DEVELOPMENT OF AN INSTRUMENT TO MEASURE BELIEFS AND ATTITUDES FROM HEART VALVE DISEASE PATIENTS

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The objective of this study was to verify content validity and reliability of "CAV-Instrument" - an instrument to measure beliefs and attitudes of heart valve disease patients concerning their illness and treatment. The instrument was analyzed by three judges (using predetermined criteria) and submitted to the pretest (n = 17 subjects). The majority of the items were evaluated as adequate regarding their pertinence, clearness and significance regarding the analyzed questions. The pretest showed the necessity for small changes in some statements, which optimized instrument comprehension by the patients. The restructured instrument was applied to 46 patients to verify internal consistency. The whole instrument and most of its scales presented satisfactory internal consistency. It is concluded that the instrument has content validity and is internally consistent, ratifying the adequacy of its application to measure the strength of association among the researched variables.

DESCRIPTORS: attitude; validity; heart valve diseases

DESAROLLO DE INSTRUMENTO DE MEDIDA DE CREENCIAS Y ACTITUDES DE PACIENTES CON ENFERMEDAD DE LAS VALVULAS CARDÍACAS

Fue objetivo de este estudio verificar la validez del contenido y la confiabilidad del instrumento para mensuración de las creencias y actitudes de los pacientes con enfermedad de las válvulas cardiacas sobre su enfermedad y tratamiento (Instrumento-CAV). El instrumento fue analisado por tres jueces (utilizando criterios predeterminados) y sometido a prueba (n=17 sujetos). La mayoría de los ítenes fue evaluada como pertinente, clara y significante para la cuestión analisada. Con prueba se evidenció la necesidad de pequeños cambios en la construcción de algumas afirmativas, que optimizaron la comprensión del instrumento por los pacientes. El instrumento reestructurado fue aplicado en 46 pacientes para verificación de la consistencia interna. La totalidad del instrumento y la mayoría de sus escalas presentaron consistencia interna satisfactoria. Se pudo concluir que el instrumento es pertinente al objecto de estudio y internamente consistente, ratificando la adecuación de su aplicación para mensuración de la fuerza de asociación entre las variables investigadas.

DESCRIPTORES: actitud; validez; enfermedades de las válvulas cardíacas

DESENVOLVIMENTO DE INSTRUMENTO DE MEDIDA DE CRENÇAS E ATITUDES DE PACIENTES VALVOPATAS

Foi objetivo deste estudo verificar a validade de conteúdo e a confiabilidade do instrumento para mensuração das crenças e atitudes dos pacientes valvopatas sobre sua doença e tratamento (Instrumento-CAV). O instrumento foi analisado por três juízes (utilizando critérios pré-determinados) e submetido ao pré-teste (n= 17 sujeitos). A maioria dos itens foi avaliada como pertinente, clara e de significância para a questão analisada. O pré-teste evidenciou a necessidade de pequenas modificações na construção de algumas afirmativas, que otimizaram a compreensão do instrumento pelos pacientes. O instrumento re-estruturado foi aplicado em 46 pacientes para verificação da consistência interna. A totalidade do instrumento e a maioria de suas escalas apresentaram consistência interna satisfatória. Conclui-se que o instrumento é pertinente ao objeto de estudo e internamente consistente, ratificando a adequação de sua aplicação para mensuração da força de associação entre variáveis pesquisadas.

DESCRITORES: atitude; validade; doenças das valvas cardíacas

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INTRODUCTION

Literature has emphasized the importance of developing methods that allow for the measurement of variables that constitute a specific area of attention and interest, like psychosocial variables[1]. This measurement process permits a more objective approach to information, besides attributing a quantitative dimension and, therefore, a relatively precise information acquisition[2]. In consequence, the use of scales to measure psychosocial variables has been an increasingly frequent practice in contemporary scientific studies.

