European Journal of Cardiovascular Nursing

EUROPEAN SOCIETY OF CARDIOLOGY®

Original Article

European Journal of Cardiovascular Nursing
2015, Vol. 14(2) 126–136

DOI: 10.1177/1474515113518443
cnu.sagepub.com

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Describing self-care in Italian adults with heart failure and identifying determinants of poor self-care

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Abstract

Background: Self-care improves outcomes in patients with heart failure; however, no studies have been conducted on this topic in Italy.

Aims: We aimed to describe self-care in Italian adults with heart failure and to identify sociodemographic and clinical determinants of self-care.

Methods: A cross-sectional design was used to study 1192 heart failure patients enrolled across Italy. We measured self-care using the Self-Care of Heart Failure Index version 6.2, which measures self-care maintenance, management and confidence. Sociodemographic and clinical data were tested as potential determinants of self-care.

Results: The mean age of the sample was 72 (SD = 11) years; 58% were male. In the three areas of self-care, scores ranged from 53.18 to 55.26 and few people were adequate in self-care (14.5% to 24.4% of the sample). Self-care behaviours particularly low in this population were symptom monitoring, exercise, use of reminders to take medicines and symptom recognition. Confidence in the ability to keep oneself free of symptoms and relieve symptoms was low. Taking fewer medications, poor cognition, older age, having a caregiver, being male and having heart failure for a shorter time predicted poor self-care maintenance. Poor cognition, not being employed, being male, and having worse New York Heart Association class predicted poor self-care management. Poor cognition, taking fewer mediations, older age, and male gender predicted poor self-care confidence.

Conclusion: Self-care is poor in Italian heart failure patients. Determinants of poor self-care identified in this study can help to target patients' education. Male gender and poor cognition were consistently associated with poor self-care maintenance, management and confidence.

Keywords

Self-care, heart failure, cognition, gender, caregiver, medications, adherence

Received 9 June 2013; revised 4 December 2013; revised manuscript accepted 8 December 2013

Introduction

Heart failure (HF) is a global health issue and a leading cause of morbidity and mortality in developed countries.[1] The prevalence of HF ranges between 0.4% and 2% in the general population of countries across the world with over 15 million HF patients in Europe and five million in the US.[2,3] In Italy, where this study was conducted, the prevalence of HF is 1.1.[4–6] HF is age-dependent so its prevalence rises to 12.13% in adults over 70 years of age.[4–6]

Self-care is an important component of HF treatment: people with adequate self-care have better quality of life, fewer hospitalizations and better event-free survival.[7–9] However, self-care is often burdensome for patients[10] and several investigators have found that patients find its performance a challenge.[11,12]

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Self-care has been defined as a naturalistic decision-making process that includes two dimensions: self-care maintenance and self-care management.[13] Self-care maintenance includes behaviours performed by patients to maintain physiological stability of HF, monitoring of symptoms and adhering to treatment; self-care management includes behaviours aimed at recognizing and interpreting symptoms of HF exacerbation, implementing treatments to relieve symptoms and evaluating implemented treatments.[13] As theorized in the situation-specific theory of HF self-care,[13] self-care maintenance and self-care management are also influenced by self-care confidence, or self-efficacy, an important concept that is not part of the self-care process per se.

Several studies have been conducted internationally to evaluate self-care maintenance, management and confidence in adults with HF and all have been conducted with the Self-Care of Heart Failure Index (SCHFI) version 4[14] and version 6.2,[15] the only instrument that measures these dimensions. The SCHFI uses a standardized scoring convention (0 to 100) where higher scores mean better self-care; a score ≥70 is considered adequate self-care. These studies have found several differences among the studied populations. For example, self-care maintenance has been reported to be relatively lower in Taiwan[16] and Mexico[11] (54 and 58 respectively) compared with Canada[17] and Australia (67 and 68 respectively). Self-care management has been quite low (from 50 to 53) in almost all studied populations (Australia, Taiwan, Canada and Mexico)[11,16-18] but somewhat better in the US population (68).[11] Self-care confidence has been reported to range from a low of 55 in Taiwan[16] and Canada[17] to 77 and 73 in Mexico and Australia[11] respectively.

