



Self-Care Management Education Through Health Coaching for Heart Failure Patients



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ABSTRACT

Keywords:
health coaching
heart failure
hospital readmission
self-care
self-care management

Self-care management education is 1 of the recommendations of the European Society of Cardiology given to reduce the readmission rate of patients with heart failure (HF). As 1 of the methods of the educational approach, health coaching has a positive potential in making education effective so that it will improve patient outcomes. This study aimed to identify the effect of self-care management education with health coaching methods on the 30-day readmission rate and outcomes of patients with HF. Providing self-care management education by health coaching may help improve self-care and positively affect outcomes of patients with HF.

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Mortality and morbidity rates of patients with heart failure (HF) are increasing, which affects approximately 26 million people worldwide.¹ In developed countries such as the United States, HF has affected 6.2 million people, 9.3% of whom have died of HF.² These statistics are followed by a high rate of unplanned readmission, with a 30-day readmission rate of patients with HF of approximately 21.4%.³ No national data related to the readmission rate of patients with HF have been reported in Indonesia. At Wahidin Sudirohusodo Hospital, a representative cardiovascular disease referral center in Eastern Indonesia, HF was included in the top 10 diseases in 2018 with a total of 833 patients.⁴ In the same year, the 30-day readmission rate of patients with HF was approximately 20%, and HF was the second most reported heart disease after atherosclerosis (26.12%).⁴ Data show that the incidence and tendency of readmission are still high in Indonesia and developed countries despite medical therapy and advances in equipment used for treatment.

High readmission rates can affect the quality of life of patients with HF.⁵ Readmission increases health care spending for patients and poses inherent risks such as hospital-acquired infections that negatively affect patients.⁶ For this reason, a 30-day readmission prevention strategy should be applied to patients with HF. This 30-day readmission can be an essential indicator of the quality of health services.⁷ In other studies, 30-day readmission indicators have been associated with inadequate patient education and follow-up.⁸ Thus, the management of patients with HF should focus not only on medical care but also on behavioral change.

Previous studies have suggested that behavioral change can be possible with self-care management education,⁹ which is a potential strategy that helps individuals in decision making and self-

monitoring of health parameters by establishing health patterns to enhance knowledge, attitudes, and self-reliant healthy behaviors.¹⁰ The provision of this type of educational program has been shown to have a positive influence on the self-care behavior of patients with HF.¹¹ However, in the application of self-care management education, health practitioners in Indonesia have been more focused on the dominance of daily routines and have given high priority to curative services, such as administering medication.^{12,13} Thus, the current patient education provided for patients with HF remains insufficient, and educational methods are less effective in building independent care self-care skills in patients with HF.¹⁴ Therefore, patient education should begin at admission and continue through to hospital discharge and home care with appropriate methods.

Health coaching is 1 method of providing education and support that has the potential for advanced practice application in effective self-care management education. It refers to all contexts of interpersonal relationships with nurse coaches, including nurse practitioners (NPs), who implement a patient-centered approach. The patients set goals and use self-discovery or active learning processes combined with health education; in this way, the patient can work toward the established goals accompanied with self-monitoring behavior to improve accountability.^{15,16} Health coaching is an effective approach for NPs and nurses to improve patients' behavior by empowering them to take more control of their health care.¹⁷

Studies related to self-care management education in patients with HF have focused on self-care programs. However, in the present study, self-care management education involved health coaching accompanied with a follow-up via a home visit through

face-to-face meetings. Studies related to the readmission rate of patients with HF in Indonesia are also rare. In the present study, self-care management education was delivered when the patient was hospitalized and continued after the patient was discharged home by home visits conducted by the NPs accompanied by health coaching. Therefore, the purpose of this study was to investigate the effect of self-management education through health coaching on the 30-day readmission rate and outcomes of patients with HF.

Methods

Design

This quantitative quasi-experimental study used a pretest-posttest nonequivalent group design to test a self-management educational intervention with the use of health coaching compared with standard (usual) care in patients with HF. The study was conducted between October 2019 and February 2020 and was preapproved by the Medical Research Ethics Commission of the Faculty of Medicine, Hasanuddin University, Makassar, Indonesia. Informed consent was obtained from all the participants involved in this study after the objectives, procedures, benefits, risk estimates, the confidentiality of measurement results, and the right to withdraw from the study were explained.

