Self-care ability and influencing factors in chronic heart failure patients.

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Abstract

Objectives: To describe the self-care abilities and associated factors in chronic heart failure (CHF) patients.

Methods: Participant characteristics, illness-related information, and self-care ability were investigated using self-report questionnaires and patient records for 91 CHF patients in Nantong University Affiliated Hospital, China.

Results: On average, patients had medium- to low-level self-care abilities. Comprehensive self-care ability was positively influenced by higher education level, employment status, and income level. Patients who received health education and had sound heart function had better self-care abilities. Regression analysis showed that the factors influencing self-care ability included average monthly income, education level, and heart function grading.

Conclusions: Self-care ability in CHF patients is, in general, in medium to low ranges, indicating that medical workers need to enhance self-care education for CHF patients to help them better understand their condition and help them gain the necessary skills for self-care. We conclude that, when conducting self-care education for patients, medical workers should tailor their approach based on the individual characteristics of the patient. Doing so would effectively promote patient knowledge, mobility, and treatment compliance.

Introduction

Chronic heart failure (CHF) has become a prominent global public health issue, with a worldwide prevalence rate of around 1-2%. Patients with CHF face severe threats to their health, a reduced capacity to work, a poorer quality of life, and place a sizable strain on medical resources, resulting in a heavy financial burden for affected households and society in general [1]. In recent years, with advancements in pathophysiology, new strategies have been advanced for the treatment of CHF, yet the admission rate of CHF patients keeps climbing [2]. Therefore, to improve the quality of life for CHF patients, treatment goals should lie not only in improving symptoms, but also in lowering the rates of readmission and fatalities. Previous studies have verified that self-care can improve CHF patient prognosis [3,4], and that effective self-care could improve the health of patients [5], improve quality of life [6], and reduce the number of hospital admissions as well as fatality rates [7-9]. However, the self-care abilities of CHF patients have been reported to be poor to moderate [10]. Considering these findings, the current study aims to gain a better insight into the self-care abilities of CHF patients and the factors influencing self-care, with a view to raising nurses' awareness of issues impacting self-care in patients and helping nurses determine the degree of compensatory nursing required. Based on the results of a survey analysis of 91 cases of self-care in CHF patients, a support-education method is proposed as a means of educating patients to improve their self-care abilities.

Materials and Methods

Participants

This research involved 91 CHF patients from the Vasculocardiology Department of Nantong University Affiliated Hospital in China, and was conducted between June 2015 and August 2016. A convenience sampling methodology was employed, and self-report questionnaires were administered to 93 patients, with 91 complete questionnaires being returned, resulting in a valid return rate of 97.85%. Inclusion criteria were as follows: (1) inpatients with a confirmed diagnosis of CHF given by the doctor in charge or senior physicians; (2) New York Heart Association (NHYA) cardiac function grading II-IV class; (3) the basic disease leading to heart failure was a disease of the cardiovascular system; (4) being able to independently complete questionnaires (written or oral); and (5) being willing to take

part in the survey. Exclusion criteria were: (1) patients in the terminal stage of CHF with cachexia; (2) complications involving severe diseases in other systems; (3) cognitive dysfunction; (4) not being willing to participate.

The study protocol was approved by the Ethics Committee of Nantong University Affiliated Hospital, and patients who participated in the questionnaire survey all signed informed consents. Participants were all informed about their right to withdraw from the study, and they were told that their information was to be kept confidential and anonymous, and to be used for no other purpose.

Methods

Two undergraduate nurses administered surveys as part of their course requirements. After obtaining informed consent from patients in stabilized conditions, self-report questionnaires were administered. If participants were not able to complete the questionnaires themselves, family members or medical workers could help on their behalf, but did not offer any guidance regarding how to answer questions. If participants had any queries as to how to complete the questionnaires, they were able to seek help from the undergraduate nurses. After completion, questionnaires were collected on the spot.

