000
	- Moderate	18	19.6	37	40.2	
	- Infrequently	12	13.0	35	38.0	
Total		92	100	92	100	
2	Smoking habit					
	Heavy smoker	71	77.2	23	25.0	0.000
	Moderate smoker	15	16.3	32	34.8	
	Light smoker	6	6.5	37	40.2	
Total		92	100	92	100	
3	Sporting habit					
	Never exercise	68	73.9	27	29.3	0.000
	Non-ideal exercise	17	18.5	36	39.1	
	Ideal exercise	7	7.6	29	31.5	
Total		92	100	92	100	

According to the chi-square test, this study concluded that:

- 1) There is a significant influence between eating behavior and CHD occurrence as mostly CHD patients in this research were dominated by those who have frequent meals (67.4%);
- 2) There is a significant influence between smoking habit and CHD occurrence as mostly CHD patients in this research were identified as heavy smokers (77.2%);
- 3) There is also a significant influence between sporting habit and CDH occurrence as mostly CHD patients in this research were known to had never exercise (73.9%).

4.3 Multivariate Analysis

After multivariate analysis for observing the relationship of each variable on CHD occurrence was done, the multivariate analysis was then carried out for determining the most dominant variable that influence the CHD occurrence by using Multiple Logistic Regression Model.

The variables with p value of <0.25 were then included into regression test. According to the chi square test result (Table 4), all the tested variables were had p<0.25, thus they all were able to be included to the multivariate analysis. Detail is shown below (Table 5).

Table 5. Variables selection result

Variable	p value	Description
Eating behavior	0.000	P<0.25
Smoking habit	0.000	p<0.25
Sporting habit	0.000	P<0.25

Table 6. Multiple Logistic Regression Model and CDH occurrences

Variabel	B	Sig.	OR	95% C.I	
				Lower	Upper
Eating behavior	1.394	0.000	4.031	2.316	7.016
Smoking habit	1.662	0.000	5.269	2.962	9.373
Sporting habit	1.438	0.000	4.214	2.322	7.647
Constant	7.736	0.000	0.000		

According to multivariate analysis, the most dominant variable that influence CHD occurrence is smoking habit (p=0.000; OR=5.3) which means that CHD risk in heavy smoker is 5.3 times higher than in light smokers.

4.4 Discussion

The Influence of Eating Behavior on CHD Occurrence

The research results shows that there is a significant influence between eating behavior and CHD occurrence (p=0.000). The majority patients of CHD (case group) were those who have frequent meals (67.4%), while the non-CHD patients (control group) were those who have moderate eating behavior (40,2%).

Ridwan (2009) stated that almost 90% of diseases, both degenerative and cardiovascular, are caused by the poor eating habits in people daily life. Foods recommended to avoid are those that contain high saturated fat and bad cholesterol like meat and fast foods.

According to Ratna et. al [19] eating behavior plays an important role in CHD prevention and treatment. People consuming 35 grams fiber foods per day have lower risks of CHD compared to people who consume less than 15 grams fiber per day. Low calorie foods, like seeds, fruits and vegetables can lowering cholesterol and maintaining healthy weight. Most of cardiovascular patients are overweight and have high blood cholesterol. To lose the weight, the calorie intake must be cut back by doing more physical activities.

The Influence of Smoking Habit on CHD Occurrence

The result of this study shows that there is a significant influence between smoking habit and CHD occurrence ($p=0.000$). According to the results, 77.2% persons in the case group were identified as heavy smokers, while in the contrary, 40.2% persons in the control group were identified as light smokers. In addition, the multivariate analysis was clearly suggested that smoking habit is the most dominant variable that influences CHD occurrence ($p=0.000$; OR = 5.3, which means that heavy smokers are 5.3 times have increased risks of CHD). This result is in line with the previous researches conducted by Lewis *et al.* (2007) and Smeltzer and Bare (2002) which suggested that heavy smokers were likely to have 2-4 times higher risks of CHD than the non-smokers.

Cigarette contains hundreds of harmful chemical substances, like tar, nicotine, carbonmonoxide, etc., that can reduces oxygen supply to the heart, increases blood and pulse pressure, decreases HDL cholesterol level, clots blood and causes endotel dysfunction.

Gray *et al.* (2002) stated that CHD risk rises with the increasing of blood pressure. This study suggested that blood pressure levels ranging from 120-129 mmHg systolic/80-84 mmHg diastolic were associated with two times higher risk of cardiovascular disease compared to levels of less than 120/80 mmHg.

The Influence of Sporting Habit on CHD Occurrence

The result of this study also shows that there is a significant influence between sporting habit and CHD occurrence as mostly CHD patients in this research were known to had never exercise (73.9%), while the non-CHD patients were mostly had non-ideal exercise (39.1). This is in accordance with Bender et al. [2] research results presented in their *Cardiology* book which indicated that there is a strong relationship between physical activity and CHD occurrence. The more exercises people do, the lesser CHD risk they have. Kabo (2008) stated that lack physical activity causes various diseases, including CHD. In regard to the disease, inactive people are 1.9 times more likely to develop CHD than those who are active.

According to Kusmana et. al [13], the frequency of physical activity/exercise determines its quality. The best exercise frequency that gives optimal result is carried out in a regular basis, 3- 6 times a week. The longer the exercise, the more the blood supplied to the heart and the more oxygen get distributed to the whole body. Having a 30-minutes exercise per day can double the effect, not only increases the blood supply but also turn off the body's generation of fat and cholesterol which eventually decreased CHD risk.

5 Conclusion and Suggestions

This research was intended to observe CHD patients behaviors which are viewed from socio-cultural aspect of Aceh society in Zainoel Abidin Hospital Banda Aceh with the following conclusions:

- 1) There is a significant influence between eating behavior and CHD occurrence ($p=0.000$);
- 2) There is a significant influence between smoking habit and CHD occurrence ($p=0.000$);
- 3) There is also a significant influence between sporting habit and CHD occurrence ($p=0.000$).

According to the results, we also provide several suggestions as follow:

- 1) Health workers are expected to increase health promotion in order to improve the quality of life of people, especially in elderly people, by adopting a healthy lifestyle and avoiding CHD risk factors;
- 2) People are also suggested to take regular lipid profile check up and keep off smoking habit in order to do early prevention of CHD.

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