Research article

Heart failure self-care, factors influencing self-care and the relationship with health-related quality of life: A cross-sectional observational study

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A B S T R A C T

Background: Self-care helps maintain health, prevents complications and improves the quality of life of patients living with heart failure (HF). Self-care is critical to HF management but has received limited attention in Nepal. Identification of the sociodemographic and clinical characteristics associated with self-care is crucial to tailoring appropriate self-care programs to improve health outcomes including patients' quality of life.
Aims: The aims of this study were to describe self-care including the factors influencing self-care and the relationship between self-care and health-related quality of life in patients living with HF in Kathmandu, Nepal.
Methods: We used a cross-sectional observational study design to measure self-care maintenance, self-care management, and self-care confidence using the Nepali Self-Care of Heart Failure Index. To analyze data, we used descriptive statistics, bivariate associations and regression modeling.
Results: We recruited 221 patients with HF: mean age 57.5 ± 15.76 years, 62% male. The results in this sample indicated poor self-care maintenance (38.5 ± 11.56), management (45.7 ± 15.14), and confidence (40.9 ± 16.31). Patients with higher education were associated with higher self-care maintenance and management. Living alone and a better New York Heart Association functional classification for HF were related to higher self-care confidence. Higher social support was associated with better self-care. Self-care confidence was an independent predictor of self-care maintenance, management and health-related quality of life on adjusted analyses.
Conclusion: Self-care was limited among patients living with HF in Nepal yet was associated with better quality of life. The study identified various sociodemographic and clinical factors related to self-care, which could be crucial while developing self-care interventions.

1. Introduction

Heart Failure (HF) is a chronic, progressive condition associated with significant morbidity, mortality, and health care expenditures [1, 2]. HF is considered a final common pathway for many cardiovascular diseases [3] and the burden of HF is increasing in low- and middle-income countries [4], including Nepal. Although national data on HF in Nepal is undocumented [5], globally, 26 million people are living with HF, with the prevalence of HF in Asian countries being approximately 1.26%–6.7% [6]. In neighboring countries, China and India, it is estimated that there are 4.2 million and up to 23 million people with HF, respectively [2]. The percentage of patients admitted to hospitals with HF who die within 1 year of admission is 17–45% [6].

The prevalence and associated toll of HF are expected to increase in Nepal with a shift of disease burden from communicable disease to non-communicable disease [7], the aging of the population, increasing life expectancy [8], and a higher prevalence of cardiovascular diseases (one of the leading causes of death in Nepal) [9]. A search of the literature on HF in Nepal generated only a handful of studies that were limited to clinical patient profiles, causes of HF, and HF medication use [10, 11, 12, 13]. Hence, there is a need for studies to increase our knowledge of HF and improve the management of HF in Nepal.

The diagnosis of HF is associated with higher healthcare utilization and decreased quality of life (QoL) for patients and their family members [14]. Further, the lengthy and frequent hospital admissions required by patients with HF are associated with placing a higher economic burden on individuals and society. Though the burden of HF is high, effective management with high-level patient self-care has been demonstrated to improve HF quality of care and disease outcomes [15, 17, 18]. The goal of HF self-care is to help maintain and manage HF symptoms, prevent

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avoidable complications, and improve disease outcomes [16]. Studies have found that self-care of HF can reduce re-hospitalization, healthcare costs, and mortality and improve health-related QoL (HRQOL) [17, 18, 19]. Hence, the concept of self-care is supported internationally in evidence-based practice guidelines and there is an increasing body of work being undertaken to develop this concept in clinical practice [15].

Riegel and colleagues define self-care in HF as a naturalistic decision-making process that influences the actions that maintain physiologic stability (maintenance), facilitate the perception of symptoms (symptom perception) and the response to symptoms (management) when they occur [16]. Confidence in the ability to perform self-care can improve both self-care maintenance and management. A recent review on factors affecting self-care has demonstrated that self-care can be influenced by various sociodemographic and clinical characteristics related to the person (e.g., age, sex, education, ethnicity, self-efficacy), the problem (e.g., comorbidity, severity of HF, New York Heart Association [NYHA] functional classification), and environment (e.g., location, social support) [20].