Survey tools

General participant characteristics were recorded, including basic information such as age, sex, education level, monthly income, and marital status. Information relating to illness duration and cardiac function grading was obtained through patient records. Cardiac function was graded according to the 1928 standards set out by the New York Heart Association.

This study utilized a modified CHF patient comprehensive self-care ability evaluation scale questionnaire (MCHFCSQ) [10]. The scale contains 20 items divided across 3 dimensions: patient knowledge of CHF (information subscale), self-care ability (mobility subscale), and compliance behaviour in CHF patients (treatment compliance subscale). All entries were scored as 0, 3, or 5. The total scores for the MCHFCSQ are as follows: whole measure scores range between 0-100, the information subscale scores range between 0-40, mobility subscale scores range between 0-30, and treatment compliance subscale scores range between 0–30. Higher scores indicate stronger comprehensive self-care ability and better self-care. Comprehensive self-care ability is divided into high, medium, and low levels based on cut off scores of >85 points, 70-85 points, and <70 points, respectively. In 2007, Liu [11] reported the Cronbach's α coefficient of the scale and the three dimensions as being 0.846, 0.840, 0.695, and 0.654, respectively. Communality was reported as being 88.3%, indicating high levels of reliability and validity. It is not necessary to evaluate Cronbach's α for validated questionnaires, because their reliability has already been confirmed [11]. While the targets of previous research and our study differed, similar sets of questions were presented to

participants. Thus, we did not assess Cronbach's α in our study as the validity of our scale was guaranteed.

Statistical methods

Epidata 3.02 was used for electronically recording participants' questionnaire responses, and SPSS 21.0 for Windows was utilized for statistical analysis. Descriptive statistics, such as means, standard deviations, frequency, and percentages were obtained for sociodemographic data and patient records. Chi-square tests, t-tests, and ANOVAs (or rank sum multiple comparison tests) were conducted to compare comprehensive self-care abilities by sociodemographic and illness-related variables, such as age and sex, and to analyse differences across the three MCHFCSQ dimensions. Stepwise linear regression, or ordinal regression, was adopted to analyse the factors influencing comprehensive self-care abilities in CHF patients. The threshold for statistical significance was set at .05 for all analyses.

Results

Participant characteristics

The 91 CHF patients involved in this study had an average age of 65.94 ± 15.60 years, and 56.7% of participants were male. Regarding level of education, 24.7% of patients had received nine-years of compulsory education or gone on to further education. The majority of patients (86/91) reported that they had received health education related to CHF from medical workers. Specific sociodemographic and disease related information can be found in Table 1.

Table 1. Sociodemographic and illness-related patient characteristics (n=91).

Variable	Mean ± standard deviation	Frequency (%)
Age	65.94 ± 15.60	
Gender		
Male		51 (56.7)
Female		39 (43.3)
BMI		
<18.5		8 (8.9)
18.5-23.9		50 (55.6)
24-27.9		22 (24.4)
>28		10 (11.1)
Marital status		
Married		75 (82.4)
Others		16 (17.6)
Residence		
City		61 (64.0)
Countryside		22 (24.7)

Education level	
<9 years	67 (75.3)
>9 years	22 (24.7)
Employment status	
Employment	57 (64.0)
Unemployment	32 (36.0)
Household average monthly income	
<1000 RMB	19 (20.9)
1000-3000 RMB	34 (37.4)
>3000 RMB	38 (41.8)
Medical insurance, yes	78 (85.7)
Illness duration	7.01 ± 7.08
Admission times	
One time	31 (34.8)
>one time	58 (65.2)
Mastery over CHF information or not, yes	62 (72.1)
Caregiver	
Single caregiver	54 (59.3)
Several caregivers	36 (39.6)
No caregiver	1 (1.1)
Reception of health education or not; yes	86 (94.5)
Cardiac function grading	
II grade	31 (35.6)
III grade	43 (49.4)
IV grade	13 (14.9)
Cardiovascular disease type	1.74 ± 0.71

Table 2. CHF patient comprehensive self-care ability and scores on MCHFCSQ subscales.