The usefulness of psychosocial variables in identifying the impact of chronic disease on the subject's life is particularly noted. The manner in which the subject perceives the disease experience leads him to respond with therapeutic techniques and rituals judged adequate. This judgment is generally construed from past experience, the social environment and characteristics of the subject, who gradually interprets his/her beliefs and attitudes about facts, experience, and also about his/her disease and treatment, mainly concerning chronic disease[3].

The measurement of the intensity of psychosocial variables allows us to estimate the magnitude of one or more phenomena in the subject's life, as well as to evaluate the evolution of this intensity in response to the natural course of the disease or to specific intervention.

Heart disease is generally characterized, with a few exceptions, by chronicity – heart disease patients, even when clinically stabilized, have to deal with the need for continuous follow-up and constant possibility of new decompensation or worsening of the clinical picture.

In literature, there are innumerous studies on the needs and special care required for heart valve disease patients submitted to interventionist procedures. In spite of disease chronicity, few studies approach the aspect of the subject's experience of the illness, its symptoms and treatment in the periods not related to the intervention, highlighting the absence of research to identify beliefs and attitudes of heart valve disease patients about their condition and treatment[4-7].

Considering the importance of learning how heart valve disease patients deal with the illness, studies were carried out to verify beliefs and attitudes of such individuals about their disease and treatment[8-9] while being followed at outpatient clinics. The analysis of these investigations gave rise to four major domains of beliefs, related to: a concept construed about the disease, impact of the disease, impact of the treatment and adherence to the treatment[10].

As a result of this analysis, we could develop an instrument that is able to objectively measure such beliefs and attitudes. The identification of the most significant beliefs and the strength of association between them may provide an important background to direct rehabilitation and/or health promotion efforts by means of educational activities, besides allowing for the evaluation of modifications in these values and the magnitude of this change in response to educational interventions.

When constructing a measuring scale for a qualitative phenomenon, the researcher should propose items that express a viewpoint concerning a topic, starting from theoretical foundations related to the measurement of qualitative events and characteristics of the study object[11]. Therefore, through a global analysis of the qualitative data obtained from prior studies of patients with heart valve disease, an instrument was developed to measure beliefs and attitude of heart valve disease patients concerning their illness and treatment[12], the CAV - Beliefs, Attitude and Values Instrument.

After its conception, a measuring scale should be evaluated as to reliability and validity.

The reliability of a measurement instrument is one of the main criteria to evaluate its quality and may be defined as the coherence degree at which the instrument measures the attribute. It may be evaluated through test/retest, which evaluates instrument stability; interrater reliability, which evaluates measurement equivalence between different observers; and through Cronbach's alpha coefficient, which evaluates internal consistency[2,13-14], one of the most widely used methods for reliability assessment.

Validity indicates the degree to which an instrument measures the item it is supposed to be measuring. There are three types of validity: content validity, criterion validity and construct validity. **Content validity** evaluates the adequacy of the content area sample to be measured; **criterion validity** evaluates the capability of an instrument to differentiate between behaviors of subjects concerning any external criterion, with the use of correlation analyses to establish these relations[2,13-14]; and **construct validity** aims to verify which construct the instrument is really measuring. The most widely used methods of construct validity are: analysis of the theoretically forecasted relationship between the constructs and factorial analysis[2].

Content validity is accomplished by evaluation of the instrument items by a group of experts, with prior experience or acknowledged current competence in the areas of study, called judges. The importance of this phase in the scale validation process is emphasized in literature[2], although only a small number of articles in literature give a detailed description of the evaluation process of instrument items by judges.

As a result, the questions guiding this study were: does the CAV Instrument present content validity? If its validity is confirmed, is the collected information precise, i.e., is the instrument reliable?

In an attempt to answer these questions, the aim of this study was to describe the content validity processes and verify the reliability of the CAV-Instrument.

METHODOLOGY

This is a methodological study that may be defined as the investigation of methods for data collection, organization and analysis, designed for the preparation, validation and evaluation of instruments and research techniques[2].

