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Knowledge level as a predictor of self-care in patients with heart failure

Nível de conhecimento como preditor de autocuidado em pacientes com insuficiência cardíaca

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Abstract

Background: Health education is an essential component of cardiovascular rehabilitation programs (CRP), particularly in the management of heart failure (HF), whose growing prevalence poses significant challenges to healthcare systems. Educational strategies that enhance knowledge and self-care may contribute to reducing complications and hospitalizations. **Aims:** To analyze the association between the level of knowledge about health conditions and self-care behaviors in people with heart failure, and to verify if this knowledge is an independent predictor of self-care. **Methods:** This cross-sectional study was conducted with 30 patients with a clinical diagnosis of heart failure (HF), enrolled in CRP at a public and private facility. Two validated instruments were used: Heart Failure Patient Disease Knowledge Questionnaire and Heart Failure Self-Care Assessment Instrument. Statistical analyses included Pearson correlation and multiple linear regression, adopting a significance level of 5% ($p < 0.05$). **Results:** A moderate and significant correlation was observed between knowledge and self-care ($r=0.56$; $p=0.0014$), although the level of self-care was considered adequate in only 16.7% of the sample. Multivariate analysis showed that knowledge appears to contribute to explaining these behaviors, even after adjusting for age and education ($p=0.0501$). **Conclusion:** The level of knowledge showed a positive and significant correlation with self-care. Furthermore, knowledge appears to play a relevant role in predicting this behavior, regardless of age or education level, reinforcing health education as a strategic and essential component in CRP.

Keywords: Self Care; Health Education; Heart Failure; Cardiac Rehabilitation.

Resumo

Introdução: A educação em saúde é componente essencial dos programas de reabilitação cardiovascular (RCV), sobretudo no manejo da insuficiência cardíaca (IC), cuja prevalência crescente impõe desafios significativos aos sistemas de saúde. Estratégias educativas que promovem maior conhecimento favorecem o autocuidado e estão associadas à redução de complicações e hospitalizações. **Objetivo:** Analisar a associação entre o nível de conhecimento sobre a condição de saúde e os comportamentos de autocuidado em pessoas com IC e verificar se esse conhecimento é preditor independente do autocuidado. **Métodos:** Estudo transversal realizado com 30 pacientes com diagnóstico de IC, vinculados a programas de RCV de um serviço público e privado. Foram aplicados dois instrumentos validados: Questionário de Conhecimento da Doença para Pacientes com Insuficiência Cardíaca e o Instrumento de Avaliação de Autocuidado para Pessoas com Insuficiência Cardíaca. Para análise dos dados foram utilizadas a correlação de *Pearson* e a regressão linear múltipla, adotando-se nível de significância de 5% ($p < 0,05$). **Resultados:** Observou-se uma correlação moderada e significativa entre conhecimento e autocuidado ($r=0,56$; $p=0,0014$), embora o nível de autocuidado tenha sido considerado adequado em apenas 16,7% da amostra. A análise multivariada mostrou que o conhecimento parece contribuir para a explicação desses comportamentos, mesmo após o ajuste por idade e escolaridade ($p=0,0501$). **Conclusão:** O nível de conhecimento apresentou correlação positiva e significativa com o autocuidado. Além disso, o conhecimento parece exercer um papel relevante na predição desse comportamento, independentemente da idade ou escolaridade, reforçando a educação em saúde como componente estratégico e essencial nos programas de RCV.

Palavras-chave: Autocuidado; Educação em Saúde; Insuficiência Cardíaca; Reabilitação Cardíaca.

INTRODUCTION

Heart failure (HF) is considered a major public health problem, representing one of the leading causes of morbidity and mortality worldwide, and placing a significant burden on healthcare systems due to the high costs of hospitalization and long-term treatment[1].

Clinically, HF is a complex syndrome characterized by the heart's inability to supply sufficient blood to meet the metabolic demands of the tissues; in many cases, increased filling pressures are required to maintain adequate cardiac output[2]. The presence of HF directly compromises patients' quality of life (QoL), with factors such as advanced functional class (NYHA III and IV), history of hospitalizations, and emotional symptoms — especially anxiety — being important predictors of poorer QoL[3].

