ANALYSIS OF RISK FACTORS RELATED TO CORONER HEART DISEASE IN ONE OF THE INDONESIAN NATIONAL HOSPITALS

[1]Fatma RisdaHidayanti, [1]PrabaDiyan R., [*1]Abu Bakar S

Abstract---Background: Coronary Heart Disease (CHD) is one of the greatest causesof death in developing countries. This disease is associated with both uncontrollable risk factors and uncontrollable risk factors. Controllable risk factors can be used as an effort to prevent CHD risk.

Aim: This study aimed to investigate the dominant risk factors that trigger Coronary Heart Disease (CHD) in a national hospital in Central Java province, Indonesia.

Method: This study was a descriptive analytic with cross sectional approach. The dependent variable was CHD and the independent variable were CHD risk factors, namely age, sex, dyslipidemia, hypertension, smoking, Diabetes Mellitus (DM), stress, and obesity. The sampling technique was a purposive sampling with the number of respondents of 49 patients with CHD and 49 patients without CHD, who were treated at Dr Moewardi Hospital Surakarta. The data used in this study was a primary data through the stress and smoking questionnaire and a secondary data from a medical record. The statistical test used was logistic regression analysis.

Results: Based on the results of this study, all respondents with CHD was triggered with age factors over 40 years (45.92%) with medical history of respondents experiencing dyslipidemia (31%), hypertension (33%), and diabetes mellitus (22.45%). Whereas gender factors, obesity, family history, stress, and smoking had a minor influence on CHD. However, the odds ratio through multivariate logistic regression analysis (1.5 to 2.9) showed sufficient values can trigger CHD.

Conclusion:It can be concluded that the age factor, dyslipidemia, hypertension, and diabetes mellitus were the dominant factors in coronary heart disease in a national hospital in Indonesia. Whereas gender factors, obesity, family history, stress, and smoking had a minor influence that can trigger CHD.

Keywords---hypertension, dyslipidemia, stress, obesity, smoking.

[1]*Department of Nurse Education, Nursing Faculty, Universitas Airlangga, Surabaya.*

Jalan Mulyorejo, Mulyorejo, Surabaya 60115, East Java, Indonesia

Phone: (031) 5913754

*Corresponding author E-mail: prabadiyan@gmail.com

I. Introduction

Coronary heart disease (CHD) is the single largest cause of death in the developed countries and is one of the leading causes of disease burden in developing countries as well (1) From the data of the World Health Organization (WHO), jmortality of cardiovascular disease will increase by 17 million in 2004 to 23.4 million in 2030. An estimated 17.5 million people died from cardiovascular disease in 2012. This disease become 3 of 10 causes of death in the world, where 7.4 million people die from ischemic heart disease. (2)

Based on prospective epidemiological studies, one of them is the Framingham study, the Multiple Risk Factors Interventions Trial and Minister Heart Study, showed that a person's risk factors for CHD were determined through the interaction of two or more risk factors, including the uncontrollable factors including family history, age, and gender. Furthermore, the controllable factors includeddyslipidaemia, high blood pressure, smoking, diabetes mellitus, stress and obesity. (3)

Many studies stated that 50% women over 50 years have a higher risk of developing coronary heart disease than men (4,5). Besides that, hypertension and sugar levels are the main risk factors for CHD due to changes in blood vessel conditions. While other risk factors namely stress, smoking, obesity, and dyslipidemia can also trigger a disorder of coagulants, activation of platelets and adrenaline which stimulates cardiac performance. (6–9) Moreover, the higher stress levels have an impact on the prevalence of metabolic syndrome (MetS) and coronary heart disease. (10)

Due to a lack of people awareness to the importance of prevention of coronary heart disease. Although there have been many studies that discussed the risk factors that can trigger CHD, most people are late to be aware of this disease. Thus, the purpose of this study was to investigate the dominant risk factors that trigger Coronary Heart Disease (CHD) in a national hospital in Indonesia.

II. Methods

Determination of Research Locations and Testing of Stress and Smoking Questionnaires

This study was a descriptive analytic with a cross-sectional approach. The samples of this study were patients at the Regional General Hospital of Dr. Moewardi, Surkarta, Indonesia. The number of samples used in this study was 49 respondents who had Coronary Heart Disease (CHD). The study was conducted in September 2015. In addition the samples of CHD patients, in this study also took 49 respondents who did not have CHD. The process of this research had obtained the permission from the Faculty of Nursing, Airlangga University Surabaya with letter number no.125 / UN3.1.13 / PPd / 2016 and had also been declared ethical conduct by the ethics committee of RSDM-FK, SebelasMaret University, Surakarta city.