Phase 1: Building the CAV-Instrument

After global analysis of the qualitative data obtained through prior studies[8-9], a new instrument was built, divided into large items, in which the results obtained for patients with mitral and aortic affection were grouped side by side. Subsequently, such results were reallocated according to similarities and divergences and their frequencies were registered. The results were classified in the following groups: demographic and clinical characterization of subjects; knowledge of the subject about his/her disease; beliefs of the subject about the disease and treatment; and evaluation of the impact of the disease and treatment on patient life[15].

The groups and their content guided the building of four psychometric scales, as well as the three closed questions that initially composed the CAV-Instrument.

A1. Measurement of patient evaluation concerning knowledge about the disease. In this item the patient is requested to evaluate his/her knowledge on a Likert-type five-point scale, varying from *(1) absolutely nothing* to *(5) much*.

A2. Measurement of beliefs about the disease. This scale aims to measure subjects' beliefs concerning the disease and related care. It is composed of 14 items, which the patient may answer through a Likert-type five-point scale, varying from *(1) disagree strongly* to *(5) agree strongly*.

B. Measurement of beliefs concerning disease impact on subject's life. This scale aims to measure patient evaluation regarding disease consequences on his/her life, thus seeking to measure, in an indirect way, a favorable or unfavorable attitude toward the disease. It is composed of 14 items, which the patient may answer through a Likert-type five-point scale, varying from *(1) disagree strongly* to *(5) agree strongly*.

C. Measurement of beliefs concerning treatment impact on subject's life. This scale aims to measure (indirectly) the attitude of the patient toward the treatment consequences in his/her life, for example, if he/she has a favorable (positive) or unfavorable (negative) attitude regarding the treatment. It consists of 7 items that may be answered through a Likert-type five-point scale , varying from *(1) disagree strongly* to *(5) agree strongly*.

D. Measurement of beliefs concerning adherence to medical treatment:

D1: It aims to measure adherence to the medical therapy as related by the patient. Thus the patient is requested to provide one of five possible answers on medication use in the last two months: *(1) I have not taken any of the prescribed medicines, (2) I have not taken some of the prescribed medicines, (3) I don't know how to answer, (4) I have taken the prescribed medicines quite regularly* and *(5) I have taken the prescribed medicines regularly*.

D2: Its purpose is to directly measure patient attitude toward medication use through a Likert-type five-point scale, varying from *(1) totally unfavorable* to *(5) totally favorable*.

D3: It aims to measure subject beliefs concerning medication use. This scale is composed of 10 items which the patient may answer through a Likert-type five-point scale, varying from *(1) strongly disagree* to *(5) strongly agree*.

Phase 2: Evaluating the Content Validity of CAV - Instrument

In order to verify content validity, as recommended in literature[16], the CAV-Instrument was evaluated by three judges (a nurse, a physician and a psychologist), who were chosen based on the following prerequisites:

- To be a health care worker;
- To have experience and recognized competence in at least one of the following situations: nursing care to cardiac patients; health education; medical care of cardiac patients or usage (creation, evaluation, validation) of psychometric scales; and
- To agree to evaluate a pilot version of the data collection instrument.

A specific instrument was created for this evaluation, which required all the items of each scale to be evaluated as to favorability, clearness and pertinence.

To evaluate the clearness of the items, each judge issued a score ranging from *1* to *3 (1- hardly clear, 2- relatively clear, 3- very clear)*.

With respect to pertinence evaluation, the respondents were oriented to evaluate each item as *pertinent (P)* or *non-pertinent (NP)*.

The judges were requested to choose between 5 and 10 items in each scale which better measured the construct of interest, ranking them numerically (1, 2...) according to degree of importance, following the numerical sequence.

The judges also evaluated each scale item measuring the attitude construct as favorable *(+)* or unfavorable *(-)* to the object being analyzed (disease, treatment, use of medication).

