

Original Article

Effectiveness Of HF-Care Educational Media on Self-Care Among Patients with Heart Failure: A Quasi-Experimental



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ABSTRACT

Background: Heart Failure (HF) remains a major cause of morbidity, mortality, and recurrent hospitalization, often associated with inadequate self-care. Although educational interventions can support HF self-management, evidence on HF-Care educational media in the Indonesian healthcare context remains limited. This study evaluated the effectiveness of HF-Care educational media on self-care among patients with heart failure.

Methods: A two-week quasi-experimental two-group pretest–posttest study following the TREND guideline was conducted at an Indonesian military teaching hospital in Bandung. Forty-six patients with HF were recruited using purposive sampling and allocated to an intervention group or control group, with 23 participants in each group. The intervention group received HF-Care educational media in addition to usual care, while the control group received usual care only. Self-care was measured using the Self-Care of HF Index Version 7.2. Data were analyzed using descriptive statistics, paired-samples t-tests, and independent-samples t-tests.

Results: Self-care improved in both groups, with greater improvement in the intervention group. The intervention group had significantly higher posttest self-care scores than the control group, with a mean difference of 27.00 points (95% CI: 21.80–32.20; $p < 0.001$) and a very large effect size (Cohen's $d = 3.14$).

Conclusion: HF-Care educational media may serve as an effective evidence-based nursing intervention to improve self-care among patients with heart failure. Future multicenter studies with larger samples, randomized designs, and longer follow-up are needed to confirm its sustainability and broader applicability.

Keywords: Heart Failure; Self-Care; Patient Education; Health Education; Self-Management.

Implications for Practice:

- HF-Care educational media can be implemented as an evidence-based nursing intervention to improve patients' self-care skills, promote treatment adherence, and support long-term HF management.
- Healthcare institutions should integrate standardized HF-Care educational protocols

Implications for Practice:

- into routine nursing practice and discharge planning to ensure consistent and effective patient education.
- Healthcare policymakers and professional organizations may adapt HF-Care educational strategies according to cultural characteristics and resource availability to

Implications for Practice:

enhance equitable chronic disease management across diverse healthcare settings.

Introduction

Heart Failure (HF) is a major public health concern and one of the leading causes of morbidity, mortality, recurrent hospitalization, and healthcare utilization worldwide ([Savarese et al., 2023](#)). Clinically, HF is characterized by symptoms such as dyspnea, fatigue, edema, and reduced functional capacity, which occur when the heart is unable to pump sufficient blood to meet the body's metabolic demands ([Maddox et al., 2024](#)). The burden of HF has continued to increase due to population aging, improved survival from cardiovascular diseases, and the growing prevalence of risk factors such as hypertension, diabetes mellitus, obesity, and other chronic conditions. Beyond its clinical impact, HF creates a substantial economic burden through repeated hospital admissions, long-term medication use, outpatient follow-up, emergency care, and caregiver involvement. Recurrent hospitalization may reduce patients' quality of life, increase family caregiving demands, and place additional pressure on healthcare systems. Therefore, effective HF management requires not only pharmacological treatment but also active patient engagement in self-care practices, including medication adherence, symptom monitoring, dietary regulation, fluid restriction, physical activity, and timely healthcare-seeking behavior ([Amalia et al., 2025](#)).

Globally, more than 64 million people are estimated to be living with heart failure, making it a major contributor to the cardiovascular disease burden ([Mumtaz et al., 2023](#)). In low- and middle-income countries, including Indonesia, the burden

of HF is increasing rapidly and creates substantial challenges for healthcare systems ([Metra et al., 2023](#)). National health data indicate that cardiovascular diseases remain among the leading causes of hospitalization and death in Indonesia, with HF contributing significantly to these outcomes, the reported prevalence of HF in Indonesia was approximately 1.6%, representing about 1,017,290 people. In West Java Province, 73,285 patients with HF were reported, placing the province ninth nationally ([Indonesian Ministry of Health, 2023](#)). In Bandung, mortality data recorded by community health centers and reported to the Bandung City Health Department during 2022–2023 documented 1,158 deaths. These figures indicate that HF is an important public health challenge in Indonesia, particularly because recurrent admissions and poor disease control are often related to inadequate self-management and limited patient understanding of HF management strategies ([Taylor et al., 2023](#)).