In this context, health education is a key practice for strengthening autonomy in health care and is recognized as a strategic tool for improving health literacy, especially in chronic conditions such as heart failure. It is a continuous, dialogic process centered on patients' needs aimed at fostering understanding of the health condition, its risk factors, and daily management strategies. Thus, it surpasses the mere transmission of information, playing a transformative role by promoting sustained behavioral changes and self-care.

Educational interventions have shown a positive impact on both clinical indicators and quality of life. Furthermore, the involvement of professionals from different fields promotes interdisciplinary approaches, strengthening the therapeutic relationship and fostering patient empowerment in the care process.

Self-care is also an essential component of HF management, encompassing routine behaviors such as weight monitoring, salt restriction, adherence to medication, physical exercise, and attendance at medical appointments[4]. The effectiveness of these practices is directly linked to the patient's ability to understand their clinical condition, highlighting the importance of health education as an intervention strategy[5,6]. Cardiovascular rehabilitation (CVR) programs led by multidisciplinary teams have proven effective not only in the patient's clinical and functional recovery but also in raising awareness and adherence to treatment[7].

The use of validated instruments to assess disease knowledge and self-care levels has proven effective in clinical and educational settings, enabling targeted interventions that promote significant behavioral changes in this patient population[8,9]. Therefore, considering the key role of health education in HF, this study aimed to investigate the association between the knowledge level of the health condition and self-care behaviors in individuals with HF and to assess whether this knowledge is an independent predictor of self-care.

METHODS

Sample

Participants with a clinical diagnosis of heart failure were recruited on a convenience basis from two different healthcare settings: a CVD outpatient clinic at a teaching hospital located in the city of Juiz de Fora, in the state of Minas Gerais, and a private CVD clinic located in the city of Sete Lagoas, in the state of Minas Gerais, between August and December 2024. Participants aged 18 years or older who had been enrolled in the programs for at least one month and no more than three months were eligible for inclusion.

The clinical diagnosis of HF was previously established by a cardiologist based on clinical evaluation, diagnostic tests, and medical records. We excluded individuals who, due to sensory limitations (such as severe visual impairment) or illiteracy, were unable to understand or respond appropriately to the assessment instruments used and who had previously participated in structured health education programs specifically focused on heart failure.

All participants who voluntarily agreed to participate in the study were informed of the study's objectives, procedures, and potential risks, and signed the Informed Consent Form (ICF). The study was approved by the Research Ethics Committee of the Faculty of Medical and Health Sciences of Juiz de Fora (FCMS/JF - SUPREMA), city of Juiz de Fora, state of Minas Gerais, Brazil, CAAE 82933624.5.00000.5103.

Instruments and measurements

Participants first completed a structured medical history interview to collect sociodemographic and clinical data using a questionnaire developed by the researchers. Subsequently, they completed two questionnaires designed to assess their knowledge of the disease and their HC-related self-care behaviors. The questionnaires were administered by pre-trained interviewers through face-to-face interviews, with a single interviewer assigned to each clinic.

Questionnaire About Heart Failure Patients' Knowledge of Their Disease

The Questionnaire About Heart Failure Patients' Knowledge of Their Disease was developed and validated in 2014[8]. It consists of 19 items, divided into ten areas deemed critical for the education of patients with heart failure. The items cover the following topics: pathophysiology of the syndrome, concept of the syndrome, risk factors, signs and symptoms, lifestyle habits, diagnosis, medications, treatment, self-care, and physical exercise. Each question presents four multiple-choice options, classified as "correct," "incomplete," "incorrect", and "I don't know."

The following scores are assigned to the responses: correct = 3; incomplete = 1; incorrect = 0; I don't know = 0. The sum of the scores determines the patient's overall level of knowledge, with 57 points being the maximum possible score. The higher the score, the greater the knowledge by the patient. For score analysis, the results were categorized into five knowledge ranges, as proposed by the instrument: optimal knowledge (51 to 57 points), good (44 to 50 points), acceptable (38 to 43 points), limited knowledge (30 to 37 points), and insufficient knowledge (below 30 points). This classification allows for a qualitative assessment of the level of knowledge demonstrated by the participants.

