The Overview of Echocardiography of Acute Coronary Syndrome Patients at *Universitas Kristen Indonesia* Hospital on January – April 2018

Frits RW Suling

Department of Internal Medicine, Sub-Division of Cardiovascular, Medical Faculty, *Universitas Kristen Indonesia, Jakarta, suling_frits@yahoo.com*

*Abstract***:** This study discusses the description of echocardiography in patients with an acute coronary syndrome at the General Hospital of *Universitas Kristen Indonesia (UKI* Hospital*)* on January – April 2018 using a secondary data in the form of medical records. This study used a descriptive method with a retrospective approach. Echocardiography in this study was left ventricular ejection fraction (LVEF). The data from this study were obtained from 151 patients with the acute coronary syndrome. The results showed that LVEF values in patients with the acute coronary syndrome in the *UKI* Hospital in the period January to April 2018 were 33 male patients (21.9%) with normal interpretations, 42 female patients (27.8%) with normal interpretation, 19 male patients - men (12.6%) with mildly abnormal interpretations, 35 female patients (23.2%) with mildly abnormal interpretations, ten male patients (6.6%) with moderately abnormal interpretations, nine female patients (6.0 %) with moderately abnormal interpretations, three male patients (2.0%) with severely abnormal interpretations.

Keyword: Acute coronary syndrome, *left ventricular ejection fraction (LVEF).*

INTRODUCTION

Non-communicable diseases are the leading causes of death globally. World Health Organization (WHO) data shows that out of the 57 million deaths that occurred in the world in 2008, as many as 36 million or nearly two-thirds were caused by non-communicable diseases. PTM also kills younger people. In countries with low and middle economic levels, of all deaths that occurred in people aged less than 60 years, 29% were caused by PTM, while in developed countries, it caused 13% of deaths. The proportion of causes of death for PTM in people aged less than 70 years, cardiovascular disease was the biggest cause (39%), followed by cancer (27%), while chronic respiratory diseases, digestive diseases and other PTM together account for about 30% of deaths, as well as 4% of deaths due to diabetes [1;2].

According to WHO, deaths from Non-communicable Diseases are expected to continue to increase worldwide; the greatest increase will be in middle and developing countries. More than two thirds (70%) of the global population will die from non-communicable diseases such as cancer, heart disease, stroke and diabetes. In total, in 2030 it is predicted that there will be 52 million deaths per year due to non-communicable diseases, an increase of 9 million from 38 million people today. On the other hand, mortality due to infectious diseases such as malaria, tuberculosis (TB) or other infectious diseases will decrease, from 18 million currently to 16.5 million in 2030 [3;4;5]. In middle and developing countries PTM will be responsible for three times the life years lost and disability

(Disability-adjusted life years = DALYs) and nearly five times the deaths of infectious diseases, maternal, perinatal and nutritional problems [6;7]. Globally, regionally and nationally in 2030, the epidemiological transition from infectious diseases to non-communicable diseases is increasingly clear. It is projected that the number of morbidity due to non-communicable diseases and accidents will increase and infectious diseases will decrease. PTM, such as cancer, heart disease, diabetes mellitus and chronic obstructive pulmonary disease, as well as other chronic diseases, will experience a significant increase in 2030. Meanwhile, infectious diseases such as tuberculosis, HIV/AIDS, malaria, diarrhoea and other infectious diseases are predicted to decrease this year. 2030. The increase in the incidence of PTM is associated with an increase in risk factors due to lifestyle changes in line with the development of an increasingly modern world, population growth and an increase in life expectancy [8;9].

Non-communicable diseases that will be discussed by researchers in this study are cardiovascular disease (heart and blood vessel disease). Heart and blood vessel disease is the number 1 cause of death globally. Heart and blood vessel disease cause more people to die each year than from any other cause. An estimated 17.7 million people died from heart and blood vessel disease in 2015, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were caused by coronary heart disease and 6.7 million were caused by stroke. More than three-quarters of cardiovascular disease deaths occur in low- and middle-income countries. Of the 17 million premature deaths (under the age of 70 years) due to non-communicable diseases in 2015, 82% were in low- and middle-income countries and 37% were due to heart and blood vessel disease [10;11;12].