The implementation of effective HF self-care education in Indonesia may face several contextual challenges, particularly because HF management requires patient-centered education, symptom monitoring, medication adherence, lifestyle modification, and continuity of care after hospital discharge ([Heidenreich et al., 2022](#); [McDonagh et al., 2021](#)). Compared with many developed countries, healthcare settings in Indonesia may have greater variation in patient health literacy, access to structured educational resources, availability of digital health tools, continuity of follow-up, and healthcare infrastructure ([Kleman et al., 2024](#); [UNDP Indonesia, 2021](#)). In addition, family members often play an important role in supporting patients' daily care, medication use, dietary decisions, symptom monitoring, and decisions to seek healthcare ([Alharrasi et al., 2025](#)). These sociocultural

characteristics may influence how patients understand heart failure, respond to symptoms, adhere to treatment recommendations, and maintain long-term self-care behaviors ([Son et al., 2025](#)). Therefore, educational interventions for patients with HF should be culturally appropriate, easy to understand, feasible for use in routine nursing care, and adaptable to hospitals with different levels of resources

Self-care is recognized as a cornerstone of HF management. Adequate self-care enables patients to recognize early symptoms, adhere to treatment recommendations, and make appropriate lifestyle modifications, thereby reducing complications and hospital readmissions ([Jaarsma et al., 2021](#)). Nurses play a crucial role in educating patients and promoting self-care behaviors through structured educational interventions. Educational media have become increasingly important in facilitating patient learning because they can enhance understanding, improve information retention, and support behavioral change ([Dessie et al., 2021](#)). Heart Failure-Care (HF-Care) educational media, specifically designed for patients with heart failure, may provide an effective approach to improving patients' knowledge, self-care abilities, and engagement in long-term disease management ([Amalia et al., 2024](#)). In clinical practice, such media may help nurses deliver standardized information more consistently during inpatient education, discharge planning, and outpatient follow-up.

Previous studies have demonstrated that educational interventions can improve self-care among patients with HF ([Cañon-Montañez et al., 2021](#)). However, findings remain inconsistent regarding the magnitude and sustainability of these effects. Some studies have reported substantial improvements in self-care behaviors following structured educational

programs, whereas others have found only modest or short-term benefits. These inconsistent findings may be explained by differences in intervention duration, educational format, frequency of reinforcement, patient characteristics, health literacy, cultural context, family involvement, and healthcare environments. For example, interventions that include structured content, repeated reinforcement, and patient-centered materials may produce stronger behavioral improvements than brief verbal education alone. Conversely, limited follow-up, low literacy, inadequate family support, or poor access to educational resource.

Although educational interventions for HF have been widely studied, several aspects remain insufficiently understood. Many previous studies have focused on conventional education, general digital health interventions, or populations in developed countries, which may not fully reflect the needs of patients in Indonesian healthcare settings. Limited evidence is available regarding the effectiveness of structured HF-Care educational media that is adapted to Indonesian cultural characteristics, patient literacy levels, family-centered care patterns, and hospital-based nursing workflows ([Chen et al., 2024](#)). In addition, evidence from teaching hospitals and regional healthcare facilities remains limited. This gap highlights the need for context-specific research to determine whether HF-Care educational media can effectively improve self-care behaviors among patients with HF in Indonesia, particularly in Bandung.

This study is guided by Dorothea Orem's Self-Care Deficit Nursing Theory, which emphasizes the individual's capacity to perform activities required to maintain health, well-being, and quality of life ([Mahmoudi et al., 2023](#)). According to Orem, when individuals are unable to perform adequate self-care independently, nursing

interventions are needed to support and strengthen their self-care capacity. Educational support is one of the key nursing systems proposed by Orem to enhance patients' self-care agency and promote independence in managing chronic conditions ([Ghanbari-afra, 2023](#)). In the context of heart failure, HF-Care educational media can function as a supportive-educative nursing intervention by providing structured information, visual explanations, and practical guidance that help patients understand their disease and perform self-care behaviors more confidently ([Shahmoradi et al., 2022](#)). improve knowledge, motivation, decision-making ability, and self-care agency, which subsequently influence patients' self-care behaviors.

The Self-Care of HF Index Version 7.2 assesses three major components of HF self-care: self-care maintenance, symptom perception, and self-care management. HF-Care educational media may influence self-care maintenance by reinforcing daily behaviors such as medication adherence, dietary regulation, fluid restriction, physical activity, and weight monitoring. It may improve symptom perception by helping patients recognize early signs of worsening heart failure, such as dyspnea, edema, fatigue, and sudden weight gain. It may also strengthen self-care management by guiding patients to take appropriate actions when symptoms occur, including adjusting daily activities, seeking timely healthcare assistance, and communicating with healthcare providers. Therefore, based on Orem's theory, the independent variable in this study is the use of HF-Care educational media, while the dependent variable is the level of self-care among patients with HF ([Sjöberg-ehn, 2022](#)). Improved self-care behaviors include adherence to medication, symptom monitoring, dietary compliance, fluid management, and timely healthcare-

seeking actions ([Victoria-Castro et al., 2023](#)).

