

Portuguese translation, adaptation and validation of Control Attitudes Scale Revised (CAS-R) in people with heart disease

Tradução, adaptação cultural e validação para português da *Control Attitudes Scale-Revised* (CAS-R) em pessoas com doença cardíaca

Traducción al portugués, adaptación y validación de la *Control Attitudes Scale Revised* (CAS-R) en Enfermos Cardíacos

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Abstract

Perceived control is a construct which focuses on individual psychosocial characteristics, and its study has been primarily focused on individuals who go through situations of health/disease, such as cardiovascular diseases, with possible adverse effects on their physical and psychological well-being. The aim of this study was to translate, linguistically and culturally adapt, and validate the portuguese version of the *Control Attitudes Scale – Revised* (CAS-R).

The sample consisted of 160 cardiac patients admitted to the cardiology services/ICCU of three hospitals in the north of Portugal. The principal component analysis revealed the one-dimensional structure of the scale, as had been proposed by the authors, and an acceptable *Cronbach's alpha* ($\alpha = 0.65$) was obtained.

Discriminant validity testing showed a negative relation between perceived control and anxiety and depression. The portuguese version of the CAS-R proved to be a suitable instrument to assess perceived control in cardiac patients and help identify the patients who present greater difficulties in the self-management of the disease and treatment. Even though this instrument shows acceptable validity and reliability, further psychometric studies are needed to ensure measurement accuracy.

Keywords: perceived control; cardiovascular diseases; validation studies.

Resumo

O controlo percebido é um constructo que se inscreve nas características psicossociais individuais. O seu estudo tem-se reportado essencialmente a indivíduos que passam por situações de saúde/doença, como as doenças do foro cardiovascular, potencialmente geradoras de resultados nefastos no seu bem-estar físico e psicológico.

Este estudo teve como objetivo traduzir, adaptar linguística e culturalmente e validar para português a *Control Attitudes Scale Revised* (CAS-R). A amostra foi constituída por 160 doentes cardíacos, internados em serviços de cardiologia/UCIC de três hospitais do Norte de Portugal. A análise de componentes principais indicou uma estrutura unidimensional da escala, tal como a proposta pelas autoras. Obtivemos um *Alpha de Cronbach* aceitável ($\alpha = 0.65$). A validade discriminante revelou uma relação negativa entre o controlo percebido e a ansiedade e depressão. A versão portuguesa da CAS-R mostrou ser um instrumento ser um instrumento adaptado para avaliar a perceção de controlo em pessoas com doença cardíaca, importante para ajudar a sinalizar os doentes cardíacos com maiores dificuldades de autogestão da sua doença e tratamento. Apesar de apresentar uma aceitável fidelidade e validade, necessita que sejam realizados novos estudos psicométricos que assegurem o rigor na sua mensuração.

Palavras-chave: controlo percebido; doenças cardiovasculares; estudos de validação.

Resumen

La percepción del control es un concepto que se adapta a las características psicossociales individuales y cuyo estudio ha incidido principalmente en personas que pasan por situaciones de salud/enfermedad, como es el caso de las enfermedades del sistema cardiovascular, que potencialmente pueden generar resultados nefastos para el bienestar físico y psicológico.

El objetivo de este estudio fue traducir, adaptar lingüística y culturalmente, y validar la *Control Attitudes Scale Revised* (CAS-R) para el portugués. La muestra estuvo constituida por 160 pacientes cardíacos ingresados en cardiología / UCIC de tres hospitales en el norte del país. El análisis de los componentes principales atribuyó una estructura unidimensional a la escala, tal como fue propuesto por las autoras. Así, obtuvimos un *Alpha de Cronbach* aceptable ($\alpha = 0.65$). La validez discriminante mostró una relación negativa entre el control percibido, la ansiedad y la depresión. La versión en portugués del CAS-R demostró ser un instrumento adecuado para la evaluación de la percepción de control en personas con enfermedad cardíaca y un elemento importante para ayudar a identificar a los pacientes cardíacos con mayores dificultades para la autogestión de su enfermedad y tratamiento. A pesar de presentar una fiabilidad y validez aceptable, es necesario que se realicen nuevos estudios psicométricos para asegurar la precisión en su medición.

