Factor analysis of an instrument to measure the impact of disease on daily life

Análise de fatores do instrumento de medida do impacto da doença no cotidiano

Análisis de factores del instrumento de medición de impacto de la enfermedad en el cotidiano

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ABSTRACT

Objective: to verify the structure of factors of an instrument to measure the Heart Valve Disease Impact on Daily Life (IDCV) when applied to coronary artery disease patients. **Method:** the study included 153 coronary artery disease patients undergoing outpatient follow-up care. The IDCV structure of factors was initially assessed by means of confirmatory factor analysis and, subsequently, by exploratory factor analysis. The Varimax rotation method was used to estimate the main components of analysis, *eigenvalues* greater than one for extraction of factors, and factor loading greater than 0.40 for selection of items. Internal consistency was estimated using Cronbach's alpha coefficient. **Results:** confirmatory factor analysis did not confirm the original structure of factors of the IDCV. Exploratory factor analysis showed three dimensions, which together explained 78% of the measurement variance. **Conclusion:** future studies with expansion of case selection are necessary to confirm the IDCV new structure of factors.
Descriptors: Validation studies; Factor Analysis; Coronary Disease; Questionnaires; Nursing.

RESUMO

Objetivo: verificar a estrutura de fatores do Instrumento para Mensuração do Impacto da Doença no Cotidiano do Valvopata (IDCV) quando aplicado em coronariopatas. **Método:** fizeram parte deste estudo 153 coronariopatas em seguimento ambulatorial. A estrutura de fatores do IDCV foi inicialmente avaliada por meio da análise confirmatória de fatores e, subsequentemente, por meio da análise exploratória de fatores. Utilizou-se o método de estimação dos componentes principais de análise com rotação Varimax e *eigenvalues* acima de um para extração de fatores e carga fatorial superior a 0,40 para seleção dos itens. A consistência interna foi estimada por meio do coeficiente alfa de Cronbach. **Resultados:** a análise confirmatória não confirmou a estrutura original de fatores do IDCV. A análise exploratória de fatores evidenciou três dimensões que, em conjunto, explicaram 78% da variância da medida. **Conclusão:** estudos futuros com ampliação da casuística são necessários para confirmação da nova estrutura de fatores do IDCV.
Descritores: Estudos de Validação; Análise Fatorial; Doença das Coronárias; Questionários; Enfermagem.

RESUMEN

Objetivo: verificar la estructura de factores del Instrumento para Medición del Impacto de la Enfermedad en el Cotidiano del Valvulópata (IDVC) aplicado a enfermos coronarios. **Método**: formaron parte de este estudio 153 enfermos coronarios en seguimiento ambulatorio. Estructura de factores del IDVC evaluada inicialmente mediante análisis confirmatorio de factores, y luego por análisis exploratorio de factores. Se aplicó método de estimación de componentes principales de análisis con

rotación Varimax y *eigenvalues* por sobre 1 para extracción de factores, y carga factorial superior a 0,40 para selección de ítems. Consistencia interna estimada mediante coeficiente alfa de Cronbach. **Resultados**: el análisis confirmatorio no confirmó la estructura original de factores del IDCV. El análisis exploratorio de factores evidenció tres dimensiones que, en conjunto, explicaron el 78% de la diferencia de la medida. **Conclusión**: estudios futuros con casuística ampliada serán necesarios para confirmación de la nueva estructura de factores del IDCV.
Descriptores: Estudios de Validación; Análisis Factorial; Enfermedad Coronaria; Encuestas y Cuestionarios; Enfermería.

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INTRODUCTION

Coronary artery disease (CAD) is the leading cause of death in adults in developed countries. In the United States, CAD is responsible for more than half a million deaths each year[1-3]. In Brazil in 2013, circulatory system diseases were the leading cause of death among diseases, corresponding to 28.0% of the number of deaths from defined causes that year, with acute myocardial infarction (AMI) being the cause of death of 85,939 individuals, 40,366 of whom were in the Southeast region of the country[4]. In May 2014, ischemic heart disease accounted for 11.6% of total hospitalizations in the Brazilian public Unified Health System[4].

