Development of an instrument to measure psychosocial determinants of physical activity behavior among coronary heart disease patients

DESENVOLVIMENTO DE INSTRUMENTO PARA MEDIDA DOS FATORES PSICOSSOCIAIS DETERMINANTES DO COMPORTAMENTO DE ATIVIDADE FÍSICA EM CORONARIOPATAS

DESARROLLO DE UN INSTRUMENTO PARA LA MEDIDA DE LOS FACTORES PSICOSOCIALES DETERMINANTES DEL COMPORTAMIENTO DE LA ACTIVIDAD FÍSICA EN INDIVIDUOS CON CORONARIOPATÍA

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ABSTRACT

The aim of this study was to report the development and the analysis of content validity and reliability of the Psychosocial Determinants of Physical Activity among *Coronary Heart Disease Patients Questionnaire*, based on an extension of the Theory of Planned Behavior. In the content validity step, three experts evaluated the instrument which was, afterwards, pre-tested with five subjects in order to obtain a conceptually appropriate and easily understood instrument. Fifty-one patients participated in the evaluation of internal consistency of the reviewed instrument. Cronbach's alpha coefficients above 0.75 were observed for the constructs: Intention, Attitude, Subjective Norm, Self-efficacy and Habit. The new instrument demonstrated acceptable evidence of content validity and reliability.

KEY WORDS

Coronary disease.
Exercise.
Motivation.
Behavior.
Validation studies.

RESUMO

Este estudo teve como objetivo apresentar o desenvolvimento, a análise de conteúdo e da confiabilidade do *Questionário para identificação dos fatores psicossociais determinantes do comportamento de atividade física em coronariopatas*, baseado na extensão da Teoria do Comportamento Planejado. O instrumento foi submetido à validade de conteúdo, com realização de sua avaliação por três juízes e pré-teste com cinco sujeitos, até mostrar-se conceitualmente adequado e compreensível aos sujeitos entrevistados. Foi aplicado em 51 sujeitos para a avaliação preliminar da consistência interna, por meio da determinação do coeficiente alfa de Crombach. Foram observados coeficientes alfa de Crombach >0,75 para os constructos Intenção, Atitude, Norma Subjetiva, Autoeficácia e Hábito. O instrumento desenvolvido mostrou evidências de validade de conteúdo e de confiabilidade.

DESCRITORES

Doença das coronárias.
Exercício.
Motivação.
Comportamento.
Estudos de validação.

RESUMEN

Este estudio tuvo como objetivo presentar el desarrollo, el análisis de contenido y de confiabilidad del *Cuestionario para la identificación de los factores psicosociales determinantes del comportamiento de actividad física en pacientes afectados de coronariopatías*, basado en la extensión de la Teoría del Comportamiento Planificado. Se sometió la validez del contenido del instrumento a la evaluación por parte de tres jueces y pre test con cinco sujetos, hasta mostrarse conceptualmente adecuado y comprensible para los sujetos entrevistados. Fue aplicado en 51 sujetos para la evaluación preliminar de consistencia interna, a través de la determinación del coeficiente Alfa de Cronbach. Fueron observados coeficientes Alfa de Cronbach >0,75 para los constructos Intención, Actitud, Norma Subjetiva, Autoeficacia y Hábito. El instrumento desarrollado evidenció la validez de su contenido, así como su confiabilidad.

DESCRIPTORES

Enfermedad coronaria.
Ejercicio.
Motivación.
Conducta.
Estudios de validación.

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INTRODUCTION

Coronary artery disease (CAD) is one of the main causes of morbidity and mortality in developed countries and its incidence is related with the lifestyle and the presence of cardiovascular risk factors, such as smoking, hypertension, diabetes mellitus (DM), dyslipidemias, obesity and a sedentary lifestyle [1].

In reference to being sedentary, adopting an active lifestyle helps control cardiovascular risk factors and reduce weight, besides increasing endothelium nitric oxide levels, promoting vasodilatation and antithrombotic effects[2]. Regular physical activity also helps to increase tolerance towards exercise, improves quality of life and reduces cardiovascular mortality at mild or older ages[1]. Therefore, cardiac rehabilitation programs have proven an important therapeutic strategy in myocardial infarction patients after hospital discharge, and are effective in the treatment and in preventing new events.

