Characteristics of Acute Myocardial Infarction Patients

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ABSTRACT
Acute myocardial infarction (AMI) is a disease that has a high mortality. Usually happens to anyone and regardless of age, both male and female. The purpose of this study was to describe the characteristics of acute myocardial infarction patients hospitalized. This study uses a descriptive design. The variables used in this study were the characteristics of acute myocardial infarction patients consisting of gender, age, education, history of hypertension, history of diabetes mellitus, family history of acute myocardial infarction, blood pressure and pulse frequency. The number of samples used was 35 respondents who analyzed the data using a frequency distribution. The results showed that the characteristics of 35 respondents showed that the majority of AMI patients occurred in men, namely 60%, the majority were aged 56-60, namely 34.3%, the majority had a history of hypertension, diabetes mellitus and also a family history of having AMI. Conclusion Acute myocardial infarction can occur in both men and women who enter menopause. History of hypertension, diabetes mellitus and family history with AMI have a major contribution to cause acute myocardial infarction.

Keywords : Gender, Age, History of Disease, Acute Myocardial Infarction

BACKGROUND

Acute Myocardial Infarction (hereinafter referred to as AMI) is an Acute Myocardial Infarction (AMI) which is the main cause of morbidity and mortality in developed countries and is a very important health problem in developing countries (Kirthi, 2019) or AMI is a disease that attacks the heart organ. which causes cell death in the heart muscle due to a long myocardial ischemic process in the heart (Idris, 2017). Symptoms shown in patients with AMI are chest pain such as being crushed by heavy objects, shortness of breath, cold sweats, nausea and vomiting accompanied by a feeling of fullness in the stomach. The pain you feel radiates to the arms and jaw, which can cause limited or cut off blood flow to a part of the heart. If the cut or reduction in blood flow lasts more than a few minutes, the heart tissue will die (Nugroho et al., 2016). In addition, according to Joob & Wiwanitkit (2013) a typical manifestation of AMI is chest pain. Pain most often starts in the retrosternal area and can spread to one or both arms, neck, and jaw (Amsterdam et al., 2014), but can also be manifested by epigastric pain or back pain (Darawad, et al., 2016). These symptoms can also be accompanied by dyspnea, diaphoresis, syncope, nausea, or abdominal pain (Amsterdam et al., 2014; Asgar Pour, et al., 2015). If not treated immediately, AMI can cause death (Joob & Wiwanitkit, 2013).

AMI is a cardiovascular problem that is the cause of the increasing mortality rate (PERKI, 2015). According to a report by the World Health Organization (WHO) in 2020, cardiovascular disease can kill 17.9 million lives each year, 31% of all global deaths. As with the 56.9 million deaths worldwide in 2016, more than half (54%) were due to heart disease. Ischemic heart disease and stroke are the biggest killers in the world, the two combined can cause 15.2 million deaths in 2016. This disease remains the leading cause of death globally in the last 15 years (WHO, 2020).

AMI is a non-communicable disease where there are pathological changes or abnormalities in the walls of the coronary arteries that can cause myocardial ischemia (Tumade et al., 2014). AMI is caused by atherosclerosis, which is the process of plaque formation which results in the formation of a thrombus which causes the lumen to narrow, which causes disruption of blood supply so that the strength of heart muscle contraction decreases. If the thrombus ruptures before total necrosis of the distal tissue, then an infarction of the myocardium will occur (Asikin et al., 2016). The occurrence of AMI is associated with several risk factors including non-modifiable factors such as age, gender, heredity, and modifiable factors such as smoking, hypertension, diabetes mellitus, dyslipidemia, and obesity (Ghani et al., 2016; Indrawati, 2014) Other evidence states that factors that can cause AMI include diabetes mellitus, dyslipidemia, smoking, hypertension, and a family history of AMI (Safitri, 2015).