In several studies investigators have explored sociodemographic and clinical determinants of poor self-care maintenance, management and confidence in order to identify patients at risk for poor self-care. These studies have been fairly consistent in identifying female gender,[19,20] higher (worse) New York Heart Association (NYHA) functional class, lower education[11] and shorter illness duration[11,17,21] as determinants of poor self-care maintenance while the effects of age and comorbidity are unclear. Some studies have found that younger age is associated with poor self-care maintenance[18,19] but one study reported the contrary.[22] One study[18] found that fewer comorbid conditions were associated with poorer self-care but another one[11] found no relationship between comorbidity and self-care maintenance.

Consistent determinants of poor self-care management have been identified as cognitive impairment,[21,22] lower (better) NYHA class,[11,21,22] shorter illness duration[21] and older age.[11] Inconsistent results have been found regarding gender and comorbidity; some authors have found that females have poorer self-care management than males[23] while one study found that males have poorer self-care management than females.[21] Some authors have found that patients with less comorbidity have poorer self-care management,[21,23] while others have found the contrary.[11]

Studies of sociodemographic and clinical variables as determinants of self-care confidence have been consistent in identifying poor cognition, older age, male gender, lower education, more comorbid conditions and higher NYHA class as determinants of poor self-care confidence.[11,21,22] However, there was one study that did not find that sociodemographic and clinical variables had an influence on self-care confidence.[23]

Although HF is increasing in Italy because of the aging population,[24] self-care behaviours are still poorly studied and variables predicting self-care are still unknown in this population. Because several inconsistencies are reported in the literature and because self-care is also influenced by culture, a patient's education and the health-care systems[25,26] socio-demographic and clinical variables might have a different impact on self-care from one country to another. So it is important to know the level of self-care maintenance, management and confidence and their determinants in the Italian HF population in order to identify patients at risk for poor self-care. This knowledge would facilitate the design of tailored interventions. Therefore, the aims of this study were: 1) to describe self-care maintenance, self-care management and self-care confidence in Italian adults with HF; 2) to identify socio-demographic and clinical determinants of self-care maintenance, self-care management and self-care confidence.

Methods

Study design

A cross-sectional, descriptive design was used to conduct the study.

Before data collection the Institutional Review Boards of each centre where data were collected approved the study. All participants provided written informed consent. Data were collected during outpatient visits.

Sample, setting and procedure

A convenience sample of 1192 adults with HF was enrolled in the study. Patients were recruited from cardiovascular centres located across Italy in the provinces of Agrigento, Avellino, Benevento, Bolzano, Caltanissetta, Cosenza, Frosinone, L'Aquila, Latina, Lecce, Livorno, Mantova, Messina, Milano, Napoli, Nuoro, Olbia, Palermo, Potenza, Ragusa, Reggio Calabria, Rieti, Roma, Salerno, Terni, Trapani, Udine and Viterbo by research assistants, all of whom were nurses. Participants, recruited between January 2011 and November 2012, were invited to participate if they had a diagnosis of HF confirmed by echocardiogram and clinical evidence of HF (i.e. with signs and symptoms

typical of HF such as dyspnoea and elevated jugular venous pressure). These criteria are specified in the diagnostic criteria of the European Society of Cardiology of the 2008,[27] which were reconfirmed in 2012.[28] Also, patients had to be more than 18 years old and have not experienced an acute coronary event in the last three months. After signing the informed consent document, the research instruments described below were administered.

