Description of Risk Factors for Coronary Heart Disease at the Family Medical Center Hospital Heart Clinic In 2021

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Abstract

Coronary heart disease (CHD) is a condition of reduced blood and oxygen supply to the heart muscle due to blockage by plaque in the blood vessels, called atherosclerosis. CHD is a health burden in the world because it contributes to high mortality rates, including in Indonesia according to Riskesdas 2018. This research aims to determine the description of risk factors for coronary heart disease at the Family Medical Center Hospital Heart Clinic in 2021. This research uses a descriptive survey method with a cross-sectional approach. The total population was 369 and the sample using the total sampling technique obtained 318 people who met the inclusion criteria. The research results showed that the largest age distribution was in the 60-69 year age range, as many as 111 people (34.9%), the largest gender was female, 165 people (51.9%), 15 people (4.7%) had a family history, hypertension 109 people (34.3%), diabetes mellitus 125 people (39.3%), dyslipidemia 201 people (70.4%), smoking 63 people (19.8%), overweight and obesity 224 people (70.3%). CHD patients at the Family Medical Center Hospital Heart Clinic are mostly aged 60-69 years, female, most have no family history, have dyslipidemia, have a BMI in the overweight and obese categories, most did not have a history of hypertension, did not have Diabetes Mellitus, and most did not smoke.

Keywords: *Risk Factors, Coronary Heart Disease, Family Medical Center Hospital.*

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A. INTRODUCTION

Cardiovascular disease (CVD) is still a health burden in the world because it causes high morbidity and mortality rates. Coronary heart disease (CHD) is a form of CVD that still accounts for approximately one-third of all deaths in people over the age of 35 years, and it is predicted that deaths from CHD will continue to increase in developing countries, illustrating the need to implement effective primary prevention approaches (Rehman et al., 2021). The CHD risk factors identified by the Framingham study were divided into 2, namely modifiable risk factors (hypertension, dyslipidemia, smoking, diabetes, overweight or obesity, lack of physical activity, unhealthy diet, and stress); and those that cannot be modified (age, gender, family history of cardiovascular disease, and race). According to Basic Health Research (Riskesdas) in 2018, the incidence of CVD in Indonesia is increasing every year, at least around 2,784,064 individuals in Indonesia suffer from heart disease. This research aims to determine the risk factors for CHD in the Heart Clinic of the Family Medical Center Hospital in 2021 (Poznyak et al., 2022).

The heart is a muscular organ located in the mediastinum, weighing between 250-350 grams. The heart has four chambers: the right has the right atrium and ventricle which receive blood from the systemic circulation and pump it to the

pulmonary circulation for gas exchange; The left has the left atrium and ventricle which receive blood from the pulmonary circulation and pump it to the systemic circulation for gas exchange. Coronary heart disease (CHD), also known as coronary artery disease or ischemic heart disease, is a condition of reduced blood and oxygen supply to the heart muscle which causes an imbalance between the heart muscle's oxygen supply and demand (Ranek et al., 2022). The most common cause is atherosclerotic disease of the epicardial coronary arteries, causing a local reduction in myocardial blood flow and insufficient perfusion of the myocardium supplied by the involved coronary arteries. If heart muscle cells die because blood flow to the heart muscle is completely blocked, a condition called a heart attack or myocardial infarction occurs (Vancheri et al., 2020). The chronic inflammatory process from the formation of fatty streaks to the final formation of fibrous atheroma is said to be related to the occurrence of CHD. This process is triggered by endothelial dysfunction due to one or a combination of several factors, namely oxidative stress due to free radicals, genetic changes, chronic infections, or hypercholesterolemia. These trigger factors are thought to be uncontrolled hypertension, diabetes, smoking, and certain genetic factors (Leng et al., 2022).

Coronary heart disease (CHD) is classified into chronic coronary syndrome or stable ischemic heart disease and ACS. The clinical manifestations of chronic coronary syndrome are asymptomatic and stable angina pectoris, while ACS is divided into unstable angina pectoris, NSTEMI, and STEMI. The classic symptom of ACS is substernal chest pain like pressure, radiating to the left arm, neck, and jaw. These symptoms are not always visible and can be accompanied by main complaints, often in the form of difficulty breathing, dizziness, jaw or left arm pain, nausea, epigastric pain, diaphoresis, and weakness (Knuuti et al., 2020). Chest pain in unstable angina pectoris continues to appear both during activities and at rest with normal electrocardiogram (ECG) results and normal heart enzymes. In NSTEMI, the complaints felt are chest pain at rest with increased cardiac enzymes, and a normal ECG or with ST-segment depression. In STEMI, the complaints felt are chest pain with nausea/vomiting, diaphoresis, increased cardiac enzymes, and ECG with ST-segment elevation (Nilsson et al., 2020).