Palabras clave: control percibido; enfermedades cardiovasculares; estudios de validación.

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Introduction

The influence of Perceived Control (PC) on health is based on the control and the capacities of each individual to control potentially negative events. Mardiyono, Songwathana, and Petpichetchian (2011, p. 236) define it as "(...) Perceived control is personal belief that refers to controllability on behalf of one's self and ability to control threats or events". Control perceptions have proven to be important predictors of social behaviour and functioning. They are central constructs in motivational theories, such as Ajzen's Theory of Planned Behaviour and Bandura's Social Cognitive Theory. The definition of this construct has still little consensus as it is defined by several theories, thus its meaning is still ambiguous. However, it has to be understood as a personality characteristic which contributes to the psychosocial adjustment of individuals when exposed to threatening events (Jacelon, 2007; Mardiyono et al., 2011) and is able to minimize negative responses to adverse life events (Beckjord, Glinder, Langrock, & Compas, 2009). Despite being a personality characteristic, it is not immutable, rather it can be increased, particularly through educational interventions (Moser & Dracup, 2000; Moser & Watkins, 2008; Moser et al., 2012).

Evidence shows that high levels of PC are associated with low levels of psychological distress (Moser & Watkins, 2008). Research on this concept has demonstrated that high levels of PC are strongly associated with and, in some cases, are predictive of better physical and mental health (Beckjord et al., 2009). Since anxiety and depression are factors which have a negative influence on the quality of life of individuals and are indirectly related to PC, the higher the levels of perceived control, the better the quality of life will be (Moser & Watkins, 2008). Several researchers have been discussing the importance of this concept to the specific area of cardiovascular disease (CVD). Moser and Watkins (2008), and Moser et al. (2009) show that quality of life and psychosocial adaptation to the chronicity of the disease, as well as the success of psychosocial recovery from acute cardiac events, depend more on psychological than on physical factors. The main objective is to successfully prepare the adaptation of individuals to their cardiovascular conditions. PC mitigates the negative impact of anxiety on intra-hospital complications, namely post-acute myocardial infarction complications, including

recurrent ischemia, reinfarction and malignant arrhythmia (Moser et al., 2009). A study by McKinley et al. (2012) reinforces this conclusion by referring that low perceived control was predictive of post-acute coronary syndrome (ACS) complications. In addition to the scientific evidence on the positive role of PC in individuals with cardiovascular diseases such as acute myocardial infarction (AMI) and heart failure (HF), Vollman, Lamontagne, and Wallston (2009) also refer the role of this construct in individuals with other chronic diseases such as diabetes, cancer, mental illness and rheumatoid arthritis. Additionally, Moser and Watkins (2008) mention the positive role of control perceptions in increasing adherence to the therapeutic regimen in individuals with diabetes, patients undergoing cardiac rehabilitation, hypertensive patients, alcoholics and older people. The association between PC and better psychosocial adjustment, less anxiety, depression, emotional stress and self-esteem improvement in both acute and chronic diseases is currently clear (Vollman et al., 2009).

Based on these assumptions, important theoretical and clinical implications for health professionals emerge. In nursing, some of these implications relate to the development of interventions capable of increasing PC levels in individuals with heart disease, thus contributing to reducing post-ACS complications (McKinley et al., 2012). It is therefore urgent to identify individuals who are more likely to suffer from psychosocial stress after a cardiac event. This will allow health professionals to develop interventions aimed at reducing most negative effects of the health/illness processes and improving adaptation to health conditions. In groups of patients with chronic disease, this nursing intervention is of utmost importance due to the high degree of disease and therapeutic regime self-management, thus leading to a better management of the disease and associated symptoms (Moser et al., 2009).