The questionnaire in this study was used to observe stress factors and smoking factors. In both questionnaires, validity and reliability tests were conducted to measure the level of validity, consistency, and stability of the variables used in the study. Validity and reliability tests were carried out using Cronbach's alpha equation with the results of values on a scale grouped in five classes of validity and reliability levels.

Sample Collecting and Observation of Risk Factors that Associated with Coronary Heart Disease (CHD)

In the research that conducted at the Dr. Hospital Moewardi,the samples were 49 respondents. In this study, the dependent variable was coronary heart disease. Whereas the observed independent variables were age, family history, gender, hypertension, diabetes mellitus, obesity, smoking and stress. In the variables of age, family history, sex factors, dyslipidaemia factors, hypertension factors, diabetes mellitus factors, and obesity factors originated from the patient's medical record.

Whereas in the stress variable and smoking, the assessment method was used through yes or no answers in the questionnaire. In the stress questionnaire there were four negative questions, if the respondents's answers of YES and they were at risk of CHD if the stress questionnaire scored of two to four. If the respondents answered NO, they were less risky if the stress questionnaire scored of zero to one. Whereas, in the smoking variable questionnaire, there were three negative questions, with a range of values of two to three if they answered YES, they were at risk, and it scored of zero to one if they answer NO, they were less risky. In addition, the questionnaire method carried out in this study was given to respondents who were aggred to become respondents and the name of respondents were not mentioned.

In the data analysis, multivariant analysis was conducted to determine the dominant correlation in independent variables. Multivariate analysis was intended to find out how much the relationship or contribution all the risk factors studied on the incidence of CHD were focussed on age, family history, gender factors, dyslipidemia factors, hypertension factors, smoking factors, DM factors, stress factors, and obesity factors and had been selected in bivariate analysis. To analyze the hypothesis of the relationship of independent variables (age, family history, gender, dyslipidemia, hypertension, smoking, diabetes mellitus, stress, and obesity) with the dependent variable (coronary heart disease), the statistical test used was logistic regression.

III. Results

PenentuanLokasiPenelitian dan PengujianKuisioner Stress dan Merokok Determination of Research Locations and Testing of Stress and Smoking Questionnaires

This study was conducted at RSUD Dr. Moewardi, Surakarta city, in the integrated heart failure care, which included cardiac polymers, cardiac care rooms, intensive cardiovascular care units, and serves cardiac surgery. At this hospital, there were 1499 patients of coronary heart disease with Unstable Angina Pectoris (UAP), ST Elevation

Miocard Infarction (STEMI), and Non-ST Elevation Miocard Infarction (NSTEMI). In the CHD incidence variables, found 49 people with CHD and 49 people without CHD or experience other types of heart disease. From 49 people with CHD, 28 people (28.57%) had NSTEMI, 12 people (12.24%) had STEMI, and 9 people (9.18%) had angina. In addition, from the CHD and non-CHD respondents' data obtained demographic characteristics based on the occupation, respondents who worked as many as 46 respondents (46.94%) and 52 (53.06%) respondents who did not work.

In this study also used a questionnaire method for smoking factors and stress factors. From the validity and reliability test of both questionnaires showing that the smoking questionnaire had valid and very reliable results, with values of 0.01 and 0797, respectively. Meanwhile the stress factor questionnaire was valid and reliable with a value of 0.01 and 0.886, respectively.

Sample Collecting and Observation of Risk Factors Associated with Coronary Heart Disease (CHD)

In this study, there were 49 people who had CHD and 49 people who did not had CHD or other types of heart disease. Based on the data obtained, from 49 subjects with CHD, 28 subjects experienced NSTEMI, 12 subjects experienced STEMI, and 9 subjects experienced angina. In this study took several research variables as risk factors associated with the occurrence of CHD in RSUD Dr. Moewardi, Surakarta city. The variables used as risk factors include variables of age, gender, family history, dyslipidemia, hypertension, diabetes mellitus, obesity, stress, and smoking. Based on the results of the medical record and questionnaire that given to each subject, each variable had several criteria that also affected the occurrence of CHD as shown in Table 1.