The findings of this study are expected to contribute to nursing and healthcare practice. For nursing professionals, the results may provide evidence supporting the integration of HF-Care educational media into routine patient education, discharge planning, and outpatient follow-up, thereby enhancing nurses' effectiveness in promoting self-management among patients with heart failure. For healthcare institutions, this study may inform the development of standardized educational protocols that ensure consistent delivery of HF self-care education across inpatient and outpatient settings. For hospitals with limited resources, HF-Care educational media may offer a practical and reusable educational tool that supports efficient and safe intervention delivery. In addition, the findings may serve as a basis for policymakers and healthcare administrators to strengthen patient-centered educational interventions and chronic disease management programs. Ultimately, improved self-care among patients with HF may contribute to better quality of life, reduced healthcare utilization, and improved continuity of care.

Therefore, this study aimed to evaluate the effectiveness of HF-Care educational media on self-care among patients with HF by comparing self-care outcomes between the intervention group and the control group before and after a two-week intervention period at dr. M. Salamun Hospital, Bandung. Specifically, this study assessed whether patients who received HF-Care educational media demonstrated greater improvement in self-care than patients who received usual care.

Methods

Study Design

This study used a quasi-experimental two-group pretest-posttest design to assess

the effect of HF-Care educational media on self-care among patients with heart failure. In this design, participants' self-care was measured before the intervention, followed by the implementation of HF-Care educational media in the intervention group, and then measured again two weeks after the intervention. The control group received usual care during the same study period. This approach enabled the researchers to compare changes in self-care outcomes between the intervention and control groups. This study was designed and reported in accordance with the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) guideline to improve the transparency and completeness of reporting for nonrandomized intervention studies.

Participants

Participants were recruited using purposive sampling from the inpatient and outpatient cardiac care units of an Indonesian military teaching hospital in Bandung, Indonesia. Eligible participants were adults aged 18 years or older who had been diagnosed with HF by a cardiologist, were receiving hospital-based care, were able to communicate in Indonesian, were physically and cognitively capable of participating in the educational intervention and completing questionnaires, and provided written informed consent. Patients were excluded if they had severe cognitive impairment, diagnosed psychiatric disorders, critical illness requiring intensive care, or severe hearing or visual impairment that limited their ability to use the educational media.

The target population comprised 52 patients with HF who received care during the study period. The sample size was determined using the Slovin formula because the study was conducted within a defined accessible population in a routine hospital setting and the total number of

eligible patients during the study period was limited. Based on this calculation, a minimum sample of 46 participants was obtained. Although an a priori power analysis was not performed, the sample size was considered feasible for the available study population and operational conditions of the hospital. This limitation was considered in interpreting the findings and is acknowledged in the limitations section.

The recruitment process was conducted sequentially. First, potentially eligible patients were identified through medical records and clinician referrals from inpatient and outpatient cardiac care units. Second, the research team screened patients based on the inclusion and exclusion criteria. Third, eligible patients were approached individually, informed about the study objectives, procedures, potential risks and benefits, confidentiality, and voluntary nature of participation. Written informed consent was obtained before enrollment. Participants who met the eligibility criteria and agreed to participate were then sequentially recruited until the required sample size was reached.

Of the 52 patients assessed for eligibility, 6 were excluded because they declined to participate. Thus, 46 participants were enrolled and allocated into the intervention group and control group, with 23 participants in each group. Potentially eligible patients were identified through medical records and clinician referrals from inpatient and outpatient cardiac care units, screened based on the predefined inclusion and exclusion criteria, and approached individually to receive information regarding the study objectives, procedures, risks and benefits, confidentiality, and voluntary participation before providing written informed consent. After enrollment, participants were assigned consecutive numbers according to

recruitment order and allocated using a predetermined odd-even numbering procedure, whereby odd numbers were assigned to the intervention group and even numbers to the control group. This procedure was applied consistently and was not based on clinical condition, participant preference, admission unit, or investigator judgment, although residual allocation bias could not be fully excluded because randomization was not performed. During the two-week study period, the intervention group received HF-Care educational media, while the control group received usual care. No participants were lost to follow-up, and all 46 participants completed the posttest assessment and were included in the final analysis.

Instruments

This study involved two main variables. The independent variable was the use of HF-Care educational media, while the dependent variable was self-care outcomes among patients with heart failure. Self-care outcomes were measured before and two weeks after the intervention to assess changes in HF self-care behaviors between the intervention and control groups.

Self-care was assessed using the Indonesian version of the Self-Care of HF Index (SCHFI) questionnaire, which was used to evaluate self-care behaviors among patients with HF (Riegel et al., 2022). The questionnaire consisted of demographic characteristics and 20 self-care items. The demographic section included age, sex, education level, monthly income, and history of hospitalization due to heart failure.