Risk factors for CHD that cannot be modified include age, gender, and family history. With increasing age, cardiovascular function decreases so that the risk of CVD including CHD in older adults increases. The relationship between gender and CHD is related to sex hormones and related receptors. The incidence of CHD is higher in men than in women because the hormone estrogen in women of childbearing age can protect women from atherosclerosis. Genetic factors contribute to susceptibility to a disease, such as people who have a family history of CHD have a risk of CHD that is around 1.5 – 2.0 times higher than people without a family history of CHD (Maas et al., 2021).

Modifiable CHD risk factors consist of hypertension, dyslipidemia, smoking, diabetes mellitus, overweight and obesity, lack of physical activity, and psychosocial stress. Hypertension is a condition where blood pressure (BP) increases, and

according to JNC 8, it is said to be hypertension if systolic BP is > 140 mmHg or diastolic pressure is > 80 mmHg. Dyslipidemia is considered an important determinant of atherosclerosis leading to CVD including CHD, characterized by elevated total cholesterol levels (> 200 mg/dL); LDL (>130 mg/dL); triglycerides (> 150 mg/dL); and decreased HDL levels (<40 mg/dL) (Falkner & Gidding, 2021). Smoking can influence the severity and pattern of CHD and is also associated with non-proximal coronary artery occlusion due to the effects of cigarettes and nicotine which can damage coronary blood vessels. In the Framingham study, the incidence of CVD was twice as high in diabetic men compared with non-diabetic men, and also three times higher in diabetic women compared with non-diabetic women (Salehi et al., 2021). Diabetes Mellitus as a risk factor for CHD is related to insulin resistance, namely type 2 DM. Overweight and obesity are associated with increased development of CHD and predispose to insulin resistance and type 2 DM, where these conditions can accelerate the development of CHD and worsen the prognosis. Physical inactivity is an independent risk factor for heart disease because it can lead to conduit arterial stiffness and reduced endothelium-dependent dilatation (i.e., flow-mediated dilatation) (Zarkasi et al., 2022). Psychosocial stress is also associated with the occurrence of CVD, especially CHD. Psychosocial stress will activate the same response system, namely the sympathetic nervous system (SNS) axis and the hypothalamus-pituitary-adrenal axis (HPA), regardless of the source. Manifestations of relative increases in SNS activity include increased heart rate, low-frequency/high-frequency heart rate variability ratio, and blood viscosity with risk of thromboembolism (Scatà et al., 2023).

B. LITERATURE REVIEW

1. Risk Factors

Risk factors are a concept used to identify and analyze elements or conditions that can increase the likelihood of a negative or undesirable event occurring. This concept is rooted in the understanding that several factors, both internal and external to a system, individual, or process, can contribute to an increase in the probability of an adverse event. These factors can vary, ranging from personal characteristics, environmental conditions, and certain behaviors, to technical aspects of a process or system (Settembre-Blundo et al., 2021).

In a health context, for example, risk factors may include lifestyle habits such as smoking or lack of physical activity, genetic conditions, or exposure to harmful substances. In finance, risk factors can be market fluctuations, government policies, or investor behavior. Meanwhile, in the context of cyber security, risk factors include system weaknesses, malware attacks, or user negligence. Identifying risk factors is an important step in efforts to prevent and reduce negative impacts that may arise (Budreviciute et al., 2020).

The concept of risk factors is also closely related to risk measurement and analysis, where these factors are identified and assessed based on their potential impact and likelihood of occurrence. This process enables the creation of effective

mitigation strategies, which can take the form of implementing controls, developing contingency plans, or modifying behaviors and processes to reduce risks. Regular evaluation of risk factors is also important to ensure that risk management strategies remain relevant and effective amidst changing conditions or new information (Jarvis et al., 2020).

Additionally, understanding risk factors plays a key role in the development of policies and programs by governments, organizations, or individuals. This is because the identification and analysis of risk factors can help in a more focused and efficient allocation of resources, as well as in the design of targeted interventions to prevent or reduce negative events. Thus, the concept of risk factors is not only important in the context of risk management and mitigation but also in strategic planning and decision-making (Moreira & Da Costa, 2020).

However, it is important to remember that the identification and analysis of risk factors often involve uncertainty. This is due to the complexity of many situations and events involving risk factors, as well as limitations in data and methodology. Therefore, a cautious and adaptive approach is required in managing risk factors, with the understanding that risk assessments may change over time and as new information is obtained (Teo & Rafiq, 2021).

