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Perceived control attitude among heart failure patients in Oman: a multicenter study

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Heart failure (HF) is a global epidemic with a prevalence of over 64.3 million cases worldwide. Several factors account for the increase in the prevalence of HF. The most significant factor is the growing population of older adults. Other factors include improved treatment and survival after myocardial infarction, poorly controlled hypertension (HTN), and diabetes mellitus (DM). As a modifiable construct, perceived control can be improved to promote healthier lifestyle choices, such as self-care, and consequently better health outcomes. A person's perception of control is their conviction that they have the power to deal with adverse circumstances, like receiving an HF diagnosis, and produce favorable results, such as an improvement in symptom status. The objective of this study was to evaluate the factors influencing perceived control attitudes among patients with heart failure in Oman. In this sample of HF patients (N = 180), the mean perceived control attitude was 16.97 ± 2.25. Certain factors had higher effects than others. For example, females ($p = 0.006$), old age ($p < 0.001$), those who smoke ($p < 0.001$), current health compared to one year back ($p < 0.001$), higher ejection fraction ($p = 0.008$), and comorbidities ($p = 0.026$) have significant relationships with perceived control attitude. The perceived control attitude in this sample was found to be adequate. Female gender, old age, smoking, current health, higher EF, and comorbidities were the associated factors of a perceived control attitude. Thus, interventions targeting attitudes, barriers, and social support may improve perceived control. Clinicians should assess and manage perceived control to maintain or improve quality of life.

Keywords Oman, Heart failure, Control attitude, Self-care, Cardiovascular cystem

Heart failure (HF) is a global epidemic with a prevalence of over 64.3 million people worldwide, of whom 29.5 million are males and 34.8 million are females[1,2] Several factors are contributing to the rise in HF prevalence, the most significant of which is the expanding elderly population[3]. Other causes include improved treatment and survival after a myocardial infarction, poorly managed hypertension (HTN), and diabetes mellitus (DM)[2,3].

In Oman, HF is a major health issue, resulting in a lower quality of life as well as increased healthcare expenses, disability, and death. According to the Ministry of Health's Annual Report of 2018, approximately 25% of all hospital deaths were caused by cardiovascular diseases[4]. The estimation of HF with reduced ejection fraction (EF) (HF*r*EF) was as high as 56% in 2013[5]. The Arabian Gulf CARE study in 2015 reported that 69% of HF patients had HFrEF[5]. Over the last two decades, there has been a continuous increase in the reported cases of HF among people > 60 years of age[6]. Several countries have been able to control the rise in HF; in contrast, Oman has had the biggest percentage increase [25.8% (95% uncertainty intervals 17.8–35.0)] in the age-standardized prevalence rate of HF from 1990 to 2017 when compared to other countries[2].

HF has a significant impact on health outcomes. For example, HF affects health-related quality of life (HRQOL)[7]. HF symptoms of dyspnea, limb edema, and fatigue can affect patients' quality of life, resulting in disrupted sleep, inability to carry out routine daily activities, and diminishing cognitive function[7]. These complex HF symptoms frequently result in hospitalizations and emergency department (ED) visits, increasing the risk of death and health-care costs[1]. All of this can be minimized by self-care activities and a more positive attitude toward symptoms. Patients who improved their self-care had a much greater perceived control attitude than those who maintained consistent good self-care over time[8].

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Attitude is an expression of how one feels, and it has three components: affective, behavioral, and cognitive. The affective attitude component is concerned with the emotional side of a person. It encompasses a person's feelings and emotions about something. The behavioral component is how someone acts in reaction to their attitude toward something, and the cognitive component is made up of the actual beliefs that someone has[9]. Most behavioral change theories, including the theory of planned behavior, are founded on the intention-behavior link, which holds that behaviors are impacted by causes (e.g., intention is influenced by attitudes, perceived control, and social conventions)[10].

Perceived control is a well-studied concept that focuses on a person's idea that he or she can influence outcomes in stressful situations. In the field of HF, it is defined as a person's perception of control and confidence that they have the power to deal with adverse circumstances, like receiving a HF diagnosis, and produce favorable results, such as an improvement in symptom status[11]. It is commonly connected with the ability to successfully manage a chronic disease[12]. It was also found that a lower control attitude predicted worst symptom status in HF patients and better self-care was linked to perceptions of greater control[13]. It is expected that patients who believe they have more control over their conditions will practice better self-care, including effective symptom management and adherence to food and medicine, and so will have better symptom status than those who do not[11,14]. Accordingly, a perceived control attitude is linked to a better health related quality of life[15,16]. It also has an impact on emotional well-being and symptoms of depression[17]. The complex symptoms of HF require special management such as continuous symptoms monitoring. Living with family members was found to improve HF management[18], and almost all patients in Oman live within extended families and have good family support.

