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The Relationship between Medication Adherence, Rehospitalization and Mortality in Bandung, Indonesia

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Abstract. Medication adherence in patients with heart failure is very important. Previous study, the low level of medication adherence in patients with heart failure can increase the risk of recurrence of the patient, thereby increasing the rehospitalization and mortality. This study was conducted to evaluate existing programs in heart failure clinic. The purpose of this study is to determine the relationship between the incidence of medication adherence with the incidence of rehospitalization and mortality in patients with heart failure. Retrospective cohort study conducted using medical record data from the Heart Failure Clinic in dr Hasan Sadikin Hospital Bandung between October 2018 to July 2020. This study involved 77 people with a diagnosis of CHF and had attended a minimum of 6 months of the heart failure clinic program at Dr Hasan Sadikin Hospital, Bandung. Descriptive statistics were used to describe demographic characteristics such as age, gender, and NYHA class. Chi-square analysis was used to analyze the relationship between medication adherence, the incidence of rehospitalization and mortality. Result, demographic data, there are 55 (71.4%) adults and 22 (28.6%) elderly, male 50 (64.9%) and female 27 (35.1%), NYHA I 32 people (41.6%), NYHA II 26 (33.8%), NYHA III 7 (9.1%), NYHA IV 12 (15.6%). Non-adherence 8 (10.4%), rehospitalization 20 (26%), and mortality 18 (23.4%). Based on the chi-square statistical analysis, there was a relationship with the incidence of rehospitalization ($p < 0.001$) and there was a relationship with mortality ($p < 0.002$). This study has research limitations, because the data obtained is only based on medical record data. Medication adherence was associated with rehospitalization and mortality. It is important to develop interventions to improve medication adherence.

Keywords: heart failure; medication adherence; rehospitalization; mortality

1. Introduction

Heart failure (HF) is clinical syndrome characterized by typical symptoms that may be accompanied by sign caused by a structural and/or functional cardiac abnormality, resulting in a reduced cardiac output and/or elevated intracardiac pressures at rest or during stress (ESC, 2016). Heart failure is an

epidemic global disease, there are 26 million people with heart failure worldwide, that rehospitalization of 1 million per year and mortality more than 50% in 5 years (ESC, 2014). The prevalence of HF in Indonesia is 0.13% and based on a doctor's diagnosis 0.3% (Kemenkes RI, 2013). Data in RSHS: 1092 inpatients in 2015 and 1143 in 2016, 13194 outpatients in 2015 and 15639 in 2016, 25% of the total inpatients undergo rehospitalization twice per year. Length of stay for heart failure patients averaged 1 week or more. It can increase the financial burden on hospital and country.

Heart Failure Clinic at Hasan Sadikin General Hospital, Bandung, Indonesia was established in 2018 to improve outcomes of patients. This Heart Failure Clinic program has been conducted by two local cardiologists and one nurse trained in HF. Programs carried out for both inpatients and outpatients. One of the programs in HF Clinic is to provide education about the adherence to taking medication for HF patients, the type of drug, dosage, and how to drink it. This study was conducted to evaluate the program specially to determine the relationship between the incidence of medication adherence with the incidence of rehospitalization and mortality in patients with HF. Medication non-adherence leads to increased HF exacerbations, reduced physical function, and higher risk for rehospitalization and death (Ruppar TM, et al., 2016).

Treatment of HF patients is very complex. Multidisciplinary & interdisciplinary handling is needed with planned and measured management. One way to manage patients with HF is HF Clinic. Through HF Clinic, HF patients can be well managed. HF clinic consists of HF cardiologist, HF nurses, clinical pharmacists, dieticians, exercise specialist, mental health providers, social workers, primary care providers, and additional subspecialty providers (Cooper LB, Hernandez AF, 2015). The goals of HF clinics are to improve outcomes of patients with HF, reductions in rehospitalization and mortality (Howlett JG, Mann OE, & Cox JL, 2009). One of the programs in HF Clinic is to provide education (disease, etiology, medication, diet, signs of congestion, immunization, and lifestyle).

The primary treatment for HF is pharmacological therapy (Kemp C CJ, 2012). Drug therapies for HF are important in controlling symptoms. Good medication adherence is defined as the consumption of >80% of the prescribed medications (Hawkins LA, et al., 2012). Medication non-adherence was associated with increase in emergency department visits, re-hospitalization, length of hospital stays, and mortality (Hood SR, et al., 2018). Medication adherence is affected by education level, number of children, comorbidity, disease severity, and number of tablets used per day (Amininasab SS, et al., 2018)

2. Method

2.1. Sample

The sample in this study involved 77 outpatients with HF in HF Clinic at Dr. Hasan Sadikin General Hospital, Bandung, between October 2018 to July 2020. We included patients who were at least 20 years old, had attended a minimum of 6 months of the heart failure clinic program. Patient has been given education about disease, etiology, medication, diet, signs of congestion, immunization, and lifestyle.

2.2. Data Source

Data sources used medical records data from the HF Clinic. Data collected are medication adherence, rehospitalization, and dead. Non-adherence was defined if there are a record of a patient stopping medication without consulting a doctor or nurse. Rehospitalization was defined as every unplanned readmission to the hospital occurring within 30 days after admission to the heart failure clinic.

2.3. Study Design

Retrospective cohort study examined medication non-adherence, rehospitalization, and dead.

2.4. Statistical Methods

Descriptive statistics were used to describe demographic characteristics such as age, gender, and NYHA class. Chi-square analysis was used to analyze the relationship between compliance with the incidence of rehospitalization and mortality. The significance is taken with a confidence level of 95%. All analyzes were performed with SPSS 26.0 for Windows.