Despite the importance of self-care strategies in HF disease management, no studies have examined self-care and influencing factors in patients living with HF in Nepal. Further, the relationship between self-care and HRQOL specific to the Nepali population is unknown. Having information on the sociodemographic and clinical factors influencing self-care and the relationship between self-care and HRQOL may be useful to develop, tailor and target appropriate self-care strategies for patients living with HF in Nepal. We have provided a commentary on the epidemiology and profile of HF in Nepal, which identifies inadequate self-care among most of the participants and recommends a study exploring factors influencing self-care [5]. This study seeks to describe the context of self-care, examine sociodemographic and clinical factors affecting self-care, and to explore the relationship between self-care and HRQOL.

2. Methods

2.1. Study design

The present observational, cross-sectional study was conducted and reported following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [21].

2.2. Sample, setting, and sample size

The target population of the study was hospitalized HF patients with a verified diagnosis of HF at one of the three leading hospitals providing cardiovascular services in Kathmandu, Nepal: Shahid Gangalal National Heart Centre, Manmohan Cardiothoracic Vascular and Transplant Center, and the Norvic International Hospital. The following prospective, consecutive patients were included in the study: (a) confirmed diagnosis of HF at least 1 month before hospitalization, (b) could understand and speak Nepali, (c) had no documentation of dementia or cognitive impairment, and (d) provided informed consent. Power analysis indicated that about 110 participants would be needed to study six independent variables in a multiple linear regression model with 80% power and alpha of 0.05 [22].

2.3. Measures/instruments

2.3.1. Heart failure self-care

HF self-care was assessed using the Nepali Self-Care of Heart Failure Index (SCHFI) version 6.2, a valid and culturally reliable instrument with 22 items [23]. The scale consists of three subscales: self-care maintenance, self-care management, and self-care confidence. Following the scoring guidelines, scores on each of the SCHFI scales were standardized to 100; higher scores indicated higher self-care [23]. A score <70 on each SCHFI subscale was considered inadequate self-care [23]. The Cronbach's

alpha of the original English version of the SCHFI subscales were: maintenance 0.55, management 0.65, and confidence 0.86 [23]. In this sample, the composite reliability coefficient for subscales were: maintenance 0.6, management 0.7, and confidence 0.8. The instrument demonstrated adequate validity and reliability.

2.3.2. Heart failure snapshot

Data collection was based on a two-page clinical report form used as part of the New South Wales HF Snapshot Study [24]. The form included patients' data on sociodemographic and clinical characteristics including past medical history, NYHA functional classification, severity of left ventricular ejection fraction (LVEF) as determined by echocardiography, and medical management based on the evidence-based guidelines [25]. The form was modified to consider social and cultural differences. Sociodemographic data included age, sex, education, ethnicity, marital status, living alone, residential location, employment, and disease diagnosis time (in months).

2.3.3. Comorbidity

We assessed comorbidities using the Charlson Comorbidity Index (CCI) [26]. Sixteen diseases were included in this index with different weights: 1, 2, 3 or 6. For calculation of the CCI, all items of the comorbidity scores were added; higher scores indicated higher comorbidity. All participants in this study received score 1 for a confirmed diagnosis of HF and 0 for no documentation of dementia based on the eligibility criteria.

2.3.4. Social support

We used the ENRICHD Social Support Inventory (ESSI) to measure social support [27]. The ESSI was developed for the ENRICHD trial with 7 items related to structural (partner), instrumental (tangible help), and emotional (caring) support. The response categories ranged from 1 (none of the time) to 5 (all of the time); item 7 (living with spouse) scored 4 for 'yes' and 2 for 'no'. The scores in ESSI were summed and ranged from 8 to 34; a higher score indicated greater social support. The Cronbach's alpha of ESSI was 0.88.

2.3.5. Heart failure knowledge

To measure HF disease knowledge, we selected 5 items from the Dutch Heart Failure Knowledge Scale [28] with the help of a panel of three cardiovascular nurses and researchers. The panel reviewed all 15 items of the scale based on the importance of items and cultural relevance. The final selected items were: 4 (which statement is true regarding medication adherence), 5 (best thing to do in case of increased shortness of breath or swollen legs), 6 (cause of rapid worsening of HF symptoms), 7 (meaning of HF), and 12 (which statement is true regarding exercise). The right answer in each item was scored 1 and a wrong answer was scored 0. The scores ranged from 0-5; a higher score indicated better knowledge.