Nevertheless, despite the benefits of exercise on coronary disease, literature provides evidence that there is poor adherence to rehabilitation programs. In social psychology there are several theoretical models for understanding the factors that influence the adoption of behaviors in health. One important example among the referred models is the motivational theories, which point at motivation as the main determinant of behavior; therefore, the best predictors of a behavior would be the factors that predict or determine motivation (or Intention). One of these important theories is the Theory of Planned Behavior (TPB)[3].

According to the TPB, Intention, the main determinant of behavior, and has three components: personal feature, referred to as Attitude; Subjective Norm which reflects the influence of the society on behavior; and Perceived Behavior Control (PBC) which refers to the perception of an individual in terms of his or her ability to performing or not a certain behavior. The central idea of the model may be expressed using the following diagram (Figure 1). The scheme shows that the Perceived Behavioral Control, in addition to contributing with the development of Intention, may play two different roles in predicting behavior. First, along with Intention it can be a direct behavior predicting variable. The second role, represented by the dotted line in Figure 1, reflects the Intention x Perceived Behavior Control interaction hypothesis, i.e., among individuals who express the same level of Intention towards performing a certain behavior, those with a higher perception of control tend to be firmer in performing the behavior compared to those with a lower perception of control. Among the advantages of the model, the most important are the demonstration of its effectiveness in health behavior studies, including exercising behaviors, as well as its flexibility to include other variables that may contribute to comprehend how Intention is formed[4].

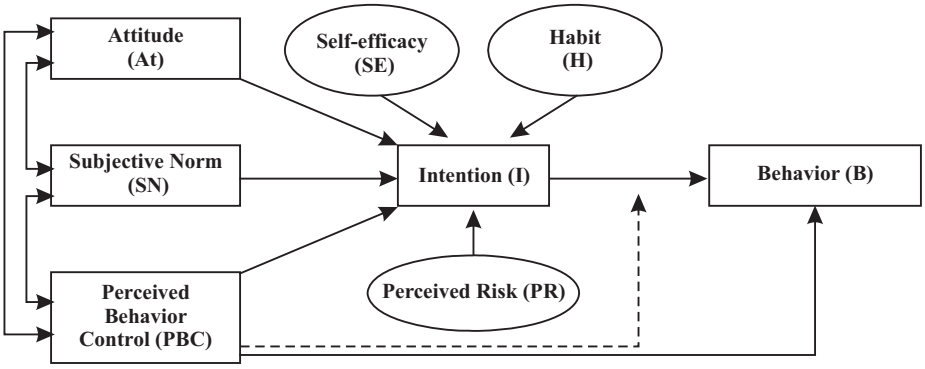

Figure 1 - Diagram representing the relationships between the factors that determine behavior, according to the TPB, considering the additional psychosocial variables - Self-efficacy, Past Behavior, Habit and Perceived Risk, adapted by Ajzen[3].

Although literature states that behavior, Intention is a strong predictor because of the variables that compose the TPB. Authors[5] have argued that adding variables from other theoretical models can improve its predictive strength.

Variables external to the TPB include **self-effectiveness**, which is reflection of one's personal abilities for a certain behavior, different from the concept of Perceived Control that represents barriers, which refers to aspects beyond control[5]; **Habit**, a construct defined as a *sequence of learned actions that become automatic responses to specific situations, completed unconsciously*[6] and **Perceived Risk**, which is related to the judgment that an individual has about the risk for developing a certain disease, and is an important motivator in prevention, detection and treatment[7]. Other studies using the referred theory have demonstrated that these three variables are significant elements in the prediction of Intention[5].

The motivational model is applied by means of instruments based on psychometric scales that aim at measuring the magnitude of the factors related to the studied behavior and its correlations. To do this, it is necessary to evaluate the psychometric properties of the instrument, as well

as its reliability and validity, which, if confirmed, indicate that it provides valid and consistent measures[8].

The TPB has been widely used in of health behaviors, including those that address physical activity, from sports to leisure activities, in different subject groups[9-10]. Studies have also been developed to identify the factors involved in the motivation of coronary disease patients to perform physical activity[11-12].

Hence, literature portrays the researchers' concern with understanding the factors supporting physical activity, including in the context of coronary disease. Nevertheless, no study has addressed patients' perception about performing physical activity in the period following hospital discharge related to an ischemic event, due to angina or stroke.

