Original article

A Study of Coronary Heart Patients' Lifestyle at Zainoel Abidin Hospital, Banda Aceh, Indonesia

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Abstract:

Background: About 40% of heart disease patients do not realize they have coronary heart disease (CHD). Based on the lifestyle of people in Aceh, several factors can increase the CHD risk, such as smoking, coffee, fatty foods, stress, and lack of physical activity. Such a lifestyle has the potential to increase the risk of CHD, as evidenced by statistical papers reporting high levels of CHD cases in Aceh. This study was aimed to review the patients' lifestyle with coronary heart disease at Zainoel Abidin Hospital, Banda Aceh, Indonesia. ***Method***: This research is quantitative, with a case-control design. In April 2017, 206 cases of CHD and 206 non-PJK cases were analyzed, using the patient's medical record and a lifestyle questionnaire, in Zainoel Abidin Hospital. The result of bivariate analysis through a chi-square test showed that lifestyle factors related to CHD included diet, physical activity, smoking, coffee, and stress control ($p<0,05$). ***Result:*** The results of the multivariate analysis with logistic regression showed that smoking is a lifestyle that remains consistent as a risk factor for CHD. In addition, after interacting with other risk factors, stress control and coffee drinking habits become a protective factor of CHD. Smokers are twice risky to have CHD than nonsmokers. ***Conclusion:*** The influence of lifestyle on CHD is also determined by age and income factors. The research implications of this study offer various parties the opportunity to pursue active involvement in preventive efforts against CHD.

Keywords: Determinant, lifestyle; Coronary Heart Disease; Zainoel Abidin Hospital

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Introduction:

Coronary heart disease is one of the biggest health issues. World Health Statistics (2008) reported that 17.3 million people died, or that 30% of deaths worldwide were due to CHD.[1] Leila Sabzmakan et al., (2013) reported that cardiovascular disease (CVD) is the number one cause of global deaths and predicted nearly 23.6 million people will die from CVDs in 2030, mainly because of heart disease and stroke. Acute cardiovascular disease (CVD) composes half of the non-contagious diseases suffered worldwide, affecting 16.7 million people. The high number of CVD risk factors in many developed and developing countries is expected to be the leading cause of death cases over the next 20 years.[2]

The National Household Health Survey (SKRTN) reported that, in Indonesia, mortality rates due to CHD tended to increase over the last 10 years. In

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1991, the CHD mortality rate was 16%, in 2001 it increased to 26.4%, and increased again to 59.5 % in 2007. Basic Health Research (2013) reported that the mortality rate of coronary heart patients in Indonesia was 7.6 million people per year; the total of heart disease patients of all ages also increased significantly, from 10,600 people in 2010, to more than 12,800 people in 2013.[3]

Indonesian Basic Health Research (2013) reported that the coronary heart disease prevalence in Aceh Province is 2.3 %, heart failure 0.3 %, and stroke 6.6% above the age of 15. This data shows that Aceh is affected by this degenerative disease, which occurs mostly in adults. Each month there are 60 patients requiring heart ring installation and 40 patients requiring heart surgery. Based on data from Zainoel Abidin Hospital, collected from January to November 2014, it was found that 10 people with chronic rheumatic heart disease, 439 people with ischemic heart disease, 60 people with conducting disorders & arrhythmias, 227 people with heart failure, 60 people with heart disease attended the hospital. According to data provided by Indonesian Basic Health Research (2013), 40% of people who die of heart attacks do not realize they suffer from coronary heart disease.[3]

The cause of CHD is not known, however, it is commonly known that CHD is triggered by several non-modifiable factors, such as gender, age, and family health history, while modifiable risk factors include hypertension, dyslipidemia, obesity, diabetes mellitus, smoking, consumption of alcoholic beverages, diet, lack of physical activity and stress.[4]

Leila Sabzmakan et al., (2013) reported that there were nine modifiable risk factors (abnormal lipids, hypertension, smoking, diabetes, psychosocial factors, abdominal obesity, low consumption of fruits and vegetables, regular alcohol consumption, and physical activity regularly). This evidence suggests that modifiable risk factors and behaviors associated with unhealthy lifestyles are key determinants of CVD morbidity and mortality.[2]

The factors described above, which are supported by the exploratory results interviews with patients, suggest that those affected by CHD had a family history of high blood pressure, stroke, and diabetes, a history of a high-fat diet, lack of physical activity, smoking, and drinking habits. This study aims to analyze lifestyle as a risk factor for coronary heart disease at Zainoel Abidin Hospital, Banda Aceh, Indonesia.