Living with a chronic illness such as coronary artery disease, with the symptoms caused by it and the heart disease stigma results in physical, psychological and social impairments, and requires regular clinical follow-up[5].

Assuming that the impact of the disease is the result of weighting between the patients' perception of its consequences on different dimensions of their life, and its assessment (good or bad), it is likely that individuals who perceive a very negative impact of the illness on their lives have a worse perception of quality of life[6].

The concepts quality of life and disease impact have been used interchangeably, i.e., most studies do not measure the construct "impact", but consider the assumption that the greater the impact of the disease on the patient's life, the worse their quality of life[7-8].

In order to measure impact among patients with cardiac disease, Padilha et al.[6,9] built and validated an instrument that assesses the impact of valvular heart disease on the daily life of patients. This instrument is called Heart Valve Disease Impact on Daily Life (IDCV). The entire IDCV presented evidence of internal consistency. The construct validity evaluated by means of factor analysis showed four factors: physical impact of the disease; impact on activities of daily living; social and emotional impact of the disease; and, adaptation to the disease[6].

The scope of items that make up the IDCV led to interest to use it on other groups of patients with heart disease. To this end, in the study developed by Rodrigues et al.[10], with expansion of cases in the study by Santos et al.[11], the IDCV was applied to patients with coronary heart disease. In both studies, the said instrument presented satisfactory evidence of reliability and validity. However, the convergent validity tested by means of correlation of its domains with generic and specific measures of health-related quality of life (HRQOL) was partially supported, with observation (not expected) of strong correlations between dissimilar constructs and absence of correlation of the domain *Adaptation to the disease* of the IDCV with the HRQOL measures.

Such results pointed to the need to reassess the structure of factors that led to the IDCV. In the study which presents the proposition of the IDCV[6], some limitations of the psychometric performance of the domain *Adaptation to the disease* had already been indicated.

Therefore, it was considered relevant to test the IDCV structure of factors when applied to patients with coronary artery disease. The findings of this study will contribute to the psychometric refinement of the instrument built in Brazil to assess the impact of cardiovascular disease on patients' lives.

METHODS

Study type and location

This was a cross-sectional methodological study that investigated the methods of collection, organization and analysis of data, aimed at developing and validating research instruments and techniques[12]. The study was carried out in the cardiology outpatient clinic for ischemic heart disease at a teaching hospital in the state of São Paulo, Brazil.

Study participants

This study included 153 patients with coronary artery disease, aged 18 years or older, with prior clinical signs of unstable angina and/or myocardial infarction (MI). Patients with history of MI or unstable angina of less than six months, and those who showed inability to effectively and verbally communicate, were excluded.

Sampling process and sample size

The data of this study were derived from a previous study[11], which assessed the measurement properties of the IDCV when applied to patients with CAD, the sample size of which was determined based on Pearson's correlation coefficient between the IDCV and the domains of the Brazilian version of the MacNew Heart Disease Health-Related Quality of Life Questionnaire and the Medical Outcomes Trust Short-form Health Survey (SF36), obtained based on analysis of preliminary results. Considering correlation coefficients between 0.30 and 0.40, and values of $\alpha = 0.05$ and beta $= 0.10$, a sample size of 113 subjects was estimated. Considering losses, the sample size was expanded to 153. The estimated sample size met the recommendation for use of factor analysis, according to which the number of observations must be at least 5 to 10 times greater than the number of variables involved[13].

Data collection

One of the researchers collected the data in a private site at the research location cited above. Clinical data (number of MI, symptoms, associated medical conditions, medications and echocardiogram data) were obtained from the patient's medical chart. A structured interview was used, with application of a previously validated instrument[14], to obtain sociodemographic data (age, sex, race, marital status, education, employment status and individual and family income). Measurement of the disease impact on the subject's life was measured by applying the IDCV.

Instruments

Instrument to measure the Heart Valve Disease Impact on Daily Life – IDCV.