Therefore, the **objective** of this study was to present the development, content and reliability analyses of the *Questionário para identificação dos fatores determinantes do comportamento de atividade física em pacientes com infarto do miocárdio* (*Questionnaire for identifying determining factors of exercise behavior in with myocardial infarction*), based on TPB, and including the additional variables – Self-efficacy, Habit and Perceived Risk, defined as an *extension of TPB*.

The reliability and validity analysis of the referred instrument is important so it can be used in studies that aim at evaluating the determinants of the physical activity performed by coronary disease patients. The period following discharge from hospitalization due to an ischemic event is a critical moment to motivate patients towards adopting healthier behaviors. The bridge between the patient's perception and the educational goals from the view of health workers is a challenge for developing interventions that are more realistic and have greater chances of becoming effective[13]. The data that could be obtained with the new instrument should support the development of specific strategies to motivate patients towards becoming more physically active in the different adaptation periods that follow their experience of an ischemic event.

METHOD

Developing the Instrument

The instrument was designed based on the theoretical construct of the TPB and including additional variables (Habit, Self-efficacy, Perceived Risk) to the model, which is widely used in worldwide literature in studies involving health behaviors[14], and on an extensive literature review on the use of TPB in behaviors related to physical activity[9-10,15] and some in behaviors related to exercise involving patients with coronary disease[11-12]. The original questionnaire consisted of 30 items distributed to evaluate the following constructs: Behavior (1 item), Intention (6 items), Attitude (5 items), Subjective Norm (4 items), Perceived Behavior Control (5 items), Self-efficacy (2 items), Habit (5 items) and Perceived Risk (2 items), which was submitted to content validation.

Content Validation

For content validation, the instrument was submitted to an evaluation by judges who had knowledge and expertise in the field, and met at least one of the following criteria: knowledge in care, teaching and research in cardiology and knowledge in research using theoretical frameworks for behavior. As described before, there is no minimum number of judges required for content validation studies, but a minimum of three has been recommended. More than ten judges is considered overestimation[16]. In the present study, three judges evaluated the instrument in terms of its title, items, answer format, scoring procedure and form of register. The evaluation was performed considering pertinence (it the items expressed a true relationship with the study proposition); clarity (if the items are understandable); and coverage (if the selected variables permit to obtain information to achieve the study objectives). After the informal approach, the judges received a letter with an invitation and consent form to participate in the study accompanied by a copy of the instrument and the instructions for its administration and scoring and the content validation questionnaire. The judges were also informed about the conceptual framework (TPB and additional variables) of the instrument, and the target population. Items were left unchanged if there was 100% of agreement among the judges in terms of their pertinence and clarity. Item with at least one disagreement were discussed among the other judges until reaching a consensus of its evaluation and restructuring.

After the analysis stage, the judges moved to the process of instrument validation, based on the recommendations of the theoretical model and of studies using the TPB, according to the following diagram:

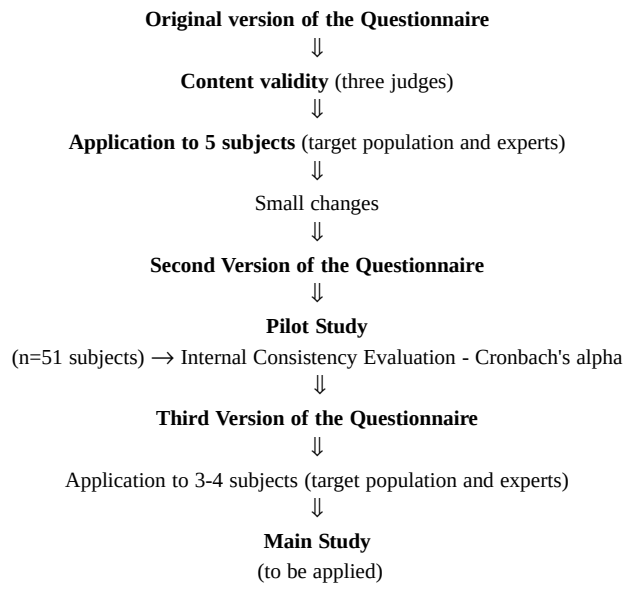

Figure 2 – Flow chart of the construction and validation process of the *Questionnaire to identify determining psychosocial factors of physical activity behavior in individuals with coronary disease*

Instrument

The instrument was submitted to content validity and was composed by the measures of physical activity behavior (walking), and its respective variables from the TPB (Intention, Attitude, Subjective Norm, Perceived Behavior Control) and other models (Self-efficacy, Habit and Perceived Risk).