Instruments

The following instruments were used:

1. A structured questionnaire was used to collect sociodemographic and family characteristics (age, gender, education, marital status, job, family income, and caregiver support). This tool was developed by the research team.
2. The SCHFI v.6.2,[14,15] a 22-item instrument that measures three components of HF self-care: maintenance, management and confidence. The self-care maintenance scale, with 10 items, measures symptom monitoring and treatment adherence. The self-care management scale has six items and measures the ability of patients to recognize and evaluate symptoms of a HF exacerbation (problems breathing and/or ankle swelling), to implement a treatment in response to symptoms (e.g. reduce salt in the diet) and to evaluate treatments. The self-care management scale can be administered only to patients who have experienced HF symptoms in the last month. The self-care confidence scale has six items evaluating how confident patients feel in performing self-care. The SCHFI v.6.2 has been tested for validity and reliability in several countries[29,30] as well as in Italy.[31] When the Italian version of the SCHFI v.6.2 was tested with confirmatory factor analysis, supportive fit indices were found (CFI ranging between 0.93 and 0.99; RMSEA between 0.02 and 0.07). Contrasting group validity was demonstrated when the SCHFI discriminated between patients educated versus not educated in self-care (p <0.001). Reliability tested with factor score determinacy revealed a coefficient between 0.78 and 0.90 for the three scales.[31] As noted above, a standardized 0–100 score is calculated for each scale: higher scores indicate better self-care. A score ≥70 on each scale is considered adequate self-care.[15]
3. The Charlson Comorbidity Index (CCI),[32] a widely used instrument for the assessment of comorbidity. The CCI considers 19 common diseases, each with a possible score of 1, 2, 3 or 6, according to its gravity, with a total score ranging from 0 to 36. A higher score means higher comorbidity. All participants in this study had a score of at least 1 because they all had HF. Validity of the CCI was demonstrated by its ability to predict a 10-year mortality.[11] The CCI was computed using information abstracted from patients' medical records.

   In addition, comorbid conditions not included in the CCI were noted during medical record review, as were details about medical treatment (e.g. medications and implanted pacemaker or cardioverter defibrillator) and lifestyle habits (smoking and alcohol). Data regarding illness duration, NYHA functional class and ejection fraction also were abstracted from the medical record by nurse research assistants.
4. The Mini Mental State Examination (MMSE),[33] a 19-item instrument that is widely used to assess global cognitive function. The MMSE assesses: orientation to time, orientation to place, registration of three words, attention and calculation, recall of three words, language, and visual construction. Possible scores vary from 0 to 30, with higher scores indicating better cognition.

Statistical analysis

Means, standard deviations, medians, interquartile ranges and frequencies were used to describe patients' sociodemographic and clinical characteristics and also self-care maintenance, management and confidence scores. In order to identify the sociodemographic and clinical determinants of self-care maintenance, self-care management and self-care confidence, stepwise regression analysis was conducted with entry and removal criteria for the independent variables to remain in the model with a two-tailed alpha of 0.05 and 0.1 respectively. Specifically, all sociodemographic and clinical determinants were introduced as independent variables (patient's age, gender, education, job, the presence of caregiver, family income, NYHA class, MMSE score, months of illness and number of medications) in three stepwise multiple regression analyses (predicting self-care maintenance, management and confidence). Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) (version 18.0).

Results

Sociodemographic and clinical characteristics

Table 1 presents the sociodemographic characteristics of the total sample, both males and females. The sample was predominantly older (mean age = 72, SD = 11) and male (58%). The level of education was low with almost 80% of respondents having less than a high school education. Most participants were unemployed (82%) because they

Table 1. Sociodemographic and family characteristics of patients (*N*=1192).

Variables	Total sample	*M* (SD)		*p*
		Males	Females	
Age	72.36 (11.2)	71.8 (11.2)	73.0 (11.2)	0.08
		N (%)		
Gender				
Male	694 (58.2)			
Female	498 (41.8)			
Education				0.051
Less than high school	951 (79.7)	535 (77.3)	412 (83.1)	
High school	170 (14.3)	110 (15.9)	60 (12.1)	
University degree	71 (6.0)	47 (6.8)	24 (4.8)	
Marital status				<0.001
Married	677 (56.8)	452 (65.1)	225 (45.2)	
Widowed	358 (30.0)	144 (20.7)	214 (43.0)	
Single	80 (6.7)	47 (6.8)	33 (6.6)	
Divorced	77 (6.5)	51 (7.3)	26 (5.2)	
Family income per month (euros, *N*=1178)				0.02
0–1000	361 (30.3)	189 (27.6)	172 (35.0)	
1001–2000	604 (50.7)	362 (52.9)	240 (48.8)	
>2000	213 (19.0)	133 (19.4)	80 (16.3)	

had retired (77.9%) and most were married (57%) or widowed (30%). Thirty per cent of patients lived in poverty: in 2011 an income of 1011 euros per month was considered the threshold of poverty in two-person families in Italy.[34] Most (75.8%) reported having a caregiver. Married men were significantly more likely than married women to have a caregiver, while widowed women were significantly more likely than widowed men to have a caregiver (p <0.001).

