



Utilizing Heart Failure Digital Education Media (HF-DEM) Intervention on the Quality of Life among Heart Failure Patients

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Abstract

Introduction: Heart failure patient care has evolved to include a variety of methods and technology aimed at preventing recurrence and improving patients' quality of life. The use of digital media aims to improve the self-care ability of heart failure patients. Digital health technologies can improve patient participation through education, remote monitoring, and individualized care. **Purpose:** This study to identify the effect of Heart Failure Digital Education Media (HF-DEM) on the quality of life of heart failure patients at Dustira Hospital, Bandung-Indonesia. **Method:** Quantitative research quasi-experimental approach type with pre-post method. The population of this study were 63 patients with heart failure who underwent outpatient care with the criteria Patients who were diagnosed with heart failure for more than 2 years and had been treated at Dustira Hospital and were able to read and have a smartphone. Sample size are 30 respondents with purposive sampling technique and divided into 2 groups. Respondent in Intervention group was given the digital education namely Heart Failure Digital Education Media (HF-DEM) consisting Video and e-booklet and intervention was given 1 week. **Result:** The results showed that the quality of life of heart failure patients at Dustira Hospital before being given the intervention was 3 respondents (20%) had a moderate quality of life and 12 respondents (80%) had a poor quality of life and after being given the intervention as many as 13 respondents (87%) had a good quality of life and 2 respondents (13%) had a moderate quality of life. Statistical tests using Mann-Whitney obtained a p-value of 0.000 which indicates the effect of providing HF-DEM interventions on the quality of life of heart failure patients at Dustira Hospital. **Discussion:** After the HF-DEM intervention, there was an improvement in the patient's quality of life, this shows the effect of the intervention provided along with the improvement of the patient's Self Care.

Keywords: Digital Media, Education, Heart Failure, Quality of Life

Introduction

The main goals treatment among cardiovascular diseases patients included understanding of the cardiovascular disease process, understanding medical care, self-management, and the relationship between patient and practitioner (Koirala *et al.*, 2021). Many deaths due to cardiovascular illnesses can be avoided with preventative treatment (Vaduganathan *et al.*, 2022). Other intervention to avoid hospitalization are to educate patients about good pharmacology, to follow up in a structured manner, to identify clinical recurrence in patients with heart failure, and to create medicines in advance of acute exacerbations. Future cardiovascular patient care initiatives situated in healthcare facilities, private residences, or community settings ought to positively impact heart failure patients' self-care. In order to implement the program, nurses must provide a variety of coordinated interventions, including home visits, telenursing, and educational programs that offer health information (Malara & Syarul, 2020). One strategy to reduce obstacles in patients with cardiovascular disease is to increase health

education, which affects patients' ability to self-care after hospital discharge, such as medication and medical appointments (Chen *et al.*, 2020).

Patients should be able to broadly understand complex medical treatment plans for cardiovascular disease so that any barriers are removed (Etminani *et al.*, 2020). Their level of education of patients directly affects their ability to take their medications as prescribed, make the necessary lifestyle changes, minimize medication errors, and lower their risk of cardiovascular disease (Persell *et al.*, 2020). Lack of understanding can also contribute to non-adherence of treatment recommendations and over time will impact on the patient's quality of life (Suhail *et al.*, 2021). There is data that a patient's long-term health suffers when their treatment plans are not followed (Pouls *et al.*, 2021). Good patient education is a critical clinical objective in both inpatient and outpatient settings because it affects patients' understanding of their disease process. Effective patient education can reduce the risk of death from cardiovascular disease (Bhattad & Pacifico, 2022). The use of technology and digital tools to identify health risks, make early diagnoses, and support positive health behaviors of those most at need through targeted treatments (Gold *et al.*, 2021).