In order to analyze judge evaluation of the CAV instrument, data were submitted to the Friedman test, Kendall's coefficient of concordance and Kappa's multiple coefficient of concordance. The items with conflicting analyses were restudied and restructured or excluded.

Finally, to confirm coverage of all of the construct dimensions, the judges were requested to include items for the evaluated constructs, which were submitted to analysis by the researcher and added to the initial group of items as appropriate.

After analysis by the judges and restructuring, the instrument was applied to a sample of 17 patients in order to verify the interpretability and scope of instructions, items and scale format.

After the analysis and pretest, some statements were modified in the definitive instrument, while one of them was excluded (item D3.7 of scale D3).

Phase 3: Evaluation of CAV-Instrument Reliability

After the instrument was restructured according to the analysis of the judges and the pretest, it was applied to a sample of 46 patients, under treatment at the cardiology clinic of the Unicamp School Hospital, with mean age of 43.9 (± 17.3) years (minimum age = 18; maximum age = 78), 67.4% (31/46) female, 63.0% (29/46) married, with an average of 5 (± 3.6) years of education, varying from zero to 16 years. In this sample, 52.2% (24/46) of the patients had only one lesion in a single heart valve, 19.5% (9/46) had double lesion and 28.3% (13/46) had more than one heart valve affected. The mean time since valvular disease diagnosis was 6.9 (± 7.2) years, ranging from zero to 39 years.

The data obtained through the CAV instrument were submitted to descriptive analysis and Cronbach's alpha coefficient to determine their reliability.

Ethical Aspects

The project and the term of free and informed consent, signed by the patient before the beginning of the interview, were submitted to and approved by the Research Ethics Committee, Medical Sciences School, State University of Campinas – UNICAMP (CEP n. 389/2001).

RESULTS AND DISCUSSION

Content validity – Analysis by the judges

The analysis will be presented according to the sequence of scales, following the evaluated items.

Scale A2 *(Measurement of beliefs about the disease)*: according to the evaluation of the judges, there were no divergences among items regarding *pertinence* (Chi-square test of Cochran, p-value = 0.448), i.e. all of the items were pertinent, although according to Kappa's multiple coefficient analysis there was no concordance among the judges on this analysis (k = -0.050, p-value = 0.63).

With respect to *clearness*, it was verified that there are divergences (Friedman test, p-value = 0.014), indicating that there were items considered not clear (items A2.9 and A2.10). Through Kendall's coefficient analysis, it was demonstrated that judges agreed on this evaluation (w = 0.682).

One of the judges did not classify the scale items according to their degree of importance, which made the statistical analysis of the query on *ordering* unfeasible.

Item A2.10 was submitted to modification after analysis, according to the following suggestion: "In my case the valve is not working, I think I have propensity to suffer from waterlogged lungs and breathlessness" was changed to "Because of my problem I may be breathless". On the other hand, it was suggested that item A.9 be changed from "The cause of my problem was rheumatic fever" to "The cause of my problem is blood rheumatism", but it was not altered because all of the patients interviewed understood the term rheumatic fever.

Although item A12 was evaluated as clear by the judges, it was modified since the use of negative phrases interferes with the formulation of the patient's answer. Subsequently, the following change was made: "I think I don't need any special care with my food" was changed to "I think I need special care with my food".

Scale B *(Measurement of beliefs regarding disease impact on subject's life)*: In relation to favorability, it was observed that the judges divergenced, i.e. there are favorable items (B1, B3, B6 and B9) and unfavorable items (B2, B4, B5, B7, B8, B10, B11, B12, B13, B14) (Box 1) (p-value = 0.002 Chi-square of Cochran's test). In this evaluation, it was verified that there was concordance among the judges (k=0,767, p-value = 0.0001).