Participants reported having HF for a mean of 4.3 years (SD = 3.7). Most (75%) were symptomatic and functionally compromised (NYHA classes II and III) (Table 2). Both reduced and preserved ejection fraction HF patients were enrolled; ejection fraction was 44.6% (SD =10.9) on average. The mean MMSE score was 24, indicating borderline cognitive impairment; women were significantly more likely to be cognitively impaired than men (p=0.007). One-quarter (25.8%) of the sample had a pacemaker and 6.6% had an implanted cardioverter defibrillator. These devices had been implanted more frequently in men than in women. More than half of the sample (54.5%) had been hospitalized at least once in the last year. As shown in Table 2, several specific comorbid conditions were common: hypertension, atrial fibrillation, a prior acute coronary event and diabetes. Women were more affected than men by peripheral vascular disease and connective tissue disease, while men were more frequently affected by prior coronary events and renal disease. Few (15%) of the patients were currently smokers and 37% drank alcohol; both behaviours were significantly more common in men than in women. On average, participants took more than four different types of medication (mean = 4.35, SD = 2.4); almost all took a diuretic (91%) and 67% took an antiplatelet medication. Surprisingly, only 50% were taking a beta blocker and 48% were taking an angiotensin-converting enzyme inhibitor. Few patients were treated with an angiotensin receptor blocking agent (11%).

Self-care maintenance, management and confidence

Tables 3, 4 and 5 summarize the descriptive statistics for self-care maintenance, management and confidence. Mean scores on the self-care maintenance, management and confidence scales were 55.26, 53.18 and 54.57 respectively – all below the recommended threshold of 70.[15] Male patients scored lower than females on the three SCHFI v.6.2 scales but only the self-care management score was significantly different (p = 0.03) between men and women. The percentage of HF participants with adequate self-care (score ≥ 70) was only 14.5% for self-care maintenance, 24.4% for self-care management and 21.2% for self-care confidence.

The descriptive analysis of individual items on the self-care maintenance scale showed that more than half of the sample never, rarely or sometimes checked their weight, performed physical activity or used a system to remind themselves to take their medicines. Instead, more than 70% of patients reported remembering to take medicines, keeping doctor or nurse appointments and trying to avoid getting sick (Table 3). Male patients were significantly worse than female patients at checking their ankles for

Table 2. Clinical characteristics of patients (*N*=1192).