Table1:The Results of Logistic Regression Selection of Risk Factors Variables related to Coronary Heart Disease (CHD) in RSUD Dr. Moewardi, Surakarta

Variable	Criteria		CHD		Total	Significance (p)
			Yes	No		
Age*	> 40 years		45	28	73	0.000
		Percentage	45.92%	28.57%	74.49%	
	< 40 years		4	21	25	
		Percentage	4.08%	21.43%	25.51%	
Family History	Yes		21	20	41	0.838
		Percentage	21.43%	20.41%	41.84%	
	No		28	29	57	
		Percentage	28.57%	29.59%	58.16	
Gender	Men		37	36	73	0.817
		Percentage	37.76%	36.73%	74.49%	
	Women		12	13	25	

		Percentage	12.24	13.27%	25.51%	
Dyslipidemia *	Yes		31	16	47	0.002
		Percentage	31.63%	16.33%	47.96%	
	No		18	33	51	
		Percentage	18.37%	33.67%	52.04%	
Hypertension *	Yes		33	23	56	0.040
		Percentage	33.67%	23.47%	57.14%	
	No		16	26	42	
		Percentage	16.33%	26.53%	42.86%	
Smoking	Yes		21	20	41	0.838
		Percentage	21.43%	20.41%	41.84%	
	No		28	29	57	
		Percentage	28.57%	29.59%	58.16%	
DiabetesMellitus*	Yes		22	11	33	0.018
		Percentage	22.45%	11.22%	33.67%	
	No		27	38	65	
		Percentage	27.55%	38.78%	66.33%	
Stress	Yes		9	11	20	0.616
		Percentage	9.18%	11.2%	20.41%	
	No		40	38	78	
		Percentage	40.82%	38.7%	79.59%	
Obesity	Yes		14	15	29	0.825
		Percentage	14.29%	15.3%	29.59%	
	No		35	34	78	
		Percentage	35.71	34.6%	79.59%	

Note: * show a significant effect (p <0.25) with logistic regression statistical analysis

Based on the results of the study, each risk factors variables for CHD were analyzed using simple logistic regression analysis. The results of simple logistic regression selection showed that there were only four variables that had p value <0.25, namely the age variable, dyslipidemia, hypertension, and diabetes mellitus. While the family history, gender, smoking, stress, and obesity variables showed a significance value greater than 0.25 (p> 0.25).

The final model of logistic regression showed variables of age, gender, dyslipidemia, hypertension, smoking, diabetes mellitus, and obesity that included in multivariate analysis. Through several stages, family history and stress variables were excluded or not included in the multivariate analysis. From the multivariate logistic regression test, p values and Odds Ratio (OR) or Exp (B) are represented in Table 2.

Table2:Significant Risk Factors Associated with Coronary Heart Events Disease (CHD) in RSUD Dr. Moewardi Surakarta

Variable	p (sig.)	Exp (B)/OR	95% CI for Exp (B)

			Lower	Upper
Age*	0.000	23.032	4.661	113.816
Gender	0.138	2.918	0.709	12.009
Dyslipidemia *	0.003	5.493	1.761	17.132
Hypertension *	0.007	5.146	1.561	16.971
Smooking	0.310	1.900	0.550	6.566
Diabetes Mellitus*	0.010	4.846	1.453	16.156
Obesity	0.265	2.010	0.589	6.867

Note: * show a significant effect (p <0.05) with logistic regression statistical analysis

Based on the results of data analysis, significant variables affected CHD were age, dyslipidemia, hypertension, and diabetes mellitus. Whereas, for gender variables, smoking, and obesity, although not significantly affecting the incidence of CHD, these factors can also influence CHD incidence considerably.