Methods:

This quantitative study employed a case-control design to analyze the lifestyle risk factor for coronary heart disease among 206 patients with CHD and a 206-person control (non-CHD). The determination of the sample and control was based on the medical records of Zainoel Abidin Hospital, Banda Aceh, Indonesia. Questionnaires were used to attain data on various CHD risk factors, including daily diet, smoking habits, physical activity, coffee consumption, and stress. The data was then analyzed using univariate, bivariate, and multivariate method analysis.

The case-control design requires that both the case and control groups come from comparable or equivalent populations. The case group consisted of diagnosed CHD patients who have been treated at the Polyclinic of Cardiovascular Disease. The control group was selected from patients who had visited the Internal Medicine Policlinic in Zainoel Abidin Hospital and received a diagnosis of a non-CHD disease. Based on the Chi-Square test, it was found that the CHD patients (as the case group) and the non-CHD patients (as the control group) were comparable in all aspects of age, gender, education, and employment status.

The analysis aims to answer the dominant question of lifestyle as a risk factor. The analysis conducted included the frequency distribution of each variable, case, and control case homogeneity analysis, the analysis of relationships between variables, and between several variables and the coronary event. The results of the analysis were interpreted and discussed using various concepts and the results of previous research.

Results:

The results of this study indicate that the age of CHD patients is mostly between 31 to 45 years old (186 people or 90.3%). Only 20 respondents were aged between 20 to 30 years old (9.7%). In the non- CHD control group, 172 respondents were aged between 31-45 years old (83.5%), and 34 respondents were aged between 20 to 30 years old (16.5%). Most of the CHD patients and the control group were women. This study found that 122 (59.2%) of the respondent CHD patients were women, while129 (62.6%) of the non-CHD were women. A further examination from the education level showed that both dominant groups had undergone higher education. The occupational status of the CHD patients and control group was

mostly unemployed. Most respondents (115 or 55.8%) with CHD have less than 1.900.000 IDR, while non-CHD patients have more than 1.900.000 IDR as income.

Based on data analysis, the diet pattern of CHD patients (132 respondents or 64.1 %) is mostly poor and unhealthy. On the contrary, non-CHD patients (107 respondents or 51.9%) tend to have better diet patterns. An irregular pattern of physical activity was shown by both CHD and non-CHD patients, 170 CHD (82.5%) and 106 non-CHD (51.5%) respondents having an irregular activity pattern. In terms of smoking, 86 respondents in the CHD group (41.7%) and 84 in the non-CHD group (40.8%) were non-smokers. In the CHD group, 120 respondents (58.3%) were smokers, whereas in the non-CHD group only 81 respondents (39.3%) were smokers. Regarding coffee consumption, this research found that 117 CHD respondents were categorized as coffee addicted (56.8%), while only 44 of the non-CHD patients (21.4%) were addicted to coffee.

Furthermore, CHD patients (111 respondents or 53,9%) mostly maintain their stress improperly. Based on the description of a lifestyle comparison between the two groups of the respondent, it can be concluded that there is a lifestyle difference between CHD and non-CHD patients in terms of stress and lifestyle maintenance. Besides environmental and heredity factors, lifestyle is one of the most decisive factors of people's health.

Table 1: Frequency Distribution of Respondents Lifestyle

Lifestyle	Case: CHD		Contol: Non-CHD	
	n	%	n	%
Diet:				
Unhealthy	132	64,1	99	48,1
Healthy	74	35,9	107	51,9
Physical activity and Exercise:				
Non-Regular	170	82,5	106	51,5
Regular	36	17,5	100	48,5
Smoking:				
Active Smoker	120	58,3	81	39,3
Non-Smoker	86	41,7	125	60,7
Coffee Consumption:				
Addicted	117	56,8	44	21,4
Consumer, but non-addicted	89	43,2	162	78,6
Stress Control:				
Non effective	111	53,9	51	24,8
Effective (proper)	95	46,1	155	75,2
General Lifestyle:				
Unhealthy	152	73,8	112	54,4
Healthy	54	26,2	94	45,6

Based on the statistical value (p<0,05), an unhealthy diet pattern can increase the risk of CHD to two times that of a healthy diet CHD (p-value = 0.001, OR = 1.92, 95%; CI 1.29-2.86). In addition, the lack of physical activity can make CHD four times more likely (p = 0,000, OR = 4.45, 95%; CI 2.83-6.99). This study exhibits an interesting analysis of lifestyle factors, especially smoking. Smoking can make the risk of CHD two times more likely than the risk for non-smokers (value-p = 0,000, OR 2.15, 95%; CI 1.45-3.19). Coffee addiction is also associated with a risk of CHD. Someone who is very coffee-addicted and consumes huge quantities of coffee will increase their risk by almost four to five times. Improper stress control (p = 0,000, OR = 3.55, 95% CI 2.33 - 5.39) will likely increase the risk of CHD by three. Further analysis observed that lifestyle is related to CHD risk (p=0,000, OR = 2.36, 95%; CI 1.56-3,57). Based on these results, a healthy lifestyle can decrease the risk of CHD by two times (Table 2).