The self-care questionnaire was divided into several components. The self-care maintenance section consisted of 8 items assessing routine behaviors to maintain health stability, including weighing body weight, checking ankle swelling, preventing infection, performing physical activity,

reducing salt and monosodium glutamate intake, medication-taking behavior, requesting low-salt food when eating outside the home, and using reminders for medication intake. The symptom recognition or symptom perception section assessed how quickly patients recognized shortness of breath or ankle swelling as symptoms of heart failure. The self-care management section assessed patients' actions when symptoms occurred, including reducing salt intake, limiting fluid intake, taking additional diuretic medication when instructed, contacting a doctor or nurse for guidance, and evaluating whether the treatment actions helped relieve symptoms. The self-care confidence section consisted of 6 items assessing patients' confidence in keeping themselves free from HF symptoms, following treatment instructions, evaluating symptoms, recognizing health changes, taking action to manage symptoms, and evaluating how well treatment worked.

Each item was scored using a 4-point response scale, with response options adjusted according to each section, such as "never," "sometimes," "often," and "always," or confidence responses ranging from "not confident" to "very confident." The SCHFI score was transformed into a standardized score ranging from 0 to 100, with higher scores indicating better self-care. A score of 70 or higher was interpreted as adequate self-care, while a score below 70 indicated inadequate self-care. In this study, the score was used to classify participants' self-care level and to compare self-care outcomes before and after the two-week intervention period.

The Indonesian questionnaire was administered using a Google Form during face-to-face data collection. Participants completed the questionnaire independently when possible. For participants with low literacy, visual limitations, fatigue, or physical limitations, trained research

personnel provided standardized assistance by reading the questions and response options without explaining, suggesting, or directing answers. Participants were encouraged to answer based on their actual condition and self-care practices during the previous month. To minimize response bias, the research team emphasized confidentiality, voluntary participation, and that there were no right or wrong answers. The completed questionnaire responses were checked for completeness after submission.

The HF-Care educational media consisted of animated video-based educational materials designed to support HF self-care education. The content covered medication adherence, symptom monitoring, dietary regulation, fluid restriction, physical activity, weight monitoring, and appropriate actions when symptoms worsened. The educational media and its validation sheet were developed by the researchers in collaboration with the information technology team. The content was reviewed and approved by cardiology experts at dr. M. Salamun Hospital, Bandung, Bandung, Indonesia.

Expert validation was conducted by three professionals with relevant expertise, consisting of a health promotion practitioner, a medical-surgical nursing expert, and a cardiologist. The expert review assessed the suitability of the media content, clarity of language, accuracy of HF information, relevance to patient education, visual presentation, ease of understanding, and feasibility for use in the intervention. Based on the expert assessment, the educational media was declared "suitable for data collection with revisions as suggested." The media was subsequently revised according to the validators' recommendations before being implemented in the intervention group.

Intervention

The intervention in this study was HF-Care educational media provided to participants in the intervention group in addition to usual care. The intervention was developed based on Dorothea Orem's Self-Care Deficit Nursing Theory, particularly the supportive-educative nursing system, which emphasizes the role of nurses in strengthening patients' knowledge, self-care agency, and ability to manage chronic illness independently. HF-Care educational media was selected because structured education can support heart failure self-management by improving knowledge, motivation, treatment adherence, symptom monitoring, and decision-making.

The HF-Care educational media consisted of one animated video about heart failure care with a duration of 1 minute and 30 seconds. The video was delivered in Indonesian using simple language, visual illustrations, and audio narration. Its content covered medication adherence, symptom monitoring, dietary regulation, fluid restriction, physical activity, weight monitoring, and appropriate actions when symptoms worsened. After the pretest assessment, participants in the intervention group received an individual educational session delivered by the principal researcher, which included an introduction to the media, video viewing, discussion, question-and-answer session, and reinforcement of key self-care messages. Participants were then added to a dedicated WhatsApp group, where the video was shared for home review during the two-week intervention period. Repeated viewing was encouraged as reinforcement but was not mandatory.

To support exposure to the educational content, the researcher sent reminder messages, reshared the video, and facilitated question-and-answer discussions through the WhatsApp group. Standardized clarification and

reinforcement were provided to maintain consistency of information across participants. Adherence to video viewing was monitored through participant self-report and WhatsApp-based confirmation, and responses were recorded in the intervention checklist. However, the exact number of repeated views and duration of exposure were not objectively measured using digital analytics.

The control group received usual care during the same study period, including routine nursing care and standard verbal education provided by the hospital, such as general information about medication use, diet, activity, follow-up visits, and discharge instructions. The control group did not receive HF-Care educational media during the intervention period. To minimize contamination, the media was provided only to the intervention group until posttest completion, after which the control group was offered the same media.

Intervention fidelity was maintained by using the same video, explanation sequence, reinforcement points, and intervention checklist for all participants in the intervention group. The checklist documented the completion of the pretest, educational session, discussion, reinforcement, home review instruction, follow-up reminder, adherence confirmation, and posttest assessment after two weeks. The intervention was educational, non-pharmacological, and noninvasive; therefore, no medication dosage adjustment or invasive procedure was involved. No adverse events or safety issues related to HF-Care educational media were reported during the study period.