3. Results

Table 1. Respondent Distribution Data.

No	Variable	Category	n=77	Percentage
1	Age	Adult	55	71,4
		Elderly	22	28,6
2	Gender	Male	50	64,9
		Female	27	35,1
3	NYHA class	I	32	41,6
		II	26	33,8
		III	7	9,1
		IV	12	15,6
4	Medication Adherence	Adherence	69	89,6
		Non-adherence	8	10,4
5	Rehospitalization	Rehospitalization	20	26,0
		Non rehospitalization	57	74,0
6	Mortality	Life	59	76,6
		Dead	18	23,4

Based on Table 1, the distribution of respondents according to age, most of them are adult respondents (71.4%). The mean age was 48.65 years. Furthermore, respondents according to gender were mostly male (64.9%). NYHA class was most included in the NYHA class I, 32 patients.

Patients who were adherent to therapy were 69 (89.6%) while those who were non-adherence were 8 patients (10.4%). Most respondents did not undergo rehospitalization, 57 patients (74%). The mortality rate was lower, 18 patients (23.4%) compared to the number of living patients 59 patients (76.6%).

Table 2. Medication Adherence Data based on Gender and Age (n=77).

Medication Adherence					
		Adherence	Percentage	Non-adherence	Percentage
Gender	Female	27	27	0	0
	Male	42	54,54	8	10,38
Age	Adult	49	63,63	6	7,79
	Elderly	20	25,97	2	2,59

Based on Table 2, there were more male patients who adherence than those who were non-adherence 8 patients. All female patients were in the adherence category, 27 patients. Adult patients who non-adherence were 49 patients (63.63%). More elderly patients were also adherence than non-adherence, 20 patients (25.97%).

Table 3. Relationship between Adherence, Reprehospitalization and Mortality.

		Medication Adherence				p value
		Adherence	%	Non-adherence	%	
Rehospitalization	Rehospitalization	12	15,58	8	10,39	0,001
	Non rehospitalization	57	89,61	0	0	
Mortality	Life	57	89,61	2	2,59	0,002
	Dead	12	15,58	6	7,79	

Based on Table 3, it is explained that there was a relationship between medication adherence with the incidence of rehospitalization with p value < 0.001.

Patients who were adherent (15.58%) were more likely do not re-hospitalized while non-adherence 8 patients (10.39%) experienced rehospitalization. Adherence was inversely related to the incidence of rehospitalization.

There was a relationship between adherence and the incidence of mortality with a p value < 0.002 . Adherence patients are 57 patients (89.61%) lived and 6 non-adherence patients (7.79%) were died.

4. Discussion

The results of this study showed a relationship between medication adherence and incidence of rehospitalization ($p < 0.001$). The results of this study are in accordance with previous studies. The results of this study are in accordance with the theory of Smeltzer and Bare (2002), namely that recurrence of heart failure and re-admission to the hospital occurs because the patient does not fulfill the continued treatment and inaccurate treatment therapy. This study shows that there is a relationship between medication adherence and mortality ($p < 0.002$). that result similar with Rehman Zu., et al (2019) find that adherent patients have a lower risk of the primary endpoints compared with nonadherent patients.

The results showed the readmission rate was 26%. This is different from Majid research (2010) which is 52.21%. Hubbard, 2012 stated that to reduce the readmission rate, not only should the discharge planning be improved but also support from medication management. According to The Joint Commission on Accreditation of Healthcare Organizations, medication management includes ensuring that self-administered medications are safely and accurately administered.

Our results suggest that increasing adherence to HF medications can reduce rehospitalization and mortality rates. Medication non-adherence in HF patients can increase risk recurrence, regressing the NYHA class, and worsening patient's condition. Therefore, the mortality rate also increases (Rehman ZU, et al., 2019). In addition to medication adherence, there are several factors that influence patient rehospitalization and mortality, such as non-adherence in low sodium diet and water retention (Parrinello G, Greene SJ, Gheorghiade M., 2016), advanced HF, comorbidities, congestion, and target-organ lesions (Metra M., et al., 2015).

Factors associated with medication adherence among heart failure patients and their caregiver depend on Enthusiasm from patients and caregivers in new technologies (Aggarwal, 2015). factors that reduce adherence can be overcome by a good therapeutic relationship between patient and caregiver.

Patients' responsibility for their own health can be achieved with the help of coordinated actions such as patient education and regular follow-up contacts (Unverzagt, 2016). Strategies to improve patients' adherence to taking their medication and self-care such as training education for patient, reminder system, measure to improve self-care, and doctor-oriented strategies will increase long-term success.

A heart failure clinic involving an intensive intervention by both a clinician and a cardiovascular nurse substantially reduces hospitalizations for worsening HF and/or all-cause mortality and improves functional status, while decreasing healthcare costs, even in a country with a primary-care-based healthcare system (Bruggink, 2007). Through this study, the RSHS Heart Failure Clinic managed by a combination of a clinician and a cardiovascular nurse is progressing in a significant way in the same direction. RSHS clinic heart failure can really improve functional status (including left ventricular ejection fraction, New York Heart Association (NYHA) class and quality of life) in patients with NYHA III and IV.

5. Conclusion

Medication adherence was associated with rehospitalization and mortality. It is important to develop interventions to improve medication adherence. This study is the most recent study conducted at the Heart Failure Clinic Dr. Hasan Sadikin Hospital Bandung and can be used as an evaluation of the program that has been carried out.

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