Table 2: Lifestyle Relationships with Coronary Heart Disease

Lifestyle	Case: CHD		Control: Non-CHD		OR 95%CI	P value
	n	%	n	%		
Diet:						
Unhealthy	132	64,1	99	48,1	1,92	0,001
Healthy	74	35,9	107	51,9	(1,29 – 2,86)	
Physical activity and Exercise:						
Non-Regular	170	82,5	106	51,5	4,45	0,000
Regular	36	17,5	100	48,5	(2,83 – 6,99)	
Smoking:						
Active Smoker	120	58,3	81	39,3	2,15	0,000
Non-Smoker	86	41,7	125	60,7	(1,45 – 3,19)	
Coffee Consumption:						
Addicted	117	56,8	44	21,4	4,84	0,000
Consumer, but non-addicted	89	43,2	162	78,6	(3,14 – 7,45)	
Stress Control:						
Non effective	111	53,9	51	24,8	3,55	0,000
Effective (proper)	95	46,1	155	75,2	(2,33 – 5,39)	
General Lifestyle:						
Unhealthy	152	73,8	112	54,4	2,36	0,000
Healthy	54	26,2	94	45,6	(1,56 – 3,57)	

Further examination through a gradualistic analysis

(Table 3) shows the interaction between variables for CHD patients, shown by Exp (β) values. The final research model in this study is the postulate that smoking (as a negative habit) increases the risk of CHD. Based on the value of OR Exp (β), it can be seen that only smoking is positively attested as a risk factor for CHD (OR Exp (β) = 1.568), which means that a smoking habit increase the risk of CHD to twice the risk of a non-smoker. Age analysis (OR Exp (β) = 0.568) indicates that children are56 times less likely to suffer from CHD than adults or teenagers (>15 years old). Likewise, individuals who have a higher income are 50 times less likely to have CHD (OR Exp (β) = 0.501).

Furthermore, the analysis also shows that coffee and stress control are factors that contribute to increasing the risk of CHD. Reducing coffee consumption and maintaining stress can mean a 17 to 36 times lower likelihood of CHD. Also, young individuals are 56 times less likely to contract CHD. Overall, a healthy lifestyle is 38 times more likely to prevent CHD, compared to unhealthy lifestyles. Smoking increases the risk of CHD by almost two times, compared with not smoking.

Tabel 3: Hasil Analisis Model Multivariat

Variable	β value	*p-value*	OR *Exp (β)*	95% *Lower*	CI *Upper*
Coffee consumption	-1,742	0,000	0,175	0,103	0,299
Stress control	-1,007	0,000	0,365	0,230	0,581
Age	-0,566	0,004	0,568	0,287	0,623
Income	-0,690	0,003	0,501	0,319	0,787
Smoking habit	0,450	0,080	1,568	0,948	2,596
Lifestyle	-0,948	0,000	0,388	0,241	0,624
Constanta	1,856	0,000			

-2 *Log Likelihood*=478,767, *Overall percentage*=68,4, *p-value*= 0,000, df= 6, n=412

Discussion:

The results of this study have identified a new concept that a smoking habit is the dominant lifestyle determinant of CHD patients in Zainoel Abidin Hospital Banda Aceh. This study examines the daily lifestyle of CHD patients, including smoking, drinking coffee (addictive), lack of physical activity, and improper stress control. Age and income were observed as individual characteristics that also affected the risk of CHD.

Smoking Habit

Smoking in daily life, during breaks at work or while relaxing in social gatherings, is common in Indonesia. Some social traditions even serve cigarettes to guests. One local habit involves delivering an invitation to a party or gathering with betel and cigarettes as a mark of respect. In Indonesia, despite the health risk, smoking is socially approved and common. Nesrin, et al., (2010) revealed that smoking in Jordan is also a social custom (1). Various studies have revealed the negative impact of smoking behavior on health, including that nicotine substances can increase the heart rate up to 20 times the normal rate. Cigarettes can also increase blood pressure by 10 mmHg.[5]

Gray et al., (2002) revealed that heart disease risk increases as blood pressure increases. Furthermore, it has been found that sudden deaths among male smokers are 10 times more likely than among non-smokers.[6] Donald (2008) found that CHD risk factors were hypertension, smoking, physical activity, behavioral, and stress, whereas smoking increased the risk of CHD by almost 3 times.7 Donald (2008), who also studied at Dr. Pirngadi Public Hospital in Medan, found that smoking factors increased the risk of CHD to twice that of not smoking, especially when interacting with another lifestyle factor, such as coffee drinking habits and stress control. Research on women aged 25 to 65 years in Australia shows that CHD risk factors include hypertension, smoking, hypercholesterolemia, alcohol consumption, and obesity[8].

