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Systolic Function is Related to the Quality of Life in Chronic Heart Failure Patients

Systolic Function is Related to the Quality of Life in Chronic Heart Failure Patients

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Abstract. As a chronic disease, heart failure may have a significant impact on a patient's quality of life. There are conflicting study results regarding the relationship between systolic function and quality of life in patients with chronic heart failure. This study identifies the relationship between systolic function and quality of life in patients with chronic heart failure. This study was conducted on 34 consecutive Chronic Heart Failure (CHF) patients in Cardiovascular Department, Sosodoro Djatikoesoemo General Hospital. Left Ventricle Ejection Fraction (LVEF) was obtained from echocardiography, and quality of life was assessed using Minnesota Living with Heart Failure Questionnaire (MLHFQ). A low quality of life was defined as MLHFQ score $\geq$ 45. The correlation between LVEF and physical, emotional dimension, and overall score from MLHFQ shows significant results ($p > 0.05$). The correlation between LVEF and physical dimension and between LVEF and an overall score of MLHFQ shows strong negative degree ($r = -0.727$). The correlation between LVEF with both physical and emotional dimension shows negative strong degree ($r = -0.678$, the latter $r = -0.547$). There is a significant correlation between systolic function and physical, emotional, and overall quality of life in chronic heart failure patients.

1. Introduction

Chronic heart failure is a significant health problem with increasing rates of incidence worldwide. Chronic heart failure is defined as a pathological condition where the heart is unable to pump sufficient blood to meet the body tissue's metabolic demand [1]. Chronic heart failure is also determined as a clinical syndrome comprised of symptoms such as dyspnea, fatigue, both in a state of rest and activity, accompanied by signs of fluid retention such as pulmonary congestion and ankle edema [2].

Chronic heart failure is a significant cause of death and disability. Although current therapeutical development is progressing, the mortality rate still reaches 20% of cases per year. According to the American Heart Association [3], 5.3 million Americans suffer from chronic heart failure, and 660,000 new cases are diagnosed each year, with an incidence of 10 out of 1000 people. According to Riskesdas (Riset Kesehatan Dasar) 2013 data, the number of chronic heart failure patients in Indonesia was approximately 229,696 people, with the highest prevalence in East Java Province (about 54,826 people), while North Maluku Province was the lowest (144 people) [4].

Hemodynamic changes in chronic heart failure consist of a decrease in cardiac output, volume, and ejection fraction, causing symptoms such as shortness of breath, fatigue, and intolerance to physical exercise. Reduced exercise tolerance is a significant factor in decreasing the social, physical, and overall quality of life, thus, again increasing the likelihood of cardiovascular events and dependence on hospitalization. The main goal of treatment for chronic heart failure is to reduce symptoms, improve work capacity and quality of life, and prolong life expectancy. Quality of life is one of the outcomes of therapy that can be used to assess the therapeutic effect on a patient's health [5].

The tendency of patients to experience dependency (even to do simple activities at home), affects the role and function of the family members who care for the patient, which later could disrupt the family's socioeconomic status. Patients must forego routine check-ups and therapy that not only consume time and energy but are also expensive. Consequently, family stress levels may be affected. Chronic heart failure patients also have psychological problems, such as anxiety, sleep disturbances, depression, and excessive sensitivity, which results in a decreased quality of life for patients. Heart failure is classified into various categories based on location, function, or blood volume pumped. Classification of heart failure based on function is divided into disorders of systolic and diastolic function [6].

There have been many studies conducted to assess the quality of life in CHF patients, but only a few findings that explain the relationship between systolic function and the quality of life, especially in Indonesia. Previous studies reveal opposite results regarding the influence of systolic function on the quality of life of patients [7].

2. Methods

2.1. Study Design and Subjects

This prospective cross-sectional study was conducted on 34 consecutive CHF patients from outpatient, inpatient, and Cardiovascular Care Unit (CVCU) in the Cardiovascular Department, Sosodoro Djatikoesoemo General Hospital in April-May 2017. Patients with mental disorders, memory disorders, acute illness, and other chronic diseases were excluded from the study. All participating patients gave their written informed consent. The details which disclosed a patient's identity were omitted. All research protocol received ethical clearance from the local ethics committee of Sosodoro Djatikoesoemo General Hospital.