Knowing the characteristics of AMI sufferers is necessary for preventive interventions so that the incidence of AMI can be reduced because of the many losses incurred such as arrhythmias, cardiogenic shock, pericarditis, cardiac arrest, heart failure, acute pulmonary edema and even death if not complied with (Asikin et al., 2016; Ghani) et al., 2016). By knowing the characteristics of AMI sufferers, primary prevention can be carried out to improve health and reduce risk factors, secondary prevention to deal with symptoms quickly and optimally so as to prevent more severe conditions and rehospitalization, and tertiary prevention to maintain optimal health through the support and strength available. in sufferers (Indrawati, 2014). Based on the background, the purpose of this study was to describe the characteristics of the Acute Myocardial Infarction Patient in the ICCU Room at Kediri Baptist Hospital.

METHODS

This study used a descriptive design with the aim of describing the characteristics of the patient with acute myocardial infarction. This study was conducted on April - August 2020. The variables of this study were the characteristics of patients with acute myocardial infarction, including gender, age, education, history of hypertension, history of diabetes mellitus, family history with AMI, blood pressure and pulse frequency. The population was all AMI patients in the ICCU Room of the Kediri Baptist Hospital, with a sample size of 35 respondents who were taken by quota sampling, namely taking sampling based on unrestricted characteristics. The research instrument used was a questionnaire which described the characteristics of AMI patients. Analysis Data with distribution frequency. This research has passed ethics with letter number 076/30 / III / EC / KEPK-3 / STIKES RSBK / 2020.

RESULT

Table 1.   Frequency Distribution of Gender Demographic Data Characteristics of Acute Myocardial Infarction Patients in the ICCU Room at Kediri Baptist Hospital April - August 2020 (n = 35)

Gender	Frequency	Percentage%
Male	21	60
Female	14	40

Based on Table 1 shows the characteristics of acute myocardial infarction patients based on gender with the most frequent male 21 respondents, namely 60%.

Table 2.   Frequency Distribution of Age Demographic Data Characteristics of Patients with Acute Myocardial Infarction in the ICCU Room at Kediri Baptist Hospital April - August 2020 (n = 35)

Age	Male	Female
45-50	3 (14,3%)	0 (0%)
51-55	3 (14,3%)	4 (28,6%)
56-60	4 (19%)	7 (50%)
61-65	2 (9,5%)	3 (21,4%)
>65	9 (42,9%)	0 (0%)
Average Age	Mean: 60,00	Std. Deviasi: ±7,985

Based on Table 2, it shows the characteristics of acute myocardial infarction patients by age with a maximum frequency of 56-60 years 21 respondents, namely 34.3%, with a mean of 60.00 and a standard deviation of ± 7.985.

Table 3.   Frequency Distribution of Patient Characteristics of Acute Myocardial Infarction Based on History of Hypertension in the ICCU Room at Kediri Baptist Hospital April - August 2020 (n = 35)

History of Hypertension	Frequency	Percentage%
Yes	20	57,1
No	15	42,9

Based on Table 3 shows the characteristics of patients with acute myocardial infarction based on a history of hypertension with a frequency of more than 50% had a history of hypertension 20 respondents that is 57.1%.

Table 4. Frequency Distribution Characteristics of Acute Myocardial Infarction Patients with Diabetes Mellitus Based on Space History ICCU Kediri Baptist Hospital April - August 2020 (n = 35)

History of Diabetes Mellitus	Frequency	Percentage%
Yes	19	54,3
No	16	45,7

Based on Table 4 shows the characteristics of patients with acute myocardial infarction based on a history of diabetes mellitus with a frequency of more than 50% had a history of hypertension 19 respondents that is 54.3%.

Table 5. Frequency Distribution Characteristics of Acute Myocardial Infarction Patients Based on Family History with AMI in Kediri Baptist Hospital Room ICCU April - August 2020 (n = 35)

Family History with AMI	Frequency	Percentage%
Yes	24	68,6
No	11	31,4

Based on Table 5 shows the characteristics of patients with acute myocardial infarction based on family history with the frequency of AMI at most have a family history with AMI 24 respondents that is 68.6%.