Patient education programs are often provided in the form of complex printed materials. This can make it difficult for patients to understand important materials in patient self-care (Schooley *et al.*, 2020). Patients who have multiple medical illnesses and comorbidities may find it difficult to understand complicated medical advice and are frequently less likely to seek clarification (Birtcher *et al.*, 2023). Several studies have shown differences in the level of understanding of patients about treatment using conventional and digital educational media. E-learning has rapidly expanded into mainstream use. However, the effectiveness of this learning approach has not been fully synthesized quantitatively and evaluated using knowledge outcomes in health education (Vallee *et al.*, 2020). Therefore, a strategy is needed to accelerate the transition of educational media towards simpler digitalization. The use of digital media is known to have more effective impact. Digital health technologies can improve patient participation through education, remote monitoring, and individualized care (Victoria-Castro *et al.*, 2023). Digital media utilization in patient consultations can assist patients in comprehending the combined impact of several heart disease risk factors (Lip *et al.*, 2022). Digital health technology (DHT)—the convergence of digital technologies with health, health care, and society—has the potential to revolutionize CVD healthcare delivery by streamlining operations, improving patient outcomes and decreasing healthcare costs (Whitelaw *et al.*, 2021).

By utilizing digital media educational interventions, patients can increase their knowledge about cardiovascular disease. Increased knowledge can have a positive impact on motivation to manage heart disease and improve treatment adherence (Niksadat *et al.*, 2023). The benefits of providing education for heart failure patients include not only improving self-care behavior, but also improving quality of life, lowering depression, and re-hospitalization (Mahmoudi *et al.*, 2023). Heart failure (HF) is commonly associated with poor quality of life, yet little is known about the relationship between quality of life and mortality (Johansson *et al.*, 2021). Quality of life can be defined as the capacity to perform activities of daily living appropriate to one's age or main role in the surrounding community (Camp *et al.*, 2021). World Health Organization (WHO) ordered the measurement of quality of life as one of the benchmarks of measurement in health and success of therapy, in addition to changes in frequency and severity of illness. Quality of life refers to the complex aspects of life that cannot be expressed using only measurable indicators, but quality of life can describe the of life in general (Skevington *et al.*, 2021).

Health-related quality of life is the patient's overall evaluation of the impact of their therapy and condition, or HRQL. It at least represents mental, emotional, and cognitive performance in addition to physical functioning. Individuals with heart failure (HF) have significantly worse health-related quality of life (HRQOL) than individuals with other chronic illnesses (M. A. Seid, 2020). Nevertheless, despite the syndrome's inherent complexity and many patients' inadequate health literacy, innovative methods to enable patients to participate actively in their disease management are required (Perrin *et al.*, 2021). Through education, continuous and remote monitoring, and more tailored care, digital health technologies can encourage patient participation (Senbekov *et al.*, 2020). Given the importance of education in improving patients' quality of life, an innovative educational program is needed, one of which can be done with Digital Education Media intervention. Healthcare practitioners are responsible for providing safe and effective patient education (Gulbrandsen *et al.*, 2023). Healthcare professionals should never stop looking for innovative and efficient methods to educate patients (Jarva *et al.*, 2022). Providing HF DEM intervention in heart failure patients is certainly one of the strategies in achieving the goal of care in cardiovascular diseases patients.

Material and Methods

Study Design

The field of study design was conducted quasi-experiment using a pre-post testing configuration. Quantitative research is considered an analytical approach to research. Quantitative research designs are techniques and measurements that produce quantifiable/discrete values (Asenahabi, 2019). In this study, observations were made on 2 variables to see if there was an effect of the intervention provided. The research site at Dustira Hospital-Cimahy Bandung City, Indonesia and data were conducted from August-September 2023.

Population & Sample

The population of this study were 60 patients with heart failure who underwent outpatient care at Dustira Hospital. Based on data on visits to heart failure patients at Dustira Hospital during July 2023. Sampling technique in this study used purposive sampling. A method of selecting a sample based on criteria determined by the researcher so that it is considered representative of the characteristics of the population (Mweshi & Sakyi, 2020). The inclusion criteria of this study were a) Patients diagnosed with heart failure who receive outpatient care at Dustira Hospital b) Patients or families of patients who have and can access smartphones c) Patients between 45-60 age d) Patients without comorbidities so that 30 patients who fulfil these criteria are obtained.