Variables	Total sample	*M* (SD)		*p*
		Males	Females	
Years of illness	4.3 (3.7)	4.3 (3.8)	4.4 (3.8)	0.7
Ejection fraction	44.60 (10.9)[a]	44.3 (11.1)	45.2 (10.3)	0.2
CCI score	2.9 (2.1)	2.9 (2.1)	2.8 (2.2)	0.7
MMSE score	24.2 (6)[b]	24.6 (5.5)	23.6 (6.6)	0.007
		N (%)		
NYHA class				0.2
I	198 (16.7)	126 (18.2)	71 (14.3)	
II	507 (42.5)	283 (40.8)	224 (45.1)	
III	393 (33.0)	231 (33.3)	162 (32.6)	
IV	93 (7.8)	53 (7.6)	40 (8.0)	
With pacemaker	308 (25.8)	207 (29.9)	101 (20.2)	0.001
With defibrillator	79 (6.6)	58 (8.4)	21 (4.2)	0.008
Hospitalization in last year				0.134
Never hospitalized	542 (45.5)	306 (44.1)	236 (47.4)	
Hospitalized once	423 (35,5)	258 (37.2)	165 (33.1)	
Hospitalized twice	159 (13.3)	96 (13.2)	63 (12.7)	
Hospitalized ≥ 3 times	68 (5.7)	34 (4.8)	34 (6.8)	
Comorbidities				
Hypertension	811 (68.0)	476 (68.6)	335 (67.3)	0.356
Atrial fibrillation	462 (38.8)	282 (40.6)	180 (36.1)	0.066
Prior acute coronary syndrome	407 (34.1)	267 (38.5)	140 (28.1)	0.000
Diabetes	331 (27.8)	201 (29.0)	130 (26.1)	0.169
Anaemia	252 (21.1)	132 (19.0)	120 (24.1)	0.051
Peripheral vascular disease	190 (15.9)	99 (14.3)	91 (18.3)	0.036
Renal disease	171 (14.3)	112 (16.1)	59 (11.8)	0.022
Sleep apnoea	161 (13.5)	94 (13.5)	67 (13.5)	0.510
Peptic ulcer	122 (10.2)	72 (10.4)	50 (10.0)	0.467
Stroke	109 (9.1)	61 (8.8)	48 (9.6)	0.404
Pulmonary hypertension	77 (6.5)	41 (5.9)	36 (7.2)	0.323
Cancer with metastasis	26 (2.2)	12 (1.7)	14 (2.8)	0.223
Cancer without metastasis	49 (4.1)	25 (3.6)	24 (4.8)	0.596
Hemiplegia	58 (4.9)	34 (4.9)	24 (4.8)	0.532
Connective tissue disease	30 (2.5)	10 (1.4)	20 (4.0)	0.009
Leukaemia	8 (0.7)	4 (0.6)	4 (0.8)	0.608
Lymphoma	7 (0.6)	4 (0.6)	3 (0.6)	0.449
Currently smokers	174 (15.1)	132 (19.0)	42 (8.5)	0.000
Currently alcohol drinkers	422 (37.1)	315 (45.4)	107 (21.5)	0.000

Patients could have more than one illness.
[a]Ranges: 20–90.
[b]Ranges: 10–30.
CCI: Charlson Comorbidity Index; MMSE: Mini Mental State Examination; NYHA: New York Heart Association.

swelling (item 2, $p < 0.001$), eating low salt items (item 6, $p = 0.001$) and asking for a low-salt items when eating out or visiting others (item 9, $p = 0.005$); female patients scored significantly lower than males in exercising (item 7, $p = 0.03$).

More than half of the sample had HF symptoms in the preceding month so self-care management (actions taken to relieve HF symptoms) could be assessed in these 631 participants (Table 4). Most of these patients failed to recognize their symptoms or did not recognize very quickly that they were related to HF. Once they had recognized their symptoms, most patients called their providers. Although less likely, many reduced dietary salt and fluid intake. These patients were least likely to take an extra diuretic dose. Most respondents felt sure of their ability to judge whether the remedy they tried most recently was effective. Males scored significantly worse than females in salt and fluid restriction in the case of symptoms (items 12

Table 3. Descriptive statistics for individual items of the Self-Care Maintenance Scale.

	N	Never or rarely *n* (%)	Sometimes *n* (%)	Frequently *n* (%)	Always or daily *n* (%)
Listed below are common instructions given to persons with heart failure. How routinely do you do the following?					
(1) Weigh yourself daily	1190	264 (22.2)	529 (44.5)	260 (21.8)	137 (11.5)
(2) Check your ankles for swelling	1191	109 (9.2)	472 (39.6)	408 (34.3)	202 (17.0)
(3) Try to avoid getting sick (flu shot, avoid ill people)	1190	126 (10.6)	226 (19.0)	369 (31.0)	469 (39.4)
(4) Do some physical activity	1190	311 (26.1)	426 (35.8)	296 (24.9)	157 (13.2)
(5) Keep your doctor or nurse appointments	1191	67 (5.6)	102 (8.6)	264 (22.2)	758 (63.6)
(6) Eat a low-salt diet	1191	119 (10)	338 (28.4)	329 (27.6)	405 (34)
(7) Exercise for 30 minutes	1191	448 (37.6)	375 (31.5)	229 (19.2)	139 (11.7)
(8) Forget to take one of your medicines (reverse coded)	1189	732 (61.6)	229 (25.1)	89 (7.5)	69 (5.8)
(9) Ask for low-salt items when eating out or visiting others	1190	258 (21.7)	406 (34.1)	305 (25.6)	221 (18.6)
(10) Use a system (pill-box, reminder) to help you remember medicines	1191	428 (35.9)	235 (19.7)	227 (19.1)	301 (25.3)