The importance of PC in health outcomes, particularly in the cardiovascular area, and the lack of a specific instrument capable of assessing perceived control in cardiac patients in Portugal impelled us to translate, adapt and validate an instrument to measure this construct in Portugal. This instrument was based on a similar one already used in the United States.

This research paper is the result of a master's thesis carried out within the scope of Nursing Science at the

Institute for Biomedical Sciences Abel Salazar of the University of Porto.

This study aimed to translate, linguistically and culturally adapt, and validate to Portuguese the *Control Attitudes Scale – Revised* (CAS-R) developed by Moser et al. (2009).

Methodology

The process of translation, cultural adaptation and validation of the CAS-R used a set of procedures in order to ensure the linguistic, cultural and metric equivalence of the concepts under analysis. As a way to implement the translation and cultural adaptation processes, a quantitative and methodological study was carried out taking into account the recommendations of Polit, Beck, and Hungler (2004) and Ribeiro (1999) concerning its characteristics.

A form for data collection was applied by the researcher. The interview was the technique used for that purpose, as well as the following instruments: a sociodemographic and clinical characterization questionnaire designed by the researcher; the Portuguese version of the Hospital Anxiety and Depression Scale (HADS) by Pais-Ribeiro et al. (2007); and the CAS-R by Moser et al. (2009), translated into Portuguese and adapted to the Portuguese context in this study.

Data were analysed using the software *Statistical Package for Social Sciences (SPSS)*, version 19. Parametric statistics and the criteria described by Ribeiro (1999) were used to assess the psychometric properties of the data.

All ethical principles for conducting research were applied throughout the research process (Fortin, 2009). We highlight the following procedures: permissions were obtained from the authors of the scales applied in the study and from the ethics committees of the hospitals where data were collected, as well as the informed consent of every participant in the study.

Instrument

The CAS-R was originally developed by Moser et al. (2009). As the original version, the Portuguese version (which was translated and adapted to the Portuguese culture) is composed of eight statements. The scale aims to assess the level of

perceived control of people with heart disease based on their level of agreement with each statement, in a 5-point Likert-type scale. The total score of the scale ranges from 8 to 40, in which the higher the score, the higher the level of perceived control. The total score is the sum of the eight items, although the score of statements 5 and 8 is reversed. It can be applied through a self-administered questionnaire or an interview.

Translation and cultural adaptation process

After permission was granted by the authors, the CAS-R was translated and adapted, using the methodology described by Ribeiro (1999), namely: the translation of the scale into Portuguese, while keeping the structure and characteristics of the original scale. The translation was performed by the researcher, the study's supervisor and a researcher in the area of health care with basic training in Psychology and a PhD in Public Health. The back-translation was performed by an independent translator (English language teacher/expert), who had no previous knowledge of the original scale. Both versions of the scale (original and back-translation) were compared so as to achieve its linguistic adaptation, and no significant differences were found between them. All items of the scale were then analysed and discussed by the experts (English teacher, psychologist, researcher and supervisor) in order to analyse the cultural connotation of each item and whether its meaning was similar to the original. The final consensual version was then applied to ten participants so as to think aloud on the questionnaires (pilot study). After the completion of the instrument, the participants (not included in the main study) were asked if the statements were easy to understand and relevant and if the questionnaire was easy to fill. Hence, it was possible to assess whether the terms used were easily understood and acceptable by the respondents. All respondents reported a good understanding and acceptance of the statements. The scale's response time varied between two and three minutes.

Participants

An intentional sample was used to validate the Portuguese version of the CAS-R (Polit et al., 2004). The sample was composed of 160 patients hospitalized in cardiology units and Intensive Care Cardiology Units (ICCU) of three hospitals in the northern

region of Portugal. The sample was composed using the following criteria: patients ≥ 18 years; oriented in time and space (without cognitive changes); stable from a hemodynamic perspective; who accepted to participate in the study; and who were hospitalized for at least 24 hours. Data collection took place between January and April 2011.