Self-Care of Heart Failure Index (EAC-IC)

The Self-Care of Heart Failure Index (EAC-IC) was developed in 2003 and validated in Portuguese in 2013[9]. The instrument consists of three sections: Section A contains 10 questions that assess how often the patient follows the guidelines received regarding heart failure. Responses are dichotomous ("yes" or "no"); there is no "I don't know" option. Section B: contains three key questions regarding the presence of signs and symptoms of the disease. Patients who answer "yes" must indicate how they reacted to the symptoms, with responses scored on a Likert scale from 1 (did not recognize) to 4 (recognized immediately); Section C: addresses the patient's confidence regarding their knowledge of the disease, symptom management, and medication adherence, also using a Likert scale. The total score obtained across the three sections reflects the patient's level of self-care, which is considered adequate for a total EAC-IC score of 70 or higher.

Statistical analysis

First, the normality of the continuous variables was tested by the Shapiro-Wilk test. The sample was characterized using descriptive statistics, including means, standard deviations, and absolute and relative frequencies. The association between the participants' knowledge and self-care levels were assessed by Pearson's correlation. The following cutoff points were used to interpret the magnitude of the correlations: $r < 0.30$ (low), between 0.30 and 0.69 (moderate), and ≥ 0.70 (high). Subsequently, a multiple linear regression model was fitted, with the self-care score as the dependent variable. The following independent variables were included: knowledge score, age, and education level (as categorical variables) to identify independent predictors of self-care in patients with HF. The model was evaluated based on the adjusted R^2 value, F-test, standardized coefficients, and respective p-values. All analyses were performed on R software (version 4.3.1, R Core Team, Vienna, Austria) with a significance level of 5% ($p < 0.05$).

RESULTS

The sample consisted of 30 individuals with a clinical diagnosis of heart failure. All participants initially included in the study completed the stages of the research protocol; there were no losses to follow-up, refusals, or exclusions. Table 1 provides the sociodemographic characteristics of the participants.

Table 2 presents the scores obtained from the questionnaires regarding knowledge and self-care, respectively. Only 16.7% of participants achieved the optimal score (51–57 points) for knowledge, while 83.3% of did not achieve the ideal score for adequate self-care.

Figure 1 shows the correlation between the knowledge and self-care scores of the study participants. There is a positive linear trend between the variables, as shown by the trend line. Pearson's correlation analysis demonstrated a moderate and statistically significant association ($r = 0.56$; $p = 0.0014$), suggesting that higher levels of knowledge are associated with better self-care behaviors in patients with HF.

A multiple linear regression model was fitted to assess whether knowledge could predict self-care (Table 3), controlling for the variables age and education level (at multiple levels). The knowledge score showed a borderline association with self-care (coef. = 0.35; $p = 0.0501$), even after adjusting for the other variables, reinforcing the importance of educational strategies in the context of CVD prevention, given that knowledge may have a direct influence on self-care behaviors in patients with HF.

Table 1. Participants' sociodemographic characteristics (n=30).

Variables	Values
Sex n (%)	
Male	46.7
Female	53.3
Age (years)	61.3 ± 13.1
Body mass (kg)	82.6 ± 16.4
Height (m)	1.65 ± 0.1
BMI (kg/m²)	30.2 ± 6.6
Education n (%)	
Incomplete elementary education	15 (50%)
Complete elementary education	1 (3.3%)
Incomplete secondary education	1 (3.3%)
Complete secondary education	8 (26.7%)
Incomplete higher education	0
Complete higher education	5 (16.7%)

BMI: Boy Mass Index.

Source: elaborated by the authors.

Table 2. Results of the knowledge and self-care scores in heart failure (n=30).

Level of knowledge	Values
Great	5 (16.7%)
Good	6 (20%)
Acceptable	7 (23.3%)
Little knowledge	5 (16.7%)
Insufficient knowledge	7 (23.3%)
Level of self-care	**Values**
Adequate self-care (EAC-IC ≥70)	5 (16.7%)
Inadequate self-care (EAC-IC < 70)	25 (83.3%)

Source: elaborated by the authors.

DISCUSSION

The main finding of this study is the significant correlation between knowledge and self-care scores in individuals with HF, indicating that higher levels of knowledge about the health condition are associated with more appropriate behaviors and fewer complications. These findings reinforce evidence from the literature suggesting that knowledge of the health condition can contribute to better self-care practices. However studies indicate that this knowledge alone does not always result in behavioral change[10].