2.3.6. Health-related quality of life

The HRQOL was measured using the Nepali version of the Visual Analytic Scale [29], a vertically calibrated scale that allows respondents to rate their overall health status on a scale ranging from 0 (worst) to 100 (best) imaginable. This scale demonstrated adequate validity and reliability among Nepali populations in previous study [29].

2.4. Data collection procedures

The data for the present study were collected from patient interviews and medical records by nurses experienced in working with HF patients; the nurses were identified with help from collaborators at each data collection site. The translators and data collectors were bilingual and fluent in both Nepali and English. Further, data collectors were trained and evaluated by observing and reviewing the patients' interviews and medical data abstraction. The measures in the English language were

translated into the Nepali language. During the translation process, some items were deleted or added to account for cultural differences.

The investigation conforms to the principles outlined in the Declaration of Helsinki (Br Med J 1964; ii:177). Ethics approval was obtained from the Johns Hopkins Medicine Institutional Review Board, the Nepal Health Research Council, and the Shahid Gangalal Institutional Review Board. After the ethical approval, final administrative approval to collect data was obtained from the hospital directors.

2.5. Statistical analysis

Data analyses included descriptive statistics, bivariate analyses and regression modeling. All analyses were performed using Stata v.14. Continuous data were reported as means and standard deviations or median and interquartile range (IQR); categorical data were reported as frequencies and percentages. Bivariate analyses were conducted using correlation tests for continuous variables and chi-square or Fisher's exact tests for categorical variables. Linear regression was used to identify predictors of self-care (maintenance, management, and confidence) and to explore the relationship between self-care and HRQOL. The rate of missing data was less than 2% across variables; hence, the list-wise deletion method was used to handle missing data.

At first, unadjusted simple linear regression analyses were conducted between sample characteristics and self-care. Since the social support scale was also included in the model, marital status was removed from the adjusted model. The employment status, location, diagnosis time and severity of ejection fraction were also removed from the final adjusted model in light of the bivariate analyses, the Situation-Specific Theory [16], the findings from recent reviews on factors influencing self-care [20, 30], and sample size. We conducted simple linear regression and multiple linear regression analyses to analyze the relationship between self-care and HRQOL; the final adjusted model was controlled for age, sex and NYHA class based on the literature [19]. Statistical significance was set at $p < 0.05$.

3. Results

3.1. Sample characteristics

Table 1 displays the following sample characteristics of 221 patients living with HF: mean age was 57.5 ± 15.76 years, the majority were male (62%), married (83%), unemployed (65%), ethnically Brahmin (25%); at discharge the patients were predominantly NYHA class II (65%); and most of the participants had informal education (45%). The majority of the participants had severe (46%) or moderate (43%) LVEF as evidenced by echo report. Ischemic heart disease (42%), diabetes mellitus (30%), and rheumatic heart disease (24%) were the most common comorbidities. The median (IQR) time since HF diagnosis was 8 (27) months. The mean Charlson Comorbidity Index score was 2.6 ± 1.49, the ENRICHD Social Support Inventory score was 24.3 ± 4.46 and HF knowledge was 2.8 ± 1.16. The mean HRQOL as measured by the visual analytic scale was 56.9 ± 19.76.

Overall, HF self-care was poor with mean scores below the established cutoff for adequate self-care scores—a standardized score of 70 on each subscale of the SCHFI scores. The mean scores on SCHFI subscales were self-care maintenance 38.5 ± 11.56, self-care management 45.7 ± 15.14, and self-care confidence 40.9 ± 16.31.

3.2. Self-care maintenance, management and confidence

Table 2 summarizes the descriptive statistics of individual items on the self-care maintenance, management, and confidence scales. The majority of the participants never, rarely or sometimes monitored their weight, checked ankle swelling, tried to avoid getting sick, performed physical activity, exercised for 30 min, asked for a low-salt diet when eating out or visiting friends/relatives, or used a system to remember

Table 1. Sample characteristics (N = 221).