DISCUSSION
Gender
Gender Men have a higher incidence of AMI than women. According to the results obtained in this study, men experienced more AMI than women. AMI occurs not only in men, women are also at risk of experiencing AMI (Supriyono, 2008). The incidence of AMI was recorded to be higher in men than in women before the age of 50 years or before entering menopause (Anand Sonia, et al., 2008). The difference in the incidence of AMI between men and women in this study is 3:1. According to Supriyono (2008) Every year One in four men and one in five women die because of AMI. AMI is still the main cause of premature death, around 40% of the deaths of middle-aged men in Indonesia. The results obtained are consistent with data obtained from the Jakarta Cardiovascular Study in 2008, showing the prevalence of myocardial infarction in women is 4.12% and 7.6% in men, or 5.29% overall. This shows that myocardial infarction is more common in males than females (Rima Melati, 2008). The results of this study are also in accordance with the WHO statement which states that the majority of patients diagnosed with AMI occur in men. Another study from Indrawati also stated that the most ACS sufferers were men with 44 people (77%) of 71 respondents (Indrawati et al., 2018). Another study that supports the results of this study is a study conducted by Muhibbah et al. (2019) with the results of the majority of AMI patients being 38 men, a study conducted by Mehilli, Julinda et al (2005) stated that it was measured in follow-up scintigraphy, significantly less in women than in men. In line with this study, research conducted by Susilo (2015) states that the majority of patients with AMI are male, namely 16 respondents (80%).

Age

The age of AMI patient respondents was mostly in the age range of 56-60 years, namely 11 patients (31.4%). It can be seen that the number of AMI sufferers increases with increasing age. The incidence of AMI in men starts from the age of 45 years while in women it is 51 years. As you get older, a person's blood vessels will experience gradual changes continuously which can affect heart function (Long et al., 2011; Susilo, 2015). As individuals age, the susceptibility of individuals to coronary atherosclerosis increases. The incidence of AMI at age 45-> 65 years the incidence increases 5 times. This is in accordance with the results of a study by Capewell et al (2010) that the largest age group of patients is 45-54 years. Another study that supports the results of this study is research conducted by Faridah et al (2016) which states that most AMI sufferers are aged 56-65 years as many as 34 (42.5%). The results obtained are also in accordance with Goldman (2012) that at the age before 60 years, men are 1.5 - 2 times more likely to develop AMI than women and women after the age of 60 years, have the risk of experiencing AMI increases faster than men . This is due to the decrease in estrogen in menopausal women associated with the occurrence of myocardial infarction (Kumar, 2010). AMI cases in men mostly occur at the age of 45-> 65 years, while in women AMI begins at the age of 51 years and most occur in the 56-60 years age group. From the above results, it can also be seen that the onset in women occurs in the older age group than men, namely in the 41-50 year age group. This is in accordance with the literature which states that in women, AMI occurs more slowly than men, which is around 10-15 years and the risk increases after menopause (Supriyono, 2008). The results of this study are also supported by the results of research conducted by Nathan M Boyer (2012) which states that women with increasing age are more likely to experience AMI. This percentage is in accordance with the research of Antman et al (2010) that before the age of 40 years, the ratio of heart disease between men and women is 8: 1, and after the age of 70 the ratio is 1: 1.The peak incidence of heart disease in men are the ages of 50-60 years, while the women are 60-70 years old. According to the results of research, patients experience AMI at the age of 45 years and are more susceptible to experiencing AMI with over 45 years of age, the older a person will be more prone to experience AMI this is because in old age there is a decrease in body function and also because there is a decrease in body function making a person experience this limitation of activity decreases immunity in older conditions.