The IDCV was built to evaluate the impact of valvular heart disease on the daily life of patients. The concept that the impact is a result of the disease consequences by the patient's assessment of each one of them led to the development of two groups of 14 items. Part A is intended to measure the degree of impact perceived by the patient in multiple dimensions of his or her life, whereas Part B was developed to consider their assessment (good or bad) for each of the consequences mentioned.

In Part A, the patient responded to each of the items using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). In Part B, a Likert scale was used for each of the items, with responses ranging from 1 (very bad) to 5 (very good). The items were grouped into four areas: *Physical impact of the disease – symptoms (*items 11, 12 and 13); *Impact of the disease on activities of daily living* (5, 7, 9, 10 and 14); *Social and emotional impact of the disease* (items 2, 3, 4 and 6); and, *Adaptation to the disease* (1 and 8). To determine the final score of the IDCV, all of the items were transformed in the same direction. Thus, all of those in Part B and items 1, 5 and 8 of Part A, which correspond to perceptions related to favorable impact, were reversed. To calculate the score, each item corresponds to the product of the scores obtained on both sides of the IDCV, which can generate a minimum score of 1 and a maximum score of 25 for each statement evaluated. The closer to 1, the lower the impact perceived by the subject, and the closer to 25, the greater the impact. The total score of the impact was calculated by the sum of all products obtained, with the score ranging from 14 to 350. A high score meant that the patient perceived negative consequences of the disease in their life, and these were interpreted as negative. A low score meant that the patient did not perceive the consequences of the disease and treatment in their life and, if they did, would not evaluate them as negative. Although this instrument was originally developed in Brazil to evaluate the beliefs of patients with valvular heart disease, the set of statements composing it evaluates the impact of chronicity imposed by heart disease[6].

Data analysis

Construct validity: factor analysis.

The construct validity of the IDCV was evaluated initially by confirmatory factor analysis by means of the SAS software PROC TCALIS[15]. Confirmatory factor analysis is a way to test how well the variables measured represent a smaller number of constructs. Rather than allowing the statistical method to determine the number of factors and loadings, as in an exploratory factor analysis, confirmatory factor analysis statistics informs how well the specification of factors confirms the reality[13].

To test the adjustment of the model and verify whether the factors explained the correlations observed between the variables, as well as whether any of the variances of the residuals was equal to zero (if this occurs, the model is accepted), the following statistics were calculated: Chi-square test of adjustment quality (checks whether the estimated covariance matrix is equal to the covariance matrix of the sample), which should present a significance level >0.05; the Goodness of Fit Index (GFI), with acceptance value of ≥ 0.85; Adjusted for Degrees of Freedom (AGFI), with acceptance value of ≥ 0.80; Bentler's Comparative Fit Index (CFI) and Normed Fit Index (NFI), with acceptance value of ≥ 0.90, and the Root mean square error of approximation (RMSEA), with an acceptance value of ≤ 0.08[16].

Subsequently, exploratory factor analysis was performed for identification of a new structural model, by the method of the main components with Varimax rotation (orthogonal rotation unrelated factors) and *eigenvalue* greater than 1. The *eigenvalue* assesses the contribution of the factor to the model built by factor analysis, with a value less than 1 suggesting low contribution of the factor in explaining the variations of the original variables[13].

For each item, the factor loading (saturation) on the factor was produced, which indicated the correlation between the item and the factor, so that the closer to 100% of covariance, the better the item was considered, since it strongly represented the latent trait measured by the factor. Therefore, description of the factors in terms of the items of which it is composed was made based on the magnitude of correlations[17]. A minimum factor loading = 0.40 was considered, so that the item could be considered representative of the factor[13,18].

For evaluation of commonality, e.g., how much of the variance of each item was explained by each factor generated in the factor analysis, >0.40 was considered to be a satisfactory value of commonality[18]. Lower commonality values suggest a small contribution of the item to the model built[13,16].

Reliability

Cronbach's alpha coefficient was used to evaluate the reliability of the IDCV (total score and domains), according to the criterion of homogeneity of the items. The value of >0.70 for Cronbach's alpha coefficient was established as proof of internal consistency[19].