Research Instruments

In this study 2 instruments were used, a questionnaire was given the MLHFQ (Minnesota Living with Heart Failure Questionnaire) to measure the patient's quality of life level. The MLHFQ questionnaire consisted of 21 questions with 6-point Likert Scale (0-5), developed to evaluate the effect of heart failure and treatment on patient's quality of life. There were two domains in the questionnaire which were physical domains (8 questions) and emotional domains (5 questions) and the other 8 questions were not included in both domain categories; however, the questions were added to evaluate the overall scores. The higher the MLHFQ score, the lower the quality of life of the patient (Rosu *et al.*, 2020). The Indonesian version of the MLHFQ had moderate-to-strong correlation between domains and items in questionnaire ($r: 0.571-0.748$; $p < 0.01$) and it had moderate negative correlation with SF-36 questionnaire ($r -0.595$; $p < 0.001$). The Cronbach α of Indonesian version of MLHFQ was 0.887; while the ICCs was 0.918. The Indonesian version of MLHFQ has good validity and reliability to assess the quality of life of patients with chronic heart failure in Indonesia (Kusuma *et al.*, 2019). Second instrument for the intervention group used HF-DEM (Heart Failure Digital Education Media) consist two parts: Video and e-booklet. They were two videos in this instrument, first focused on the Physiological and pathogenesis of heart failure and second focused on self-care management for heart failure patients. An expert exam, consisting of a cardiologist and an IT specialist, is used to determine the content's veracity.

Intervention Procedure

Research samples that have met the criteria are divided into two groups, namely the Intervention and Control groups. For both groups, a questionnaire was given the MLHFQ (Minnesota Living with Heart Failure Questionnaire) to measure the patient's quality of life level. The treatment group was given a Digital Media Education intervention consisting of videos and e-booklets on heart failure disease information and how to self-care independently. This intervention was given for one week and then re-measured the patient's quality of life level used same questionnaire. The control group was given a usual care intervention, in the form of health education provided by the nurse at the time of discharge from the hospital as Discharge Planning. Patients in the control group were also reassessed for quality of life using the MLHFQ.

Statistical Analyzed

Data analysis began with a data normality test using Shapiro Wilk because the number of samples was less than 50 respondents. Result showed that Sig.value for normality test was $< 0,05$ and indicated the data non-normal distribution. The results of the study were analyzed using parametric statistical Mann Whitney test to determine the effect of intervention. With a significant level of p-value (< 0.05), it can be concluded that there is an effect of intervention Digital Education Media to Quality of Life level among heart failure patients at Dustira Hospital.

Ethical Consideration

Ethical consideration in this study involves Informed consent, Beneficence and Confidentiality/Anonymity. The research study has been approved by Research Ethics Committee, Military Hospital Tk.II Dustira, Cimahi, Indonesia vide reference number ETIK RSD/ 035/ VII/2023 dated 30th July 2023.

Results and Discussion:*Quality of Life in Intervention group before giving HF- DEM intervention*

The result at Table 1 showed that the quality of life of heart failure patients at Dustira Hospital before being given intervention as many as 3 respondents (20%) had moderate quality of life and 12 respondents (80%) had poor quality of life. the result of Quality of Life in the intervention group after being given the HF-DEM intervention. From the 15 respondents, 13 respondents (87%) had good quality of life and 2 respondents (13%) had moderate quality of life and none of them have poor quality of life

Table 1. Quality of Life in Intervention Group before and after giving HF- DEM intervention

Self Care	Quality of Life						Mean
	Good		Moderate		Poor		
	f	%	f	%	f	%	
Before Intervention	0	0	3	20	12	80	45.4
After Intervention	13	87	2	13	0	0	60.2

The fond of study before the intervention of education through digital media (HF-DEM), almost all (80%) patients were in the low QoL category. Heart failure (HF) is frequently accompanied by poor health-related quality of life (HRQL), yet there is no clear correlation between HF and death (Johansson *et al.*, 2021). The low quality of life in HF patients is certainly closely related to patient education, especially regarding self-care (Mahmoudi *et al.*, 2023). Self-care ability of heart failure patients has a very important role in improving the quality of life of patients. Patients with strong self-care abilities know how to take better care of themselves and know what to do to deal with the physical and psychological stress they confront. Changes in self-care will correspond with changes in quality of life (S. S. Seid *et al.*, 2023). Three dimensions of self-care including self-care maintenance, self-care management, and self-care confidence can be used to identify factors that impact self-care behavior (Nuraeni *et al.*, 2023). The first dimension in the self-care process is self-care maintenance. This dimension assesses the patient's adherence to medication and a healthy lifestyle. Most individuals with heart failure at Dustira-Hospital have a poor quality of life, respondents (20%) who still need to be educated to be more regular and consistent in carrying out self-care in a healthy lifestyle. It is hoped that the activeness of service providers (especially nurses) can encourage them to carry out their role as educators and motivators by providing information and motivation to heart failure patients to maintain and improve their quality of life.

