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Medication Adherence among Acute Coronary Syndrome Outpatients at Sardjito Hospital in 2019

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A B S T R A C T

Worldwide, heart disease accounts for the majority of deaths. One of the indications of coronary illness is Acute Coronary Syndrom (ACS) STEMI. With a prevalence rate of 7.2%, Indonesia still has the highest ACS incidence, and it continues to rise annually. Several factors are involved in reducing the mortality rate of ACS, namely by controlling several risk factors that can reduce the incidence and improve treatment. This study aims to determine the level of adherence to drug use in patients who are registered with new STEMI and outpatients at Sardjito Hospital Yogyakarta. The research method used in this study was non-experimental analytic observational with a retrospective cohort design. Measurement using the Medication Possession Ratio (MPR) method. The study population was patients who were registered for the first ACS diagnosis since January 2017 and followed the course of their treatment until the patient stopped using the drug or the end of observation (31 December 2018). The number of samples obtained according to the inclusion criteria was 495 patients. Adherence to the use of antithrombotic drugs was greater in female patients (82.4%), age < 60 years (88.4%), and patients using combination antithrombotic therapy regimens (81.4%). Statistical significance was shown in the category of gender (Log Rank = 0.046) and treatment regimen (Log Rank = 0.005). However, the age category did not show statistical significance (Log Rank = 0.289). The conclusion of this study is that adherence to the use of antithrombotic drugs in STEMI patients is influenced by gender and therapeutic regimen.

1. Introduction

Based on data from the World Health Organization in 2001, 60% of the causes of heart disease are coronary heart disease (CHD). Several factors are involved in reducing CHD mortality, including controlling several risk factors that can reduce the incidence of CHD and improve treatment (Wijeysundera et al., 2010' Ahmadi and Lanphear, 2022). Acute Coronary Syndrome (ACS) is a manifestation of CHD that results in an uncomfortable condition in the chest or other symptoms caused by a lack of oxygen to the heart muscle (myocardium). ACS is a collection of manifestations or symptoms due to various disorders of the coronary arteries, one of which is ST-Elevation Myocardial Infarction/STEMI (Tumade et al., 2014). A total of 7.2 million (12.2%) deaths occurs due to this disease worldwide. Acute myocardial infarction (AMI) is the second leading cause of death in low-income countries, with a mortality rate of 2.47 million (9.4%).

There is no specific epidemiological data for AMI in Indonesia, but the 2018 basic health research report (Riskesdas) states that the prevalence rate for heart disease in Indonesia has reached 1.5%, including AMI (Riskesdas, 2018). AMI is Indonesia's leading cause of death, after other heart conditions (Amaliah et al, 2019). Age, gender, race, genetics, obesity, smoking, hyperlipidemia, diabetes mellitus, a history of hypertension, stress, and a lack of physical activity are all risk factors for myocardial infarction (Astuti and Maulan, 2018), a person is more likely to have a myocardial infarction if they have more risk factors (Smeltzer and Bare, 2013; Merlo et al., 2022). Apart from the two risk factors above, the patient's non-adherence in undergoing treatment therapy is also a factor that can increase the risk of ACS or death, so patient compliance in undergoing treatment therapy is something that has a major influence in reducing the incidence of STEMI.

Adherence is defined as the patient's active involvement in undergoing treatment to produce an optimal therapeutic effect. The level of patient compliance refers to whether the patient uses and continues the prescribed therapeutic regimen (Fernández-Lázaro et al., 2019; Laranjeira et al., 2023; Hugtenburg et al., 2023). Non-adherence to treatment is of great concern to clinicians, healthcare providers, and policymakers because there is evidence showing an increase in unwanted outcomes and higher costs of care in patients with STEMI (Ho et al., 2009; Yoon et al., 2023). Medication Possession Ratio (MPR) is a formula that can be used to determine the level of patient compliance during treatment therapy. Patients are considered compliant in undergoing treatment therapy if the proportion of MPR > 80% (Tuppin et al., 2010; Gadkari and McHorney).

2. Materials and Method

The research method used in this study was observational non-experimental with a retrospective cohort design. Data collection was done by collecting secondary data from patient medical records with the research flow, namely observing medical record data and then selecting them based on inclusion criteria. The population of this study was all registered patients with acute coronary syndrome identified with ICD-10 STEMI and undergoing outpatient treatment at Sardjito Hospital Yogyakarta in 2019. The inclusion criteria are patients with a new

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diagnosis of STEMI with ICD.10 numbers I21.0-I21.3 treated with antithrombotics agent, while the exclusion criterion is no follow-up data from medical records or accounting data. The technique of measuring patient compliance is measured by the Medication Possession Ratio (MPR) formula. Measurements were made by counting days of drug use for 12 months after hospitalization or the end of the study (31 December 2018). Patients who are said to be obedient use antithrombotic drugs if the MPR value is 80%. The data obtained were then analyzed using the Chi-Square test method and Survival Analysis (Log Rank). This research has received approval from the ethical commission, Faculty of Medicine, Public Health and Nursing Universitas Gadjah Mada with number KE/FK/1074/EC/2018.