Referring to the results of previous research and the findings of this study, it can be concluded that efforts to control CHD need to be conducted with a strategy covering all aspects of life, especially controlling lifestyle risk. Several such interventions have been implemented, such as the establishment of smoke-free areas, especially in educational institutions and offices. However, in some non-formal business establishments, the movement towards smoke-free areas has not been affected, especially in public services such as public transport. Referring to the results of this study, it is necessary to create systematic movements that target all elements, so that smoking behavior can be reduced and ultimately the risk of CHD can be minimized.

Stress Control and Coffee Consumption

The results of this study also showed that stress control and coffee consumption are part of the lifestyle that must be considered in the effort to prevent CHD. Coffee consumption and smoking habit are one of several mechanisms to control or compensate for stress, especially when seeking to eliminate boredom or cope with an excessive workload. Such habits, however, are not healthy and can increase the risk of CHD [9]. Unhealthy lifestyle factors are inseparable from the increasing worldwide risk of CHD[10].

Furthermore, low incomes and ineffective stress control through excessive coffee consumption can lead to the formation of negative habits. Coffee has caffeine that affected sleep periods. Mostly, coffee-addicted people spend hours awake before actually going to sleep very late at night. And that habit leads someone to tend to feel lazy and avoid physical exercise the following morning.

The final model in the analysis of this study showed less effective stress control and coffee drinking habits as a significant lifestyle associated with CHD patients in Zainoel Abidin Hospital Banda Aceh. The interaction is also influenced by age and income factors.

Haskell WS (2003) revealed that lifestyle risk factors for CHD include a lack of physical activity, psychological stress, social isolation, and smoking behavior [11]. These findings are supported by Crouch's (2008) study, which revealed that 58 percent of CHD patients have a less healthy lifestyle in the form of excessive weight, lack of activity, a history of hypertension, and hypercholesterolemia, and smoking and alcohol consumption.[8]

This study recommends that efforts to reduce the risk of CHD be conducted through the control of the lifestyle factors of smoking and drinking coffee, and that, to be effective, stress control should be done synergistically. Efforts to control smoking can be done through a wider campaign of smoke-free areas through the support of local government and village-level policies. Greater control of coffee consumption can be achieved by increasing educational awareness of the effects of increased consumption of the fruit that is processed in a variety of drinks, while stress control can be managed through a healthy lifestyle campaign that teaches people to rest and work regularly, and avoid stress triggers.

Age and Income

Consistent with the findings of this study, which suggest that age and income, as social characteristics, are influential, some previous studies have revealed various behavioral, psychosocial, and social environmental factors as determinants of CHD[12]. Psychosocial factors include unemployment, lack of social support, depression, social isolation, non-permanent employment, and lack of empowerment[13]. The social environment may be the level of income, education, and occupation[14]. In the United States, low income is acknowledged as a contributing factor to death due to CHD[15]. Based on the results of this study and those of previous research, it can be concluded that income affects health status in the form of the health of the living environment, access to health services, prevention, and treatment, as well as educational exposure to prevention efforts.

As previously mentioned, risk factors for CHD include smoking behavior, lack of activity, drinking coffee, and improper stress control, but studies have also revealed that the prevalence of CHD increases with age. It can be understood that, with the increase of age, the level of exposure to CHD risk factors increases. CHD is the inability of the heart to supply blood throughout the body due to plaque and arteriosclerosis that is formed due to hypercholesterolemia, which is triggered by various risk factors that have been described previously. Observing the research data descriptions[8], it is clear that there is a tendency of an increased risk factor status with higher respondent ages. Such risk factors, including blood pressure and hyper cholesterol, tend to be experienced by respondents aged 45 years or over.

Conclusion:

Reviewing the lifestyle of patients with CHD, it can be concluded that smoking increases the CHD risk. This study also proves that the mechanism of smoking behavior, which increases the risk of CHD, is also influenced by factors such as age, income level, drinking habits, and less effective control of stress. Based on the conclusions of this study, efforts to control incidences of CHD in Aceh province should involve targeting young communities to facilitate the prevention of smoking behavior and excessive coffee drinking, and the provision of information on proper stress maintenance.

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Author's contributions:

(i) Conception of research, data collection, analysis and interpretation of results, preparation of the manuscript - Marniati

(ii) Conception of research, review the text and interpretation of results-Soekidjo Notoatmodjo

(iii) Conception of research, review the text and interpretation of results - Soetomo Kasiman

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