Data Collection

Data collection was conducted from May to June 2025 in the inpatient and outpatient cardiac care units of an Indonesian military teaching hospital in Bandung, Indonesia. The data collection

process was carried out by the principal researcher and one trained research assistant. The data collection workflow consisted of several steps. First, potential participants were identified through medical records and referrals from healthcare professionals. Second, patients were screened based on the inclusion and exclusion criteria. Third, eligible patients were approached individually, informed about the study objectives and procedures, and asked to provide written informed consent. Fourth, participants completed the baseline assessment, including demographic data and the Self-Care of HF Index questionnaire. Fifth, participants were allocated to either the intervention group or the control group. Sixth, the intervention group received HF-Care educational media, while the control group received usual care. Seventh, follow-up reminders were provided during the two-week study period. Finally, both groups completed the posttest assessment using the same self-care questionnaire.

The research assistant had a healthcare background and was trained before data collection. The training covered participant recruitment, eligibility screening, informed consent procedures, questionnaire administration, standardized clarification, confidentiality, data recording, and completeness checking. Competency was assessed through discussion, simulation of questionnaire administration, and review of the study protocol with the principal researcher before data collection began.

To ensure consistency, all data collectors used the same questionnaire instructions, explanation procedures, and data collection checklist. Because the questionnaire was structured and did not require clinical judgment scoring by different raters, inter-rater reliability testing was not applicable. However, standardized procedures were used to minimize variation in questionnaire

administration. Data were recorded using Google Form and then exported to Microsoft Excel and SPSS version 26.0 for data checking and analysis. The electronic data files were stored in a password-protected folder and were accessible only to the research team. Participant identities were coded to maintain confidentiality.

Quality control was performed by checking questionnaire completeness after submission, verifying data entries, reviewing the consistency of pretest and posttest data, and conducting regular discussions between the principal researcher and research assistant. No missing data were found. All 46 participants completed both pretest and posttest assessments and were included in the final analysis.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Prior to analysis, all data were screened for completeness, accuracy, and consistency. Descriptive statistics were used to summarize participants' demographic characteristics and self-care levels before and after the intervention.

The normality of self-care scores was assessed using the Shapiro–Wilk test because each group consisted of fewer than 50 participants. The Shapiro–Wilk results showed that all p-values were greater than 0.05, indicating that the self-care scores were normally distributed in both the intervention and control groups at pretest and posttest (**Table 1**). Therefore, parametric tests were used for further analysis.

A paired-samples t-test was used to examine within-group changes in self-care scores before and after the intervention in each group. An independent-samples t-test was used to compare self-care outcomes between the intervention and control groups after the intervention. Statistical

significance was determined at $p < 0.05$ with 95% confidence intervals. The findings were presented in tables and narrative form to support interpretation of the effect of HF-Care educational media on self-care among patients with heart failure.

Table 1. Normality Test

Group and Assessment	Shapiro–Wilk Statistic	df	p-value
Control group, pretest	0.940	23	0.181
Control group, posttest	0.951	23	0.301
Intervention group, pretest	0.952	23	0.326
Intervention group, posttest	0.930	23	0.109

Ethical Considerations

This study was conducted in accordance with ethical principles for research involving human participants and followed the principles of the Declaration of Helsinki, including respect for autonomy, beneficence, non-maleficence, justice, privacy, and confidentiality. Ethics approval was obtained prior to data collection from dr. M. Salamun Hospital, Bandung under approval number B 1778/IV/2025. Administrative permission to conduct the study was also obtained from the Indonesian military teaching hospital in Bandung, Indonesia.

All eligible participants received clear information about the study's purpose, procedures, potential benefits, minimal risks, the voluntary nature of participation, and their right to withdraw at any time without consequences to their medical or nursing care. Written informed consent was obtained from all participants prior to enrollment. To protect confidentiality, each participant was assigned a unique identification code, and no personally identifiable information was entered into the study database. All questionnaires and

study records were securely stored and accessible only to the research team.

The intervention involved the delivery of HF-Care educational media and did not include any invasive procedures; therefore, the study posed minimal risk to participants. All participants continued to receive standard medical and nursing care

throughout the study period. To ensure fairness, participants in the control group were offered the same HF-Care educational media after completing the post-test assessment.