Coronary heart disease is a condition caused by decreased blood flow in the myocardium due to atherosclerosis in the coronary arteries. Coronary heart disease is the leading cause of death, accounting for one in six deaths in the United States in 2010 [13;14]. The 2013 Basic Health Research stated that the prevalence of coronary heart disease in Indonesia based on a doctor's diagnosis or symptoms was 1.5 per cent. Coronary heart disease cases at Harapan Kita National Heart Center Hospital increased the number of cases from 2000-2009. The incidence of CHD in Jakarta occupies the 3rd position after Central Sulawesi and Aceh.6 In the last ten years, there has been an increase in coronary operations by 83% [15].

Acute coronary syndromes include unstable angina pectoris, acute myocardial infarction with ST-segment elevation (STEMI), or acute non-elevated ST-segment myocardial infarction (NSTEMI). Patients with the criteria for acute chest pain typical of infarction accompanied by an elevation in the ST segment persistence (> 20 minutes) are classified as myocardial infarction. Meanwhile, patients with acute chest pain but without persistent ST-segment elevation were classified as NSTEMI or APTS. These electrocardiography features may include persistent/transient ST-segment depression or T wave inversion, flat T waves, pseudo-normal T waves or no change in the ECG waves. NSTEMI is diagnosed if there is an increase in troponin; otherwise, it will be diagnosed as APTS [16].

The examination that will be discussed by the researcher here is echocardiography examination. Echocardiography test or ultrasound of the heart, or more commonly known as Echo, is an examination that provides an image of the heart that is beating using ultrasound (sound waves) frequency 2-6 MHz and can record images perfectly, this can help doctors evaluate. The patient's heart health. The most commonly used type of cardiac ultrasound is the non-invasive

type and is very easy to perform on patients. Echocardiography is performed using a soft plastic wand (an echo-transducer) to transmit sound waves to the chest or abdomen. Sound waves pass safely until the body, and the resulting echo will be interpreted by a computerized system [17]. Echocardiography is the most accurate monitoring tool available to practitioners of emergency care, such as the management of the acute cardiovascular disease. Echocardiography is currently included in international guidelines for treating cardiac arrest [18].

Based on the background of the above study, the authors would like to conduct a study regarding the description of echocardiographic test results from patients diagnosed with unstable angina pectoris (UAP), myocardial infarction without ST-segment elevation (non-ST segment elevation myocardial infarction / NSTEMI), and myocardial infarction with segment elevation. ST (ST-segment elevation myocardial infarction / STEMI) at the *Universitas Kristen Indonesia (UKI)* Hospital. Based on the research background described, the problem in this study is how the picture of the echocardiography results of acute coronary syndrome patients at *UKI* Hospital is? The purpose of this study was to describe the real picture of the results of echocardiography in patients with the acute coronary syndrome, both the results of echocardiography to determine the left ventricular ejection fraction (LVEF) of acute coronary syndrome patients, a description of the age and sex of acute coronary syndrome patients at the *UK*, as well as the type of echocardiography most often used by cardiac and blood vessel specialists at *UKI* Hospital.

METHOD

This type of research used in this research is descriptive research to see an overview of the results of echocardiography in patients with the acute coronary syndrome. The data used are secondary data taken from medical records. The location of this research was conducted at the Medical Records of the *UKI* Hospital, which is located on Jl. Major General Sutoyo, Cawang, East Jakarta. The research was conducted in November 2018 - January 2019. The population used as the object of the study were all patients undergoing treatment at the ER at the *UKI* Hospital for the period of January - April 2018. In this study, the samples studied were all patients with the acute coronary syndrome (UAP, NSTEMI, STEMI), who underwent treatment at the ER at the *UKI* Hospital for the period January - April 2018. Data collection in this study used secondary data obtained from the medical records of all patients with a diagnosis of the acute coronary syndrome (UAP, NSTEMI, STEMI) at *UKI* Hospital from January 2018 to April 2018. Secondary data will then be observed to determine the results of echocardiography in patients with a diagnosis of the acute coronary syndrome (ACS).