The size of the sample is an essential factor to achieve reliability, particularly when studying the psychometric characteristics of an instrument. Given that there are no ideal indicators for the proper size of a sample, the rule of Tinsley and Tinsley (1987, cited by Ribeiro, 1999) to use at least five subjects for each measured variable was followed.

The study sample obtained through descriptive statistics was mostly composed of men (65%), with a mean age of 62.17 years ($SD=11.79$), catholic (92.5%) and resident in the district of Porto (62.5%) and Braga (36.3%). As for their civil status, participants were mostly married or in a non-marital partnership (79.4%); most of them lived with their spouse, spouse and children or with one of the parents (74.4%), most of them lived on average with 1.89 people ($SD=1.38$). As for education, most participants had a very low level of education, i.e. an average of 5.54 years ($SD=3.73$), with a mode and a median equal to 4. Regarding professional activity, most were retired (60%), and (26.3%) were employees. The main diagnoses on admission were AMI (58.8%), followed by HF (16.9%) and unstable angina (UA) (13.8%). As for treatment, most individuals had undergone angioplasty (41.6%), followed by medical treatment (40.6%) and cardiac surgery (18.1%).

Results

In order to assess the main psychometric properties of the Portuguese version of the CAS-R in the study sample, construct validity and instrument reliability were tested.

Construct Validity

In order to test CAS-R construct validity and adapt its structure to Portuguese linguistic and cultural characteristics, we conducted a principal component analysis, tested item convergent and discriminant validity with the subscales found and used the discriminant analysis with the Portuguese version of the HADS. In these tests, we tried to reproduce the procedures followed by the authors of the scale.

Items with a factor loading lower than 0.40, and items that decreased its subscale's internal consistency (*Cronbach's Alpha*) (Polit et al., 2004) were excluded.

In order to understand whether perceived control was a one-dimensional or a multidimensional construct in the Portuguese context, an exploratory principal component analysis (PCA) with varimax orthogonal rotation and Kaiser Normalization was performed. To this end, the eigenvalues-greater-than-1 criterion was applied. From this analysis, three factors with an explained variance of 58.13% (26.06% for the first factor, 16.11% for the second factor, and 15.95% for the third factor) emerged, with a total Cronbach's Alpha of 0.65 (0.70 for the first factor, 0.31 for the second factor and 0.39 for the third factor) (Table 1).

TABLE 1 – Exploratory Principal Component Analysis with Varimax Rotation and Kaiser Normalization

Scale Items				
	1	2	3	H2
1 - If I do all the right things, I can successfully manage my heart condition.		0.821		0.741
2 - I can do a lot of things myself to cope with my heart condition.	0.490			0.416
3 - When I manage my personal life well, my heart condition does not bother me as much.		0.633		0.546
4 - I have considerable ability to control my symptoms.	0.754			0.649
5 - No matter what I do, or how hard I try, I just can't seem to get relief from my symptoms.			0.879	0.786
6 - I am coping effectively with my heart condition.	0.737			0.569
7 - Regarding my heart problems, I feel lots of control.	0.783			0.632
8 - Regarding my heart problems, I feel helpless.			0.469	0.311
% Explained Variance (Total 58.13%)	26.06	16.11	15.95	
<i>Cronbach's Alpha</i> (Total 0.65)	0.70	0.31	0.33	

The factor structure analysis did not contribute to explaining the construct, even when the current theoretical frameworks that define the concept of perceived control are taken into account (Jacelon, 2007; Moser et al., 2009; Mardiyono et al., 2011). Therefore, another PCA was carried out, using a forced two-factor solution and following the procedure of the authors of the scale (Moser et al., 2009). Through an analysis with rotation, with two forced factors

(Table 2), an explained variance of 44.93% (26.41% for the first factor and 18.51% for the second factor), with a total Cronbach's Alpha of 0.65 (0.70 for the first factor and 0.36 for the second factor) was obtained. However, this two-dimensional structure grounded on the theoretical construct to be measured was also not very consistent (Moser & Dracup, 2000; Moser et al., 2009; Mardiyono et al., 2011).