3. Result and Discussion

The incidence of STEMI tends to occur in men (81.62%) compared to women (18.38%). The results of this study are in line with the research of Andrikopoulos et al, that the male gender tends to be greater (79.6%) is experiencing the incidence of STEMI compared to the female gender. In addition, a study conducted by Stangl et al. showed that the proportion of coronary illness among people was 8:1 prior to turning 40 years of age, and after the age of 70, the proportion was 1:1. The most noteworthy occurrence of coronary illness is in men at the age of 50-60 years, while in ladies at the age of 60-70 years. The gamble of coronary illness in ladies increments after menopause. In addition, the incidence of heart disease in women occurs 10-15 years later than in men (Antman & Braundwald, 2010; Saleh, 2021).

The percentage of the age group < 60 years was 50.51% and the age group > 60 years was 49.49%. This shows that the incidence of STEMI is more likely to occur at the age of < 60 years. These results are in line with previous studies which showed that patients under the age of 65 who had STEMI had a higher age profile (51.22%) than those over the age of 65 (48.78%) (Tofler et al., 2017). In addition, this is also in accordance with research conducted by Ramadhani et al (2013) which shows that the incidence of ACS is more common in the 41-60 year age group. This is in accordance with the theory that the age factor at risk for ACS is > 45 years for men and > 55 years for women.

The use of combination therapy in ACS patients was more (81.62%) compared to the use of monotherapy (18.38%). This aspect indicates that the treatment of ACS patients with combination therapy regimens is very likely to have co-morbidities experienced by the patients. The aspect of adherence level shows that the majority of patients undergoing therapy are classified as obedient with a percentage of 81.2% compared to those who are non-adherent at 18.8%. This means that the patient is obedient in undergoing treatment therapy (MPR> 80%). This study is in line with research conducted by Szummer et al. (2020), which showed that ACS patients who used combination therapy were larger (60.2%) than patients who used monotherapy (39.8%). Baseline characteristics data is summarized in **Table 1**.

The level of adherence to the use of antithrombotic drugs by gender can be seen in **Table 2**. The level of adherence to antithrombotic use was greater in the female patient group (82.4%), although not significantly different from the male patient group (RR = 0.982; 95% CI: 0.883-1.092). These results are consistent with a study conducted by Faridi et al. (2016) who showed that the rate of adherence to medication use in patients with acute myocardial infarction for 12 months after hospitalization was higher in women (OR = 0.86; 95% CI: 0.79-0.95).

This study also examines survival analysis to see adherence to antithrombotic use based on days of use, which is 365 days. The survival analysis graph related to the level of adherence to drug use for a year can be seen in Kaplan Meier in **Figure 1**.

Table 1. Baseline characteristic

Patient characteristics	N = 495	
	Total (n)	Percentage (%)
Gender		
Male	404	81.62
Female	91	18.38
Age		
< 60 years	250	50.51
≥ 60 years	245	49.49
Therapy regimen		
Monotherapy	91	18.38
Combination	404	81.62
Adherence		
Yes	402	81.2
No	93	18.8

Table 2. Adherence based on gender

Gender	Adherence			
	Yes (%)	No (%)	RR	95% CI
Male	80.91	19.13	0.98	0.88 – 1.09
Female	82.42	17.74		

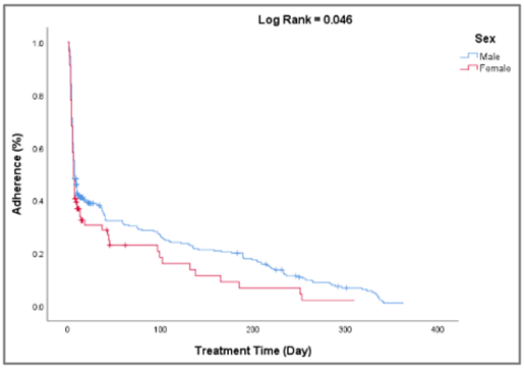

Figure 1. Kaplan Meier of adherence with antithrombotic use by gender

Based on the graph in **Figure 1** shows that the male and female patient groups experienced a decrease in the level of adherence to antithrombotic use at the beginning to the end of the observation, and this showed a statistically significant difference (Log Rank = 0.046).