Table 4. Descriptive statistics for individual items of the Self-Care Management Scale.

	N	I did not recognize it *n* (%)	Not quickly *n* (%)	Somewhat quickly *n* (%)	Quickly *n* (%)	Very quickly *n* (%)
(11) If you had trouble breathing or ankle swelling how quickly did you recognize it as symptoms of HF?	631	52 (8.2)	119 (18.9)	218 (34.5)	145 (23.0)	97 (15.4)
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	631		105 (16.6)	201 (31.9)	172 (27.3)	153 (24.2)
(13) Reduce your fluid intake	630		147 (23.3)	185 (29.3)	177 (28.1)	121 (19.2)
(14) Take an extra water pill	631		241 (38.2)	121 (19.2)	169 (26.8)	100 (15.8)
(15) Call your doctor or nurse for guidance	631		138 (21.9)	124 (19.7)	172 (27.3)	197 (31.2)
		I did not try anything	Not sure	Somewhat sure	Sure	Very sure
(16) Think of a remedy you tried the last time you had trouble breathing or ankle swelling. How sure were you that the remedy helped or did not help?	629	16 (2.5)	81 (12.9)	154 (24.5)	291 (46.3)	87 (13.8)

Data on the Self-Care Management Scale are fewer because this scale is administered only to patients who experienced symptoms of heart failure in the last month.

and 13, $p < 0.001$ and 0.01, respectively) and in treatment evaluation (item 16, $p = 0.004$).

The descriptive statistics of the self-care confidence scale (Table 5) revealed that most participants were confident in their ability to follow treatment advice and to recognize symptoms but their confidence was lower in the ability to keep themselves free of symptoms and to relieve symptoms. Female and male patients did not exhibit any statistically significant differences in any of the items in the self-care confidence scale.

Table 5. Descriptive statistics for individual items of the Self-Care Confidence Scale.

	N	Not confident *n* (%)	Somewhat confident *n* (%)	Very confident *n* (%)	Extremely confident *n* (%)
How confident are you that you can:					
(17) Keep yourself free of HF symptoms	1188	321 (27.0)	468 (39.3)	270 (22.7)	129 (10.9)
(18) Follow the treatment advice you have been given	1190	65 (5.5)	161 (13.5)	443 (37.2)	521 (43.8)
(19) Evaluate the importance of your symptoms	1190	161 (13.5)	398 (33.4)	388 (32.6)	243 (20.4)
(20) Recognize changes in your health if they occur	1190	72 (6.1)	306 (25.7)	470 (39.5)	342 (28.7)
(21) Do something that will relieve your symptoms	1190	155 (13.0)	522 (43.9)	356 (29.9)	157 (13.2)
(22) Evaluate how well a remedy works	1189	170 (14.3)	448 (37.7)	379 (31.9)	192 (16.1)

HF: heart failure.

Table 6. Regression analysis on the self-care maintenance, self-care management and self-care confidence.

Variables	Standardized β	R^2	*F*
Predictors of self-care maintenance		0.16	17.81*
Number of medication	0.275*		
Patient's age	−0.135**		
MMSE	0.158*		
Caregiver (no = 0, yes = 1)	−0.131*		
Gender (0 = female, 1 = male)	−0.104**		
Months of illness	0.102**		
Predictors of self-care management		0.19	17.90*
MMSE	0.213*		
Job (0 = unemployed; 1 = employed)	0.216*		
Gender (0 = female, 1 = male)	−0.147**		
NYHA class	−0.116***		
Predictors of self-care confidence		0.19	34.25*
MMSE	0.324*		
Number of medications	0.265*		
Patient's age	−0.142*		
Gender (0 = female, 1 = male)	−0.114**		

*$p < 0.001$.
**$p < 0.01$.
***$p < 0.05$.
MMSE: Mini Mental State Examination; NYHA: New York Heart Association.