Setting

Indonesia has a population of more than 240 million and adheres to a tiered referral health care system that ranges from primary (community health centers) to advanced (regional, provincial, tertiary, and specialist hospitals) health facilities.¹⁸ Patients requiring specialized or subspecialty services (such as acute HF management) are referred to a hospital that is considered capable of handling their condition.¹⁸ One of them is Wahidin Sudirohusodo Hospital, which is located in Makassar, Indonesia, the setting used for this study. This setting is a referral center in Eastern Indonesia with a bed capacity of 900 beds, of which 202 beds are allocated for cardiovascular patients.⁴ Regarding the HF program, based on observations, the standard care for patients with HF is primarily focused on curative efforts. However, health promotion, education, and a rehabilitative program are necessary components of care for patients with HF that should be included.

Sample

A probability sampling technique was used (simple random sampling based on the medical record numbers of eligible participants). Specifically, eligible patients admitted to the fourth floor of the hospital with odd-numbered medical records were assigned to the control group. By contrast, the intervention group was composed of eligible patients admitted on the fifth floor with even-numbered medical records. The nursing and ancillary staff on these 2 floors were different, which helped minimize contamination of the intervention effects.

The inclusion criteria were as follows: adults aged ≥ 18 years diagnosed with HF who received inpatient care and were categorized as New York Heart Association (NYHA) II to III functional class, could speak and read Indonesian, lived in 1 of 3 geographic areas (Makassar City, Gowa, or Maros Regency), and consented to participate in the study.

The exclusion criteria were as follows: participants undergoing invasive and noninvasive intervention procedures to treat and correct structural disorders of the heart (such as cardiac resynchronization therapy, coronary artery bypass graft, and valvular heart replacement), uncooperative participants, those with significant

cognitive impairment and a comorbid diagnosis of malignancy or stroke, those undergoing regular hemodialysis, and those with bilateral vision or hearing loss.

The dropout criteria were as follows: participants who died, withdrew consent during the research study, moved out of the 3 geographic areas (Makassar City, Gowa, and Maros Regency), had an inpatient stay of ≥ 14 days, or did not complete the program.

In total, 46 participants were recruited and enrolled based on the inclusion and exclusion criteria with the following sample allocation: 23 participants in the control group and 23 participants in the intervention group. The sample size was calculated using the following power analysis formula, and referring to the previous study.¹⁹ For the analysis of variance, the level of significant value was set to 5% (0.05) with the power interest value set by the researcher at 80. The Figure illustrates detailed information about eligibility, enrollment, and dropout of the participants.

Outcomes and Instruments

The primary outcome was the 30-day readmission rate defined as participants being readmitted for any reason (progression of illness, comorbidity, or nonadherence of self-care) within 30 days after hospital discharge for the index HF hospitalization. The secondary outcomes were self-care maintenance, self-care management, and self-care confidence as measured by the Self-Care of Heart Failure Index (SCHFI) questionnaire Version 6.2,²⁰ body weight (BW), and blood pressure. The SCHFI questionnaire was adapted into Indonesian and retested,²¹ with a reliability value of 0.746. A total of 22 items were provided in the questionnaire: 10 items in the dimension of self-care maintenance, 6 items in the dimensions of self-care management, and 6 items in self-care confidence. A Likert scale (eg, “1” for “never or rarely” and “4” for “always or daily”) was used for existing items, with lower scores indicating less adequate self-care. Based on scoring guidelines for the SCHFI, adequate self-care is determined by having an acquisition score of ≥ 70 and inadequate self-care when the score is 0 to 69.

BW in kilograms was measured with a digital weighing scale (HBF-251, Omron). The level of accuracy in measuring weight using this tool was BW = 2.0 to 67.5 kg: ± 100 g, BW = 67.5 to 100.0 kg: ± 150 g, and BW = 100.0 to 135.0 kg: ± 300 g. This tool was calibrated with 619/MET-TK/III/2019 by the Makassar Metrology Unit.