*Quality of Life in Control group before and after giving HF- DEM intervention***Table 2.** Quality of Life in Control Group before and after giving HF- DEM intervention

Self Care	Quality of Life						Mean
	Good		Moderate		Poor		
	f	%	f	%	f	%	
Before Intervention	0	0	4	26	11	74	45.6
After Intervention	2	13	3	23	10	64	49.3

Comparison the level of Quality of Life between intervention group and control group

After analysing the results before and after giving the next intervention, the researchers test the normality of the data and found the data distribution 0.010 ($p < 0.05$) and the next test uses the Mann Withney non-parametric test. The result obtained a p-value of 0.000 indicating the effect of the intervention digital education media on the quality of life of heart failure patients at Dustira Hospital

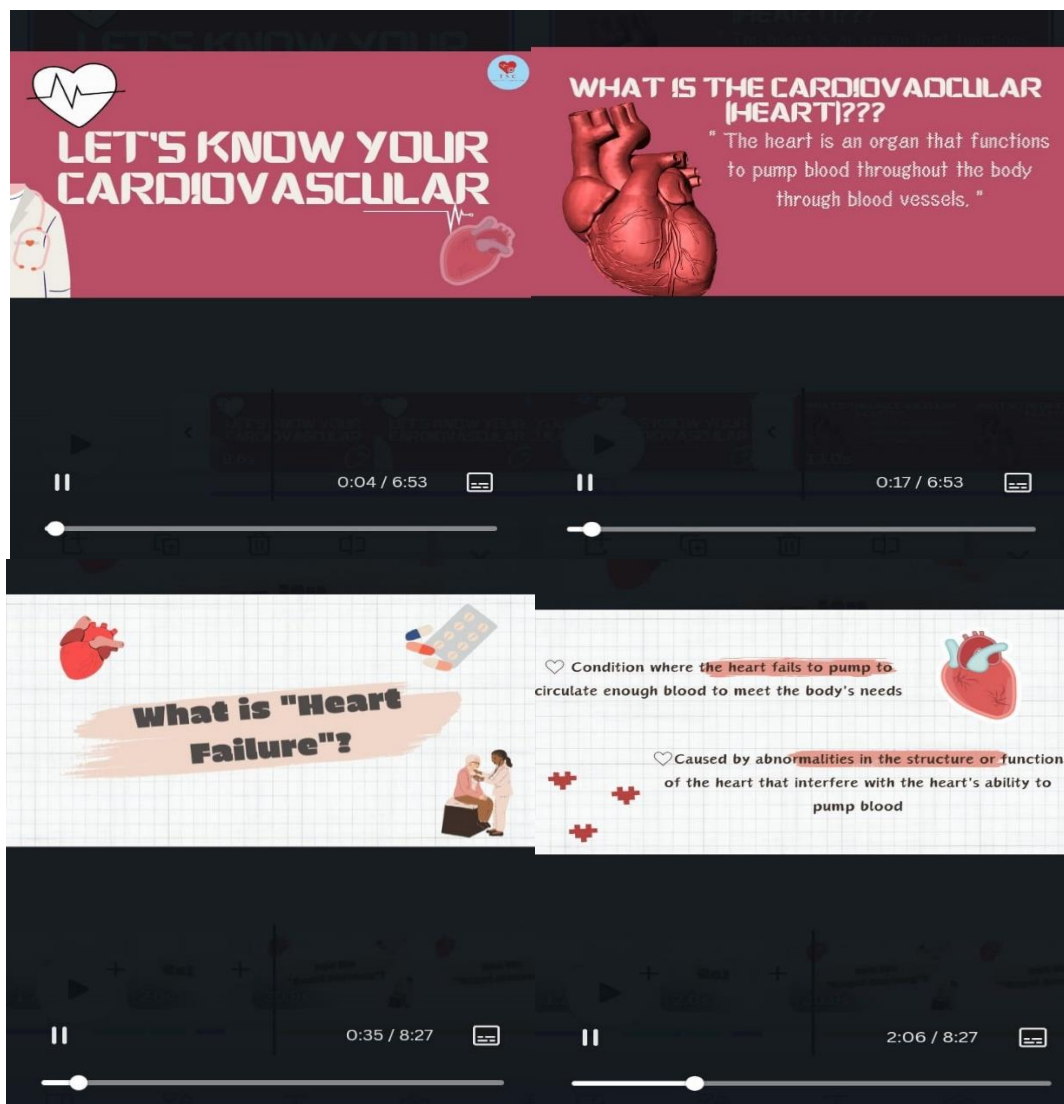
Table 3. Comparison between intervention group and control group

