

The Six-Minute Walk as A Safety Exercise in Improving the Health-Related Quality of Life Among Heart Failure Patients: A Preliminary Research

Nurhayati Nurhayati¹, Andri Kusuma Wijaya¹, Nova Yustisia², Tuti Anggraini Utama²

¹ Department of Nursing, Faculty of Health Science, Universitas Muhammadiyah Bengkulu, Indonesia

² Department of Nursing, Faculty of MIPA, Universitas Bengkulu, Indonesia

Correspondence should be addressed to: Nurhayati

nurhayati@umb.ac.id

Abstract:

The prevalence of heart failure patients is steadily increasing worldwide. The quality of life among them was also shown to be decreasing day by day. Inadequate health-related quality of life in heart failure patients leads to an increase in mortality rate. Thus, effective management of heart failure patients is essential. The present study was to examine the intervention based on the six-minute walk test to improve health-related quality of life for patients with heart failure. A quasi-experimental study was conducted in the cardiovascular center of the acute care setting. The Six-minute Walk Test (6MWT), in accordance with the American Thoracic Society guideline, was implemented as the intervention procedure. The Minnesota Living with Heart Failure (MLWHF) was used to measure the health-related quality of life of patients. Fifteen heart failure patients enrolled in the study for a month; 73.3% were male with a mean age of 57.47 (SD 14.32). Overall, the health-related quality of life in heart failure patients was poor at the baseline of the study, then their quality of life significantly increased to good quality after implementing the 6MWT. An improvement in the functional performance was also found among them. This study indicates that the 6MWT was suitable, safe, and simply performed in heart failure patients, which can effectively improve the health-related quality of life of patients with heart failure.

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INTRODUCTION

The incidence and prevalence of heart failure is rising globally (Polikandrioti, 2019). Although advances in medicine have led to longer survival rates for patients diagnosed with heart failure, there has also been a steady increase in mortality rates for these patients (Maisyarah et al., 2023). The Tabata study (2014) illustrated that patients with heart failure were 70% more likely to be re-admitted into the hospital within the first year or their initial discharge and have a high mortality rate due to disease progression.

The quality of life among heart failure patients is lower in comparison to the general population. Over the last 30 years there have been vast developments in the medical and symptom management of heart failure. In spite of this, patients still experience poorer quality of life (Tung et al, 2013). This issue of debilitating heart failure is associated with a high mortality rate and poorer prognosis (Polikandrioti, 2019; Setioputro & Rizky, 2023). Previous studies have shown that the death rates after heart failure diagnosis is up to 11 to 60% at the first and over five years,

respectively. Thus, effective management of heart failure for patients is imperative to help improve their quality.

The National Institute for Health and Care Excellence (NICE) states the guideline i.e the NG106 2018 guidance advised that heart failure patients should be offered lifestyle modification, psychosocial support, and safe exercise program (Real et al, 2018). Nevertheless, research on the safety exercise to improve the quality of life among heart failure patients in Indonesia was limited. The purpose of this present study is to examine the intervention based on the six-minute walk test to improve health-related quality of life patients with heart failure.

METHOD

Design of study, sample, and setting

A purposive, quasi-experimental study with pretest and posttest group design conducted in the cardiovascular center of acute care setting in Bengkulu, Indonesia. The sample was recruited based on eligible inclusion criteria: adult outpatients, patients who confirmed diagnosis of heart failure, conscious and able to walk. Patients were excluded from this study if they had blood pressure upper than 180/100 mmHg and a pulse rate of more than 120 beats per minute. The sample size was estimated after data collection was done for the first five patients ($n = 5$), with an effect size of 1.2, a significance level (α) of .05, and an expected power of .80. The sample size required was 15 patients.

Measures

The measurements of this study consisted of the demographic form and the Minnesota Living with Heart Failure (MLHFQ). The detail of each instrument is narrated as follows. The demographic form consisted of the patient's age, gender, BMI, illness duration, comorbidities, previous surgery, NYHA classification, and ejection fraction.

The Minnesota Living with Heart Failure (MLHFQ) was used to examine the quality of life of patients with heart failure. This tool was designed by Rector and Cohn in 1992. The Indonesian version of the MLHFQ was performed by Kusuma et al. (2019) that has been translated and culturally adopted by using the Quality of Life Special Interested Group-Translation and Cultural Adaptation Group with the value of Cronbach's alpha coefficient was 0.88 for all items. This tool consists of 21 items of two main subscales: the physical and emotional states. The respondents respond to each item of 6-point Likert scale of the MLWHF scoring from 0 (None) to 5 (Very much) to represent how respondents felt during the last month. Each measure is classified into and interpreted for two levels representing a good life quality level (<24), a moderate level (24-45), and a poor level (>45). The possible lowest score was zero and the highest score was 105 (Bilbao et al, 2016; Polikandrioti et al, 2019; Rector and Cohn, 1992; Tabata et al, 2014).

The Six-Minute Walk Test Interventions

The researcher presented the Six-minute Walk Test (6MWT) procedure following the American Thoracic Society guideline (2002) to the respondents. This exercise was chosen because it is easier to administer, better tolerated, and better reflects activities of daily living. This intervention consisted of a 6-minute walk as far and long as possible on a 30-meter walkway.

Data collection procedures

Patients' characteristics were collected through medical records in the cardiovascular center of the acute care setting. Patients who met inclusion criteria were invited to participate in the study.