IV. Discussion

This study aimed to determine the risk factors associated with the incidence of Corronary Heart Disease (CHD). The results of this study indicated that age, dyslipidemia, hypertension, and diabetes mellitus factors had a significant effect on CHD incidence. Based on the results of the study, subjects over the age of 40 were more at risk of CHD compared to respondents aged less than 40 years. Age is the most important risk factor for predicting cardiovascular disease incidence, CHD. (5) In the United States, the number of people with heart disease increases sevenfold to 21% between the ages of 60 and 64 years. (5,6)

In this study, dyslipidemia factor had an odds ratio of 5.493, this means that respondents who had dyslipidemia had a risk of 5.493 times higher risk of CHD than respondents who did not have a history of dyslipidemia. Abnormal lipid levels (Low Density Lipoprotein (LDL), triglycerides, High Density Lipoprotein (HDL), and total cholesterol) will affect pathological changes in blood vessels. This is because inside the tunica intima and tunica inner media, fat deposits arise, especially beta lipoprotein which contains cholesterol, so that lesions will form lesions that are covered by fibrous tissue that give rise to fibrous plaques and arise aterima which then causes degenerative changes in artery walls. (11) In this study, all respondents were from Surakarta, Indonesia. Lipid levels that tend to be high in the blood can also be influenced by respondents' consumption habits of foods that contain high fat and cholesterol. High fat levels and trans-fatty acids in food affect CHD events. (8,12) Cholesterol and systolic blood pressure have a much stronger and almost log-linear relationship with vascular risk. (13,14)

In addition, the risk of hypertension factors also significantly affected CHD incidence in respondents. Hypertension causes complications in the heart in two ways, namely directly increasing the workload of the heart so

that oxygen demand increases and accelerates the atheroma process so that coronary vessels become narrower than normal blood pressure people. (13,15,16) With increasing pressure in blood vessels can cause a decrease in vascular endothelial function and impaired blood vessel elasticity, (17) acceleration of atherosclerotic narrowing and release of thrombus from blood vessels and become emboli. The released embolism can clog the coronary arteries and cause coronary heart disease. (5,6)

The factor of diabetes mellitus in this study also beame a risk factor that significantly affected the incidence of CHD. Diabetes mellitus is associated with an increased risk of cardiovascular death and a higher incidence of cardiovascular disease including coronary artery disease. (14,18) The relative risk for fatal coronary heart disease associated with diabetes is 50% higher in women than in men. (4,9)

The risk factors for obesity, smoking, stress, and gender did not show significant results associated with CHD incidence. But based on the Odds Ratio value, the three risk factors played a significant role in influencing CHD. Based on the results of the study, obesity factors were not a significant factor in CHD events because not all obese subjects had poor dietary and nutritional habits. Obesity due to the high consumption of fat, cholesterol, sugar, and calories can trigger CHD. (19) So that obesity is less able to be an accurate predictor of the triggers for CHD. In obese patients with high insulin resistance have a high risk of triggering CHD, so obese people can prevent CHD by reducing insulin levels in the blood. (7,14)

Meanwhile, smoking and stress risk factors did not have a significant effect on CHD because subjects can deny when subjects filled the questionnaires on those factors. Nevertheless, there have been studies that stated people are stressed because work will increase the desire to smoke. (20) So that these multiple risk factors can trigger coronary heart disease. Based on the research that has been done, on both factors were quite enough to trigger CHD. In subjects with a level of stress on a specific job, such as police officers can increase the prevalence of metabolic stress and trigger coronary plaque. (10) Stress that occurs due to low occupational status can indeed be a trigger factor for hypertension in women, but the relationship between stress and elevated high blood pressure that results in CHD needs to be more systematic research related to the interaction between gender and the stress level of CHD. However, gender factors in most studies suggest that women with high stress levels are more at risk of CHD than men. (7,9)

Based on the results of this study, the risk factors that trigger the incidence of coronary heart disease have been identified. Based on the results of the study, risk factors that were not genetic can be carried out preventive efforts by subjects to prevent the incidence of coronary heart disease. Increasing dietary fat intake, exercise, and stress management individually, additively and interactively related to coronary risk and psychosocial factors, suggest that multicomponent programs that focus on diet, exercise, and stress management can be useful for CHD patients. (21)

V. Conclusion

Based on data from respondents in this study, risk factors that significantly associated with triggering Coronary Heart Diseases (CHD) were age, dyslipidemia, hypertension, and diabetes mellitus. Meanwhile, gender, hereditary (genetic), stress, smoking, and obesity factors were minor risk factors that can trigger CHD. However, based on the statistical Odds Ratio all sufficient risk factors can be a trigger the incidence of CHD.

Conflict of interest statement

All authors have no conflict of interest to declare

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