Ethical Aspects

Participants signed a free and informed consent form, and the study was approved by the ethics committee of the institution.

RESULTS

Descriptive analysis

Participants were predominately men (69.9%), with a mean age of 62.2 (SD = 10.1) years, mean study time of 4.9 (SD = 3.9)

years, married (66.7%), inactive (70.0%), with an individual mean income of 2.3 (SD = 1.9) minimum wages (MW) per month and mean household income of 3.8 (SD = 2.8) MW per month.

Most of the patients (91.5%) had suffered MI (isolated or associated with post MI angina), with a mean of 1.2 (SD = 0.8) MI and 2.9 (SD = 1.1) clinical conditions and/or associated risk factors. All patients reported having had symptoms in the month prior to the interview, and had a mean of 1.3 (SD = 1.2) associated symptoms. Participants used a mean of 5.8 (SD = 1.7) medicines per day. Based on the information available, the FEVE was reduced by 46.3% in 134 patients.

Construct validity

Factor analysis

To test the structure of factors of the IDCV, confirmatory factor analysis was performed by means of the SAS software PROC TCALIS[13]. The adequacy of the model was previously verified, i.e. the adequacy of correlation matrices, the results of which were satisfactory only for the Chi-square test of adjustment quality, the GFI and the AGFI [(c^2 = 968.0620 {gl = 77}, p < 0.0001); NFI = 0.4976; GFI = 0.8717 AGFI = 0.8250; CFI = 0.5147 and RMSEA = 0.2759].

In the theoretical model presented (Figure 1), in which the factors (F1, F2, F3 and F4) are latent variables and the variable items observed, assumed correlation between the items and between factors was not observed. No item presented factor loading that permitted their insertion into more than one factor.

Subsequently, exploratory factor analysis was used to identify a new structural model for the IDCV. By means of the estimation method of the main analysis components with Varimax rotation, eigenvalues greater than 1 for extraction of factors, and factor loading greater than 0.40 for selection of the items, four factors were obtained, which together explained 63.0% of the variability of the measure.
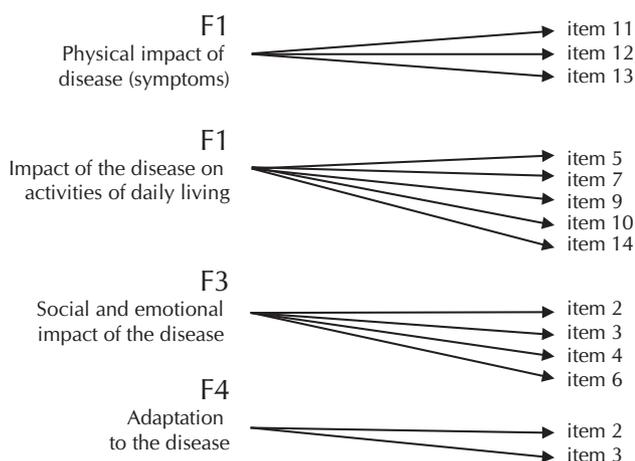
Figure 1 - Original structure of factors of the instrument to measure the Heart Valve Disease Impact on Daily Life (IDCV), proposed by Padilha et al.[9]

Nonetheless, the use of eigenvalues may lead to overestimation of the number of factors[20], which tends to be a problem in large data sets, since this produces trivial factors with few variables[17]. An alternative method recommended by experts in factor analysis is the scree plot, which consists of placing an eigenvalues graph against a number of items present[20]. The number of factors is selected by observing a rupture or discontinuity between the higher and lower values of eigenvalues. The points above the discontinuity correspond to the number of factors of the measure. To determine where discontinuity occurred, a straight line was drawn through the lower values of the eigenvalues plot. The points above the straight line, i.e., above the discontinuity, correspond to the number of factors that explain the maximum variance of the measure[21].