	Mean ± standard deviation	Minimum	Maximum
Comprehensive self-care ability	63.76 ± 16.32	25.00	100.00
Information mastery	19.24 ± 9.12	3.00	40.00
Mobility	23.05 ± 5.6	3.00	30.00
Treatment compliance	21.46 ± 5.67	8.00	30.00

Self-care abilities in CHF patients

CHF patients obtained an average score of 19.24 ± 9.12 on the information subscale of the MCHFCSQ, 23.05 ± 5.60 on the mobility subscale, and 21.46 ± 5.67 on the treatment compliance subscale. The lowest MCHFCSQ total score was

25, and the highest was 98 points, with an average of 63.76 ± 16.32. In general, the self-care abilities of CHF patients were in the low–medium range (Table 2).

The influence of sociodemographic and illness-related factors on comprehensive self-care ability in CHF patients

To examine the influence of sociodemographic and illness-related factors on self-care ability in CHF patients, we conducted a series of regression analyses. When all sociodemographic and illness-related factors (such as blood pressure and heart rate) were included in the regression model as independent variables, it was found that patient education level, employment status, average monthly income, level of health education, and cardiac function grading had a significant influence on patients' comprehensive self-care abilities (P<0.05). We then divided our sample into groups based on illness-related factors, such as cardiac function grading, to create three groups. We found that education level, employment status, and average monthly household income were all related to self-care abilities of CHF patients (P<0.01). The results are shown in Table 3.

Table 3. CHF patient comprehensive self-care ability score comparison across different sociodemographic and illness-related factors (n=91); *: P<0.05; **: P<0.01.

Variable	Comprehensive self-care ability	P	Comprehensive self-care ability			P
			Low	Medium	High	
Age			66.68 ± 15.02	65.77 ± 16.55	61.38 ± 17.75	0.671
Gender		0.092				0.312
Male	66.61 ± 14.72		29 (51.8)	18 (69.2)	4 (50.0)	
Female	60.85 ± 17.23		27 (48.2)	8 (30.8)	4 (50.0)	
BMI		0.75				0.098
<18.5	66.50 ± 22.41		4 (7.l)	2 (7.7)	2 (25.0)	
18.5-23.9	62.58 ± 17.35		34 (60.7)	11 (42.3)	5 (62.5)	
24-27.9	63.00 ± 14.16		11 (19.6)	10 (38.5)	1 (12.5)	
>28	65.40 ± 11.87		7 (12.5)	3 (11.5)	0 (0)	
Marital status		0.48				0.914
Married	64.32 ± 16.46		46 (80.7)	22 (84.6)	7 (87.5)	
Others	61.13 ± 15.91		11 (19.3)	4 (15.4)	1 (12.5)	
Residence		0.061				0.378