The researcher explained how to rate the Minnesota Living With Heart Failure questionnaire (MLHFQ). A day after that, the researcher followed up the participants at their home. The participants were given the six-minute walk test (6MWT) procedure sheet. Then the researcher explained and demonstrated the procedure. Each participant took half-hour-long practice once a day for the fourth week. The researcher carried out weekly follow-up at their home. After the initiation of intervention, the researcher reassessed the MLWHF score of each participant both.

Data analysis

The statistical analyses package was done by using the SPSS program. Data were calculated using descriptive and inferential statistics (Polit & Beck, 2012). The demographic data were described by presenting the value of minimum, maximum, mean, standard deviation, and percentage. A paired t-test analysis of responses before and after the intervention was performed with the significant levels set at $p < 0.05$.

Ethical consideration

The study was approved by the Health Research Ethics Committee of Poltekkes Kemenkes Bengkulu and selected hospital (KEPK/055/03/2200). The aims, procedure, possible risks and benefits of the study were clearly explained to the participants. The eligible participants were given the information that they had the right to withdraw at any time without any negative consequences. The participants had conveyed their agreement by signing written consent. Anonymity and confidentiality were assured.

RESULT

Patients' Characteristics

Fifteen heart failure patients participating in this study had a mean age of 57.47 (SD 14.32) and most were male (73.3%). Half of participants had previous surgery (Coronary Artery Bypass Graft). The majority had an ejection fraction more than 40% with NYHA classification was at a level I to III (See Table 1).

Table 1. Demographic Data of Respondents (N=15)

Characteristics	n (%)
Age	(M 57.47, SD 14.32)
<60	8(53.3)
≥60	7(46.7)
Gender	
Male	11(73.3)
Female	4(26.7)
Previous cardiac surgery	
Yes	8(53.3)
No	7(46.7)
EF (percentage)	(Min 29, Max 60)
≤40	5(33.3)
>40	10(66.7)
NYHA classification	
I	4(26.7)
II	7(46.6)
III	4(26.7)

The Six-Minute Walk Test (6MWT)

This study found that the six-minute walk was significantly shorter in the baseline test (325 ± 178.50 and 487 ± 140.90) compared to the fourth-week follow-up test (375 ± 228.49 and 526 ± 161.92) both in male and female group (See Table 2).

Table 2. Comparison 6MWT between Male and Female Patients (n=15)

6MWT (Meters)	Male (n=11)		Female (n=4)	
	Min – Max	Mean \pm SD	Min – Max	Mean \pm SD
Baseline	222 – 643	487 ± 140.90	171 – 553	325 ± 178.50
4 weeks	264 – 723	526 ± 161.92	207 – 698	375 ± 228.49

The Impact of the Six-Minute Walk Test on the Patients Life's Quality

This study revealed that mean of health-related quality of life score perceived by heart failure patients before participating in the six-minute walk test program (38.80 ± 13.44) was significantly higher than that after (29.53 ± 12.51) participating in this program (t 7.04, $p < .001$). (See Table 3).

Table 3. The Impact of The Six-Minute Walk Test on Health-Related Quality of Life Patients with Heart Failure (N=15)

MLHFQ	Mean	SD	t	p-value
Pre-test	38.80	13.444	7.04	0.000
Post-test	29.53	12.518		

DISCUSSION

Clinical characteristics were compared between male and female patients because gender is known to affect the six-minute walk test results (ATS committee, 2002). The present study illustrated that the 6MWT was significantly shorter in females compared to males both at the baseline test in the first week of this program and the fourth-week follow-up test. The walking distance varied up to 526 meters in the male group and 375 meters in the female group, which is of great clinical importance in adult populations with heart failure. This finding is in line with Tabata study (2014) which found that women had shorter 6MWT. Alongside the 6MWT results were also influenced by leg strength and balance in heart failure patients.

Furthermore, the present study demonstrated that overall the health-related quality of life in heart failure patients was perceived as a poor quality at the first week of this program, then their quality of life significantly increased to be a good quality after implementing the 6MWT along a 30-meter walkway within a month ($P < 0.001$). There were also no recorded mortalities in both groups at the end of the study period. This finding indicates an improvement in functional performance, the consequence of which is an enhancement of daily activity. This may be due to the fact that most of the respondents were relatively young and over 25% were asymptomatic. This study is similar to the Othman study (2019) which found that the 6MWT improved significantly in heart failure patients after intervention. Increasing the walking distance by 30 meters was associated with reduced mortality risk of patients with heart failure which was consistently associated with meaningful improvements in quality of life.

The 6MWT is often performed to assess motor function and exercise capacity in heart failure patients (Cacau et al, 2016; Davies et al, 2010; Nurhayati et al, 2021). The American Thoracic Society guideline states that 6MWT is a comprehensive indicator for cardiopulmonary function, muscular strength, and functional capacity. The present study shows that there was no side effect

of 6MWT reported by the patients. This indicates that the 6MWT is suitable, safe, and simply performed in heart failure patients. However, the 6MWT which covers as much distance as possible within the 6 minutes is not recommended in clinical practice as a way for symptomatic patients. They would be advice on starting and finishing slower to allow warm-up and cool down, to minimize symptom onset; plus advice on pacing.

CONCLUSION

The present study demonstrated heart failure patients achieved comparable improvement in their health-related quality of life with improvement in functional capacity and exercise tolerance after implementing the six-minute walk test along a 30-meter walkway within a month. The limitation of this study was a very small sample size with asymptomatic conditions which may not represent the actual functional capacity and the health-related quality of life in health failure patients in general.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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