Characteristics	Frequency (%) or Mean ± SD
Sociodemographic profile	
Age (in years)	57.5 ± 15.76
Male	136 (61.8)
Married	184 (83.3)
Employed	77 (35.0)
Education	
Illiterate	65 (29.6)
Informal (can read and write)	100 (45.4)
Higher secondary or less (≤12 grade)	44 (20.0)
More than higher secondary (>12 grade)	11 (5.0)
Ethnicity	
Brahmin	54 (24.8)
Chhetri	47 (21.6)
Newar	29 (13.3)
Mongolian	45 (20.6)
Other	43 (19.7)
Live alone	10 (4.5)
Geographical location (Municipality/City)	142 (64.8)
Diagnosis time (in months)	Median (*IQR) = 8 (27)
Past history	
Ischemic heart disease	92 (41.6)
Diabetes mellitus	66 (30)
Rheumatic heart disease	54 (24.4)
Chronic renal failure	19 (8.6)
Comorbidity	2.6 ± 1.49
Ejection fraction	
Normal (≥50%)	5 (2.3)
Mild (40-49%)	19 (8.7)
Moderate (31-39%)	95 (43.4)
Severe (≤30%)	100 (45.7)
Functional status	
NYHA class (at discharge)	
I	19 (8.8)
II	141 (65.0)
III	51 (23.5)
IV	6 (2.8)
Social support	24.3 ± 4.46
Heart failure knowledge	2.8 ± 1.16
Health-related quality of life	56.9 ± 19.76
Self-care maintenance	38.5 ± 11.56
Self-care management	45.7 ± 15.14
Self-care confidence	40.9 ± 16.31

*IQR = Interquartile Range.

medications. Participants sometimes or frequently kept doctor/nurse appointments and ate a low-salt diet. Further, most of the participants sometimes forgot to take one of their medications.

Most of the participants experienced HF symptoms in the prior month. Hence, self-care management, actions undertaken to relieve HF symptoms, could be assessed in 178 participants. The majority of the participants failed to recognize or did not recognize quickly that their symptoms were related to HF. More than 75% of the participants were somewhat likely or likely to follow remedies to manage their symptoms by reducing salt and fluid intake, taking an extra diuretic, or visiting healthcare providers. Around half of the participants were somewhat sure of their ability to evaluate the effectiveness of a remedy that they had tried recently.

Most participants were somewhat or very confident in their ability to keep themselves free of symptoms, follow treatment advice, evaluate the importance of symptoms, recognize changes in their health, and evaluate

Table 2. Descriptive statistics for individual items of the self-care scale.

Self-care items		Frequency (%)			
Maintenance items					
How routinely do you do the following?	n	Never or rarely	Sometimes	Frequently	Always or daily
1. Weigh yourself?	221	61 (27.6)	146 (66.1)	14 (6.3)	
2. Check your ankles for swelling?	221	62 (28.1)	103 (46.6)	51 (23.1)	5 (2.3)
3. Try to avoid getting sick (e.g., flu shot, avoid ill people)?	221	43 (19.5)	115 (52)	54 (24.4)	9 (4.1)
4. Do some physical activity?	221	40 (18.1)	111 (50.2)	58 (26.2)	12 (5.4)
5. Keep doctor or nurse appointments (follow up)?	221	22 (10)	113 (51.1)	79 (35.7)	7 (3.2)
6. Eat a low-salt diet?	221	22 (10)	88 (39.8)	86 (38.9)	25 (11.3)
7. Exercise for 30 minutes?	221	86 (38.9)	93 (42.1)	34 (15.4)	8 (3.6)
8. Forget to take one of your medicines?	220	51 (23.1)	137 (62)	26 (11.8)	6 (2.7)
9. Ask for low-salt items when eating out or visiting others?	221	55 (24.9)	106 (48)	53 (24)	7 (3.2)
10. Use a system (pill box, reminders) to help you remember your medicines?	221	117 (52.9)	70 (31.7)	24 (10.9)	10 (4.5)

Management items						
If you had trouble breathing or ankle swelling in the past month	n	I did not recognize it	Not Quickly	Somewhat Quickly	Quickly	Very Quickly
11. How quickly did you recognize it as a symptom of heart failure?	178	60 (33.7)	83 (46.6)	24 (13.5)	9 (5.1)	2 (1.1)

If you have trouble breathing or ankle swelling, how likely are you to try one of these remedies?		Not likely	Somewhat likely	Likely	Very likely
12. Reduce the salt in your diet	178	6 (3.4)	68 (38.2)	86 (48.3)	18 (10.1)
13. Reduce your fluid intake	178	4 (2.2)	62 (34.8)	94 (52.8)	18 (10.1)
14. Take an extra water pill (medication to help you pee)	178	29 (16.3)	61 (34.3)	73 (41.0)	15 (8.4)
15. Call/visit your doctor or nurse for guidance	178	11 (6.2)	61 (34.3)	82 (46.1)	24 (13.5)