The aforementioned studies have revealed a gap in knowledge in the existing research. The examination of perceived control attitudes among individuals with heart failure represents a significant yet unexplored concept within the context of a Middle Eastern demographic such as Oman. This study aims to bridge the gap in the existing literature by providing insights into perceived control attitudes specifically within the context of Middle Eastern culture. By collecting data and analyzing the attitudes of individuals with heart failure within this demographic, the study seeks to enrich researchers' understanding of how perceived control is conceptualized and experienced within this cultural context. By shedding light on this previously unexplored aspect, the study will contribute valuable knowledge to literature, ultimately advancing scholarship and practices in the field. In short, the objective of this study is to evaluate the factors influencing perceived control attitudes among patients with heart failure in Oman.

Methods

Design

This was a cross-sectional study. Data was obtained from each participant at one point in time. By collecting data in this way, the study aimed to capture a comprehensive overview of perceived control attitudes among heart failure patients in Oman, offering valuable insights into the factors influencing these attitudes within this population.

Measures

Demographic and HF clinical information

Important demographic data (e.g., age, education, employment) was obtained from patients using an investigator developed tool. Relevant HF clinical information (e.g., EF, medications, HF type) was abstracted from the patient's hospital information system retrospectively from the onset of diagnosis.

Attitudes of perceived control

Attitudes of perceived control were measured via the CAS-R. The CAS-R assessed cardiac patients' perceived control in relation to managing their heart condition. It has eight items, each of which is measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The original CAS-R in HF demonstrated internal consistency through a Cronbach's alpha score of 0.63, and it showed good construct validity[19]. The tool was translated to Arabic by a professional translator, reviewed by experts in the field, and then back translated to English. The translated tool has been validated previously in the Omani population[25]. The alpha score for internal consistency reliability measured in this study for the Arabic version was 0.75.

Sample and sampling technique

Adults who were 18 years and older with a HF diagnosis, able to self-report on their experience, and are English or Arabic speakers were included in this study. Patients were excluded if they were found to have a record of cognitive impairment (e.g., Alzheimer's), major psychiatric disorders (e.g., depression), or a concurrent terminal illness (e.g., terminal cancers).

The sample size calculation was determined using G * Power software (version 3.1.9.7) and considering the most sophisticated test in this study, the linear multiple regression test of fixed model and a single coefficient. The protocol of the power analysis was set at tow tails, effect size f2 = 0.15, α error probability = 0.01, and power (1-β error probability) = 0.95. Accounting for 20% of possible missing data, the minimum sample size required was 148. The total recruited participants resulted in a sample size of 180 for this study.

Data collection

Following ethical approval, this study was conducted at tertiary care institutions located in five governorates in the north and south of Oman. Participants were approached for inclusion at their follow-up visits with their health care providers at the outpatient clinic. When they agreed to be included, they were either screened for inclusion immediately or called later for initial screening and confirmation of eligibility. Once eligibility was confirmed, an in-person meeting was scheduled where participants were informed of any risks and/or benefits

and of their rights and responsibilities related to this research project, and a research team member obtained written consent. Once participants were deemed eligible and consented to the study, a questionnaire was administered. Data collection was completed either in person or via phone calls, as determined by the participant. Data collection was done in a private space at each outpatient clinic to insure privacy. Data was collected from November 2021 to June 2022 (Table 1).

Data analysis

Data was checked for normality, variance, and homogeneity, and all assumptions were tested before statistical analysis. Descriptive statistics, including means and standard deviations, as well as frequencies and percentages, were used to describe key patient- and clinical-level characteristics in patients with HF. Bivariate correlation was used to test significant linear relationships between study variables (listed in Table 2) and the dependent variable of perceived control attitude. The resulting Pearson correlation coefficients using a two tailed test of significance were examined carefully to choose the variables to be entered in the regression model (significance was set at 0.05). The multivariate linear regression test was then used to test the associations between the dependent and independent variables. Significant variables were then entered into the regression model (i.e., alcohol history, exercise, current health, and health compared to one year ago). In addition, variables that are known to have a relationship from other research (i.e., age, gender, marital status, EF, comorbidities, and NYHA class) were added. Analysis was done using statistical package for the social sciences (SPSS version 23).