Results

Table 2. Characteristics of Participants (n=46)

Characteristics	Category	Total, n (%)	Intervention group, n (%)	Control group, n (%)	p-value
Sex	Male	20 (43.5)	8 (34.8)	12 (52.2)	0.373*
	Female	26 (56.5)	15 (65.2)	11 (47.8)	
Age	Mean ± SD	57.62 ± 4.44			0.697**
	Min-Max	50-64			
	50-53 years	11 (23.9)	5 (21.7)	6 (26.1)	
	54-56 years	9 (19.6)	6 (26.1)	3 (13.0)	
	57-60 years	9 (19.6)	5 (21.7)	4 (17.4)	
	>60 years	17 (37.0)	7 (30.4)	10 (43.5)	
Educational level	Elementary school	6 (13.0)	3 (13.0)	3 (13.0)	0.927**
	Middle school	2 (4.3)	1 (4.3)	1 (4.3)	
	Senior high school	23 (50.0)	13 (56.5)	10 (43.5)	
	Associate degree	6 (13.0)	2 (8.7)	4 (17.4)	
	Bachelor's degree	8 (17.4)	4 (17.4)	4 (17.4)	
	Master's degree	1 (2.2)	0 (0.0)	1 (4.3)	
Employment status	Civil servant	11 (23.9)	4 (17.4)	7 (30.4)	0.374**
	Private-sector worker	17 (37.0)	10 (43.5)	7 (30.4)	
	Housewife	7 (15.2)	5 (21.7)	2 (8.7)	
	Self-employed	11 (23.9)	4 (17.4)	7 (30.4)	
History of symptom recurrence	Less than 1 day	3 (6.5)	2 (8.7)	1 (4.3)	1.000**
	3-5 days	11 (23.9)	5 (21.7)	6 (26.1)	
	More than 1 week	8 (17.4)	4 (17.4)	4 (17.4)	
	More than 2 weeks	13 (28.3)	6 (26.1)	7 (30.4)	
	More than 1 month	11 (23.9)	6 (26.1)	5 (21.7)	

Note. *Chi-square test was used; **Fisher's exact test was used. Statistical significance was set at $p < 0.05$.

Table 2 presents the baseline characteristics of the 46 participants with heart failure and compares these characteristics between the intervention and control groups. Overall, more than half of the participants were female (56.5%), and the mean age was 57.62 ± 4.44 years,

with an age range of 50–64 years. The largest age group was >60 years (37.0%). Most participants had completed senior high school (50.0%), and the largest proportion worked in the private sector (37.0%). The most common history of symptom recurrence was more than two

weeks (28.3%). Baseline comparison showed no statistically significant differences between the intervention and control groups in gender ($p = 0.373$), age group ($p = 0.697$), educational level ($p = 0.927$), employment status ($p = 0.374$), or history of symptom recurrence ($p = 1.000$). These results suggest that the two groups

were generally comparable before the intervention, supporting the interpretation that the observed post-intervention differences in self-care outcomes were more likely associated with the HF-Care educational media rather than measured baseline differences between groups.

Table 3. Within-Group Comparison of Self-care Scores Before and After the Intervention

Group	Pretest Mean ± SD	Posttest Mean ± SD	Mean Difference	95% CI	t	df	P- value
Intervention group	47.09 ± 14.96	80.96 ± 4.87	33.87	26.18–41.56	9.129	22	<0.001
Control group	42.48 ± 7.32	54.70 ± 12.01	12.22	5.90–18.54	4.010	22	0.001

Note. SD= Standard Deviation; Min-Max= Minimum-Maximum; CI= confidence interval.

Table 3 presents the within-group comparison of self-care scores before and after the intervention. In the intervention group, the mean self-care score increased significantly from 47.09 ± 14.96 at baseline to 80.96 ± 4.87 after the intervention, with a mean difference of 33.87 points (95% CI: 26.18–41.56; $t = 9.129$; $df = 22$; $p < 0.001$). The control group also showed a significant

improvement, with the mean score increasing from 42.48 ± 7.32 to 54.70 ± 12.01 , corresponding to a mean difference of 12.22 points (95% CI: 5.90–18.54; $t = 4.010$; $df = 22$; $p = 0.001$). The magnitude of improvement was substantially greater in the intervention group than in the control group.

Table 4. Between-Group Differences in Self-Care Outcomes after HF-Care Educational Media Intervention

Comparison	Mean Difference	Std. Error Difference	95% CI	t	df	p-value	Cohen's d
Intervention vs. control, posttest	21.652	4.800	11.977- 31.327	4.510	44	<0.001	1.33

Note. CI = confidence interval. Levene's test was not significant ($F = 0.357$, $p = 0.553$), indicating that the assumption of homogeneity of variance was met. Therefore, the "equal variances assumed" result was used for interpretation. Cohen's $d = 1.33$ indicates a very large intervention effect.

Table 4 shows the between-group difference in delta self-care scores after the HF-Care educational media intervention. The results indicated that the improvement in self-care scores was significantly greater in the intervention group than in the control group, with a mean difference of 21.652 points (95% CI = 11.977–31.327, $t(44) = 4.510$, $p < 0.001$). The effect size was very large (Cohen's $d = 1.33$), suggesting that the HF-Care educational media intervention had a substantial and clinically meaningful

effect on improving self-care among patients with heart failure.