Concerning *pertinence*, no difference was verified among the items (p-value = 0.448, Chi-square of Cochran test), i.e. all of them were evaluated as pertinent. By means of the Kappa coefficient analysis it was found that the judges disagreed among themselves (k = -0.1351, p-value = 0.81).

In respect of *clearness*, it was confirmed that there was no difference among the items (p-value = 0.448, Friedman test), nevertheless the judges partially disagreed according to the Kendall coefficient analysis (w = 0.333).

As a result, scale B did not suffer alterations since it was evaluated as pertinent and clear, without exception and with good patient comprehension in the pretest. The disproportion between favorable and unfavorable beliefs occurred due to the difficulty in finding phrases which did not modulate the idea obtained in prior works[1-2], in addition to being understood by the patient and avoiding negative phrases. In this way, there was prevalence of unfavorable beliefs.

Table 1 - Evaluation of the favorability of beliefs regarding disease impact on subject's life

Favorable Beliefs	Unfavorable Beliefs
B1 After I acquired the disease I've been more attentive to my health.	B2 Because of the disease I became dependent on other people.
B3 Since I acquired the disease my family has been worrying about me.	B4 Because of this problem I can't work as much as I used to.
B6 I accept my heart problem.	B5 Now I feel most irritated and nervous because of the problem.
B9 The disease didn't interfere with my sexual life.	B7 I feel very anxious after becoming sick.
	B8 Now I'm always afraid that something will happen.
	B9 I began to have sleeping problems after acquiring the disease.
	B10 Now it's very difficult for me to do the housework.
	B11 I often feel breathless.
	B12 I feel very tired.
	B13 I have dizzy spells.

Scale C *(Measurement of beliefs about treatment impact on subject's life)*: in relation to favorability it was found that the judges evaluated that there were divergences among the items, i.e. there are favorable items (C1, C5 and C6) and unfavorable items (C2, C3, C4 and C7) (Table 2), (p-value = 0.014, Chi-square of Cochran test). In this evaluation there was concordance among the judges (k = 0.351, p-value = 0.0114).

Considering the query on *pertinence*, there were no divergences among the items (p-value = 0.423, Chi-square of Cochran test), i.e. all of the items were evaluated as pertinent, although by the multiple Kappa coefficient analysis there was no concordance between the judges (k = 0.255, p-value = 0.9510).

Concerning scale C *clearness*, no divergences were observed among the items (p-value = 0.423, Friedman test). By means of the Kendall coefficient analysis partial discordance was verified among the judges on this evaluation (w = 0.333). Therefore, there were no alterations on this scale.

Table 2 - Evaluation of the favorability of beliefs regarding treatment impact on subject's life

Favorable Beliefs	Unfavorable Beliefs
C1 I resumed my regular job.	C2 I feel better.
C5 Now I eat better.	C3 Now I accept the disease.
C6 I can sleep well again.	C4 I feel annoyed for having to come to the hospital often.
	C7 It bothers me to have to take medicines.

Scale D3 *(Beliefs about the use of medication)*: in relation to *favorability*, it was found that there were divergences among the items, i.e. there were favorable

items (D3.3 and D3.10) and unfavorable items (D3.2, D3.4, D3.5, D3.6 and D3.9) (Box 3) (p-value = 0.014, Chi-square of Cochran test). Judges agreed on this evaluation (k = 0.417, p-value = 0.0035).

As for pertinence, it was found that there was no difference among the items (p-value = 0.423, Chi-square of Cochran test), i.e. all of them were evaluated as pertinent. Discordance was found among the judges through the Kappa coefficient analysis (k = -0.283, p-value = 0.9668).

It should be pointed out that items D3.1, D3.7 and D3.8 were not evaluated by one of the judges for favorability and pertinence. According to this judge, these items are patient-related and do not express a belief or a feeling. Therefore, these items were not statistically analyzed.

With regard to the *clearness* of this scale, no differences were found among the items (p-value = 0.132, Friedman test) and judges agreed on this analysis (Kendall coefficient W = 0.509).