Think of a remedy you tried the last time you had trouble breathing or ankle swelling		I did not try anything	Not Sure	Somewhat sure	Sure	Very Sure
16. How sure were you that the remedy helped or did not help?	178	29 (16.3)	24 (13.5)	89 (50.0)	33 (18.5)	3 (1.7)

Confidence items					
How confident are you that you can	n	Not Confidence	Somewhat Confident	Very Confident	Extremely Confident
17. Keep yourself free of heart failure symptoms?	221	30 (13.6)	141 (63.8)	46 (20.8)	4 (1.8)
18. Follow the treatment advice you have been given?	221	9 (4.1)	92 (41.6)	100 (45.2)	20 (9)
19. Evaluate the importance of your symptoms?	221	21 (9.5)	135 (61.1)	60 (27.1)	5 (2.3)
20. Recognize changes in your health if they occur?	220	31 (14.1)	121 (55)	61 (27.7)	7 (3.2)
21. Do something that will relieve your symptoms?	221	46 (20.8)	131 (59.3)	34 (15.4)	10 (4.5)
22. Evaluate how well a remedy works?	221	25 (11.3)	134 (60.6)	55 (24.9)	7 (3.2)

a symptom management remedy; however, participants' confidence was lower in their ability to relieve symptoms.

3.3. Factors influencing heart failure self-care

The results from unadjusted and adjusted linear regression analyses on factors affecting HF self-care (maintenance, management, and confidence) are shown in Table 3.

3.3.1. Factors influencing self-care maintenance
Formal education and self-care confidence were independently associated with self-care maintenance. Participants with higher secondary or less education and more than higher secondary education had higher self-care maintenance by 7.1 ($p = 0.001$) and 7.4 ($p = 0.030$) units, respectively, than illiterate participants. Each 1-point increase in self-care confidence was associated with an increase in self-care maintenance score by 0.3 ($p = 0.000$) units. The relationship between co-morbidity and self-care maintenance was borderline significant, indicating that with every unit increase in comorbidity score there was an increase in self-care maintenance score by 1 unit ($p = 0.051$).

3.3.2. Factors influencing self-care management
Formal education, Newar ethnicity (compared to Brahmin), social support and self-care confidence were independently associated with self-care management. Participants with higher secondary or less education ($\beta = 9.8$; $p = 0.000$) and more than higher secondary education (β

$= 14.5$; $p = 0.002$) were more likely than the illiterate participants to have higher self-care management. Being ethnically Newar rather than Brahmin was associated with higher self-care management scores by 6.3 ($p = 0.043$) units. With each unit increase in social support and self-care confidence scores, the likelihood of an increase in self-care management scores was, on average, 0.7 ($p = 0.002$) and 0.4 ($p = 0.000$) units. There was a borderline statistically significant relationship between gender and self-care management: on average males had lower self-care management than females by 3.8 ($p = 0.053$) units.

3.3.3. Factors influencing self-care confidence
Living alone, NYHA class II, III and IV and social support were independently associated with self-care confidence compared to class I. Participants living alone were more likely to have a higher self-care confidence score by 12.3 ($p = 0.022$) units. Compared to participants with NYHA class I at discharge, those with NYHA class II ($\beta = -13.6$; $p = 0.001$), III ($\beta = -17.6$; $p = 0.000$), IV ($\beta = -21.7$; $p = 0.006$) had lower self-care confidence. Each 1-point increase in social support score was associated with an increase in self-care confidence score by 0.9 ($p = 0.001$) units.

3.4. Relationship between self-care and health-related quality of life

Unadjusted analyses found that self-care maintenance ($\beta = 0.2$; $p = 0.037$), self-care management ($\beta = 0.2$; $p = 0.017$) and self-care confidence ($\beta = 0.3$; $p = 0.002$) were statistically related with self-reported

Table 3. Results of regression analyses of predictors of heart failure self-care.