Variable	Score	P	n	n	n	P
City	66.00 ± 15.90		36 (63.2)	18 (87.5)	7 (87.5)	
Countryside	59.20 ± 16.48		21 (36.8)	8 (30.8)	1 (12.5)	
Education level		0.000**				0.000**
<9 years	60.28 ± 14.15		48 (87.3)	18 (69.2)	1 (12.5)	
>9 years	75.73 ± 16.42		7 (12.7)	8 (30.8)	7 (87.5)	
Employment status		0.000**				0.002**
Employment	68.96 ± 14.60		28 (50.9)	21 (80.8)	8 (100)	
Unemployment	54.56 ± 15.81		27 (49.1)	5 (19.2)	0(0)	
Household average monthly income		0.000**				0.000**
<1000 RMB	50.63 ± 13.15		19 (33.3)	0 (0)	0 (0)	
1000-3000 RMB	63.97 ± 14.02		22 (38.6)	10 (38.5)	2 (25.0)	
>3000 RMB	70.13 ± 16.07		16 (28.1)	16 (61.5)	6 (75.0)	
Medical insurance		0.858				0.896
Yes	63.88 ± 16.61		48 (84.2)	23 (88.5)	7 (87.5)	
No	63.00 ± 15.09		9 (15.8)	3 (11.5)	1 (12.5)	
Illness duration			7.77 ± 6.96	4.76 ± 3.61	8.73 ± 13.35	
Number of hospital admissions		0.307				1
One time	66.16 ± 14.33		19 (33.9)	9 (36.0)	3 (37.5)	
>one time	62.40 ± 17.47		37 (66.1)	16 (64.0)	5 (62.5)	
Mastery over CHF information		0.71				0.873
Yes	63.52 ± 16.90		39 (68.4)	18 (69.2)	5 (62.5)	
No	65.00 ± 15.54		18 (31.6)	8 (30.8)	3 (37.5)	
Caregiver		0.353				1
Single caregiver	63.15 ± 16.22		33 (57.9)	16 (61.5)	5 (62.5)	
Several caregivers	65.22 ± 16.51		23 (40.4)	10 (38.5)	3 (37.5)	
No caregiver	44		1 (1.8)	0 (0)	0 (0)	
Reception of health education		0.034*				1
Yes	64.63 ± 15.72		53 (93.0)	25 (96.2)	8 (100)	
No	48.80 ± 21.16		4 (7.0)	1 (3.8)	0 (0)	
Cardiac function grading		0.010*				0.491
II grade	66.68 ± 15.44		17 (31.5)	10 (40.0)	4 (50.0)	
III grade	65.84 ± 15.96		26 (48.1)	13 (52.0)	4 (50.0)	
IV grade	51.31 ± 14.80		11 (20.4)	2 (8.0)	0 (0)	
Cardiovascular disease type			1.74 ± 0.77	1.81 ± 0.63	1.50 ± 0.57 0.53	

The influence of sociodemographic and illness-related factors on the dimensions of self-care ability

CHF patient education level, employment status, household average monthly income, and level of health education, were all correlated with the information subscale of the MCHFCSQ (P<0.05). Sex, employment status, mastery over CHF information, and cardiac function grading were also correlated with CHF patient mobility (P<0.05). Treatment compliance was higher in CHF patients with higher levels of education, employment, high household average monthly income, and sound cardiac function, than in those with lower levels of education, unemployment, low household average monthly income, and poor cardiac function (P<0.05). Other sociodemographic and illness-related factors were not correlated with the information, mobility, and treatment compliance MCHFCSQ subscales in CHF patients (P>0.05), as shown in Table 4.

Table 4. *Comparisons of different sociodemographic and illness-related factors in information mastery, mobility, and treatment compliance score, *: P<0.05; **: P<0.01.*

Variable	Information	P	Mobility	P	Treatment compliance	P
Gender		0.614		0.022*		0.104
Male	19.84 ± 8.94		24.37 ± 4.54		22.39 ± 5.61	
Female	18.87 ± 9.14		21.54 ± 6.39		20.44 ± 5.57	
BMI		0.948		0.688		0.312
<18.5	20.88 ± 10.95		22.00 ± 8.80		23.63 ± 5.34	
18.5-23.9	19.36 ± 9.79		22.76 ± 5.51		20.46 ± 5.69	
24-27.9	19.27 ± 7.36		23.23 ± 5.39		22.50 ± 5.70	
>28	18.00 ± 8.84		25.30 ± 3.50		22.10 ± 5.78	
Marital status		0.807		0.307		0.155
Married	19.13 ± 9.26		23.33 ± 5.62		21.85 ± 5.62	
Others	19.75 ± 8.63		21.75 ± 5.47		19.63 ± 5.73	
Residence		0.148		0.240		0.060