It can be said that risk factors are a fundamental concept in risk management and analysis in various fields. Through identifying, evaluating, and mitigating risk factors, individuals and organizations can take proactive steps to reduce the likelihood of negative events occurring and minimize their impact. While there are challenges in managing risk factors, an informed and adaptive approach can increase resilience and adaptive capacity in the face of risk and uncertainty (Moktadir et al., 2021).

2. Coronary Heart

Coronary Heart Disease (CHD) is a disorder caused by narrowing or blockage of the arteries that supply blood to the heart muscle and is a microardium disorder caused by insufficiency of coronary blood flow. The main cause of CHD is dyslipidemia. Dyslipidemia is a major risk factor for heart disease. Changes in people's lifestyles are closely related to increasing lipid levels (Fikih & Wijaya, 2020).

Atherosclerosis is a disease process that begins early in life and progresses without symptoms, causing narrowing of the coronary arteries with or without complications. Hardening of the blood vessel walls or atherosclerosis occurs when there is a buildup of fat consisting of lipoproteins or substances obtained from proteins and fats, cholesterol, and other waste cell residues in the inner walls of the arteries. The process spreads with muscle fibers and the endothelial layer of the walls of small arteries and arterioles thickens. This will cause blockages in the arteries which make it difficult for the heart muscle to contract because the oxygen supply is reduced and can even cause decay of the heart muscle or necrosis (Fan & Watanabe, 2022).

One of the causes of coronary heart disease is the habit of eating high-fat foods, especially saturated fat, resulting in the formation of fatty plaques called atheroma.

Atheroma causes atherosclerosis, which is a condition of large and small arteries characterized by deposits of fat, platelets, macrophages, and leukocytes throughout the layers of the tunica intima and ultimately into the tunica media. In atherosclerosis, the intimal layer of the artery walls contains a lot of cholesterol or other fats which cause calcification, hardening, and thickening. Hardening and narrowing of blood vessels by the deposition of cholesterol, calcium, and yellow fat is known as atherosclerosis or calcification (Lu et al., 2024).

The stages of atherosclerosis begin with fatty deposits in normal artery walls. If this deposit continues, it will result in more and more deposits, which can result in the closure or blockage of blood vessels. The factors that cause atherosclerosis are hyperlipidemia, hypertension, smoking, diabetes mellitus, obesity, and lack of physical activity (Lorey et al., 2022).

In simple terms, the heart can be compared to a cone-shaped bag with the top cut off. The size of the heart is approximately the size of the right fist, located in the left chest cavity slightly to the middle, precisely above the diaphragm which separates the chest cavity from the abdominal cavity. The heart functions to pump blood throughout the body. To carry out its functions properly, the intake of oxygen-rich blood must be met. Blood containing oxygen usually flows through arteries. Coronary Heart Disease begins with the accumulation of fat in the arteries that supply blood to the heart. As a result of this process, the arteries narrow and harden, so that the heart lacks a supply of oxygen-rich blood. As a result, heart function is disrupted and it has to work very hard. This disease is often also referred to as atherosclerosis (Xi et al., 2022).

Atherosclerosis is an important component that plays a role in the process of calcification or accumulation of cholesterol elements. One thing that cannot be denied is that cholesterol within normal limits is also very important for the body. The problem will be different when cholesterol intake is excessive. Adequate fat intake which is associated with a pathological condition, namely Coronary Heart Disease, is closely related to increased lipid profile levels (Meng et al., 2022).

The initial symptom of Coronary Heart Disease is a pain in the left side of the chest which can radiate to the left arm neck or back. Chest pain is subjective, some feel like being pressed by a heavy object, hot like burning, pain like being pricked by a needle, discomfort in the chest and some say it's like catching a cold. The location can also occur in the middle of the chest, just the neck, back, or right chest, and can also occur in the solar plexus like stomach ulcers. If the narrowing of the arteries reaches 80-90%, it can cause even more serious problems, namely heart attacks (Choi et al., 2023). If blood flow in the coronary arteries is completely blocked, that part of the heart muscle is damaged. This is known as an “acute heart attack” or acute myocardial infarction (AMI). AMI is generally caused by sudden blockage of the coronary arteries, namely due to the rupture of atherosclerotic fatty plaque in the coronary arteries. These fatty plaques become weak points in the arteries and tend to rupture. When it ruptures at this location, a clot quickly forms which results in complete obstruction

(oculation) of the artery, and cuts off blood flow to the heart muscle (Akhtar et al., 2024).