Determinants of self-care

To examine the unique contribution of sociodemographic and clinical characteristics in determining poor HF self-care, three separate stepwise multiple regression analyses were conducted for each SCHFI v.6.2 scale. As shown in Table 6, different variables were associated with poor self-care maintenance, management and confidence. Determinants of poor self-care maintenance were: taking fewer medications, older age, lower MMSE score, having a caregiver, being male and having HF for a shorter time. Lower MMSE score, being unemployed, male and more functionally compromised were associated with lower self-care management scores. Finally, lower MMSE score, fewer medications, older age and male gender were associated with lower self-care confidence. The above variables

explained 16%, 19% and 19% of the variance of the self-care maintenance, self-care management and self-care confidence respectively.

Discussion

To our knowledge this is the first study of self-care behaviours and their determinants conducted in Italy. Overall self-care maintenance, management and confidence were poor in this sample since only about 20% of patients had a score above the recommended threshold of 70. Compared with other countries where the SCHFI was administered, the scores of this Italian sample are among the lowest.

Self-care maintenance behaviours particularly problematic in the sample were weight and ankle swelling monitoring, physical activity/exercise and salt restriction when eating out. Instead, patients were better in 'provider-directed' self-care maintenance behaviours such as keeping doctor/nurse appointments and taking medicines. This is not particularly surprising since a recent study carried out in 15 countries worldwide[26] showed that in some populations, such as Mexicans living in south-western USA, Brazilians, and Chinese from Hong Kong, weight monitoring was performed by less than 20% of patients. The same study showed also that physical exercise and salt restriction were low in almost all the populations studied.

Our results and those of other studies clearly show that HF patients might find it easier to take medicines than to change their lifestyles.[35] This result is consistent with the international study described above, where pharmacological adherence was adequate in most samples, with only one population reporting low (19%) medication adherence.[26] Unfortunately, though, the medication regimen prescribed for the patients in the current study was not consistent with the published HF guidelines.[36] That is, although patients reported taking their medications as prescribed, relatively few were prescribed the medications shown to be effective in clinical trials. These findings are similar to recent surveys carried out in Italy[37,38] where it has been found that the adherence to international guidelines is suboptimal. Possible reasons might be that patients are also treated by their general practitioners, who are less likely to follow international guidelines and instead still largely treat in an empiric fashion.[39]

In the self-care management scale almost one-third of patients who had symptoms of a HF exacerbation in the last month were unable to recognize their symptoms. Poor symptom recognition is an issue in this population because symptom recognition is the first step to implementing a treatment to re-stabilize the illness and avoid hospitalization.[40,41] Also, in response to symptoms, few reported taking an extra diuretic. This is not surprising, though, considering that HF clinics are scarce in Italy and self-titration of diuretics is not common in Italy.

Confidence in the ability to keep free of HF symptoms was the lowest item in the confidence scale in the sample. This response is consistent with the findings that monitoring weight and ankle swelling are done only sometimes and these patients reported difficulties recognizing symptoms of a HF exacerbation. If HF patients are not educated about the importance of monitoring their HF symptoms so that they recognize early changes, HF is out of their control and consequently they lack confidence in their ability to control the illness.