Ethical considerations

When patients got tired from filling in the questionnaire, the data collection session was divided for the patient's convenience and stopped at patient request. Before initiation, the study was reviewed and approved by the local Internal Review Board. Data collection was conducted in a way that ensures privacy of participants. All the information collected in this study was confidential. Documents with identifiers were locked in a separate cabinet in the investigator's office. Ethical Approval was sought and given from the Medical Research Committee at the Ministry of Health Oman, (MOH/CSR/20/11,605). Informed consent was obtained from all participants prior to data collection. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Results

Characteristics of the sample

Sociodemographic characteristics

This study consisted of 180 participants as described in Table 1. The overall age of the cohort was 70.28 ± 9.675 years. The sample was mostly males (51.7%), married (67.8%), and unemployed (72.2%). Most of the participants were uneducated (60.6%). Participants were mainly those who did not smoke (95.6%) and who did not drink alcohol (76.1%). Most of the participants indicated that they exercise (84.4%). Most of the participants also indicated that they were living with someone (99.4%) and had someone to confide in (98.9%) and rated social support as very good (83.3%), as detailed in Table 1.

Clinical characteristics

As described in Table 1, 50% of the participants indicated poor general health and 33.9% perceived their current health as fair. When compared with one year ago, 42.2% of the participants indicated having the same health level. Most of the participants recorded having three diseases or more (55%), and they are mostly within NYHA functional class II (62.8%). Primary HF etiology in this sample was mainly due to ischemic causes (65.6%). The most common type of HF is systolic (78.3%). The mean EF in this sample was 37.74 ± 10.737%, as detailed in Table 1.

Factors associated with control attitude in HF patients

The mean perceived control attitude in this sample was 16.97 ± 2.25, with a minimum score of nine and a maximum score of 20. The multivariate linear regression, adjusting for other factors in the model, showed that females ($p = 0.006$), being older in age ($p < 0.001$), smokers ($p < 0.001$), current health compared to one year ago ($p < 0.001$), higher levels of EF ($p = 0.008$), and having more comorbidities ($p = 0.026$) were associated with perceived control attitude. That is, those who are female were better than those who are male; with advancement in age perceived control attitude increases; and those who smoked were better than those who didn't. Those who had worse health now compared to one year ago had better control attitude, and higher EF levels were also associated with better control attitude. Those with three or more comorbidities also had better perceived control attitude scores compared to those who had only two diseases, as detailed in Table 3.

Discussion

Patients with HF usually have poor control of their symptoms, and the perception of loss of control is common among this cohort of patients[15]. Therefore, it is important to assess associated factors of perceived control attitude among HF patients. To the best of our knowledge, this is the first study to assess the associated factors of perceived control attitude among HF patients in Oman. We found that a perceived control attitude was prevalent among this sample of HF patients. Female gender, old age, smokers, current health compared to 1 year ago, and disease severity (EF) were significantly associated with perceived control attitude. Our findings confirm previous studies that showed that these were potential factors for effective control attitude among HF patients[15,20]. Compared to similar studies on the perceived control attitude, the participants in this sample were relatively healthier than those described in other studies[15]. Specifically, EF level, number of comorbidities, and health status compared