Group	Mann Whitney U	Z	p-Value
Intervention	121.00	-5.164	0,000
Control	344.00	-4.634	

Based on table the Mann Withney test results on the comparison of giving DHF-DEM between the intervention and the control group with an Asymp.Sig value 0.000 (<0.05) showed that is an effect of giving intervention on the quality of life of heart failure patients at Dustira Hospital

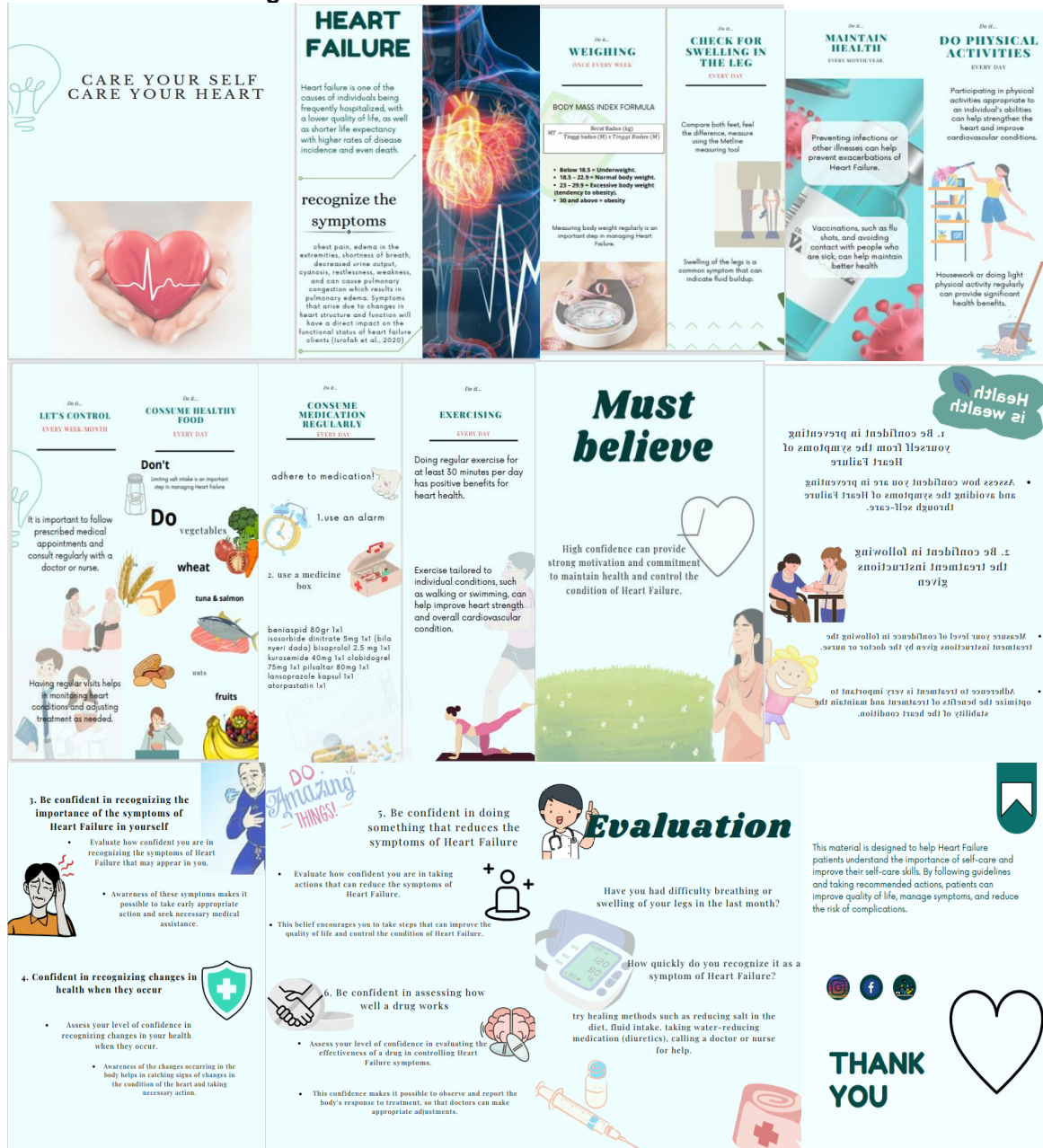
Providing education is known to improving adherence and self-care of heart failure patients. The use of digital educational media is also considered capable of providing more effective information to patients (Dessie *et al.*, 2021). In this study, the Heart Failure Digital Media Education (HF DEM) intervention which consists of videos on how the heart works, the heart failure disease process as shown at Figure 1. Like many other non-categorical diseases, heart failure is primarily understood as a clinical syndrome, with multiple and varied clinical disease states that may ultimately cause it, and not just one pathognomonic histological or biochemical signal (Bozkurt *et al.*, 2021). It is anticipated that patients may notice signs and symptoms more readily if they have a better understanding of how the disease is progressing.