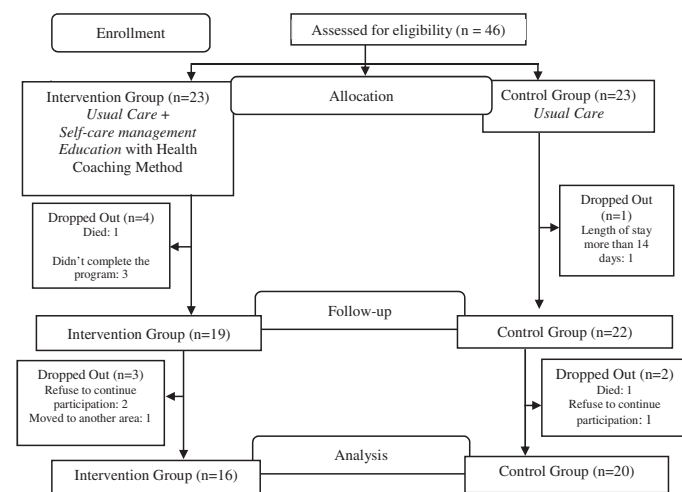


Figure. Participant recruitment.

An Omron digital sphygmomanometer (HBP-1300-AP) was used to obtain systolic blood pressure (SBP) and diastolic blood pressure (DBP). This tool was calibrated with testing registration no. 22.143.19.40009 in 2019 by the Health Facilities Safety Board, Makassar, Indonesia.

Intervention

Control Group

The control group received standard care. Each participant received routine education by medical staff (doctors, nurses, dietitians, and pharmacists) with a brief discussion recorded in integrated education sheets (5–10 minutes each). In addition, each participant also received hospital leaflets regarding the introduction to HF and a healthy diet for a patient with HF.

Intervention Group

In addition to standard care, participants in the intervention group received a self-care management education intervention via the following: health coaching, use of a self-management HF booklet and a logbook, and 2 follow-up home visits. The self-management of patients with an HF patient education booklet included information about self-care maintenance (basic education of HF and diet), self-care monitoring (symptom recognition and fluid monitoring), and self-care management of HF. This booklet was created by the authors using language easily understood by participants with low education levels (elementary level).

Procedures

Before the education program started, the self-care level (as measured by the SCHFI), SBP, DBP, and BW assessments were assessed for participants in both groups. The participants in the intervention group were given an individual self-care management education session involving the health coaching method by a trained nurse, in this case the primary researcher. The primary researcher is an NP in the cardiology field and received mentoring from a licensed health coach as part of a health coaching program. Health coaching is a skill. Therefore, NPs interested in this role should be trained by coaches from a licensed coaching organization. These programs provide coaching knowledge and skills, which focus on building relationships and trust, being an active listener, and using effective communication techniques in a patient-centered process.

The provision of self-care management education for participants in the intervention group was performed in 2 sessions. The first session was conducted while the participants were being treated at the hospital. These individualized health coaching meetings did not interfere with the wards or the participants' activities, and they were held between 10:00 to 11:00 AM and 04:00 to 05:00 PM at the bedside of each participant.

At the first meeting, after providing informed consent, participants were given a self-management education booklet. On the next day, the NP met with the participant to explore the needs of each participant by using an "Ask-Tell-Ask" technique as part of the health coaching method and provided education based on the needs of participants by applying teach-back techniques. When the participants forgot or misinterpreted the information/skills that were provided, the NP used simple language to explain the recommendations again until an understanding was reached.²²

Before shifting to outpatient care, the NP assisted participants with making an action plan related to independent care that could be implemented at home that was based on the chosen educational needs. Topics included basic knowledge of HF, healthy diet, symptom recognition, and control self-management of HF including

management of fluid balance and medication management. Participants were also given a logbook regarding the application of self-care. In the logbook, participants recorded information related to self-care including daily medication, daily fluid intake, physical activity, BW, healthy diet, or other supporting activities (blood pressure or blood sugar). The logbook was based on the choice of the participant's needs. Afterward, the second (outpatient) session included the NP visiting the participants' homes to follow up with participants who received the coaching method. The follow-up visit started on day 15 after discharge. This session focused on identifying the progress in implementing the action plan, determining how a patient's condition developed after hospitalization, finding solutions to unmet needs, and anticipating obstacles from the prepared plans moving forward. After 30 days, a second follow-up visit was performed by evaluating the participant's self-care and condition. In each follow-up, SBP, DBP, and BW were measured. The details of the education program and conceptual framework are presented in the [supplementary materials](#).

Analysis

Participant characteristics were described in percentages and means, and tests on the homogeneity of variance were also performed. Quantitative data were analyzed with the Mann-Whitney *U* test and paired *t* test. All statistical tests had a significance value of 95%, and $P < .05$ was considered significant.