The study found that 63.3% of participants had a knowledge level below that considered adequate, a percentage similar to that reported by Bonin et al.[8], who identified insufficient knowledge in 55.2% of individuals with HF. It is worth highlighting that the participants in this study had been enrolled in CVD risk reduction programs for a relatively short period, which may have negatively influenced the scores achieved. Longitudinal studies demonstrate that systematic educational interventions throughout CVD prevention programs can promote significant improvements in patients' knowledge after 8 to 12 weeks of follow-up[11]. Thus, the results presented here highlight an initial gap in health education for patients with HF, reinforcing the importance of ongoing strategies throughout the programs to promote sustainable gains in knowledge.

Only 16.7% of participants achieved a self-care score considered adequate, corroborating the findings of other studies conducted with outpatients and hospitalized patients[10-12]. This low adherence to self-care practices is concerning as it is associated with increased rehospitalization rates, poorer quality of life, and a higher risk of mortality[13].

Among the potential factors that limit self-care in patients with heart failure, the following stand out: low health literacy, cognitive impairment, the presence of depressive symptoms, and a high number of comorbidities[14-16]. Furthermore, studies indicate that lower knowledge about the disease is associated with poorer medication adherence, lower quality of life, and difficulty in recognizing signs of decompensation[17].

In addition to the correlation analysis, the proposed regression model yielded a p-value of 0.0501, suggesting that knowledge may play a significant role in explaining self-care behaviors. Although age and educational level showed no statistically significant association with the outcome, their inclusion in the model was methodologically relevant to account for the potential influence of these factors in the context of HF management.

One of the strengths of this study is the use of validated and culturally adapted instruments for the Brazilian population, which ensures greater accuracy and reliability in the data obtained. Furthermore, the research was conducted in two different healthcare settings (public and private), which contributes to the diversity of the sample and enhances the applicability of the findings to different healthcare scenarios. Furthermore, we must consider that in low- and middle-income countries, such as Brazil, studies show lower levels of knowledge about heart failure and less engagement in self-care practices, often associated with limited resources, lower educational attainment, and structural challenges in health services[18]. This underscores the importance of using validated instruments and educational strategies adapted to the local sociocultural context.

The relevance of this research lies in the growing need to promote patient-centered care strategies[13], which incorporate health education as a key tool for improving clinical outcomes in chronic conditions such as heart failure, given that this clinical syndrome is a highly prevalent condition associated with high morbidity and mortality and high costs to healthcare systems. In this context, understanding the factors that influence patients' behavior in the face of the disease is critical to developing more effective therapeutic strategies.

Limitations of this study include the sample size, which may have limited the statistical power and generalizability of the results. Furthermore, the cross-sectional nature of the study precludes the establishment of causal relationships between the variables analyzed. The lack of assessment of the time of HF diagnosis or the duration of participation in CVD prevention programs is also a limitation, since these factors could directly influence patients' level of knowledge and self-care behaviors.

Despite these limitations, our findings underscore the importance of health education as a strategic component in the care of patients with HF[19-21]. CVD prevention programs should systematically incorporate individualized and ongoing educational interventions, promoting greater knowledge about the disease and encouraging self-management. Further research involving larger samples and longitudinal methodologies may provide greater insight into the impact of knowledge on objective