Thus, in this study, by observation of the scree plot, the straight line begins to form from the number 4; above this point, only three factors were established that explained the higher variance (78.0%) of the measure of the IDCV, as shown in Figure 2.
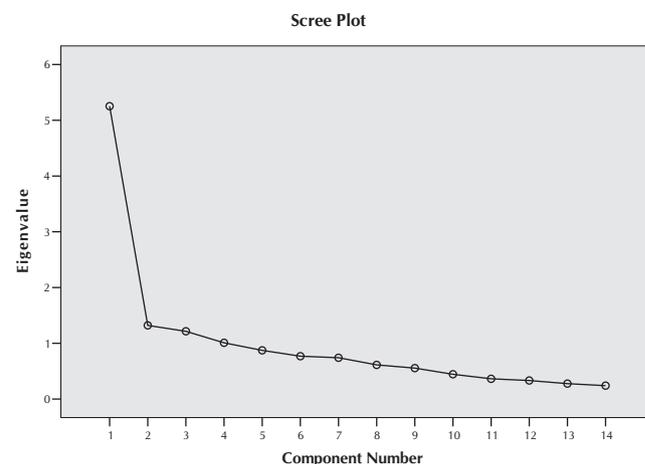
Figure 2 – Scree plot of eigenvalues for the 14 items of the instrument to measure the Heart Valve Disease Impact on Daily Life (IDCV), using the main analysis component.

The factor loadings of the items in each factor and percentage of variance of the measure explained by each factor are presented in Table 1. A factor loading lower than that desired (<0.40) was observed only in item 13 of factor 3.

The analysis of the meaning of beliefs grouped in the following factors enabled the respective titles: Factor 1- Emotional and social impact of the disease; Factor 2 - Physical impact of the disease (symptoms); and Factor 3 - Adaptation to the illness.

The commonality value for each of the items of the IDCV, which can be interpreted as the percentage of the variance of an original variable explained by the number of factors, is presented in Table 2.

Lower commonality values than desired were found in items 3 (My heart condition damaged my ability to work as before) and 13 (Because of my heart condition, I have periods of dizziness).

Table 1 - Factor loadings obtained by exploratory factor analysis of the instrument to measure the Heart Valve Disease Impact on Daily Life (IDCV) and variance explained by each factor (N = 153), Campinas, São Paulo, Brazil, 2009

IDCV	Factor loading		
	Factor 2	Factor 2	Factor 3
Item 2: My heart condition made me dependent on other people.	0.61		
Item 3: My heart condition damaged my ability to work as before.	0.54		
Item 4: Today, I become more irritated and anxious because of my heart condition.	0.70		
Item 6: Since I developed my heart condition, I feel very upset.	0.61		
Item 7: After I developed my heart condition, I started to get scared that something would happen to me.	0.75		
Item 14: Having a heart condition worries me.	0.75		
Item 9: Because of my heart condition, I have difficulty sleeping.		0.61	
Item 10: Because of my heart condition, I have a lot of difficulty performing activities of daily living.		0.67	
Item 11: Because of my heart condition, I have a lot of shortness of breath.		0.76	
Item 12: Because of my heart condition, I feel very tired.		0.76	
Item 13: Because of my heart condition, I have periods of dizziness.		0.38	
Item 1: After I developed my heart condition, I started to pay more attention to my health.		0.40	0.56
Item 5: I feel okay about my heart condition.			0.73
Item 8: My sex life stayed the same as before my heart problem.			0.54
Variance explained (%)	**34.0**	**31.0**	**13.0**

Note: IDCV = Instrument to measure the Heart Valve Disease Impact on Daily Life

Analysis of Reliability

As regards the internal consistency of the items, reliability was estimated by using Cronbach's alpha coefficient for the factors. The contribution of each item to the total score and their respective dimensions/factors is presented in Table 3.