C. METHOD

This research is descriptive survey research. In this study, observations were made of the description of CHD risk factors from medical record data of patients suffering from CHD who received treatment at the Heart Clinic of the Family Medical Center Hospital in 2021. This research was conducted at the Family Medical Center Hospital, Bogor, and carried out in February – April 2023. The population in this study were all CHD sufferers who received treatment at the Heart Clinic of the Family Medical Center Hospital in the period January-December 2021. The sampling technique used total sampling, namely taking all CHD patients seeking treatment at the Family Medical Center Hospital Heart Clinic in the 2021 period, who met the inclusion criteria. The inclusion criteria in this study were all patients suffering from CHD who received treatment at the Family Medical Center Hospital Heart Clinic for the period January-December 2021. The exclusion criteria in this study were patients who had incomplete medical record data according to the required variables or could not be assessed.

D. RESULT AND DISCUSSION

1. Research Result

The research results obtained were related to risk factors that cannot be modified, namely age, gender, family history, history of diseases related to CHD (hypertension, dyslipidemia, diabetes mellitus), the distribution of Body Mass Index (BMI), and smoking status in Heart Clinic patients at Family Medical Center Hospital in 2021 is following the tables below:

Table 1. Age Frequency Distribution of CHD Sufferers at the Family Medical Center Hospital Heart Clinic in 2021

Age	Frequency	Percentage (%)
20-29 years old	2	0.6
30-39 years old	4	1.3
40-49 years old	2	0.6
50-59 years old	4	1.3
60-69 years old	2	0.6
>70 years	4	1.3
Total	2	0.6

Table 2. Gender Frequency Distribution of CHD Sufferers at the Family Medical Center Hospital Heart Clinic in 2021

Gender	Frequency	Percentage (%)
Male	153	48.1
Female	165	51.9
Total	318	100.0

Table 3. Frequency Distribution of Family History of Disease in CHD Sufferers at the Family Medical Center Hospital Heart Clinic in 2021

Family History of Disease (RPK)	Frequency	Percentage (%)
No history	303	95.3
There's History	15	4.7
Total	318	100.0

Table 4. Frequency Distribution of Hypertension in CHD Patients at the Family Medical Center Hospital Heart Clinic in 2021

Hypertension	Frequency	Percentage (%)
No Hypertension	209	65.7
There is hypertension	109	34.3
Total	318	100.0

Table 5. Frequency Distribution of DM in CHD Patients at the Family Medical Center Hospital Heart Clinic in 2021

DM	Frequency	Percentage (%)
No DMs	193	60.7
There are DMs	125	39.3
Total	318	100.0

Table 6. Frequency Distribution of Dyslipidemia in CHD Sufferers at the Family Medical Center Hospital Heart Clinic in 2021

Dyslipidemia	Frequency	Percentage (%)
There was no dyslipidemia	117	36.8
There is dyslipidemia	201	63.2
Total	318	100.0

Table 7. Frequency Distribution of Smoking Status in CHD Sufferers at the Family Medical Center Hospital Heart Clinic in 2021

Smoking Status	Frequency	Percentage (%)
Do not smoke	255	80.2
Smoking	63	19.8
Total	318	100.0

Table 8. Frequency Distribution of BMI in CHD Patients at the Family Medical Center Hospital Heart Clinic in 2021

IMT	Frequency	Percentage (%)
Not overweight and not obese (BMI <23)	94	29.6
Overweight and Obesity (BMI >23)	224	70.4
Total	318	100.0

Based on Table 1, it is known that the risk factors for age in the incidence of CHD in patients at the Heart Clinic of the Family Medical Center Hospital in 2021 are; It was found that the highest age distribution was in the 60-69 year old range with 111 people (34.9%) and the lowest was in the 20-29 year old range with 2 people (0.6%). This is following research conducted by Sari at RSI Siti Rahmah Padang on 51 CHD

sufferers, it was found that the highest age group was 50-59 years old at 41.2%. Other research conducted by Andarmoyo at RSU Dr. Harjono Ponorogo also obtained similar results where CHD was more common in patients aged >40 years as much as 86.7%.

Based on Table 2 of age risk factors for the incidence of CHD in patients at the Family Medical Center Hospital Heart Clinic in 2021, it was found that the largest gender distribution was women, 165 people (51.9%). This is following research conducted by Sari at RSI Siti Rahmah Padang on 51 CHD sufferers, it was found that the largest gender was female, 26 people (51%). The results of this study are following research conducted by Farahdika, a case study at the Semarang City Regional General Hospital, which showed that the majority of CHD patients were women, namely 23 people (59%). The results of this study are not in line with research conducted by Suherwin which was obtained from 136 patients with CHD, 95 patients (69.9%) were male. The results of this study are also not in line with research conducted by Kurnia which showed that of a total of 43 patients with CHD, 23 (53.5%) of the patients were male.