History of Hypertension

Hypertension is defined as patients with systolic blood pressure ≥ 140 mmHg, and / or diastolic blood pressure ≥ 90 mmHg who are checked on admission using a mercury sphygmomanometer, based on the JNC VII classification (Seventh Joint National Committee Classification) (Price, 2006). Globally, the World Health Organization (WHO) estimates that non-communicable diseases cause about 60% of deaths and 43% of morbidity worldwide. One of the diseases included in the non-communicable disease group is hypertension. Hypertension is a factor that directly influences the development of atherosclerosis through mechanical stress. According to the American Heart Association (AHA), Americans aged over 20 years suffering from hypertension have reached 74.5 million people, but nearly 90-95% of cases have no known cause. Hypertension is a major risk factor for AMI and ischemic and hemorrhagic strokes (Benjamin, et al., 2017). Based on the results of the study, AMI patients had a history of hypertension, namely 20 respondents (57.1%). The hypertensive state leads to cardiac hypertrophy which is an

independent risk factor for myocardial infarction and can lead to major cardiovascular events. Left ventricular hypertrophy to increase pump force. Hypertrophic conditions result in increased myocardial oxygen demand. When the asterochlorosis process occurs, the supply of oxygen to the myocardium is reduced.

Hypertension will affect hemoestasis in the body. Hypertension causes direct trauma to the walls of the coronary arteries, causing angina pectoris, coronary insufficiency and myocardial infarction. Low output cardiac output can also decrease oxygen supply to the systemic circulation. This will also lead to the IMA (Price, 2006). One of the main factors causing the development of atherosclerosis in the blood vessels of hypertensive patients is mechanical stress. Hypertension causes direct trauma to the walls of the coronary arteries, this causes angina pectoris, coronary insufficiency and myocardial infarction (Djohan, 2006). Recent studies have also discussed hypertension as contributing to the risk of major cardiovascular events in AMI. Reinstadler et al. (2016) reported that hypertension is an independent predictor of the increased risk of major cardiovascular events and the risk of mortality in AMI patients. A study by Kang et al (2009) concluded that hypertension is a predictor of mortality in the incidence of AMI in Korea. Patients with hypertension are at high risk for MACE with a hazard ratio of 2.70 and mortality with a hazard ratio of 4.83 compared to patients without hypertension (Reinstadler, et al., 2016 and Pertiwi, et al., 2018).

Another study from Budiman et al (2015) showed that the number of AMI sufferers was more in patients with hypertension, namely 41 people (57.7%). The study, which was conducted on 622 AMI patients at the Tripoli Medical Center, Libya, as many as 35.7% of patients with hypertension experienced AMI (Abduelkarem, 2012). Patients suffering from hypertension had an incidence of 7.5 times greater than those without hypertension. Every 10 mmHg increase in systolic blood pressure and 5 mmHg diastolic blood pressure increases the risk of AMI (Mawardy et al., 2015).

Blood vessels, hypertension cause a sclerosis process in the artery walls. This process facilitates the formation of blood clots and weakens the patient's blood vessels, so that they are easily broken and thrombus forms. The effect that occurs on the blood vessels of the heart continuously causes damage to the arterial system so that it experiences a hardening of the arteries.

History of Diabetes mellitus

Diabetes mellitus (DM) with cardiovascular disease is closely related. In several studies, diabetes mellitus has been linked with poor heart rate autonomic response. Diabetes mellitus (DM) is closely related to cardiovascular disease. The risk of suffering from cardiovascular disease increases to 3 times, and the risk of cardiovascular adverse events and the mortality of patients who have suffered from cardiovascular disease also increase to 5 times in DM patients compared to those without DM. DM patient adherence to control of blood sugar regulation is also linearly related to cardiovascular adverse events in patients with cardiovascular disease (Putra, 2016). Based on the results of the study more than 50% of respondents had a history of DM, namely 19 from AMI patients.

According to Frammingham research, the Multiple Risk Factor Intervention Trial and the Minister Heart Study (PROCAM), it is known that a person's risk factors for suffering from AMI are determined through the interaction of two or more risk factors, including non-modifiable risk factors such as heredity, age, sex and factors. modifiable risks such as dyslipidemia, hypertension, smoking, stress and obesity (Long et al., 2011; Supriyono, 2008). Other literature states that the risk factors that have been shown to affect

acute coronary syndrome are diabetes mellitus, dyslipidemia, and smoking habits (Supriyono, 2008). Smoking, diabetes mellitus, hypertension, and dyslipidemia are modifiable risk factors, while family history of disease is a non-modifiable risk factor (Zafari, 2014).