The level of adherence to the use of antithrombotic drugs by age category in STEMI patients can be seen in **Table 3**. Research data showed that the number of patients who did not adhere to medication was more at the age of > 60 years with a percentage of 26% (RR = 1.194; 95% CI: 1.095-1.302). These results are consistent with other studies showing that older patients tend to be less compliant with treatment due to low education and health literacy. In another study showed that older patients tend to be non-adherent in taking medication because they think the drug is not important and the number of drugs prescribed is too much (Jin et al., 2014; Thapa and Nielsen, 2021).

In addition, the level of adherence to antithrombotic use by age category can be seen in Kaplan Meier for 12 months of observation. The graph can be seen in **Figure 2**. Based on the graph in **Figure 2,** shows that the monotherapy and combination regimen groups experienced a decrease in the level of adherence to antithrombotic use at the beginning to the end of the observation, and this showed a statistically significant difference (Log Rank = 0.005). The graph in **Figure 2** shows that there is a decrease in the level of adherence to antithrombotic use in the age category < 60 years and > 60 years from the beginning to the end of the observation. However, the difference in the decrease in adherence between the two groups was not statistically significant (Log Rank = 0.289).

Table 3. Adherence based on age

	Adherence			
	Yes (%)	No (%)	RR	95% CI
< 60 years	88.41	11.62	1.19	1.10 – 1.30
> 60 years	74.03	26.04		

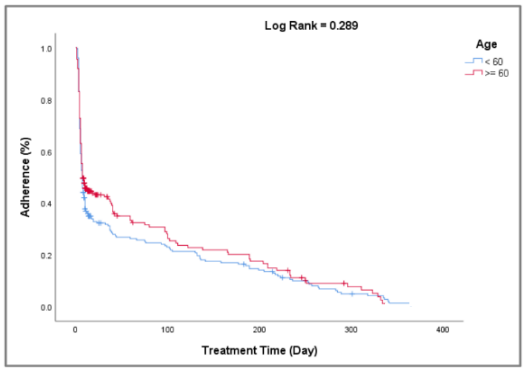

Figure 2. Kaplan Meier of adherence with antithrombotic use by age

Table 4. Adherence based on therapeutic regimen

	Adherence			
	Yes (%)	No (%)	RR	95% CI
Monotherapy	80.22	19.82		
Combination	81.43	18.61	0.99	0.88 – 1.10

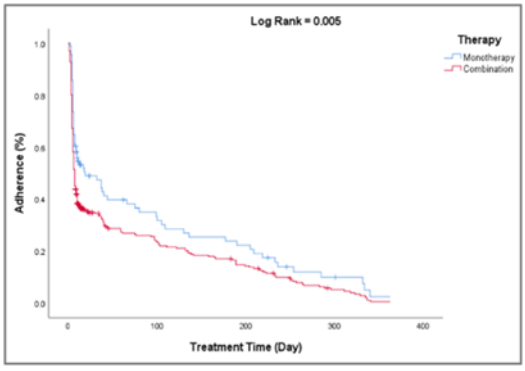

Figure 3. Kaplan Meier of adherence with antithrombotic use therapeutic regimen

The level of patient compliance with antithrombotic use by category of a therapeutic regimen for 12 months after completion of hospitalization can be seen in **Table 4**. Based on the data in **Table 4**, shows that the level of adherence to antithrombotic use was higher in the combination regimen (81.4%) than in the monotherapy regimen (RR = 0.985; 95% CI: 0.881-1.102). These results are consistent with a study conducted by Faridi et al. (2016) which showed that the level of adherence to antithrombotic use after 12 months post-hospitalization was greater in the combination therapy regimen with a Mean (IQR) = 0.76 (0.58-0.99).

This study also examined survival analysis to see adherence to antithrombotic use based on the length of days of therapy for one year (365 days). The survival analysis graph related to the level of adherence to drug use for 1 year can be seen in **Figure 3**.

Based on the graph in **Figure 3**. shows that the monotherapy and combination regimen groups experienced a decrease in the level of adherence to antithrombotic use at the beginning to the end of the observation, and this showed a statistically significant difference (Log Rank = 0.005).

4. Conclusion

The conclusion of this study is that adherence to the use of antithrombotic drugs in STEMI patients is influenced by gender and therapeutic regimen.

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Limitation

There are a few limitations to our study. Due to the study's retrospective design, it is impossible to determine whether late follow-up directly contributed to decreased medication use. There may be numerous unquantifiable variables that influence both outpatient follow-up and medication use, resulting in residual confounding. Our data only included clinic encounters that took place, so it's possible that follow-up appointments were scheduled but not attended. Patients who missed their appointment would likely have later follow-up appointments and exhibit behaviors that would make it harder for them to take their medications. At long last, our information source estimates drug adherence in view of remedies filled, it is preposterous to expect to decide if patients utilized the prescriptions.

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