Based on Table 3 of risk factors for family history of CHD in patients at the Family Medical Center Heart Clinic in 2021, it was found that the majority of patients did not have a history of similar complaints in the family, namely 303 patients (95.3%). The results of this study are in line with research conducted by Tappi which stated that of 48 CHD patients, 27 people (56.3%) had no family history of CHD.

Based on Table 4 of risk factors for hypertension in the incidence of CHD in patients at the Family Medical Center Hospital Heart Clinic in 2021, it was found that the majority of patients did not have hypertension, namely 209 patients (65.7%). The results of this study are not in line with research conducted by Sari at RSI Siti Rahmah Padang on 51 CHD sufferers, where 27 patients (52.9%) had hypertension. The results of this research are also not in line with research conducted by Amisi at RSUP Prof. Dr. R.D Kandou Manado who found that the majority (60%) of CHD patients had hypertension. This research is also not in line with previous research conducted by Farahdika, a case study at the Semarang City Regional General Hospital showed that 68.2% of CHD patients had hypertension.

Based on Table 5 risk factors for DM on the incidence of CHD in patients at the Family Medical Center Hospital Heart Clinic in 2021, it was found that the majority of patients did not have DM, namely 193 patients (60.7%). The results of this study are following research conducted by Muthaminnah which showed that only 13.6% of patients experienced DM. The results of this study are also in line with research conducted by Torawoba which stated that 59.1% of patients with CHD did not have DM. However, this research is not in line with research conducted by Sari at RSI Siti Rahmah Padang on 51 CHD sufferers, 26 patients (51%) had diabetes mellitus. This research is also not in line with research conducted by Zahrawardani which stated that of the 128 patients involved in his research, there were 82 patients suffering from diabetes mellitus (64.1%).

Based on Table 6 risk factors for dyslipidemia in the incidence of CHD in patients at the Heart Clinic of the Family Medical Center Hospital in 2021, it was found that the majority of patients had dyslipidemia, namely 201 patients (63.2%). The results of this study are following research conducted by Damayanti at Surabaya Islamic Hospital, which showed that 50.8% of CHD patients experienced hyperlipidemia. The results of research conducted by Husni stated that the relationship between dyslipidemia and the incidence of CHD at Ulin Banjarmasin Regional Hospital was that there was a significant relationship with a value of p = 0.02, patients with dyslipidemia had twice the risk of suffering from CHD compared to patients who did not have dyslipidemia.

Based on Table 7 risk factors for smoking on the incidence of CHD in patients at the Heart Clinic of the Family Medical Center Hospital in 2021, it was found that the majority of patients did not smoke, namely 255 patients (80.2%). The results of this study are not in line with research conducted by Pracilia where of a total of 62 patients with CHD, 50 people (80.6%) had a smoking habit.

Based on the table of 8 BMI risk factors for the incidence of CHD in patients at the Family Medical Center Heart Clinic in 2021, it was found that the majority of patients had a BMI in the overweight and obesity category, 224 people (70.4%). This research is by research conducted by Anisam showing that the majority of CHD patients in the study were overweight (71.9%) compared to normal body weight (28.1%).

E. CONCLUSION

From the results of research on the Description of Coronary Heart Disease Risk Factors at the Family Medical Center Hospital in 2021, it is known that the age distribution of CHD patients at the Heart Clinic of the Family Medical Center Hospital is mostly in the age range 60-69 years, 111 people (34.9%). The largest gender distribution was women, 165 people (51.9%). The majority of CHD patients at the Heart Clinic of the Family Medical Center Hospital did not have a family history of CHD, namely 303 patients (95.3%). The majority of CHD patients at the Family Medical Center Hospital Heart Clinic did not have hypertension, namely 209 patients (65.7%). The majority of CHD patients at the Family Medical Center Hospital Heart Clinic did not have DM, namely 193 patients (60.7%). The majority of CHD patients at the Family Medical Center Hospital Heart Clinic had dyslipidemia, namely 201 patients (63.2%). The majority of CHD patients at the Family Medical Center Hospital Heart Clinic did not smoke, namely 255 patients (80.2%). Lastly, the majority of CHD patients at the Family Medical Center Hospital Heart Clinic had a BMI in the Overweight and Obesity category, 224 people (70.4%).

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