Behavior. Was measured using the following question: *Over the last six months before your infarction, you used to practice physical activity, that is, walking: (1) less than once a week, (2) once a week, (3) twice a week, (4) three or more times a week.*

Intention. The Intention construct, with six items, addressed the individual's motivation to perform a certain behavior, and each item is measured using a five-point Likert scale (1.*I intend to walk, for at least 30 minutes, three times a week next month* definitely not[1] – definitely yes[5], 2.*I'm planning to walk, for at least 30 minutes, three times a week next month* definitely not[1] – definitely yes[5]; 3.*I'll try to walk for at least 30 minutes, three times a week...* definitely not[1] – definitely yes[5]; 4.*I want to walk, for at least 30 minutes, three times a week...*; definitely not[1] – definitely yes[5]; 5. *I hope to walk, for at least 30 minutes, three times a week...* unlikely [1] – very likely [5]; 6. *What are the chances that you will walk, for at least 30 minutes...* unlikely [1] – very likely [5]. The score for Intention was obtained by the arithmetic mean of the six items that compose the construct, ranging from 1 to 5: the higher the mean score the higher the subject's Intention towards the behavior.

Attitude. The attitude variable refers to the favorable or unfavorable assessment made by the individual regarding the addressed behavior, and was measured by means of five semantic differential scales constructed with bipolar adjectives, with scores ranging from one to five assigned for the answer to the following question: *To me, walking three times a week for at least 30 minutes next month is*: very bad [1] – very good [5]; very harmful [1] – very beneficial [5]; very unpleasant [1] – very pleasant [5]; very boring [1] – very pleasing [5]; very meaningless [1] – very reasonable [5]. The Attitude score was obtained by the arithmetic mean of the five items composing the construct, ranging from 1 to 5: the higher the mean score, the higher the chances of the subject performing the behavior.

Subjective Norm. The subjective norm refers to the social pressure that individuals perceive regarding their engaging or not in a behavior, and it was assessed by means of four items with answers using a five-point Likert scale: 1. *People who are important to me think that I.. walk...* definitely should not[1] - definitely should [5]; 2.*People who are important to me would... of me walking...*; definitely disapprove [1] - definitely approve [5]; 3. *People who are important to me want me to walk...* unlikely [1] – very likely [5] and 4. *I feel there is some pressure for me to start walking...* I totally disagree[1] - I totally agree [5]. The Subjective Norm score was obtained by the arithmetic mean of the four items composing the construct, ranging from 1 to 5: the higher the mean score, the higher the perception of social pressure towards the behavior.

Perceived Behavior Control. The Perceived Behavior Control refers to the individual's perceived easiness or difficulty to perform a behavior, and was measured by means of five items, using a five point Likert scale: 1. *Walking, for at least 30 minutes, three times a week next month, depends only on me* totally disagree [1] – totally agree [5]; 2.*How much control do you believe you have about walking, for at least 30 minutes, three times a week next month* totally beyond my control [1] – totally under my control [5]; 3.*I would like to go walking, for at least 30 minutes, three times a week... but I really don't know if I can* I totally disagree [1] – I totally agree [5]; 4.*I am sure that if I wanted to I could go walking... next month* I totally disagree [1] – I totally agree [5]; 5.*For me, walking, for at least 30 minutes, three times a week next month is* very difficult [1]- very easy[5]. The score for Perceived Behavior Control was obtained by the arithmetic mean of the five items composing the construct, ranging from 1 to 5: the higher the mean score the higher the subject's perceived control about performing the behavior.

Three other variables were added to the TPB construct and grouped under three domains (Self-efficacy, Habit and Perceived Risk) with nine items.

Self-efficacy. Self-efficacy is defined as one's confidence on one's own ability to perform a behavior[5] and was measured using two questions with answers on a five-point Likert scale: 1.*Even if I find it difficult I am capable of walking, for at least 30 minutes, three times a week, next month* I totally disagree [1] – I totally agree [5]; 2. *I'm sure that I'm capable of walking, for at least 30 minutes, three times a week, next month* I totally disagree [1] – I totally agree [5]. The score for Self-efficacy was obtained by the arithmetic mean of the two items composing the construct, ranging from 1 to 5: the higher the mean score, the higher the subject's confidence in his or her ability to perform the behavior.