RESULT AND DISCUSSION

The data collection process in this study was carried out from November 2018 to December 2018. The data was taken based on the medical records of patients with a diagnosis of coronary heart disease from January to April 2018 at the *UKI* Hospital. The population used as the subject of this study were all patients who underwent treatment at the ER at the *UKI* Hospital in the period January to April 2018. Based on these medical records, there were 278 patient visits with a

diagnosis of coronary heart disease, who met the inclusion criteria totalling 151 of 278 cases.

Table 4.1 Number of samples based on inclusion and exclusion criteria

	Total patients January - April 2018	Patients who matched the inclusion criteria	Patients who did not fit the inclusion criteria
Number of Patients	278	151	127

Table 4.2 Details of samples that do not match the inclusion criteria

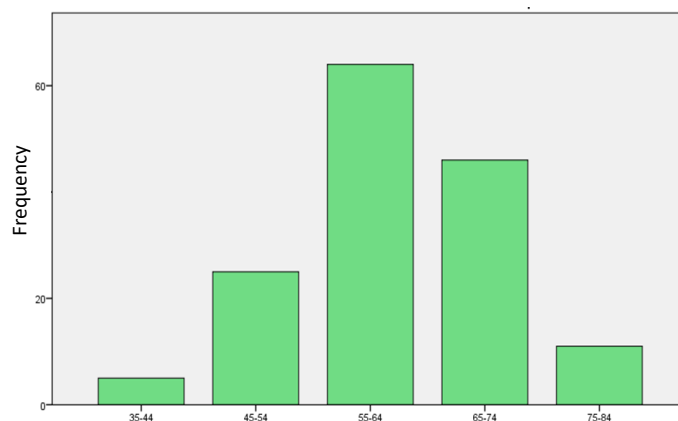| Patient details that did not match the inclusion criteria	Jumlah					
	Unstable Angina Pectoris		NSTEMI		STEMI	
	Frekuensi	(%)	Frekuensi	(%)	Frekuensi	(%)
The medical records of the patient died	5 patients	4,00%	7 patients	5,60%	3 patients	2,40%
Lost patient medical records	15 patients	11,80%	10 patients	7,80%	12 patients	9,50%
Medical records do not match periods	14 patients	11,00%	10 patients	7,80%	11 patients	8,70%
Medical record no echo results	11 patients	8,70%	13 patients	10,20%	16 patients	12,50%

Figure 1. Age Distribution of Acute Coronary Syndrome Patients at *UKI* Hospital for the Period of January - April 2018

Based on Figure 1, it was found that patients with a diagnosis of Acute Coronary Syndrome (ACS)
1. In the age range of 35 - 44 years, 5 people (3.3%)
2. In the age range of 45 - 54 years, 25 people (16.6%)
3. In the age range 55 - 64, 64 people (42.4%)

4. In the age range of 65 - 74 years, 46 people (30.5%)

5. In the age range 75 - 84 years there are 11 people (7.3%).

It shows that most of the patients with a diagnosis of Acute Coronary Syndrome (ACS) recorded in the medical records of the *UKI* Hospital in January - April 2018 period were in the age range of 55 - 64 years, totalling 64 people (42.4%).

Based on the data above, it shows that the most dominant patient age group with a diagnosis of Acute Coronary Syndrome (ACS) recorded in the medical records of *UKI* Hospital in January - April 2018 period is in the age range 55 - 64 years, totalling 64 people (42.4%). These results are consistent with the research conducted by Siska Hestu Wahyuni entitled "Age, Gender, and Family History of Coronary Heart Disease as Predictors for Major Adverse Cardiac Events in Acute Coronary Syndrome Patients" with the most acute coronary syndrome patients in the under-age range. Than 65 years. The incidence of ischemia and recurrent infarction is more often found in the elderly, left ventricular systolic function has decreased significantly in elderly ACS patients. the influence of old age can result in a twofold decrease in left ventricular systolic function. It is because changes in the function of the vascular endothelium become more rigid (less elastic) and it is easier for the formation of the vascular thrombus to occur in the elderly which can have an impact on the development of atherosclerosis [19;20;21].
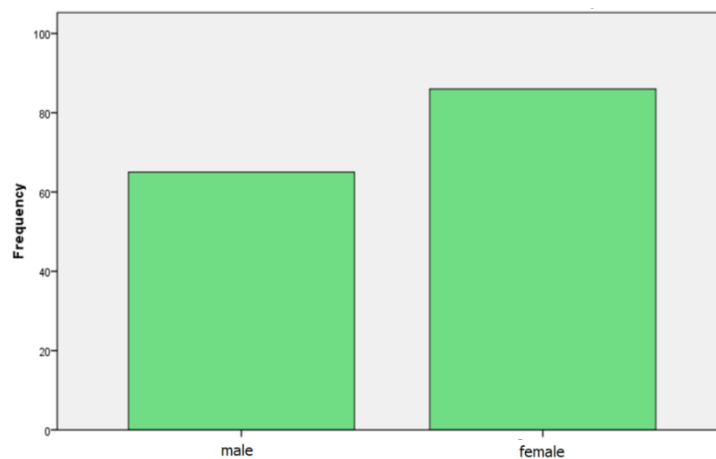