Variables	Self-care maintenance				Self-care management				Self-care Confidence			
	Unadjusted		Adjusted		Unadjusted		Adjusted		Unadjusted		Adjusted	
	Beta	95% CI	Beta	95% CI	Beta	95% CI	Beta	95% CI	Beta	95% CI	Beta	95% CI
Sociodemographic profile												
Age	-0.011	-0.109–0.086	0.036	-0.065–0.137	-0.114	-0.259–0.032	-0.031	-0.167–0.105	-0.094	-0.233–0.044	-0.051	-0.205–0.104
Male	0.678	-2.508–3.863	-1.512	-4.538–1.514	-1.008	-5.603–3.587	-3.835	-7.719–0.049	3.898	-0.560–8.355	3.175	-1.430–7.780
Education (Illiterate)												
Informal	1.587	-2.007–5.192	2.587	-0.828–6.001	-0.503	-5.794–4.788	3.764	-0.806–8.334	-0.553	-5.697–4.591	-1.059	-6.262–4.143
(≤12)	**6.354**	**1.956–10.751**	**7.132**	**2.865–11.398**	**7.786**	**1.660–13.913**	**9.789**	**4.382–15.197**	4.403	-1.887–10.694	2.606	-3.905–9.117
(>12)	6.884	-0.445–14.212	**7.419**	**0.707–14.131**	**14.721**	**3.686–25.756**	**14.480**	**5.411–23.549**	1.750	-8.755–12.255	-2.411	-12.683–7.860
Ethnicity (Brahmin)												
Chhetri	1.412	-3.184–6.007	3.093	-0.985–7.171	1.921	-4.389–8.231	3.423	-1.639–8.486	-3.417	-9.860–3.025	-2.301	-8.514–3.913
Newar	4.439	-0.859–9.737	2.452	-2.367–7.271	**10.959**	**3.634–18.284**	**6.303**	**0.187–12.419**	1.939	-5.497–9.374	2.377	-4.975–9.730
Mongolian	0.682	-3.967–5.331	1.419	-2.882–5.721	1.098	-5.637–7.834	-0.320	-6.085–5.445	-0.618	-7.137–5.901	0.886	-5.671–7.443
Other	1.667	-3.040–6.375	2.159	-2.259–6.577	2.315	-4.480–9.111	2.617	-3.318–8.552	-0.088	-6.733–6.557	-0.319	-7.059–6.421
Live alone	**7.840**	**0.524–15.157**	4.692	-2.283–11.667	**11.470**	**1.868–21.073**	5.382	-2.766–13.530	**15.939**	**5.729–26.149**	**12.307**	**1.764–22.850**
Married	1.681	-2.430–5.791			-1.918	-7.833–3.997			2.973	-2.822–8.767		
Employed	2.093	-1.115–5.301			1.776	-2.879–6.431			3.788	-0.702–8.277		
Municipality/City	1.195	-2.040–4.430			1.038	-3.581–5.657			-0.064	-4.632–4.504		
Diagnosis time	0.044	-0.007–0.096			0.045	-0.026–0.116			0.030	-0.043–0.103		
Ejection fraction (Normal)												
Mild	2.526	-8.958–14.010			-0.714	-19.701–18.272			-3.570	-19.873–12.732		
Moderate	0.050	-10.437–10.536			-7.078	-24.640–10.485			-2.985	-17.867–11.898		
Severe	0.700	-9.770–11.170			-2.744	-20.286–14.798			-1.696	-16.563–13.171		
Functional status												
*NYHA class (I)												
II	-1.469	-7.088–4.149	-0.690	-6.264–4.885	-7.899	-16.062–0.264	-4.249	-11.538–3.039	**-11.652**	**-19.561–-3.743**	**-13.639**	**-21.958–-5.321**
III	-0.916	-7.111–5.280	1.257	-4.922–7.436	**-11.026**	**-20.060–-1.991**	-4.659	-12.839–3.522	**-15.317**	**-23.980–-6.654**	**-17.643**	**-26.750–-8.537**
IV	2.573	-8.193–13.339	4.812	-5.369–14.992	0.667	-14.689–16.022	5.694	-7.357–18.745	**-19.460**	**-34.356–-4.564**	**-21.689**	**-36.980–-6.399**
Comorbidity	**1.076**	**0.048–2.104**	1.006	-0.004–2.015	1.344	-0.088–2.775	0.825	-0.427–2.078	-0.297	-1.758–1.163	-0.279	-1.819–1.262
Social support	**0.536**	**0.198–0.874**	0.191	-0.135–0.517	**1.179**	**0.704–1.654**	**0.682**	**0.250–1.114**	**0.852**	**0.378–1.326**	**0.865**	**0.381–1.349**
Heart failure knowledge	1.312	-0.018–2.643	0.646	-0.604–1.896	**3.419**	**1.555–5.283**	1.555	-0.062–3.171	**2.204**	**0.315–4.093**	1.315	-0.590–3.221
Self-care confidence	**0.315**	**0.230–0.400**	**0.309**	**0.216–0.402**	**0.492**	**0.372–0.613**	**0.414**	**0.288–0.540**				
Model statistics:			F (17,189) = 5.41				F (17.148) = 8.66				F (16,191) = 3.02	
			$p = 0.0000$				$p = 0.0000$				$p = 0.0002$	
			R-squared = 0.33				R-squared = 0.50				R-squared = 0.20	