Figure 1. Video “Meet and Greet Your Heart”



Using e-books, this digital media education not only explains the causes and progression of heart failure disease but also offers advice on patient self-care management. Patients may definitely prevent recurrence with the help of materials on how to rapidly notice indications and symptoms, as well as tips on nutrition and exercise as shown at Figure 2. Patients with heart failure will live better lives if they are able to take better care of themselves (Jaarsma *et al.*, 2021).

Figure 2. E-booklet "Care Your Self-Care Your Heart"



Heart failure patients experience limitations in carrying out daily activities so that patients become very vulnerable to depression, stress, anxiety, and difficulty controlling their own emotions. Patients also think about the cost of treatment, the prognosis of the disease, and the length of healing so that it can cause the quality of life of heart failure patients to decrease (Comin-Colet *et al.*, 2020), (Maddula *et al.*, 2022)

Due to various physical and psychological limitations, heart failure patients have a noticeably lower quality of life (QOL), which increases hospitalization, death, and the burden of disease (Fonseca *et al.*, 2021). Another study found that poverty, literacy level, availability of preventive services, and insurance impact QOL in heart failure patients. Self-care activities are another factor that affects QOL (Koirala *et al.*, 2020), (Asadi *et al.*, 2019). It is predicted that daily self-care behavior tasks performed by HF patients, such as medication adherence, sign and symptom monitoring, and lifestyle modifications, have a major influence on the course of the disease and quality of life (Baymot *et al.*, 2022). This can be compared to the control group who only received health education at the time of discharge planning and continued self-care at home without being given sufficient knowledge about heart failure

The degree to which heart failure patients engage in self-care behaviors determines their quality of life (QOL). Self-care behavior is a variable that highlights the steps HF patients should take to save their lives, their ability to function normally, and to enhance their general (S. S. Seid *et al.*, 2023). The degree to which heart failure patients participate in self-care behaviors determines their HRQOL. Self-care behavior is a controllable characteristic that highlights the steps that heart failure patients need to take to preserve their quality of life, their ability to function normally, and their overall HRQOL. It is expected that appropriate self-care practices will positively impact the overall course of the disease in people with heart failure. But according to earlier research, there is conflicting data about health-related quality of life. (M. A. Seid, 2020)

Conclusion

Before receiving the HF-DEM intervention, 12 respondents (or 80%) in the intervention group had low quality of life, according to the results of their QoL survey. Following the HF-DEM intervention, the Quality of Life survey findings for the intervention group showed that 13 respondents (87%) reported having a good quality of life. At Dustira Hospital, the quality of life of patients with heart failure is compared between the intervention group and the control group for the supply of HF-DEM, with a p-value of 0.000. After the HF-DEM intervention, there was an improvement in the patient's quality of life, this shows the effect of the intervention provided along with the improvement of the patient's Self Care.

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Conflict of Interest:

The authors declare that they have no conflict of interest.

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