Figure 2. Gender Distribution of Acute Coronary Syndrome Patients at *UKI* Hospital for the period of January - April 2018

Based on Figure 2, it was found that 65 people (43%) were male and 86 people (57%) were female. It shows that the dominant sex in patients with acute coronary syndrome recorded in the medical records of the *UKI* Hospital in the January - April 2018 period was 86 women, with a percentage of 57%. The data above shows that the dominant gender of patients with acute coronary syndrome recorded in the medical records of the *UKI* Hospital in January - April 2018 period were 86 women, with a percentage of 57%. These results are consistent with the research conducted by Aliah Ali Khesroh, Faisal Al-Roumi, Ibrahim AL-Zakwani, Sreeja Attur, Wafa Rashed, and Muhammad Zubaid entitled "Gender Differences among Patients with Acute Coronary Syndrome in the Middle East" with patient results. Acute coronary syndromes in the Middle East mostly affect older women who have many comorbidities. It also implies a high mortality rate in women with

acute coronary syndrome, but after adjusting for age and other risk factors, the difference in mortality between the sexes is not significant [22;23;24].
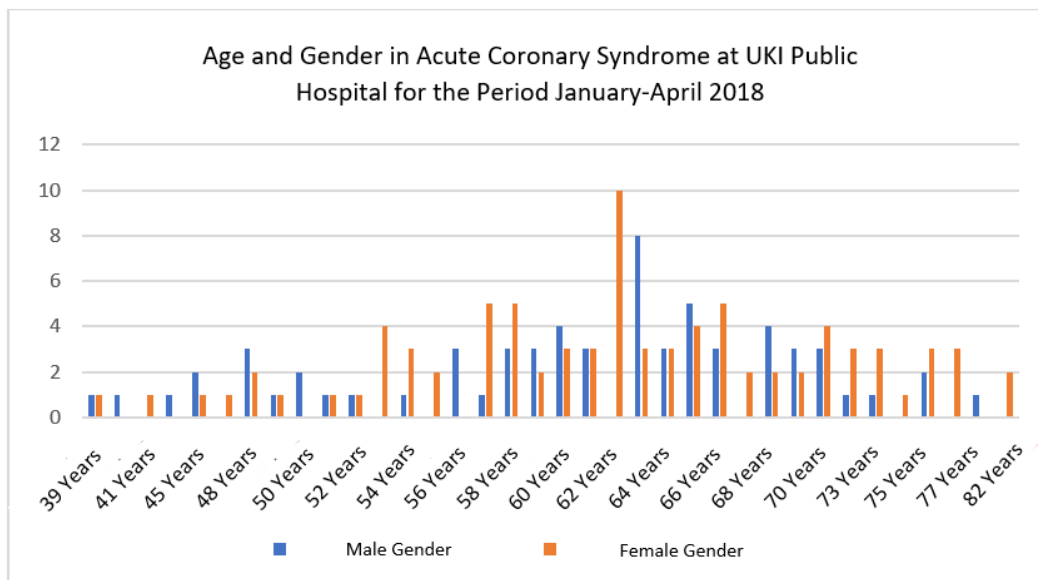

Figure 3. Age and Gender Distribution in Acute Coronary Syndrome Patients at *UKI* Hospital for the Period of January - April 2018