Discussion

This study found that HF-Care educational media improved self-care among patients with HF after the two-week intervention period. The improvement was more evident in the intervention group than in the control group, suggesting that structured educational media provided additional benefit beyond usual care. Rather

than only increasing overall self-care scores, the intervention appeared to support several important aspects of HF self-management, including daily self-care behaviors, symptom awareness, and appropriate responses to worsening symptoms.

Before the intervention, many participants demonstrated inadequate self-care. This condition indicates that patients may still experience difficulties in understanding heart failure, recognizing early warning symptoms, following dietary and fluid restrictions, maintaining medication adherence, and deciding when to seek healthcare support. From the perspective of Orem's Self-Care Deficit Nursing Theory, this reflects a self-care deficit, in which patients have not fully developed the knowledge, skills, and confidence needed to meet their therapeutic self-care demands ([Niriayo et al., 2024](#)). In this context, nurses play an important role through the supportive-educative nursing system by providing education, guidance, and reinforcement to strengthen self-care agency ([Chen et al., 2024](#)).

The improvement observed after the intervention may be explained by several mechanisms. HF-Care educational media provided information in a structured, visual, and easy-to-understand format, which may have helped patients retain key messages and apply them in daily life. Educational media can improve knowledge, strengthen motivation, increase confidence, and support behavioral reinforcement by repeatedly exposing patients to practical self-care messages ([Dessie et al., 2021](#)). For patients with heart failure, this is important because effective self-care requires not only knowing what to do, but also recognizing symptoms, making decisions, and consistently performing recommended behaviors.

The intervention may have influenced the main domains of HF self-care, namely self-care maintenance, symptom perception, and self-care management ([Kleman et al., 2024](#)). First, self-care maintenance may have improved because the educational media reinforced daily behaviors such as medication adherence, salt and fluid restriction, physical activity, weight monitoring, and prevention of symptom worsening. Second, symptom perception may have improved because patients were exposed to clear explanations of warning signs such as dyspnea, edema, fatigue, and sudden changes in body condition. Third, self-care management may have improved because the educational media guided patients on how to respond when symptoms occurred, including modifying behavior, contacting healthcare providers, and seeking timely care. These mechanisms are consistent with Orem's theory, which emphasizes that education can strengthen self-care agency and reduce dependence on healthcare providers when patients are able to manage their condition more independently ([Heidenreich et al., 2022](#); [Kleman et al., 2024](#); [McDonagh et al., 2021](#); [Xie et al., 2025](#)).

The findings are consistent with previous studies showing that educational interventions can improve self-care among patients with heart failure. However, the magnitude and sustainability of educational effects vary across studies. Some interventions show stronger effects when education is structured, repeated, visually supported, and tailored to patient needs. In contrast, studies that rely only on brief verbal education or general information may produce weaker or short-term effects. Differences in intervention duration, delivery format, patient literacy, age, disease severity, family support, healthcare access, and measurement instruments may explain variations between studies. Therefore, the present findings suggest that

the use of structured HF-Care educational media may be useful because it combines standardized content with visual reinforcement and patient-centered explanation ([Victoria-Castro et al. \(2023\)](#); [Wang et al. \(2024\)](#))

The findings also help explain why some previous studies have reported weak or non-significant effects of educational interventions on HF self-care. Educational programs may be less effective when they are too brief, not reinforced, difficult to understand, poorly adapted to patient literacy levels, or not supported by follow-up ([Tinoco et al., 2021](#)). Patients with HF often face physical limitations, fatigue, multiple medications, comorbidities, and emotional concerns that may reduce adherence to self-care recommendations ([Uslu & Akça Sümengen, 2025](#)). In addition, limited family support and inconsistent communication with healthcare providers may weaken the effect of education ([Kleman et al., 2024](#)). Therefore, educational interventions should not only provide information, but also support motivation, confidence, family involvement, and repeated reinforcement.

This study strengthens Orem's Self-Care Deficit Nursing Theory by providing contextual evidence from Indonesian patients with heart failure. The findings support the theoretical assumption that supportive-educative nursing interventions can improve self-care agency and promote independent disease management ([Xie et al., 2025](#)). HF-Care educational media can be understood as a nursing strategy that helps bridge the gap between patients' self-care deficits and the self-care behaviors required for HF management ([Longhini et al., 2025](#)). In the Indonesian context, this is particularly relevant because patients may have varying levels of health literacy, access to educational resources, digital health

readiness, and continuity of follow-up care ([UNDP Indonesia, 2021](#)).