Results

Characteristics of the Participants

Of the 46 participants recruited in this study, 36 were analyzed, equating to a participation rate of 78.26% for the whole study (69.5% for the intervention group and 87% for the control group). Two thirds of the participants were males ($n = 24$, 66.67%), with an average age of 52.75 ± 12.96 years in the intervention group and 59.45 ± 13.34 years in the control group. Most of the participants had a functional NYHA class of III ($n = 33$, 91.67%), with an average left ventricular ejection fraction of $37.95\% \pm 16.25\%$ in the control group and $35.00\% \pm 16.67\%$ in the intervention group. The average SBP in the intervention and control groups was 130.31 ± 31.35 and 128.15 ± 21.91 mm Hg, respectively. The etiology of HF in both treatment groups was dominated by coronary artery disease ($n = 16$, 44.44%), with the proportion of participants having readmission before ($n = 26$, 72.2%).

No significant differences were found in the characteristics of the 2 groups when compared by all components using the test of the homogeneity of variance ($P > .05$). In other words, the characteristics of the 2 groups were the same at baseline ([Table 1](#)).

30-Day Readmission Rate

The 30-day readmission rate for any cause in the control group was higher (6/20 who completed follow-up, 30%) than that in the intervention group (1/16 who completed follow-up, 6.3%). However, the 30-day readmission rate between the control and intervention groups showed no statistically significant difference ($P = .078$). In addition, the risk estimate of the occurrence of readmissions in both groups was assessed. The results showed that the readmission rate of the participants in the control group (relative risk = 1.776; 95% confidence interval, 1.19–3.21) was greater than that of the participants in the intervention group (relative risk = 0.276; 95% confidence interval, 0.40–1.59; [Table 2](#)).

[Table 3](#) describes that 30-day readmissions in both groups were caused by HF ($n = 4$, 57.14%) and the accompanying comorbid

Table 1
Characteristics of the Participants (N = 36)

Characteristics	Intervention (n = 16) n (%)	Control (n = 20) n (%)	P Value ^a
Sex			
Male	12 (75)	12 (60)	.357
Female	4 (25)	8 (40)	
Age (mean ± SD)	52.75 ± 12.96	59.45 ± 13.34	.963
Level education			.241
Elementary	5 (31.3)	4 (20)	
High school	6 (37.5)	13 (65)	
Academic degree	5 (31.3)	3 (15)	
Work			
Employed	12 (75.0)	12 (60)	.624
Unemployed	4 (25.0)	8 (40)	
Functional class NYHA			.433
NYHA II	2 (12.5)	1 (5)	
NYHA III	14 (87.5)	19 (95)	
LVEF (%) (mean ± SD)	35.00 ± 16.67	37.95 ± 16.25	.795
SBP (mm Hg) (mean ± SD)	130.31 ± 31.35	128.15 ± 21.91	.422
DBP (mm Hg) (mean ± SD)	81.38 ± 18.38	82.25 ± 13.52	.334
Heart rate (times/min) (mean ± SD)	86.94 ± 20.34	82.30 ± 21.93	.689
Etiology			.585
CAD	4 (31.6)	12 (60)	
HHD	5 (26.3)	3 (15)	
Valvular heart disease	7 (42.1)	5 (25)	
Comorbidity			.088
With comorbidity	11 (68.8)	10 (50)	
Without comorbidity	5 (31.3)	10 (50)	
Readmission history			.883
Never	3 (18.8)	7 (35)	
1-3 times	6 (37.5)	8 (40)	
> 3 times	7 (43.8)	5 (25)	
BMI (kg/m ²) (mean ± SD)	24.17 ± 4.53	24.89 ± 5.42	.933
BW (kg) (mean ± SD)	62.76 ± 13.29	60.28 ± 14.30	.538
Pharmacotherapy			
RAAS blockers	8 (50.0)	13 (65)	.415
Beta-blockers	5 (31.3)	9 (45)	.230
Diuretic	16 (100)	19 (95)	.379
Statin	6 (37.5)	8 (40)	.883
Nitrate	5 (31.3)	10 (50)	.082

BMI = body mass index; BW = body weight; CAD = coronary artery disease; DBP = diastolic blood pressure; HHD = hypertensive heart disease; NYHA = New York Heart Association; RAAS = renin-angiotensin-aldosterone system; SBP = systolic blood pressure; SD = standard deviation.