Variable	Col 1	Col 2	Col 3
City	20.21 ± 9.57	23.54 ± 4.92	22.25 ± 5.60
Countryside	17.27 ± 7.87	22.07 ± 6.77	19.87 ± 5.58
Education level	0.000**	0.068	0.007**
<9 years	17.01 ± 7.57	22.54 ± 5.75	20.73 ± 5.35
>9 years	26.32 ± 9.81	25.05 ± 4.74	24.36 ± 5.45
Employment status	0.002**	0.008**	0.000**
Employment	21.47 ± 9.00	24.35 ± 4.36	23.14 ± 5.32
Unemployment	15.41 ± 8.02	20.63 ± 6.84	18.53 ± 5.30
Household average monthly income	0.000**	0.079	0.001**
<1000 RMB	13.26 ± 7.01	20.16 ± 6.75	17.21 ± 4.25
1000-3000 RMB	17.65 ± 7.46	23.88 ± 5.12	22.44 ± 5.05
>3000 RMB	23.66 ± 9.35	23.76 ± 5.03	22.71 ± 5.92
Medical insurance	0.741	0.946	0.958
Yes	19.37 ± 9.28	23.04 ± 5.63	21.47 ± 5.85
No	18.46 ± 8.24	23.15 ± 5.64	21.38 ± 4.65
Admission times	0.709	0.076	0.069
One time	18.84 ± 9.42	24.39 ± 4.77	22.94 ± 5.02
>one time	19.60 ± 9.03	22.17 ± 5.91	20.62 ± 5.96
Mastery over CHF information or not	0.457	0.024*	0.632
Yes	19.89 ± 8.50	22.40 ± 6.02	21.23 ± 5.67
No	18.25 ± 10.56	24.83 ± 3.56	21.92 ± 6.22
Caregiver	0.518	0.641	0.304
Single caregiver	18.74 ± 9.50	23.11 ± 5.23	21.30 ± 5.66
Several caregivers	20.19 ± 8.59	23.08 ± 6.23	21.94 ± 5.65
No caregiver	12.00	19.00	13.00
Reception of health education or not	0.032*	0.344	0.556
Yes	19.73 ± 9.02	23.35 ± 5.08	21.55 ± 5.58
No	10.80 ± 6.61	18.00 ± 11.11	20.00 ± 7.71
Cardiac function grading	0.370	0.004**	0.012*
II grade	19.35 ± 9.67	24.35 ± 4.72	22.97 ± 4.95
III grade	20.16 ± 8.68	23.70 ± 5.33	21.98 ± 5.87
IV grade	15.77 ± 9.65	18.15 ± 5.81	17.38 ± 4.96

Regression analysis of self-care abilities and influencing factors on MCHFCSQ dimensions

Through ordinal regression analysis, we found that education level and household average monthly income were the main factors predicting comprehensive self-care ability (Table 5). Stepwise linear regression results showed that household average monthly income, education level, and cardiac function grading could predict CHF patients' comprehensive self-care ability; household average monthly income and education level were predictive factors for patient knowledge (information); cardiac function grading and employment status were risk factors for CHF patient mobility and treatment compliance (Table 6).

Table 5. Ordinal regression analysis of CHF patient comprehensive self-care ability influencing factors; *: P<0.05.

Variable	b	S_b	WaldX^2	P
Constant term1	3.712	1.644	5.096	0.024
Constant term2	6.035	1.758	11.791	0.001
Education level	1.381	0.549	6.338	0.012*
Employment status	-0.668	0.644	1.077	0.299
Household average monthly income	1.030	0.401	6.599	0.010*

Discussion

The results of this study show that CHF patients with high self-care abilities only account for 8.8% (8/91) of the total sample, with 62.6% (57/91) at the low level of self-care ability. The average score for patient comprehensive self-care ability was 63.76 ± 16.32, in the medium to low ability range, which is consistent with previous research [12,13]. We also found that education level, employment status, household average monthly income, level of health education, and cardiac function grading were related to comprehensive self-care ability in CHF patients; sex and knowledge of the illness also influenced mobility; and education level, household average monthly income, employment status, and cardiac function grading serve as independent predictive factors for comprehensive self-care ability, amount of knowledge about the illness/CHF, mobility, and treatment compliance. This indicates that those with lower levels of education, lower incomes, and who are unemployed should have more attention paid to them because they are more likely to not be as

proficient at self-care. As such, targeted intervention measures are required to improve their self-care abilities.