Table 2 - Commonality values obtained for the items of the Instrument to measure the Heart Valve Disease Impact on Daily Life (IDCV) (N = 153), Campinas, São Paulo, Brazil, 2009

IDCV	Commonality		
	Factor 1	Factor 2	Factor 3
Item 2: My heart condition made me dependent on other people.	0.42		
Item 3: My heart condition damaged my ability to work as before.	0.39		
Item 4: Today, I become more irritated and anxious because of my heart condition.	0.70		
Item 6: Since I developed my heart condition, I feel very upset.	0.67		
Item 7: After I developed my heart condition, I started to get scared that something would happen to me.	0.58		
Item 14: Having a heart condition worries me.	0.62		
Item 9: I have difficulty sleeping because of my heart condition.		0.42	
Item 10: Because of my heart condition, I have a lot of difficulty performing activities of daily living.		0.71	
Item 11: Because of my heart condition, I have a lot of shortness of breath.		0.67	
Item 12: Because of my heart condition, I feel very tired.		0.66	
Item 13: Because of my heart condition, I have periods of dizziness.		0.30	
Item 1: After I developed my heart condition, I started to pay more attention to my health.			0.65
Item 5: I feel okay about my heart condition.			0.59
Item 8: My sex life stayed the same as before my heart condition.			0.40

Note: IDCV = Instrument to measure the Heart Valve Disease Impact on Daily Life

The data show alpha values suitable for the total IDCV and factors, except for the items of Factor 3 - *Adaptation to the disease*, which did not provide total-item correlation, generating an alpha value lower than desired.

It is noteworthy that the values estimated by Cronbach's alpha coefficient for the factors do not change if items are deleted, except for Factor 1, in which an increase in the alpha value (0.83 to 0.84) is shown if item 3 is deleted.

DISCUSSION

This study sought to expand the psychometric performance evaluation of the IDCV, an instrument originally built in Brazil to measure the impact of disease on the daily life of patients with valvular heart disease, testing its structure of factors when applied to patients with coronary heart disease. The application of the IDCV to patients with CAD is justified by the evidence that the set of its items is relevant to measure the impact on patients with heart diseases with symptoms similar to that of valvular heart disease[10-11,22-23].

The construct validity of the IDCV was tested by factor analysis. As the confirmatory analysis did not reproduce the factors of the original model of the IDVC proposed by Padilha et al.[6], exploratory analysis of factors was performed with extraction method by means of analysis of the main components and Varimax rotation.

Three factors were highlighted and, together, explained 78% of the measurement variance. Factor 1- *Emotional and social impact of the disease*, explained 34% of the measurement variance and maintained in its composition all the items (2, 3, 4 and 6) of the domain *Social and emotional impact of the disease* of the original model of the IDCV[6], with addition of items 7 and 14. Beliefs related to both emotional aspects (feelings of worry, anxiety, irritability/nervousness and fear) and ability to work and dependence on others, i.e., the social limitations imposed by the disease, were observed in this new grouping.

Factor 2 - *Physical impact of the disease – symptoms*, grouped the same items of the domain *Impact of the disease on activities of daily living* of the prior model (11, 12 and 13), plus the items 9 and 10, and explained 31% of the variance of the measurement. This factor grouped items that directly measure the impact of symptoms, as well as beliefs related to the perception of difficulties generated by the disease, for executing activities of daily living.

Factor 3, consisting of items 1 and 8 of the domain *Adaptation to the disease* from the original model, was added by item 5 and explained 12.6% of the measurement variance. The beliefs represented in this factor seem to actually measure the patient's adaptation to the disease.

In this new structural model, the domain *Impact of the disease on activities of daily living* (5, 7, 9, 10 and 14) was deleted, and the items were redistributed into factors 1 and 2.

The reliability of the dimensions generated according to the criterion of homogeneity was evaluated, as carried out in other studies of factor analysis[24-25]. The analysis indicated internal consistency of the new

Table 3 – Total-item correlation, Cronbach's alpha and Cronbach's alpha if item deleted from the factors and total score of the Instrument to measure the Heart Valve Disease Impact on Daily Life (IDCV) (N = 153), Campinas, São Paulo, Brazil, 2009