2.2. Echocardiography

Echocardiographic examination was carried out by two experienced cardiologists using Vivid S60 Ultrasound instrument (General Electric) with a 3.5-MHz transducer. Observation of both parasternal and apical view was done in the left lateral decubitus position. LVEF was measured using the TEICH and Modified Simpson's Biplane rule.

2.3. Quality of Life Measurement

Patient's quality of life was measured using Minnesota Living with Heart Failure Questionnaire (MLHFQ) which consist of 21 items rated on a six-point Likert scale, representing the different degrees of the physical and emotional impact of CHF on quality of life, rated from 0 (none) to 5 (very much). The final result of MLHFQ will show a total score (range 0–105, from best to worst), physical score (eight items, range 0–40) and emotional score (five items, range 0–25). The MLHFQ has been translated into and validated in Indonesian.

2.4. Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics 25.0. Data are considered significantly different if $p<0.05$. Continuous variables were evaluated for normal distribution, presented as mean±SD. Correlation between variables was evaluated with Pearson analysis.

3. Results

3.1. Patients' Demography

Demography of the research participants who met our inclusion and exclusion criteria can be seen in Table/Fig 1. The patients included in this study were 25 males and nine females with the age range between 41 to 78 years old and the mean value of 57.18 years old.

Table 1. Characteristics of the Research Subject.

Variable	Characteristics	Amount	Percentage (%)
Sex	Men	25	73.5
	Woman	9	26,5
Age	Minimum	41	
	Maximum	78	
	Average	57.18	
Chronic Heart Failure	NYHA I	7	20.6
	NYHA II	7	20.6
	NYHA III	8	23.5
	NYHA IV	12	35.3
Left Ventricle Hypertrophy	No	2	5.9
	Yes	32	94.1
Etiology	Ischemic Heart Disease	12	35.3
	DCM Ischemic	5	14.7
	MR	4	11.8
	MS	1	2.9
	AR	1	2.9
	AS	1	2.9
	TR	0	0
	Diastolic Dysfunction	3	8.8
	AR + AS	1	2.9
	MR + AR	2	5.9
	MR + TR	2	5.9
	MR + AR + TR	1	2.9
	RV Failure	1	2.9

NYHA: New York Heart Association; DCM: Dilated Cardiomyopathy; MR: Mitral Regurgitation; MS: Mitral Stenosis; AR: Aortic Regurgitation; AS: Aortic Stenosis; TR: Tricuspid Regurgitation; RV: Right Ventricle

3.2. LVEF predict the low quality of life

To identify the association between variables, we analyzed the correlation between LVEF with MLHFQ on all dimensions. The results are listed as follows:

Table 2. Echocardiography Characteristics and MLHF Questionnaire Score.

Variable	Minimum	Maximum	Average	Standard Deviation
LVEF	10.4	74.9	39.73	±16.26
MLHFQ:				
- Physical	2	39	17.62	±9.81

-	General	2	27	13.15	±7.06
-	Emotional	0	20	5.47	±4.92
-	Total Amount	11	83	36.65	±19.68

Table 3. Correlation Results using Pearson Analysis

Variable	r*	p*
LVEF- Physical Dimension	-0.678	0.0001
LVEF- General Dimension	-0.671	0.0001
LVEF- Emotional Dimension	-0.547	0.001
LVEF- Total MLHFQ	-0.727	0.0001

The results of statistical tests using Pearson correlation analysis in the table above prove a correlation between LVEF and the questionnaire scores on physical, emotional, general dimensions and MLHFQ total scores (p-value = 0,0001), and negative correlation direction and muscular correlation strength (r = -0,727).

4. Discussion

As stated before, previous studies reveal opposite results regarding the influence of systolic function on the quality of life of patients. This study showed a significant negative correlation between LVEF and the questionnaire scores on physical, emotional, general dimensions, and MLHFQ total scores. This study is not in accordance with the study conducted by McNamara et al., which found no difference in restrictions on significant physical activity between patients with decreased LVEF and patients with normal LVEF [8].