Cultural and social factors may also influence the effectiveness of HF-Care educational media, because HF self-care is shaped by social support, patient beliefs, health literacy, and healthcare system factors ([D'Souza et al., 2025](#)). In Indonesia, family members often play an important role in medication management, food preparation, decision-making, transportation to healthcare facilities, and decisions to seek medical care ([Susanto et al., 2022](#)). Patient beliefs about symptoms, communication styles with healthcare providers, and reliance on family caregivers may shape how self-care information is understood and applied ([Alharrasi et al., 2025](#)). Therefore, educational media that use simple language, culturally familiar examples, and practical guidance may be more acceptable and easier to apply in daily life. Involving family members during education may further strengthen adherence and support long-term self-care

HF-Care educational media also has potential value for low-resource healthcare settings, because structured HF education can support self-care, continuity of care, and patient-centered disease management ([Heidenreich et al., 2022](#)). Because the intervention uses a short-animated video, it may be adapted for repeated use in inpatient wards, discharge education, outpatient clinics, and community-based follow-up ([Arofiati et al., 2025](#)). Practical adaptations may include simplified language, offline access, smartphone-based delivery, printed summaries, family-based education, and integration into routine nursing counseling ([Son et al., 2025](#); [UNDP Indonesia, 2021](#)). These adaptations may help improve equity by allowing patients with different literacy levels, resource availability, and access to digital technology to receive standardized HF self-care education.

From a practical perspective, the findings support the integration of HF-Care educational media into nursing education and practice standards, as well as HF management programs ([Longhini et al., 2025](#)). Nurses may use the media during admission, discharge planning, and outpatient follow-up to ensure consistent delivery of key self-care messages ([Arofiati et al., 2025](#)). Healthcare institutions may also use the findings to develop standardized patient education protocols and chronic disease management pathways ([McDonagh et al., 2021](#)). At the policy level, structured educational media may support evidence-based strategies for improving patient education, reducing preventable readmissions, and strengthening continuity of care among patients with chronic cardiovascular conditions.

Although the findings are promising, several considerations should be noted. The study was conducted in a single hospital with a relatively small sample size and a short follow-up period, which may limit the generalizability and long-term interpretation of the results. Self-care was measured using a self-reported questionnaire, which may be influenced by recall bias or social desirability bias. Future studies should involve larger multicenter samples, randomized controlled designs, longer follow-up periods, and clinical outcomes such as hospital readmission, quality of life, treatment adherence, and symptom control to confirm the sustainability and broader impact of HF-Care educational media.

Implications and limitations

This study supports the use of HF-Care educational media as a supportive-educative nursing strategy to improve knowledge, self-care agency, and self-management behaviors among patients with heart failure. The findings also contribute to the application of Orem's Self-

Care Deficit Nursing Theory in the Indonesian healthcare context and support the integration of structured educational media into nursing education, discharge planning, outpatient follow-up, and chronic disease management. However, this study has several limitations, including a quasi-experimental design without randomization, purposive sampling, small sample size, and single-center setting, which may limit causal interpretation and generalizability. Although an odd-even enrollment numbering procedure was used, allocation concealment and random assignment were not applied; therefore, residual allocation bias could not be excluded. Self-care and video adherence were assessed through self-report and WhatsApp-based confirmation, which may be affected by recall and social desirability bias, and objective viewing data were not available. The two-week follow-up period was also short, and detailed clinical characteristics were not comprehensively collected. Future studies should use randomized controlled designs, larger multicenter samples, longer follow-up periods, more complete clinical data, and objective methods to monitor intervention adherence.

Relevance to Practice

HF-Care educational media may be integrated into routine nursing practice as a standardized tool to support HF self-care education. In clinical settings, nurses can use the media during admission, discharge planning, and outpatient follow-up to deliver consistent messages about medication adherence, symptom monitoring, diet, fluid restriction, physical activity, weight monitoring, and timely healthcare-seeking behavior. Healthcare institutions may include HF-Care educational media in standardized discharge education protocols and nurse training programs to ensure that nurses are

able to deliver the intervention consistently and respond to patients' questions appropriately. The media may also be used in family-centered education because family members often support medication management, food preparation, transportation, and decision-making among patients with heart failure. To improve feasibility, the educational material can be adapted according to patients' literacy levels, cultural backgrounds, language needs, and available healthcare resources, for example by using simplified explanations, local examples, offline video access, printed summaries, or smartphone-based delivery. These strategies may help strengthen continuity of care and support more equitable HF self-management across hospitals with different resource capacities.

Conclusion

HF-Care educational media may serve as an effective evidence-based nursing intervention to improve self-care among patients with heart failure. Its structured, brief, and accessible format supports patient education and may be integrated into routine nursing practice, discharge planning, and follow-up care. Future studies with larger multicenter samples, randomized controlled designs, and longer follow-up periods are recommended to confirm the sustainability, effectiveness, and broader applicability of HF-Care educational media in diverse healthcare settings.

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CrediT Authorship Contributions Statement

Irma Nur Amalia: Conceptualization, Methodology, Supervision, Writing - Original Draft

Deris Riandi: Software, Validation, Formal Analysis, Writing - Review & Editing

Putri Yudhi Ardianti: Investigation, Resources, Data Curation, Project Administration

Usan Daryaman : Writing - Original Draft, Review & Editing, Visualization

Conflicts of Interest

There is no conflict of interest.

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