Long-term diabetes has a severe impact on the cardiovascular system. Microvascular complications result from thickening of the basement membrane of small vessels. The cause of the thickening is directly related to the high level of glucose in the blood. Microvascular thickening causes ischemia and decreased supply of oxygen and nutrients to the tissues. Chronic hypoxia directly damages and destroys cells. In the macrovascular system in the endothelial lining of the arteries due to hyperglycemia, the permeability of endothelial cells increases so that molecules containing fat enter the arteries. Damage to endothelial cells will trigger an inflammatory reaction so that eventually there is deposition of platelets, macrophages and fibrous tissue. Thickening of the artery walls causes hypertension which will further damage the endothelial lining of the arteries because it causes tearing forces of endothelial cells (Corwin, 2000).

In the case of diabetes mellitus as a risk factor for acute myocardial infarction occurs because excess glucose in the blood (hyperglycemia) can damage the endothelium in blood vessels so that atherosclerotic plaques form. Diabetes mellitus is known to be an important risk factor for coronary heart disease (Zafari, 2014). It is estimated that nearly 200 million people worldwide have diabetes, both type 1 and type 2, but most have type 2 diabetes. This figure is estimated to have doubled in 2005. In Indonesia it is estimated that there are 4.5 million people with diabetes in 2005. 1995 and ranks 7th, then it is estimated that there are 12.4 million people with diabetes in 2025 and in the 4th place with many sufferers. In addition to having confirmed that those who have diabetes are more likely to suffer from coronary heart disease, they also have a worse prognosis if they have an acute myocardial infarction. Diabetes is one of the causes of acute myocardial infarction (Fortun, et al., 2004).

Family History with AMI

AMI is currently still the main cause of death and illness in developing countries and even in developed countries. The cause of death and morbidity is caused by complications of acute myocardial infarction which can include mechanical, ischemic and arrhythmic complications. Acute myocardial infarction is mostly caused by a process related to thrombosis of the coronary arteries which causes the oxygen supply to the myocardium to decrease (Price, 2006). AMI is a cardiac emergency in which myocardial cell death occurs as a result of total blockage of the coronary arteries.

AMI is an acute cardiac decompensation due to inadequate oxygen blood supply to the heart. This is due to an increase in oxygen demand, reduced blood oxygen transport and most commonly a reduction in coronary flow due to narrowing or obstruction of the arteries caused by atherosclerosis. Two risk factors for AMI can be divided into two, namely irreparable and irreparable risk factors. Diabetes mellitus (DM), stress, cholesterol, obesity, inadequate physical activity, hypertension, smoking are examples of risk factors that can be changed or corrected. Meanwhile, gender, family history of cardiovascular disease, age, and race are irreversible risk factors (Burazerl, 2007). Family of parents or relatives who have cardiovascular disease for less than 50 years is a family history that can increase the risk of developing ACS or the emergence of an atherosclerotic process (Bahrudin, 2012).

Based on the results of the study, the majority of respondents had a family history of AMI, namely 24 respondents (68.6%). Based on the statement of Boudi (2012) Respondents who have a family history of AMI have a greater risk of experiencing AMI. this includes heart disease in fathers and brothers diagnosed before the age of 55, and in mothers or sisters diagnosed before age 65.

CONCLUSION

Conclusion Acute Myocardial Infarction can occur both in men and women who enter menopause, history of hypertension, diabetes mellitus and family history of AMI have a major contribution of Acute Myocardial Infarction causes. Respondents Acute Myocardial Infarction in order to better maintain a healthy lifestyle, regular exercise, and required the extension program of the IMA by a related party to the people and suppress the increase in the number of patients with acute myocardial infarction and can prevent complications and reduce mortality. The results of this study are expected to be used as a baseline for subsequent larger studies.

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