Sociodemographic characteristics		Frequency	Percent	Mean	SD
Age (years)	Minimum = 25, maximum = 91			70.28	9.675
Gender	Male	87	48.3		
	Female	93	51.7		
Marital status	Married	122	67.8		
	Unmarried	58	32.2		
Educational status	Have received formal education	71	39.4		
	Have not received any education	109	60.6		
Employment status	Employed	50	27.8		
	Unemployed	130	72.2		
	Do not have enough	43	23.9		
	Have enough	132	73.3		
	Have more than enough	4	2.2		
Smoking	Doesn't smoke	172	95.6		
	Smoking or had smoked	8	4.4		
Alcohol drinking	Do not drink alcohol	137	76.1		
	Drinking or has drunk in the past	43	23.9		
Exercise	Exercised	152	84.4		
	Do not exercise	28	15.6		
Live with another person	Yes	179	99.4		
	No	1	0.6		
Have someone to confide in	Yes	178	98.9		
	No	2	1.1		
Quality of social support	Poor	1	0.6		
	Satisfactory	6	3.3		
	Good	23	12.8		
	Very good	150	83.3		
Clinical characteristics					
General health	Poor	90	50.0		
	Good	90	50.0		
Perception of current health	Poor	29	16.1		
	Fair	61	33.9		
	Good	52	28.9		
	Very Good	32	17.8		
	Excellent	6	3.3		
Perception of current health compared to one year ago	Much worse now than 1 year ago	13	7.2		
	Somewhat worse now than 1 year ago	36	20.0		
	About the same as 1 year ago	76	42.2		
	Somewhat better now than 1 year ago	25	13.9		
	Much better now than 1 year ago	30	16.7		
Charlson comorbidity index	2 Diseases	34	18.9		
	3 Diseases	99	55.0		
	4 Diseases	37	20.6		
	5 Diseases	9	5.0		
	6 Diseases	1	0.6		
NYHA class	class 1	24	13.3		
	class II	113	62.8		
	class III	32	17.8		
	class IV	11	6.1		
Primary heart failure etiology	Ischemic	118	65.6		
	Idiopathic	1	0.6		
	Hypertensive	57	31.7		
	Valvular	4	2.2		
Heart failure type	Systolic	141	78.3		
	Diastolic	31	17.2		
	Mixed systolic and diastolic	8	4.4		
	Systolic	141	78.3		

Continued

Sociodemographic characteristics		Frequency	Percent	Mean	SD
Ejection fraction	Minimum = 15, Maximum = 65			37.74	10.737
Perceived control attitude	Minimum = 9, Maximum = 20			16.97	2.250

Table 1. Characteristics of the sample (N = 180).

	Pearson correlation (r)	Significance
Age	− 0.090	0.231
Gender	0.030	0.687
Marital status	− 0.117	0.118
Education	− 0.088	0.240
Employment	− 0.042	0.572
Finance	0.050	0.509
Smoking history	− 0.033	0.662
Alcohol history	0.201	**0.007**
Exercise	− 0.205	0.**006**
Live with another person	− 0.101	0.177
Have someone to confined in	− 0.117	0.119
Quality of social support	− 0.006	0.935
General health	0.248	**0.001**
Current health	0.251	**0.001**
Health now compared to 1 year ago	0.276	**0.000**
Ejection fraction	0.000	0.999
Charlson comorbidity index	0.024	0.745
NYHA class	− 0.102	0.172
Primary heart failure etiology	− 0.100	0.183
Heart failure type	− 0.063	0.403

Table 2. Correlation of the study variables with the total perceived control attitude score. Significance was set at 0.05. Significant values are given in bold.

Characteristic	β	t	*p*	95% Confidence interval	
				Lower bound	Upper bound
Gender: female	0.109	2.773	**0.006***	0.336	2.003
Age	0.336	5.153	< **0.001****	0.051	0.113
Marital status: unmarried	− 0.014	− 0.372	0.710	− 1.059	0.723
Smoking history: smoker	0.219	3.953	< **0.001****	1.789	5.367
Health compared to 1 year ago	0.177	5.497	< **0.001****	0.582	1.235
Ejection fraction	0.109	2.687	**0.008***	0.013	0.084
Comorbidities	0.127	2.252	**0.026***	0.085	1.300
NYHA class	− 0.069	− 1.661	0.099	− 1.159	0.100
Primary heart failure etiology	0.020	0.839	0.403	− 0.243	0.601

Table 3. Associated factors of perceived control attitude in heart failure patients' regression (N = 180). Significant values are given in bold. *NYHA* New York Heart Association Functional Classification. * < 0.01, ** < 0.001, significance (*p*) was set at < 0.05.

to one year ago indicated that this sample is relatively healthier. This may have contributed to the high scores in perceived control attitude.

Most of the participants indicated that they were living with someone and that they had someone to confide in. This may be one of the reasons why this sample had high control attitude scores. In their study, Heo et al. (2015) and Liljeroos et al. (2018) found that social support was positively related to perceived control attitude and, in turn, improved quality of life among HF patients[15,21].

Participants in this study were relatively younger than in other studies. We found that with an increase in age there is a related increase in perceived control attitude. This may be because of the maturity and experience that comes with management of the disease over time. Liljeroos et al. (2018) reported that the experience of HF

patients improved over time[21]. In this study, we also found that those who have higher EF readings and those with more comorbidities had better control attitudes towards their disease. This may be because they had to learn how to manage more than one disease at a time.