^a P value is the difference between the control and intervention group from *t* test and chi-square test. A value of *P* < .05 indicated statistical significance.

factors (n = 3, 42.86%). In addition, readmission date ranges in the 2 groups were calculated (number of days since the day of hospital discharge) with a median value of 14 days. Five participants were

readmitted on days 14 to 30 (n = 5, 13.88%), whereas less than 5 were readmitted in less than 14 days (n = 2, 5.55%). Table 3 also shows the vital signs of participants who were readmitted. The

Table 2
Primary and Secondary Outcomes

Variables	Group	Time		P Value
		Baseline	30 days	
30 days readmission rate, n (%), RR (95% CI)	Intervention		1 (6.30)	.078 ^a
	Control	0.276 (0.40-1.59)	6 (30.0)	
			1.776 (1.19-3.21)	
Self-care, mean ± SD				
Self-care maintenance	Intervention	37.28 ± 14.91	57.70 ± 19.68	.008 ^b
	Control	41.32 ± 12.44	42.32 ± 12.28	.627 ^b
Self-care management	Intervention	52.81 ± 22.43	76.56 ± 11.21	.001 ^b
	Control	56.50 ± 19.13	57.75 ± 21.18	.786 ^a
Self-care confidence	Intervention	64.28 ± 20.40	77.49 ± 17.78	.059 ^b
	Control	66.44 ± 20.84	69.77 ± 17.15	.374 ^b
Patient outcome, mean ± SD				
SBP	Intervention	130.31 ± 31.35	115.68 ± 19.80	0.017 ^b
	Control	128.15 ± 21.91	119.70 ± 18.08	0.039 ^b
DBP	Intervention	81.38 ± 18.38	73.69 ± 13.35	0.046 ^b
	Control	82.25 ± 13.52	76.35 ± 14.00	0.043 ^b
BW	Intervention	62.76 ± 13.29	61.21 ± 11.83	0.026 ^b
	Control	60.28 ± 14.30	60.47 ± 13.91	.705 ^b

BW = body weight; CI = confidence interval; DBP = diastolic blood pressure; SBP = systolic blood pressure; RR = relative risk; SD = standard deviation.

^a Mann-Whitney *U* test.

^b Paired *t* test.

Table 3
Participants Who Experienced Readmission Within 30 Days

Group	Respondent Number	Readmission Diagnosis	Readmission (days)	SBP (mm Hg)	DBP (mm Hg)	HR (times/min)	Respiratory Rate (times/min)	BW (kg)	LVEF (%)	Etiology of HF	Readmission History	NYHA	Readmission Related to HF	n (%)	Readmission Related to Comorbidity	
Intervention	27	Xerosis Cutis	14	120	80	72	20	51.00	22.00	CAD	> 3 times	III	4	4 (57.14)	3 (42.86)	
Control	2	CAP	14	90	60	100	26	55.30	17.00	CAD	> 3 times	III				
	4	DVT	29	107	87	68	22	68.44	20.10	CAD	3 times	III				
	7	HF	20	123	83	83	25	70.80	26.80	HHD	3 times	III				
	16	HF	20	90	60	80	30	48.00	37.40	VHD	> 3 times	III				
	19	HF	6	80	60	120	28	46.20	67.30	VHD	3 times	III				
	23	HF	8	140	90	125	26	62.50	55.00	VHD	3 times	III				
			Mean ± SD	15.86 ± 7.88	107.14 ± 74.29	92.57 ± 74.29	25.29 ± 3.40	57.46 ± 9.88	35.08 ± 19.28							
			Median	14.00	21.68	13.72	22.86									

BW = body weight; CAD = coronary artery disease; CAP = community-acquired pneumonia; DVT = deep vein thrombosis; HF = heart failure; HHD = hypertensive heart disease; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association; VHD = valvular heart disease.

mean left ventricular ejection fraction was 35.08% ± 19.28%. All the readmitted participants were categorized as NYHA III functional class at admission and had a history of repeated readmissions of ≥ 3 times; their BW was 57.46 ± 9.88 kg.