Variable	Total-item correlation	Cronbach's	Cronbach's alpha *(if item deleted)*
Factor 1 - Emotional and social impact of the disease		0.83	
Item 2: My heart condition made me dependent on other people.	0.52		0.83
Item 3: My heart condition damaged my ability to work as before.	0.48		0.84
Item 4: Today, I become more irritated and anxious because of my heart condition.	0.72		0.79
Item 6: I feel very upset since I developed my heart condition.	0.70		0.79
Item 7: After I developed my heart condition, I started to get scared that something would happen to me.	0.56		0.82
Item 14: Having a heart condition worries me.	0.70		0.79
Factor 2: Physical impact of the disease - Symptoms		0.80	
Item 9: I have difficulty sleeping because of my heart condition.	0.50		0.79
Item 10: Because of my heart condition, I have a lot of difficulty performing activities of daily living.	0.67		0.73
Item 11: Because of my heart condition, I have a lot of shortness of breath.	0.64		0.74
Item 12: Because of my heart condition, I feel very tired.	0.67		0.73
Item 13: Because of my heart condition, I have periods of dizziness.	0.43		0.80
Factor 3: Adaptation to the disease		0.21	
Item 1: After I developed my heart condition, I started to pay more attention to my health.	0.09		0.2
Item 5: I feel okay about my heart condition.	0.17		0.00
Item 8: My sex life stayed the same as before my heart condition.	0.09		0.23
IDCV - Total		**0.85**	

domains of the IDCV. With the exception of Factor 3, which had a lower-than-desired alpha ($\alpha = 0.20$), the other IDCV factors presented Cronbach's alpha ≥ 0.80.

It is notable that in the study proposing the structure of original factors of the IDCV[6], the factor *Adaptation to the disease* presented a Cronbach's alpha coefficient similar to that found in the present study ($\alpha = 0.20$), showing that the addition of item 5, suggested by the new model, did not improve the reliability of the new factor. However, the alpha values estimated for the other factors of the new structural model and total score of the IDCV ($\alpha \geq 0.80$) were greater than those observed in the original model (which varied between 0.68 and 0.77), which suggests stronger evidence of internal consistency of the new model of factors.

Unsatisfactory homogeneity of the three items that make up Factor 3 may be explained by problems in the construction of items, especially 1 and 8, as suggested by Padilha et al.[6]. Item 1, when it affirms that the individual began to pay more attention to his or her health after the emergence of the disease, can generate an interpretation of this consequence as being good or bad, and this is not clear in the item. Similarly, in item 8, when it is specified that the sex life is the same as before the heart problem, the consequence of the disease as good or bad is probably not evaluated, because there is no information on quality of the sex life before the illness.

Thus, the results of this study support the idea that in the application of the IDCV to research the impact of disease on the life of the subject, items 1, 5 and 8 are considered independent and not a factor, contributing only to the total score of the instrument. The maintenance of these items is independently justified by the importance of the dimensions that represent the assessment of the impact of the disease on the subject's life, especially attention to health and sexual function.

A possible limitation of this study relates to its small sample size. Further studies are recommended, with expansion of the case material and using the factorial structure proposed in the present study, in order to confirm the model proposed and/or explore a more appropriate grouping of its items.

Specifically, the authors suggest testing the correlation of the new factorial structure with generic and specific measures of HRQOL, in order to assess the contribution of the new model for the validity of divergent constructs, as well as test its ability to discriminate the impact of the disease in groups with different degrees of severity of coronary heart disease.

In short, improvement of the impact of the disease and, consequently, HRQOL of patients with coronary heart disease, is an important aspect of evaluating effectiveness of treatment[26-27]. The IDCV is a reliable and valid instrument for assessing the impact of disease on the daily life of patients with valvular and coronary artery disease. It is recommended that further studies be conducted with a view to exploring the best grouping of its items, and contributing to provide a useful indicator of the impact of the disease on the subject's life.

CONCLUSION

The results of this study provide evidence that the IDCV is a reliable and valid instrument for assessing the impact of disease on the daily life of patients with coronary heart disease. Construct validity by means of factor analysis indicated that the grouping of items from this questionnaire can be modified with a view to expanding the reliability and total variance explained by the measurement. It is recommended that further studies with expansion of the case material be undertaken in order to confirm the new structural model proposed and/or explore a better grouping of its items.

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