Regression analysis revealed several determinants of each self-care dimension, although poor cognition and male gender were consistent determinants of poor self-care maintenance, management and confidence. Finding that poor cognition was associated with poor self-care was not surprising because others have shown that patients with cognitive dysfunction have less knowledge about HF[42] and a knowledge deficit limits one's ability to perform self-care.[43] Our results also are consistent with other, prior studies[26,17] that found that cognitive impairment predicted poor self-care management and confidence in HF patients. We also found that male gender was another determinant of poor self-care, reinforcing prior studies that have found the same results.[22,44]

To our knowledge this is the first study reporting that patients taking fewer medications were worse in self-care maintenance and confidence. The most likely explanation for this finding is that those patients who do not perceive themselves as ill are not motivated to perform self-care. The number of medications also might be considered a surrogate of comorbidity since people who suffer from several illnesses in general take more medicines and some investigators have found that people with few comorbid conditions perform worse self-care maintenance and management.[23,26] However, CCI score was not a determinant of self-care in this study. Even though the CCI is largely used as a measure of comorbidity in HF patients it was primarily developed to predict mortality, complications, healthcare resource use, length of hospital stay, discharge disposition and cost and so might not be a sufficiently sensitive measure of comorbidity for these purposes.

Older age was a determinant of worse self-care maintenance and self-care confidence, as others have found.[16,22] A possible interpretation of this finding is that older people might be more cognitively impaired, which may challenge their self-care abilities.

Even though it has been shown that caregiver support may improve self-care,[45] surprisingly, in this study we found the contrary. This finding may be explained by the fact that patients reporting having a caregiver were more functionally compromised ($p < 0.001$), had higher comorbidity ($p < 0.001$) and were more cognitively impaired ($p < 0.001$) and so in need of more care.

We found that patients who had had HF for a short period of time exhibited poor self-care maintenance. This

result was expected because patients who are experienced with HF tend to adhere better to treatment.[46] We also expected that patients who had had HF for a longer time would be better in recognizing HF symptoms and implementing treatments. However, duration of HF was not a significant determinant of self-care management. This may be because so few (only 27% of our sample) were able to recognize their HF symptoms 'quickly' or 'very quickly'.

We found that one determinant of poor self-care management was being unemployed. Some studies have shown that there is no correlation between employment and self-care[22] while others suggest that self-care behaviours are poorer in HF patients who are employed outside the home.[47,48] Interestingly, employment was a determinant only of self-care management and not of self-care maintenance or confidence. Dickson et al.[49] showed in an American sample that employed HF people had the same level of self-care management and confidence as unemployed HF people but were better in self-care maintenance. Cultural diversities may explain these differences as culture is known to influence self-care.[50]

We found that higher (worse) NYHA functional class predicted worse self-care management, as has been found in other studies.[21] We also found that patients with higher NYHA class were more cognitively compromised ($p < 0.001$) and had more comorbid conditions ($p < 0.001$), two variables that are known to negatively influence the recognition of symptoms and the implementation of treatments.[51,52]

Although several determinants of HF self-care were identified, the amount of variance explained by the three models was low (between 16% and 19%): clearly many other variables that predict self-care in Italians are still unknown. Overall the results of this study provide a picture of self-care in Italian HF patients that is very poor. These results suggest the need for urgent interventions to promote self-care in Italy.

This study has some limitations. Even though data were collected in several centres across Italy, the sample was one of convenience and the study was cross-sectional in nature. Another limitation is that we used a screening tool to measure cognitive impairment. The MMSE is less sensitive to mild cognitive impairment than other measures.[53] Strengths of the study include the large sample size collected from across Italy.

In summary, in this study we found that self-care maintenance, management and confidence were quite poor in Italy. Specific sociodemographic and clinical characteristics were identified as predictors of self-care maintenance, self-care management and self-care confidence, which can help us target those Italian HF patients expected to find self-care a challenge. Further studies are needed to identify what other factors are associated with self-care in Italians and to investigate methods of improving self-care.

Implications for practice

- Self-care is poor in Italian heart failure patients.
- Being male, unemployed and older puts patients at risk for worse self-care.
- Patients cognitively impaired, with heart failure for less time, and who take fewer medications are at risk for worse self-care.

Acknowledgements

The authors acknowledge Fulbright Italy for their support of this international collaboration.

Conflict of interest

The authors declare that there is no conflict of interest.

Funding

This work was supported by the Centre of Excellence for Nursing Scholarship, Rome, Italy. Grant Number: 2.12.5.

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