Quality of life, according to Cella [8], is subjective and multidimensional. Subjectivity means that quality of life can only be determined from the patient's point of view, while multidimensional implies that quality of life is seen from all aspects of one's life holistically, including biological or physical, psychological, sociocultural and spiritual aspects. Some patients with heart failure cannot work according to their expectations due to persistent physical and emotional disturbances, and, in some cases, it can have a detrimental effect on their lifestyle and emotions. There are three things that play a role in determining the quality of life, namely mobility, pain, and psychology (especially depression or anxiety). These three factors can be measured objectively and expressed as health status [9].

Various factors, such as age, ejection fraction, drug use, patient's compliance, and economic level, can also affect the quality of life [10]. Gottlieb added that variety in race, demography, and population differences are also able to produce different quality of life [11,12]. As people age, a person is more susceptible to heart failure, but it rarely causes serious illness before 40 years and increases 5-fold at the age of 40-60 years [13]. Based on research conducted on 172 patients with heart failure, it was reported that 33.2% of patients over the age of 75 had lower quality of life compared to younger patients. In patients aged 18-24 years, only 7.5% had a poor quality of life [14]. This is consistent with the results of this study that the median age of heart failure patients is 57 years, with the oldest age being 78 years old.

This study found that most CHF patients were male (60.8%) compared to women (39.2%), but did not differ in the quality of life produced. Similar results are shown in the Varela, that there is no significant difference between sexes on quality of life [15]. According to Reckelhoff, differences in the incidence of cardiovascular disorders between men and women can be influenced by hormones. The estrogen hormone in women is thought to affect in preventing the occurrence of cardiovascular disease by reducing oxidative stress [16].

The study conducted by Panthee and Kritpracha, "Anxiety and Quality of Life in Patients With Myocardial Infarction", concluded that anxiety negatively affected the quality of life of patients with myocardial infarction. Patients often experience boredom in the face of the disease and, thus, do not

comply with the therapy, leading to a further decrease to quality of life. This study is in accordance with the findings that a reduction in ejection fraction will also affect emotions [8].

Patients with low ejection fraction (below 40%), have a lower quality of life when measured by the MLHF questionnaire. Functional limitations are thought to be indirect predictors of death in patients with ejection preserved fractions or low fraction ejection [7]. According to Hoekstra et al., both heart failure patients with preserved ejection fraction (HF-PEF) or reduced ejection fraction (HF-REF) usually experience a decrease in quality of life compared to healthy patients and tend to have physical and emotional limitations. Patients with an ejection fraction below 40% were likely to have a more reduced quality of life than patients with ejection fraction ≥40%. The smaller the EF value, the lower life expectancy, thus EF is considered substantial in the prognosis of heart failure [17].

The Minnesota Living with Heart Failure (MLHF) questionnaire was used to measure not only the impact of heart failure, but also the impact of preceding therapy towards the quality of life of patients. It is regarded as a selective questionnaire for heart failure and their effects on quality of life on physical, emotional, social, and mental aspects without requiring long-term clinical trials [10].

The mean MLHFQ value of CHF patients in the heart clinic at Sosodoro Djatikoesoemo Bojonegoro General Hospital seen in the physical dimension is 16.72 ± 8.68 (range value 0-40). The mean value on the emotional dimension of CHF patients is 5.36 ± 3.26 (range value 0-25). The smaller the amount or close to a score of 0, it can be concluded that CHF does not affect physical or emotional conditions. These results determine that CHF patients currently treated at Dr. Sosodoro Djatikoesoemo General Hospital felt a significant impact of the disease his/her physical, emotional, and overall condition.

5. Conclusions

There is a significant relationship between systolic function and quality of life in patients with chronic heart failure, both from the physical and emotional dimension, and also overall state. The author suggests further research on the quality of life by considering other aspects such as physical activity quantity, duration of illness, and other issues, such as undertaking medicine or treatment.

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