Habit. Habit has been described as a sequence of learned actions that become automatic responses to specific clues[6] and was measured by applying five questions with answers on a five-point Likert scale, one of which was I totally disagree and five were I totally agree. The following guiding question was used: Before my heart attack, walking was something that: 1. *...I did frequently*; 2. *...if I didn't do I felt strange*; 3.*...was part of my everyday routine;* 4. *...i missed whenever I didn't do it*; 5. *...I did a long time ago*. The score for Habit was obtained by the arithmetic mean of the five items composing the construct, ranging from 1 to 5: the higher the mean score, the higher the perception of the influence that Habit had on performing the behavior automatically.

Perceived Risk. Originally on the Health Beliefs Model, Perceived Risk is defined as the risk that the individual believes exists for a predisposition or chance to develop a certain disease if a behavior if performed or not[7], and, in the present study, it is referred to as a positive perceived risk, as its perception would be associated with an encouragement towards the behavior. An additional item was included to assess the perception of the risk of performing the behavior, whose perception, as opposed to the previous model, would be associ-

ated with inhibiting the behavior, and is thus referred to as a negative Perceived Risk. Both questions were designed with answers on a five-point Likert scale, being [1] I totally disagree and [5] I totally agree 1. *If I go walking, for at least 30 minutes, three times a week next month, there is a smaller chance of my having another infarction*, 2. *I think that walking, for at least 30 minutes, three times a week next month, puts me at risk for having another heart attack*. Hence, the two questions, despite addressing the perception of risk, concern perceptions with different concepts. When interpreting the scores for question 1, the higher the score, the higher the perception of the risk towards not performing the behavior. In question 2, the higher the score, the higher the perception of the risk as a consequence of walking.

It is highlighted that the instrument does not have a total score. Each construct should be considered as a variable that should be individually evaluated.

Instrument to measure the answers

To measure the psychosocial variables an adapted visual scale was used, based on the model used by Bah[17]. The purpose of using a visual scale is to facilitate answering the items related to the psychosocial variables, among subjects with a low educational level, who corresponds to the majority of the population in the present study. In this scale, the answer options are replaced by a line with a picture of a triangle, divided into five quadrants, which dimension increases as the answer is more favorable to the study object. According to the position of the vertical line, a score from one to five is assigned, which corresponds to the measure for that item. In the present study, after the initial pre-test, it was found that it was necessary to add the semantic equivalents to each quadrant/value on the scale.

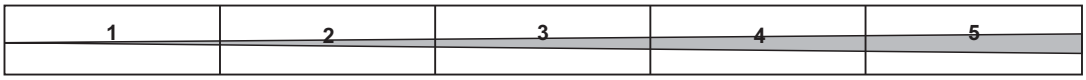

Figure 3 - Visual scale to measure the answers to the items related to psychosocial variables, adapted from Bah[17].

Reliability evaluation

The final version of the instrument was applied to 51 subjects with coronary disease, being followed at an outpatient clinic of a university hospital in the state of São Paulo, in accordance with the recommendation for developing questionnaires to measure variables in the context of social cognitive theories[18]. The subjects were selected continuously until achieving the established sample size provided they presented medical diagnosis for coronary disease, medical discharge, and no physical limitations to perform physical activity. Data collection was performed by the researcher, by individual interviews performed at a private location of the referred research field, after obtaining of the Informed Consent Form (ICF) and explaining the study objectives and the application of the instrument. To analyze the reliability according to the homogeneity criterion (internal consistency), Cronbach's alpha was used, along with performance analysis of each item in relation to the total score of the related construct. Alpha coefficients above 0.70 indicated satisfactory internal consistency[19].

Ethical Aspects

The project and the ICF, signed by the participant before the interview, were approved by the Independent Ethics Committee at Faculdade de Ciências Médicas – Unicamp (IEC number 557/2006).