Self-Care

Table 2 presents the effect of our self-care management education intervention with health coaching methods on patient self-care. Self-care maintenance and self-care management in the intervention group significantly differed after treatment (P = .008 and P = .001, respectively). Self-care maintenance included efforts to monitor the symptoms by weighing and checking the swelling in the legs and the participants' adherence with care/treatment (eg, dietary salt restriction, physical activity, and taking medication). Self-care management includes recognizing symptoms and making efforts to reduce symptoms (eg, reducing salt in the diet, limiting fluid intake, and taking extra diuretics). No significant difference was observed in the self-care confidence of the 2 groups before and after treatment (P = .059). Self-care confidence covers trust in factors that can motivate a participant to avoid the symptoms of HF, follow medication instructions, have the confidence to evaluate the importance of signs, recognize changes that occur, determine how well a medication works, and whether the individual has faith in reducing the symptoms of HF.

Blood Pressure and BW

Table 2 shows the measured blood pressure of the participants (SBP and DBP) and BW. The results showed that SBP and DBP significantly differed before and after treatment in the control (P = .039 and P = .043, respectively) and intervention groups (P = .017 and P = .048, respectively). In the first follow-up, the SBP of the participants in the intervention group decreased, and the mean difference at the baseline was 12.97 mm Hg (from 130.31 to 117.37 mm Hg). After the second follow-up (30 days), their SBP decreased with a mean difference of 14.63 mm Hg (from 130.31 to 115.68 mm Hg). After 30 days, the SBP of the participants in the control group decreased with a mean difference of 8.45 mm Hg (from 128.15 to 119.70 mm Hg). The BW of the participants in the intervention group significantly differed from that of the control group (P = .026). During the first follow-up, the intervention group had a loss of BW of 0.93 kg. After the next follow-up, the BW decreased by 0.62 kg. After 30 days, the weight of the participants in the control group increased by 0.19 kg compared with that in the intervention group.

Discussion

The provision of self-care management education with the health coaching method in the intervention group did not yield statistically significant results in influencing the 30-day readmission rate for any cause compared with that in the control group. This difference might be due to the small sample size in our study. Although our relatively small study did not show a difference in 30-day readmission for any cause, other studies have demonstrated a significant difference. Previous studies have reported that combination education and any human factor such as dietary management and interpersonal relationship were effective strategies in reducing readmission of HF patients.²³ Other studies have found that providing self-care management education by nurses can positively reduce the readmission of patients with HF regardless of the intervention method used (eg, telephone coaching or face-to-face meeting).²⁴ Patients directed to follow a self-management program for HF can significantly reduce their 30-day readmission

rate.²⁵ A combination of several methods/programs has been shown in other studies to reduce readmissions.²⁶ In addition, a meta-analysis investigated that improved medication adherence at a routine follow-up was an important component of an HF self-care program because it also contributed significantly to reducing readmissions.²⁷ Thus, the effectiveness of interventions involving self-management education depends on its combination with other methods (eg, health coaching) that can enable individual participation.

Health coaching has been shown to benefit not only the management of chronic diseases, such as HF, but also the physiological, psychological, and behavioral aspects of patient care.²⁸ With the coaching process, NPs can assist patients to identify barriers to behavior change, determine health-related goals, and compose realistic plans for achieving these goals by listening, asking open-ended questions, and providing support and accommodating feedback.²⁸ Health coaching can be an effective educational method that health professionals can use to motivate and improve the capacity of patients to change lifestyles and support independent patient care at home.²⁹

In our study, self-management education and health coaching were combined with a follow-up home visit to improve patient self-care. The teaching focused on enhancing personal knowledge, behavior, and skills. Several factors that determine the success of self-care management include having a protocol for self-care education and assessments during patient follow-up after a patient is discharged from a hospital.³⁰ In addition, self-management recommendations such as understanding of medication, self-monitoring of signs and symptoms, flexible diuretic regimen, exercise/rest, and psychosocial aspects can reduce the rate of readmissions.²³ Therefore, based on results from our study, consistent with the literature, providing a more structured self-care education accompanied with health coaching methods and follow-up appears to develop better skills for patients regarding self-management to control their symptoms.

In this study, we found that self-care maintenance and self-care management changed significantly, although self-care confidence did not. Previous studies explained that self-care maintenance and management were strongly influenced by knowledge about HF, social support, and the presence or absence of depressive symptoms.^{31,32} These results showed that the self-care process was fulfilled by developing appropriate education and providing an opportunity for patients to make consistent decisions about HF self-care, so effective self-care was realized while the effect of self-care confidence was not significant.