Although the evaluation made by the judges was considered positive concerning the pertinence and clearness of phrases, a suggestion made by two of them to clarify some phrases was accepted. Subsequently, these items were modified as follows: D3.1 – from *"Sometimes I forget to take my medication"* to *"I consider it unpleasant to remember the time to take medicines"*; D3.7 – excluded; D3.8 – from *"I've managed to adapt the use of medicines to my routine"* to *"I've managed to program the use of medicines into my daily routine"*; and item D3.9 – from *"I do not feel the bad effects of the medicines"* to *"I think that the use of medication may cause bad effects"*. Although one of the judges evaluated items D3.1 and D3.8 as more related to patient behavior regarding medication, without expressing beliefs or feelings about the issue, the items were maintained since they were significantly reported in previous studies[1-2].

Table 3 - Evaluation by the judges of belief favorability concerning the use of medication

Favorable Beliefs	Unfavorable Beliefs
D3.3 I think the medicines are necessary. D3.10 I feel better using the prescribed medication.	D.2. I think the doctor prescribes a great deal of medicines. D.3.4. The medicines are very expensive and often I can't buy them. D3.5. I feel bad when I take the medicines. D3.6. I think that the use of a lot of medicines debilitates the organism. D3.9. I think the use of medication may cause bad effects.

Results of Cronbach's α coefficient test

In order to quantify internal consistency among the items of the same instrument scale, **Cronbach's α** was calculated. This coefficient measures the correlation of each of the sub-items with the total number of items on that section for each patient. Values over 0.80 indicate high internal consistency and suggest that the instrument can be applied to other research. In case the instrument has been built only for the research being carried out, values over 0.60 indicate intra-individual accuracy[10].

The CAV-Instrument scales need an alpha at around 0.60 for confirmation of their internal consistency, since the objective is to be applied only to heart valve disease patients under treatment at the Unicamp School Hospital.

The alpha value obtained in the global instrument analysis (α=0.70) indicates a satisfactory degree of internal consistency.

On the other hand, separate analysis of the scales showed that items of scales B and D presented answers with high internal consistency. Scales A and C presented a value lower than expected.

Scale A reached an adequate value of alpha (0.60) when five items were removed, which in a posterior analysis were considered as wrong beliefs or concepts about the disease. The remaining items, which were consistent, were related to correct beliefs. The phrases were then redistributed into two new scales: **A2–I Inadequate beliefs about the disease** and **A2–II Adequate beliefs about the disease**. Scale A2–I obtained an alpha of 0.51, showing there was consistency among the inadequate beliefs as well.

The removal of scale C items did not significantly improve the alpha value, showing that, in fact, there was great variability of patient answers to the items of this scale.

Scale C, which measures treatment impact on subject life, presented extremely low alpha coefficient values, with no significant increase after removal of items. The scale will be maintained in its current form for the continuation of the study, with an increase in sample size, to verify if the great variability of answers will persist in the increased sample. If this great variability of answers is maintained, it would be interesting to analyze the factors that contribute to this fact, such as the inadequate or non-representative formulation of the studied population's beliefs

or the creation of an absolutely individual pattern of perception of such an impact, which results in great variability of answers and consequently in low alpha values.

FINAL CONSIDERATIONS

The results obtained through this study allowed us to conclude that the majority of the beliefs which compose the CAV-Instrument were evaluated as pertinent, clear and relevant to the analyzed question. The received suggestions allowed us to restructure the instrument and classify the items as favorable/unfavorable – an essential definition for subsequent statistical analysis. The CAV-Instrument was submitted to the initial process of validation, presenting satisfactory internal consistency.

The increase in the number of subjects is necessary to confirm internal consistency, as well as to implement the following steps of the validation process, i.e. to verify the validity of construct and begin the trials on correlation and comparison among the studied variables.

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