*Table 6. Stepwise linear regression analysis of CHF patient comprehensive self-care ability and influencing factors upon dimensions, *: P<0.05; **: P<0.01.*

	Variable	unstandardized coefficient		standardized coefficient	t	P
		B	Standard deviation	trial version		
Comprehensive self-care ability	Constant	44.136	6.799		6.492	0.000
	Household average monthly income	7.067	2.041	0.343	3.463	0.001**
	Education level	10.389	3.675	0.280	2.827	0.006**
	Cardiac function grading	-4.811	2.198	-0.203	-2.189	0.031*
Information mastery	Constant	2.305	2.976		0.774	0.441
	Household average monthly income	3.946	1.124	0.340	3.510	0.001**
	Education level	6.715	2.013	0.323	3.335	0.001**
Mobility	Constant	31.416	2.092		15.015	0.000
	Cardiac function grading	-2.526	0.803	-0.325	-3.145	0.002**
	Employment status	-2.640	1.169	-0.233	-2.259	0.027*
Treatment compliance	Constant	30.947	2.139		14.466	0.000
	Employment status	-4.267	1.157	-0.367	-3.686	0.000**
	Cardiac function grading	-1.880	0.817	-0.229	-2.301	0.024*

Domestic and foreign research shows that individual factors like sex, employment status, education level, and financial status had an influence on self-care ability [14]. Wang et al. [15] found that education level was positively correlated with patients' abilities to self-manage medication, treatments, and administration of medication, and that higher education levels could facilitate compliance with adaptive healthy behaviours. Hailan et al. [16] discovered that males tended to have a greater need for medical help at the onset of CHF than females, that patients in poorer health engaged in fewer activities, and that patients with low incomes had lower levels of self-care ability. O'Connell et al. [17] found that, through multi-centre studies of CHF patient self-care behaviours, patients with poor financial status had lower levels of self-care abilities. Siabani

et al. [18] surveyed 225 CHF patients using a cross-sectional method, and found that patient self-care ability was positively correlated with education level. We also found that education level, employment status, and average household monthly income influenced self-care ability, and that male patients with higher education levels, employment, and high average household monthly incomes, had better self-care abilities. This indicates that in educating patients about self-care, education should be tailored in accordance with individual participant characteristics.

Previous studies showed that cardiac function grading, knowledge about the illness, and amount of health education could influence self-care ability. Cheng et al. [19] reported that patients with higher cardiac function gradings had worse cardiac function and were less able to live independently, which affected self-care ability to a degree. Rockwell et al. [20] reported that patients with higher cardiac function gradings experienced more symptoms, and that with worsening of cardiac function, patients understanding of CHF would grow deeper. Lv [21] also found that patient knowledge about CHF was related to cardiac function grading. Lv also reported that level of health education influenced patients' comprehensive self-care ability, and that patients who had received health education had better knowledge about their CHF, self-care abilities, and comprehensive self-care abilities than those who did not. Our research also found that self-care abilities were higher in patients who had received health education, who had low cardiac function gradings, and poor understanding of CHF. This indicates that enhancing CHF patient health education could improve patient self-care ability and ultimately improve their quality of life.

Through this survey, we found that self-care abilities in CHF patients were generally poor, still in the medium to low range, and influenced by several factors. Future studies are required to further understand and verify the factors influencing self-care ability in CHF patients, with a view to ultimately informing the development of targeted intervention measures aimed at improving self-care abilities, and ultimately, quality of life for these patients.

Statement of Ethical Approval

The study protocol was approved in writing by the Ethics Committee of Nantong University Affiliated Hospital, and patients who participated in the questionnaire survey all signed informed consent forms. All participants were informed of their right to withdraw from the study, and were told that their information would be kept confidential and anonymous, and used for no other purpose.

Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

Acknowledgements

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