TABLE 2 – Principal Component Analysis with Varimax Rotation and Kaiser Normalization, using a two-factor solution

Scale Items			
	1	2	H2
1 - If I do all the right things, I can successfully manage my heart condition.		0.657	0.442
2 - I can do a lot of things myself to cope with my heart condition.	0.474	0.428	0.407
3 - When I manage my personal life well, my heart condition does not bother me as much.		0.717	0.545
4 - I have considerable ability to control my symptoms.	0.788		0.640
5 - No matter what I do, or how hard I try, I just can't seem to get relief from my symptoms.		0.366	0.198
6 - I am coping effectively with my heart condition.	0.690		0.485
7 - Regarding my heart problems, I feel lots of control.	0.793		0.631
8 - Regarding my heart problems, I feel helpless.		0.435	0.247
% Explained Variance (Total 44.93%)	26.41	18.51	
Cronbach's Alpha (Total 0.65)	0.70	0.36	

Item convergent and discriminant validity

In order to decide on the maintenance (or not) of dimensions in this scale, as well on the number of dimensions, an item convergent and discriminant validity was performed. Ribeiro (1999) considers this validity as a good indicator that the item is measuring the same construct of its own subscale and not another construct, i.e. a good validity shows that item-subscale correlation is substantially higher than item correlation with the subscales or factors to which it does not belong (discriminative item). Thus, different conceptual structures were built. As there are no standardized discriminant values, the following criterion was used: the correlation of an item with the factor to which it belongs (based on the PCA) should be at least 0.10 points higher than its correlation with the other factors considered in the PCA. We observed that only items 2, 4, 6 and 7 could be considered discriminant (in both three- and two-factor solutions). Taking into account that the other items are not discriminant, we concluded that the different factor structures did not explain the construct under analysis because the statistical

results do not suggest that perceived control (PC) is composed of clearly different conceptual structures. Since none of the previously carried out factor structures adequately explained the concept, both statistically and in confrontation with its theoretical framework (Moser et al., 2009), we decided to conduct another PCA using a one-factor solution, in line with the authors of the original scale. We believe that this conceptual structure is more consistent with the concept under analysis. Thus, based on the last factor structure found, and until further studies are carried out to validate these results, our option was to consider this scale as a one-dimensional scale, in line with what was proposed by the authors of the original scale (CAS-R) (Moser et al., 2009). In this study, this single factor explains 30.27% of the total variance, with a total Cronbach's Alpha of 0.65. In this factor structure, all items showed factor loadings above 0.40, except for item 3 (Table 3). However, we chose not to eliminate it in this phase, since it had no significant impact on the Cronbach's Alpha of the scale (Table 5).

TABLE 3 – Principal Component Analysis with Varimax Rotation and Kaiser Normalization, using a one-factor solution

Scale Items		
	Factor 1	H2
1 - If I do all the right things, I can successfully manage my heart condition.	0.412	0.170
2 - I can do a lot of things myself to cope with my heart condition.	0.624	0.389
3 - When I manage my personal life well, my heart condition does not bother me as much.	0.203	0.041
4 - I have considerable ability to control my symptoms.	0.752	0.565
5 - No matter what I do, or how hard I try, I just can't seem to get relief from my symptoms.	0.401	0.161
6 - I am coping effectively with my heart condition.	0.644	0.414
7 - Regarding my heart problems, I feel lots of control.	0.709	0.502
8 - Regarding my heart problems, I feel helpless.	0.424	0.179
% Explained Variance	30.27	
Cronbach's Alpha	0.65	

Discriminant Validity

One of the methods mentioned by Ribeiro (1999, p. 115) to assess construct validity is discriminant validity, i.e. "(...) it refers to the extent to which the correlation between the instrument and other instruments which measure different constructs is lower than the correlation with those instruments which measure the same construct".