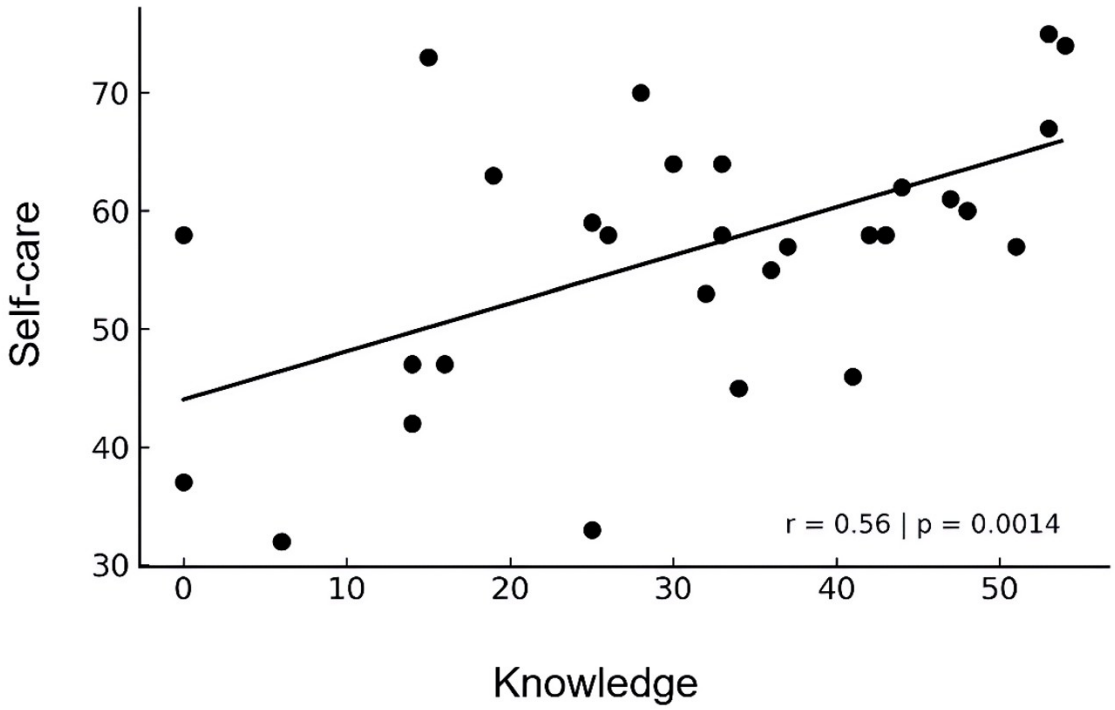

Figure 1. Correlation between the disease knowledge score (0–57 points) and the self-care score (EAC-IC, 0–100 points) in individuals with heart failure (n=30).

Table 3. Multiple linear regression model to assess whether knowledge can predict self-care (n=30).

Variable	Coefficient	Standard deviation	t	p-value
Constant	66.2837	14.5096	4.57	0.0002
Knowledge	0.3459	0.1668	2.07	0.0501
Age	-0.3088	0.2037	-1.52	0.1437
Incomplete elementary education (vs. complete elementary education)	-9.3750	14.9304	-0.63	0.5365
Complete secondary education (vs. complete elementary education)	-8.0831	15.5944	-0.52	0.6094
Incomplete secondary education (vs. complete elementary education)	-8.6307	14.7335	-0.59	0.5640
Complete higher education (vs. complete elementary education)	-5.2115	13.2118	-0.39	0.6970

Source: elaborated by the authors.

clinical outcomes, such as hospitalizations, treatment adherence, and quality of life.

CONCLUSION

This study found a moderate, statistically significant positive correlation between knowledge about HF and self-care behaviors, indicating that a better understanding of the health condition promotes more appropriate self-care practices. According to the prediction model, the knowledge score showed a tendency to be an independent predictor of self-care, indicating that this variable appears to contribute to explaining such behaviors regardless of the participants' age or educational level. Although the regression result is borderline, possibly due to the small sample size, the consistency of the findings reinforces health education as a strategic and key component in CVD prevention programs to foster self-management and help improve clinical outcomes in this population.

FUNDING

None to declare.

CONFLICT OF INTEREST

None to declare.

RESEARCH DATA AVAILABILITY

Research data are available only upon request.

ARTIFICIAL INTELLIGENCE USE STATEMENT

AI was not used at any stage of the manuscript's production.

AUTHOR CONTRIBUTIONS

Bruno Rabite Dornelas: study design; methodology; formal analysis; data curation; original draft writing; supervision. Letícia Rocha Mussel: investigation; data curation; writing, review, and editing. Raiane Costa Mendes: investigation; data curation; writing, review, and editing. Lays Augusto da Silva de Castro Lima: investigation; data curation; writing, review, and editing. Manuella Bennaton Cardoso Vieira Rehfeld: investigation; data curation; writing, review, and editing. Ana Flávia Ferreira: investigation; data curation; writing, review, and editing. Anne Caroline Andrade Oliveira: investigation; data curation; writing, review, and editing. Patricia Fernandes Trevizan: methodology; formal analysis; writing, review, and editing. Ana Paula Ferreira: formal analysis; statistical methodology; writing, review, and editing; supervision.

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