RESULTS

In the content validation step it was recommended that the instrument should be reviewed in terms of its title, which in the final version changed from *Questionário dos fatores determinantes do comportamento de realizar atividade física* (Questionnaire of the determining factors of behavior to perform physical activities) to *Questionário para identificação dos fatores psicossociais determinantes do comportamento de atividade física em coronariopatas* (Questionnaire for identifying the determining psychosocial factors of physical activity behavior in subjects with coronary disease). Regarding the coverage of the variables for studying the phenomenon (physical activity behavior), the judges evaluated it as adequate concerning the theoretical framework used. About the instructions, aiming to avoid excessive repetition of the definition of behavior for each variable, it was recommended that the following explanation should be added before the questions: *all the following questions refer to the behavior of performing physical activity, that is, walking three times a week for at least thirty minutes.* As for the items, suggestions were made for the Habit and Perceived Risk variables. Considering that Habit refers to the custom of a behavior performed in the past , it was suggested to chage the introduction of the question: *Walking for me, is something that...* to *Before my heart attack, walking was something that...* Regarding the Perceived Risk, it was suggested to include a second item: *I think that walking, for at least 30 minutes, three times a week next month, puts me at risk of having another heart attack*. Although the original definition of Perceived Risk on the health beliefs model is better defined by item 7.1 (*If I do it... there is a smaller chance of having another infarction*) according to the judges, the fear of having another ischemic event may interfere in coronary disease patients performing the physical activity. Regarding the scoring procedure, it was suggested to change, in the answer scale, the option *I don't know* to *none*, in the group of items created to measure Attitude, Subjective Norm, perceived Behavior Control, Self-efficacy and Habit. Because the instrument was designed to be applied as an interview, no comments were made about how the answers were registered.

Internal Consistency

This part of the study counted with 51 subjects, whose average age was 57.9 (±9.2) years, and 72.5% were male, 58.2% married, with an average education time of 4.6 (±3.7) years, and mean individual and family income of 1.8 (±1.2) and 3.3 (±1.7) wages, respectively.

As for the clinical profile, most subjects presented clinical complications and/or associated risk factors, with predominance of dyslipidemia (86.3%), followed by ASH (80.4%), DM (27.5%) and cerebrovascular accident (3.9%). Among the lifestyle habits, 51.0% of subjects were smokers and 9.8% were alcoholics.

Internal consistency was analyzed by calculating Cronbach's alpha coefficient for the behavior variables.

Table 1 shows the mean scores, item-total score correlations (of each construct) and Cronbach's alpha for the psychosocial variables associated with physical activity behavior.

Table 1 - Mean, item-total correlation, Cronbach's alpha of the psychosocial variables that compose the instrument *Questionnaire to Identify Psychosocial Determinants Physical Activity Behavior in individuals with coronary disease* - Campinas - 2007/2008

Variable	mean (sd)	Item-total correlation	Cronbach's alpha	Cronbach's alpha *(if item was deleted)**
1. Intention			0.95	
1.1 I intend to...	3.78 (0.94)	0.78		0.94
1.2 I'm planning to...	4.00 (1.00)	0.90		0.93
1.3 I'll try to...	3.88 (1.02)	0.84		0.94
1.4 I want to...	4.00 (0.94)	0.88		0.93
1.5 I hope to...	4.20 (1.04)	0.83		0.94
1.6 What are the chances...	4.14 (1.20)	0.83		0.94
Total score – Intention	4.00 (0.92)			
2. Attitude: *for me,... is:*			0.77	
2.1 Bad/good	4.27 (1.04)	0.74		0.71
2.2 Harmful/beneficial	4.49 (0.50)	0.22		**0.84**
2.3 Unpleasant/pleasant	4.35 (0.89)	0.82		0.67
2.4 Boring/pleasing	4.06 (0.97)	0.83		0.66
2.5 Nonsense/sensible	4.55 (0.64)	0.32		**0.83**
Total score – Attitude	4.34 (0.62)			
3. Subjective Norm: *important people for me*			0.68	
3.1 Think I should/should not...	4.22 (0.58)	0.56		0.44
3.2 Disapprove/approve of...	4.22 (0.58)	0.52		0.45
3.3 Want me to...	4.55 (0.81)	0.44		0.46
3.4 I feel social pressure to...	3.57 (1.06)	0.18		**0.76**
Total score- Subjective Norm	4.13 (0.52)			
4. Perceived Behavior Control			0.69	
4.1 ... it only depends on me	3.96 (0.89)	0.36		0.63
4.2 How much control you have...	4.24 (0.86)	0.61		0.53
4.3 I would lie to ...but I don't know if I can	3.61 (1.13)	0.31		0.67
4.4 I'm sure I could...	4.20 (0.80)	0.49		0.66
4.5 Difficult/easy...	3.78 (1.24)	0.39		0.63
Total score – Control...	3.95 (0.65)			
5. Self-efficacy			0.91	
5.1 I'm capable of...	3.96 (0.82)	0.83		
5.2 I'm sure I'm capable of...	4.06 (0.88)	0.83		
Total score - Self-efficacy	4.00 (0.81)			
6. Habit: *before my heart attack, walking was something that*			0.88	
6.1 ...I often did	2.84 (1.24)	0.84		0.84
6.2 ...if I didn't do I felt strange	3.22 (1.08)	0.85		**0.89**
6.3 ...was part of my daily routine...	3.00 (1.15)	0.84		0.84
6.4 ...I missed if I didn't do it	3.22 (1.27)	0.85		
6.5 ...I did a long time ago	3.22 (1.15)	0.86		0.85
Total score – Habit	3.09 (0.95)			0.86
7. Perceived Risk				
7.1 If I do it ... there is a smaller chance I'll have another stroke	4.18 (0.79)			
7.2 I think that walking ... puts me at risk of having another heart attack	2.37 (1.20)			