Discriminant validity was assessed using the authors' criterion. Another instrument was used to measure two constructs opposed to perceived control, namely anxiety and depression. Thus, we used the Portuguese version of the HADS, validated by Pais-Ribeiro et al. (2007) for the Portuguese population. This version is composed of two subscales with seven items each: one to measure anxiety (HADS-A) and the other to measure depression (HADS-D).

When analysing Pearson's correlation between the Portuguese version of the CAS-R and the Portuguese version of the HADS, and taking into account Pestana and Gageiro's recommendations (2008), a weak negative correlation ($r=-0.20$; $p < 0.05$) for HADS-A, and a moderate negative correlation ($r=-0.46$; $p < 0.01$) for the HADS-D were obtained. Thus, the higher the perceived control, the lower the anxiety and depression, with a most significant decrease in the latter.

We can thus conclude that both instruments measure different and opposite concepts. This is in agreement with the theoretical evidence available in the area under study, indicating that perceived control promotes individuals' adaptation to disease, while anxiety and depression are factors which have a negative impact on living with the disease (Moser et al., 2009; McKinley et al., 2012; Moser et al., 2012).

Study of the Portuguese version of the CAS-R reliability

Cronbach's Alpha coefficient was used to assess the Portuguese version of the CAS-R reliability, thus providing a measure of internal consistency. According to Ribeiro (1999), reliability measures indicate how individual differences result from actual differences in the analysed characteristics.

Cronbach's Alpha values were similar to those obtained by the authors of the original scale (Moser et al., 2009), who carried out their study in three groups of cardiac patients (Acute Myocardial infarction - AMI, Coronary Heart Disease - CHD and Heart Failure - HF) in order to demonstrate that it is a valid and reliable instrument to be applied in all patients with heart diseases (Table 4).

TABLE 4 – Analysis of the Portuguese version of the CAS-R reliability

Cronbach's Alpha (Original version: CAS-R)			Cronbach's Alpha (Portuguese version of the CAS-R)
CHD (N= 3396)	AMI (N=513)	HF (N= 146)	People with heart disease (N= 160)
0.73	0.72	0.76	0.65

As for homogeneity (Table 5), item-total correlations with the total scale varied between $r= 0.132$ (item 3) and $r= 0.522$ (item 4). As stated above, only item 3, when eliminated, increased the Cronbach's Alpha value for the total scale (from 0.65 to 0.67).

TABLE 5 – Item homogeneity and internal consistency coefficients (Cronbach's Alpha) of the Portuguese version of the CAS-R

	Item-Total Correlation	Cronbach's Alpha if item is eliminated
Item 1	0.267	0.642
Item 2	0.416	0.606
Item 3	0.132	0.671
Item 4	0.522	0.571
Item 5	0.258	0.646
Item 6	0.408	0.607
Item 7	0.473	0.587
Item 8	0.277	0.641

As a way of complementing the study, a descriptive analysis of the results of application of the Portuguese version of the CAS-R to the total sample was performed. Thus, results suggest that the level of perceived control of cardiac patients who participated in the sample (n=160) was 27.66 (SD=3.96), with a minimum of 19 and a maximum of 39 for the total sum of the eight items of the scale, representing a reasonable perceived control.