Self-care confidence in patients with HF is strongly influenced by the values adopted.³² Further investigation needs to explore the self-confidence aspect of self-care related to the values adopted to mediate self-care improvement adequately.

Significant differences in SBP and DBP changes were observed in the control and intervention groups after the treatment. It is plausible that blood pressure changes were related to the doses and titration of the HF medications as prescribed. It is also plausible that standard hospital education and the provision of self-care education with health coaching had a positive effect on medication adherence (as a part of self-care maintenance), potentially influencing blood pressure. Further research is needed to understand the relationship of self-care and blood pressure in patients with HF.

Related to fluid management, BW is an indicator of fluid balance. A reduction in excess body fluid due to congestion often decreases symptoms of dyspnea, ascites, or peripheral edema. In this study, the BW of the participants in the intervention group significantly differed from that of the control group after treatment. It is unknown whether this difference was related to the patient's medication regimen or adherence to medications (including diuretics) and dietary restrictions.

Consistent with our findings, previous results showed that providing education can significantly improve the self-care of patients with HF compared with that of standard care.³³ An understanding of self-care practices becomes an essential aspect of improving health care.^{34,35} Likewise, the provision of inappropriate education methods usually does not have the desired effect, so a structured education and follow-up should be provided. The understanding of information and the actualization of actions can be performed through an educational approach. One of them is health coaching.

Our study revealed that readmissions for any cause in the 7 participants readmitted occurred within a median of 14 days after the previous hospitalization, with 2 of the 4 participants being readmitted on days 6 and 8. Previous results have revealed similar findings (ie, the median values of 30-day readmission of patients with HF were 11 days³⁶ and 12 days^{3,37}). Another study reported that the median time of readmission within 30 days compared with other diagnoses is 15 days (67.5% in patients with HF).³⁷ In 2015, the European Society of Cardiology (ESC) recommended that follow-up home visits should be given to patients with HF 7 to 10 days after hospitalization.³⁸ Thus, our findings along with the literature and the ESC recommendations indicate that follow-up after discharge should be conducted within the first 2 weeks of hospital discharge.

The intensity of follow-up is 1 of the factors that determine the effectiveness of self-care management education for patients with HF.³⁹ A follow-up conducted through face-to-face coaching allowed coaches to interpret a patient's nonverbal communication more easily. In addition, NPs could motivate the patients by nonverbal gestures to ensure an adequate interaction occurs and increase patients' initiative in performing self-care based on their own needs. Our study provided an alternative for NPs or other nurses—health coaching to communicate and educate patients so that patients could determine their own goals and behaviors that they wanted to change. Health coaching is an effective educational medium for disease management and promotes changes in lifestyle behavior and self-efficacy through motivation and willingness.²⁸ Patients' self-care behavior significantly increases through the coaching process as indicated by increased patient adherence in weighing, undergoing physical activities, having a low-salt diet, and restricting fluid intake.⁴⁰

Limitations

Some participants dropped out, more so from the intervention group, which affected the number of participants analyzed. We did not assess the reasons for withdrawal. We also did not collect data related to medication regimens, including doses and adherence. However, a strength of this study is our ability to improve self-care maintenance and self-care management for participants in the intervention group. More research is needed with a larger sample to determine the effect of our intervention to reduce readmission.

Conclusion and Recommendation

The findings from our study revealed that providing NP-delivered self-care management education with the health coaching method increased self-care maintenance and self-care management in a relatively small sample of adults hospitalized for HF. Although our intervention did not significantly reduce the 30-day readmission rate for all causes, we found that the median time of readmission for those readmitted was 14 days. Our findings, consistent with ESC guideline recommendations for patients with HF, suggest that patient follow-up should be scheduled during the first 7 to 10 days posthospitalization to potentially reduce readmission. Further testing is needed in a larger sample to recommend broadscale implementation of the intervention. The next study

needs to explore the self-care confidence aspect related to the values adopted to mediate self-care improvement adequately. Moreover, in-depth investigations need to be performed to determine the effect of the medication regimen and medication adherence in reducing readmission associated with patient self-care.

Acknowledgments

The authors appreciate the substantial contributions from patients participating in this study.

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In compliance with standard ethical guidelines, the authors report no relationships with business or industry that would pose a conflict of interest.