*Estimated only for the constructs designed for three or more items. Note: (n=51)

A mean score of about 4.0 was found for the variables - Intention, Attitude, Subjective Norm, and Self-Efficacy, which shows the subjects positive attitude towards performing activity. However, lower mean scores were observed for the variables - Habit (3.09) and Perceived Risk (2.63). The score obtained for the Habit variable suggests that for the studied group, performing the physical activity was not included in their lifestyle as part of their everyday life, rather as an activity that requires a rational structure to be completed. On the other hand, the lower score achieved by the Perceived Risk suggests that the subjects perceive the physical activity behavior as a threat due to the risk of a new ischemic event.

Regarding the reliability analysis, Cronbach's alpha values > 0.75 were found for the Intention, Attitude, Self-efficacy and Habit variables. The Subjective Norm and perceived Behavior Control variables presented alpha values below 0.70. Removing items did not make significant improvements on the alpha coefficient of those variables, except when item 3.4 (*I feel social pressure towards...*) was removed form the Subjective Norm construct (alpha=0.68 to 0.76 after its removal) and removing the item *harmful/ beneficial* from the Attitude construct (alpha=0.77 to 0.84). The two items that improved the alpha coefficient also presented low item-total correlation values (r= 0.22 and r=0.32, respectively). The internal consistency of the Perceived Risk variable was not tested because it is composed by only two conceptually distinct items, confirmed by the absence of any correlation between them (r= -0.091; p-value=0.525).

DISCUSSION

The objective of this study was to present the development as well as the content of the reliability of an instrument developed to study the determinants of behavior and perform physical activity (walking) in patients with myocardial infarction after hospital discharge, based on TPB. The finding show that it is a conceptually valid instrument, which patients understand, and coherent for the attributes it measures.

When a new scale is developed, researchers follow strict procedures for the development as well as for providing information about its reliability and validity. Although construct and criterion validity are important, the information about measure content validity is also considered necessary to draw conclusions about the quality of the scale. Content validity has been defined as the level to which an instrument has an appropriate group of ideas to represent the construct being measured[8] or extent to which an instrument adequately represents the domain of interest, when aiming to measure a phenomenon[20].

Regarding reliability, the Attitude and Subjective Norm constructs presented better psychometric performance when some of their items were removed (Attitude =Harmful/Beneficial; Nonsense/Sensible; Subjective Norm = item 3.4 *I feel social pressure towards...*). In the Subjective Norm construct, eliminating item 3.4 made a significant improvement to the alpha coefficient, changing it from 0.68 to 0.76, which points at the recommendation of removing the item for a wider study. For the Attitude construct, however, the alpha value first observed (0.77) meets the criterion adopted in this study as an indicator of internal consistency, therefore not justifying removing the item.

Similarly, regarding the Attitude construct, it was observed that removing the items *walking for me is harmful/beneficial, for me walking is senseless or sensible* isolated results in a similar improvement of the alpha coefficient. But in this case, observing the items as a whole points at the coherence of answers. The two mentioned items refer to the aspects of the importance of behavior and were those that obtained the highest scores. The other items composing Attitude refer to the perception of acceptability of behavior (bad/good, unpleasant/pleasant, boring/pleasing), and obtained the lowest scores, suggesting that the subject acknowledges the need to perform physical activity, but does not find it pleasant/pleasing to perform this behavior.

There are many practical implications to the development of scales that support the behavior of performing physical activity in coronary disease patients, especially in the period following hospital discharge after an ischemic event.