Discussion

We aimed to translate, adapt and validate the CAS-R for the Portuguese context. To this end, we proposed to apply the same statistical procedures as the original authors and guidelines of other acknowledged authors. The Portuguese version of the CAS-R proved to be quickly applied through a self-administered questionnaire or interview (2 to 3 minutes), and easy to understand for the participants. The analysis of the conceptual structure of the scale allowed us to conclude that the theoretical constructs were organised in the same way as the original scale developed for cardiac patients. Firstly, a three-factor structure was obtained. And even when two factors were forced to assess item convergent and discriminant validity, in both factor solutions, only four of the eight items were considered discriminative. Statistical results suggested that perceived control was not clearly composed of more than one “conceptual entity”. Thus, we chose the single-factor solution proposed by Moser et al. (2009), which indicates that

this is a single, indivisible construct. We also decided not to eliminate any items in this phase, as it would not significantly impact the scale’s Cronbach’s Alpha. As for the scale’s reliability, even though the results obtained were lower than those obtained in the original version by Moser et al. (2009), they reflect an acceptable internal consistency ($\alpha= 0.65$), considering the small number of items in the instrument (Ribeiro, 1999). The discriminant validity analysis showed a negative correlation between the construct and the constructs of anxiety and depression ($r=-0.20$; $p<0.05$ and $r=-0.46$; $p<0.01$, respectively). These correlations are corroborated by the results obtained in the original study by Moser et al. (2009), where he compared the CAS-R with other instruments which assessed anxiety and depression, thus confirming the hypothesis that perceived control has a negative correlation with these constructs. Therefore, our study supports the conclusions of the above mentioned authors by demonstrating that people with high levels of perceived control show low levels of anxiety and depression. We can thus conclude that perceived control is a positive influence which is able to solve problems and play an active role in reducing anxiety levels in a more serious situation regarding their heart disease (Moser, 2007; Moser & Watkins, 2008; Moser et al., 2009; Girard and Murray, 2010; Mardiyono et al., 2011). The levels of perceived control obtained from calculating the mean, range and standard deviation after the application of the Portuguese version of the CAS-R indicate that the participants in this study were, to a certain extent, able to solve their own problems.

This interpretation of the results bears in mind what the original authors, Moser et al. (2012), have defined in their studies: scores ≤ 16 suggest low perceived control and scores ≥ 32 indicate a moderately high perceived control. Several studies corroborate our results, referring to positive perceived control levels but not moderately high levels. This is an indication of the ability of cardiac patients to deal with situations which may jeopardize their health status (Moser et al., 2009; McKinley et al., 2009; Riegel et al., 2011). It seems to us that the higher the level of perceived control, the more positive attitudes towards the disease will be, promoting the adoption of more favourable approaches to the pathology and associated symptoms. This is in line with the study by McKinley et al. (2009), which refers more positive attitudes towards health when there is a higher perceived control. It is therefore imperative that nurses become more aware of the many psychological factors which can create an imbalance in the patient's perception of their disease and which are useful for the development of a greater control over the individual's health processes.

Even though the results obtained in this study confirm the reliability and validity of the scale for the Portuguese context, they also indicate a need for further studies in different settings and with larger samples. The application of the Portuguese version of the CAS-R allows the nurse to diagnose self-management processes for the disease and the associated therapeutic regimes in order to help the patients increase their sense of control over their health. Therefore, patients participate more actively in their health/disease processes, thus making more informed and safe decisions. Based on these assumptions, a reduction of the adverse effects of the disease and, consequently, of its acute exacerbations emerge as an implication for the practice.

Conclusion

The Portuguese version of the CAS-R proved to be an instrument adapted to assess the perception of control over the disease in cardiac patients. This instrument, as an independent and specific instrument, was well accepted by the participants. However, results suggest that further studies should be carried out to ensure its reliability and validity in the Portuguese context.

Some limitations of this study should also be mentioned. The first limitation refers to the fact that most participants were elderly patients with low levels of education. Additionally, participants were only selected in hospital institutions from the northern region of the country, which prevents the generalization of these results, particularly to other population groups.

As a short and easy to apply instrument, the Portuguese version of the CAS-R can be applied by nurses in their clinical practice. It can function as a support tool for the identification of the psychosocial factors which may predispose to a more vulnerable health/disease transition process.

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