Based on Figure 3, it was found that the youngest age with the acute coronary syndrome was 39 years consisting of one male patient and one female patient, the oldest age who experienced acute coronary syndrome was 82 years with two female patients. The age of 63 years is the age that most contributes to the number of acute coronary syndrome patients, namely 11 people consisting of 8 male patients and three female patients. The age of 62 years is the age with the most female patients experiencing acute coronary syndrome with a total of 10 patients [25;26;27].
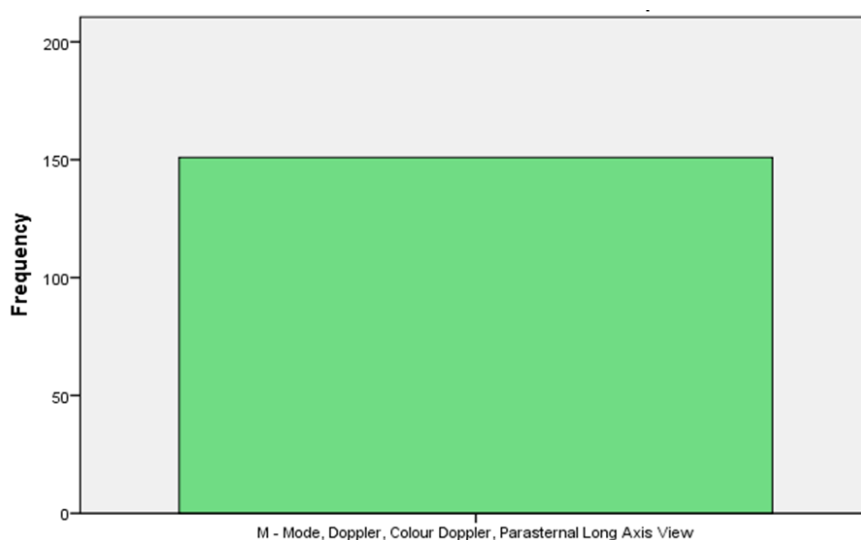

Figure 4. Distribution of the Most Frequently Used Types of Echocardiography by Cardiologists and Vascular Specialists at *UKI* Hospital for the Period of January - April 2018

Based on Figure 4, it was found that the combined use of echocardiography type M - Mode, Doppler, Color Doppler, and Parasternal Long Axis View was 151 times (100%). This combination is done to obtain complete results from an echocardiography examination in acute coronary syndrome (ACS) patients at UKI Hospital.
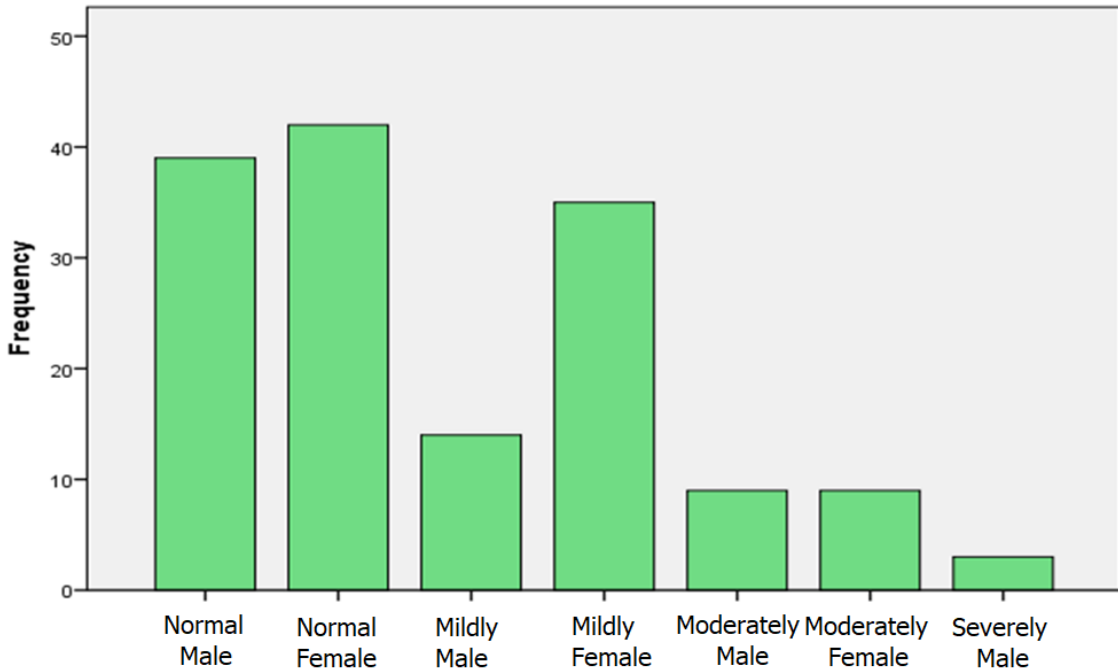