*NYHA: New York Heart Association; Statistically significant relationships at 5% are in bold. The reference category for a categorical predictor variable is given in parenthesis.

HRQOL (Table 4). However, the adjusted model identified that only self-care confidence was an independent factor associated with HRQOL, controlling for other self-care scores, age, gender, and NYHA class. Each 1-point increase in self-care confidence was associated with an increase in HRQOL by 0.3 ($p = 0.002$) units.

4. Discussion

To our knowledge, this is the first study describing self-care, factors influencing self-care, and the relationship with HRQOL among patients living with HF in Nepal. The study identified inadequate self-care among HF patients in Nepal. Compared with other countries where the SCHFI v6.2 was administered, the scores of this Nepali sample are among the lowest (Table 5). The reason for low self-care in the Nepali population is probably that community awareness and understanding of cardiovascular disease is low in Nepal [31]. HF is not widely recognized in Nepal and knowledge on how to care for oneself or a family member with HF is not adequate. Although self-care was inadequate, when comparing the three subscale scores, self-care maintenance was lower and self-care management was higher in the Nepali participants. In contrast, self-care management was lower among samples from other countries. The partial explanation for this could be that, similar to other low- and

middle-income countries, Nepal's health expenses are usually devoted to curative or tertiary-level healthcare. Yet, expenditures for preventive and health promotion services are often lower in priority. This is a significant challenge for low- and middle-income countries, including Nepal, where there is a need for well-planned, need-based, and effective programs for prevention and management of existing communicable diseases and for mitigating the increasing burden of non-communicable diseases.

Information on the distribution and factors influencing HF self-care can provide a basis for developing culturally appropriate and effective disease maintenance and management strategies. This study identified several significant clinical and sociodemographic factors influencing self-care in a Nepali sample. Results identified that those who were illiterate and had no formal education demonstrated poor self-care maintenance and self-care management. Education is important in HF self-care because the educational level might be associated with learning ability and the ability of this population to recognize changes in their symptoms [39]. In our sample, 30% of the participants could not read and write; as such, they might have a low ability to learn, which could influence their self-care activities. Additionally, being ethnically Newar, compared to Brahmin, was related to higher self-care management in this sample. A potential explanation could be that the Newar participants were younger, more educated, and living primarily in city areas with more access to

Table 4. Regression analyses of self-care and health-related quality of life.

Variables	Health-related quality of life		
	Beta	p-value	95% CI
Unadjusted			
Self-care maintenance	**0.241**	**0.037**	**0.015–0.468**
Self-care management	**0.243**	**0.017**	**0.044–0.442**
Self-care confidence	**0.256**	**0.002**	**0.099–0.413**
Adjusted			
Self-care maintenance	0.100	0.561	-0.239–0.438
Self-care management	0.038	0.764	-0.213–0.289
Self-care confidence	**0.289**	**0.015**	**0.056–0.522**
Age	0.093	0.338	-0.098–0.283
Male	4.931	0.114	-1.200–11.062
NYHA (I)			
II	4.911	0.402	-6.627–16.449
III	-1.046	0.873	-13.952–11.860
IV	16.419	0.119	-4.267–37.105
Adjusted Model Statistics: $F_{(8,160)}$ = 2.73; p = 0.0075; R-squared = 0.12.			

*NYHA: New York Heart Association; Statistically significant relationships at 5% are in bold. Reference category for a categorical predictor variable is given in parenthesis.