Interestingly, in the current study we found that those who were smokers also had better perceived control attitude scores. This may be explained by the younger age of those who smoked in this cohort. According to the Centers for Diseases Control and Prevention in the United States of America, quitting smoking can improve heart health and reduce the risk of cardiovascular diseases within the first year[22]. In addition, people with heart diseases who quit smoking after being diagnosed with heart disease had an improvement in quality of life compared with those who continued smoking[23] Therefore, we believe that health education given in the hospital for HF patients regarding smoking cessation is a key element in improving awareness and, thus, improving perceived control attitude among HF patients.

In this study we found that patients with current good health compared to one year ago had better perceived control attitude. This may be explained by the fact that they were in better health now by taking care of themselves in terms of recognizing symptoms, taking their medications, and consulting their health care providers. Educational programs that help in increasing knowledge regarding effective HF management could guide the development of strategies to improve perceived control attitude[15]. Another reason could be the provision of effective educational programs for healthcare professionals on the management of HF. For example, Demissie et al. (2021) reported that the majority of nurses (94.4%) had a positive perceived control attitude towards HF due to effective educational programs and comprehensive training[24].

Limitations

This study used a cross-sectional design, so causal relationships among the variables could not be examined. Further studies using longitudinal study designs are needed to determine whether improvements in attitudes, barriers, and social support result in improvements in perceived control. Indeed, conducting a multicentric study with a relatively small sample size can present challenges, especially in a country like Oman with a smaller population. The fact that heart failure is prevalent in less than 0.02% of the population underscores the rarity of this condition within the country[26]. Furthermore, factors such as the advanced age of heart failure patients and the severity of their symptoms can significantly impede their ability to participate in research studies, thereby complicating the data collection process. Moreover, the limited availability of heart transplant or assistive device services in Oman may contribute to a shorter life expectancy for heart failure patients following diagnosis. These factors collectively underscore the unique challenges faced in studying heart failure within the Omani context. Despite these challenges, it's important to acknowledge the efforts made in collecting data from this population, as even a small sample size can yield valuable insights that contribute to the understanding and management of heart failure. Researchers must continue to navigate these obstacles creatively and collaboratively to advance knowledge and improve outcomes for heart failure patients in Oman and beyond. Notwithstanding its limitations, the current study provides important information on factors affecting perceived control attitude to researchers and clinicians who take care of patients with HF.

Conclusion

In conclusion, the study findings indicate a predominance of a positive perceived control attitude within the sampled population. Factors such as gender, age, smoking status, current health compared to the previous year, ejection fraction (EF), and comorbidities were found to be significantly associated with perceived control attitude. Specifically, females exhibited higher levels of perceived control compared to males, while those who smoke displayed a greater sense of control compared to those who didn't smoke. Moreover, advanced age correlated with increased levels of perceived control, and individuals reporting worse current health compared to a year ago tended to exhibit a stronger sense of control. Additionally, higher EF readings were linked to a more favorable perceived control attitude. It is imperative for clinicians to recognize and address perceived control attitudes in their patients, as it can significantly impact health-related quality of life. Future research should delve deeper into this concept to better inform clinical interventions and strategies aimed at enhancing overall well-being. In addition, considering these findings, clinicians are encouraged to incorporate assessments of perceived control attitudes into their routine patient evaluations. By recognizing the influence of factors such as gender, age, smoking habits, health status, and EF on perceived control, healthcare professionals can tailor interventions to better support patients in managing their health and improving their quality of life. Strategies may include personalized counseling sessions aimed at enhancing patients' sense of control over their health outcomes, promoting healthier lifestyle choices, and providing targeted support for individuals facing specific challenges related to their perceived control attitudes. Additionally, integrating interventions that address perceived control into existing healthcare protocols can contribute to more holistic and patient-centered care approaches, ultimately leading to better health outcomes and enhanced patient satisfaction.

Data availability

The datasets generated and analyzed during the current study are not publicly available due to privacy and restrictions but are available from the corresponding author upon reasonable request.

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Author contributions

MA, designd the study and the proposal, collected data, analyzed, and drafted the initial draft. HA, provided suggestions on the final draft. AA, drafted part of the introduction. SA, drafted part of the introduction. MA, revised the discussion draft. IA, reviewed and enhanced the final draft. All authors approved the final manuscript.

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Competing interests

The authors declare no competing interests.

Additional information

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