Figure5. Distribution of Left Ventricular Ejection Fraction (LVEF) Echocardiography Results in Acute Coronary Syndrome Patients at *UKI* Hospital January - April 2018

Based on Figure 5, there were 39 male patients (25.8%) with normal interpretation, 42 female patients (27.8%) with normal interpretation, 14 male patients (9.3%) with mildly abnormal interpretation, 35 female patients (23.2%) with mildly abnormal interpretation, nine male patients (6.0%) with moderately abnormal interpretation, nine female patients (6.0%) with moderately abnormal interpretation, three male patients (2, 0%) with severely abnormal interpretations. It shows that the most interpretation of Left Ventricular Ejection Fraction (LVEF) in acute coronary syndrome patients is normal interpretation (53.6%) as many as 81 people with details of 39 male patients (25.8%) and 42 female patients (27.8%) [28;29;30]. The classification of Left Ventricular Ejection Fraction (LVEF) values is based on the American Society of Echocardiography and the European Association of Cardiovascular Imaging[31;32;33;35].

Based on the data above, it was found that several 151 patients who tested positive for acute coronary syndrome had various Left Ventricular Ejection Fractions. The interpretation of patients with echocardiography results based on Left Ventricular Ejection Fraction (LVEF) of acute coronary syndrome patients was dominated by normal interpretation (53.6%) of 81 people with details of 39 male patients (25.8%) and 42 female patients (27, 8%). Characteristics of Echocardiographic Examination Results in Heart Failure is started with a patient suffering from coronary heart disease [36;37;38]. In this study, it was explained that there were 29 more patients with heart failure with normal systolic function

(Ejection Fraction (EF)> 45%) than patients with systolic dysfunction (EF <45%) with 28 people. These results are consistent with the results of various studies which state that more than half of heart failure patients have a normal systolic function. According to research data conducted by La Ode Rinaldi et al., it was found that the average overall ejection fraction was 48.64%. The number was calculated from the average ejection fraction group> 45%, namely 64.41% and the average ejection fraction group <45%, namely 32.32% [39; 40; 41].

CONCLUSION

Based on the results of research regarding echocardiographic features in acute coronary syndrome patients at the *UKI* Hospital for the period January to April 2018, it can be concluded as follows: a) The incidence of acute coronary syndrome at the *UKI* Hospital period January - April 2018 amounted to 278 cases; b) The number of acute coronary syndrome patients at the *UKI* Hospital for the period January - April 2018 according to the study inclusion criteria was 151 cases; c) The age group with the most acute coronary syndromes is in the age range 55 - 64 years with a total of 64 people (42.4%) consisting of 28 men and 36 women. In this range, the age of 63 years is the age that contributes the most to the number of acute coronary syndrome patients, namely 11 people consisting of 8 male patients and 3 female patients. The age of 62 years is the age with the most female patients experiencing acute coronary syndrome with a total of 10 patients. The youngest age with the acute coronary syndrome is 39 years old consisting of 1 male patient, and 1 female patient, the oldest age with the acute coronary syndrome is 82 years with 2 female patients; d) The sexes with most acute coronary syndromes were 86 women (57%); e) The type of echocardiography most often used by cardiac and vascular specialists at *UKI* Hospital is a combination of M - Mode, Doppler, Color Doppler, and Parasternal Long Axis View with 151 uses (100%) of 151 times in the January - period. April 2018; and f) The most interpretation of Left Ventricular Ejection Fraction (LVEF) in acute coronary syndrome patients is normal interpretation (53.6%) as many as 81 people, with 39 patients being male (25.8%) and 42 female patients (27.8 %).

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