Table 5. Country comparison on heart failure self-care scores measured by Self-Care of Heart Failure Index v6.2

HF patient samples from countries	Self-care maintenance (mean ± SD)	Self-care management (mean ± SD)	Self-care confidence (mean ± SD)
Nepal	39 ± 12	46 ± 15	41 ± 16
Brazil [32]	57 ± 14	47 ± 28	58 ± 26
China [33]	44 ± 17	51 ± 22	52 ± 21
Iran [34]	34 ± 11	37 ± 12	44 ± 16
Italy [35]	55	53	54
Lebanon [36]	35 ± 15	16 ± 15	41 ± 15
Malaysia [37]	62 ± 20	49 ± 17	47 ± 19
Taiwan [38]	54 ± 19	53 ± 26	86 ± 22
United States [32]	70 ± 14	63 ± 23	70 ± 16

healthcare resources. However, with no previous data, it is challenging to determine how ethnicity relates to healthcare access in Nepal.

In contrast to other studies that indicated an association between age and self-care [35, 40, 41, 42], in this study, age was not associated with self-care. The participants in the present study were younger than the participants in other comparable studies [35, 40, 41], which is a possible explanation for the finding. Contrary to findings of previous studies [20], the sample of this study were experienced in living with HF diagnosis (median of 8 months) yet their engagement in HF self-care was not adequate. This study supported the finding of a recent review [20] where the majority of the study in higher-income countries did not observe a significant relationship between gender and self-care. Nonetheless, gender is an important social determinant of health, so gender differences and gender roles in self-care should be explored more.

Social support was an important promoter for better self-care in this sample and in other HF patients [41, 43]. Only 10 participants in the present study were living alone; interestingly, those living alone demonstrated better self-care confidence. A partial explanation for this from the post hoc analysis was that persons living alone were those whose functional status was better (NYHA II) and who were younger (mean age of living alone participants in this sample was 47 years). In the study, functional class, NYHA class at discharge, was an independent factor influencing self-care confidence, indicating that better functional status was associated with better self-care confidence. Those with better

functional status may believe that they have more energy, are less symptomatic, and manage their HF appropriately [44]. Further, results identified that more comorbidities were associated with higher self-care maintenance. It may be that as HF patients become more ill, they might feel the need and motivation for self-care and adhere to self-care behaviors. However, a discrepancy exists in the literature on the relationship between comorbidity and self-care warranting further investigation.

In this study, self-care confidence was an independent predictor of self-care maintenance and self-care management. The finding suggests that self-care confidence is a statistically relevant factor to self-care in alignment with the situation-specific theory of HF self-care [16]. In addition, similar to a previous investigation, this study found that greater self-care confidence was a statistically significant factor for reporting higher HRQOL, even after controlling for known confounders [19]. The influence of self-care confidence on self-care maintenance and management and HRQOL was small and not clinically significant. Still, the findings that self-care confidence provides a link between self-care and patients' HRQOL is crucial because of the further association between HRQOL and morbidity and mortality, and the complexity of self-care that is expected from HF patients [19].

The study has a number of limitations. The study findings have limited generalizability. The study used a prospective, consecutive sample from three hospitals in Kathmandu, Nepal, and is cross-sectional in nature. Additionally, the study used self-report measures for self-care, social support, HF knowledge, and HRQOL, which might be associated with social desirability bias. The study was also limited with the smaller sample size to incorporate more variables in the final adjusted model. The study modified some previously validated measures to account for cultural differences yet did not test the validity and reliability in this sample except for the Nepali SCHFI [45]. Nevertheless, this is an important first step in exploring the context of self-care in Nepal, including factors affecting self-care and the relationship with HRQOL. In addition, the variables included in regression analysis explained 50% of the variation in self-care management, which is relatively high compared to other studies [46]. Future investigation is warranted with longitudinal study designs and larger sample size to examine the predictors of self-care and the relationship with health outcomes.

Overall, the study identified that self-care maintenance, management, and confidence were lower than established norms among patients living with HF in Nepal. Several sociodemographic and clinical characteristics were identified as factors affecting self-care maintenance, management, and confidence that could be crucial while developing tailored and targeted self-care interventions. The study demonstrated a significant association between self-care—specifically, self-care confidence and HRQOL. Further studies are needed in a Nepali sample to confirm and identify other factors related to self-care and to investigate methods to improve self-care and HF disease outcomes.

Declarations

Competing interest statement

The authors declare no conflict of interest.

Additional information

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