Experiencing an ischemic event such as a myocardial infarction brings about important repercussions to the physical, psychological and social aspects of an individual's life, and can thus mean experiencing a period of crisis and turbulence. The period following the event, in the acute phase, is strongly marked by the experience of a life threatening event, by the fear of recurrence and by the need to know the causes that contributed to such a critical health condition, as well as the strategies for treatment and for preventing other events[21].

Although the negative consequences of experiencing an acute or chronic disease receive more attention in studies, some studies have shown that it is possible to find positive aspects from those experiences. For instance, a recent study demonstrated that patients who perceive (but do not necessarily have the clinical condition) that their situation is serious have a stronger chance of engaging and changing their lifestyle in the long term, a fact which appears to be associated with a higher predisposition or *good will* towards changing their lifestyle[22].

It is likely that the patient, due to the strong impact, as soon as he or she gets hold of information/knowledge of the risk factors for the disease, develop a stronger motivation towards changing behaviors, especially those related to eating and performing physical activity.

Using an instrument as the one developed and tested in the present study may help to detect which factors have the

strongest influence on motivation to engage in an active lifestyle. It is possible that these factors change as the ischemic events gets older, and, therefore, specific strategies should be employed in the different phases of recovering from the event. In addition, administering the instrument before and after the educational intervention, allied to the outcome measure would permit to assess the extent to which changing the factors involved in forming Intention actually contribute to changing or maintaining an active lifestyle.

CONCLUSION

The present study results show that the instrument to study the factors determining physical activity behavior in myocardial infarction patients is a tool with valid content that patients understand, and has concepts that present evidence of internal consistency. Its use could support designing theory-based educational interventions and assess the effect of its effectiveness.

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Attachment

Questionário para identificação dos fatores psicossociais determinantes do comportamento de atividade física em coronariopatas (Questionnaire for identifying the determining psychosocial factors of physical activity behavior in subjects with coronary disease)

A) Comportamento

No(s) último(s) (período de referência*), antes do seu ataque do coração, você costumava realizar atividade física, ou seja, caminhada:

( ) < 1 vez/semana ( ) 1 vez/semana ( ) 2vezes/semana ( ) 3 ou mais vezes/semana

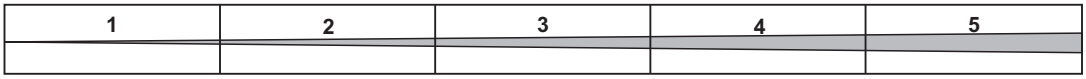
***** o período deve ser determinado de acordo com os objetivos de cada estudo. Exemplo: No último (mês) ... Nos últimos (dois meses)... Nos últimos (seis meses) antes do infarto

Definição do comportamento: TODAS AS PERGUNTAS SEGUINTES SE REFEREM AO COMPORTAMENTO DE: realizar atividade física, ou seja, fazer caminhada no mínimo 3 vezes por semana, com duração de no mínimo 30 minutos no próximo mês (ou no período determinado para cada estudo)

B) Variáveis Psicossociais

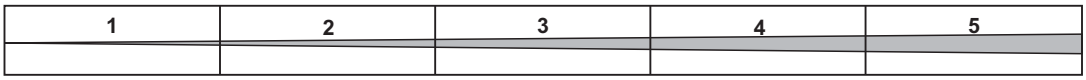
1. Intenção

1.1 Eu tenho intenção de fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês.



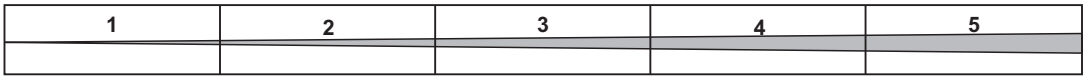
definitivamente não | não | não faz diferença ou não sei | sim | definitivamente sim

1.2 Eu estou planejando fazer caminhada, no mínimo 30 minutos, três vezes por semana no próximo mês



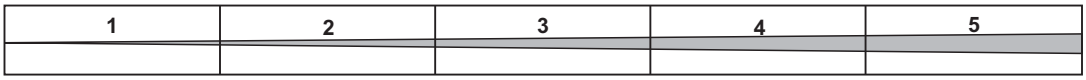
definitivamente não | não | não faz diferença ou não sei | sim | definitivamente sim

1.3 Eu vou tentar fazer caminhada, no mínimo 30 minutos, três vezes por semana no próximo mês



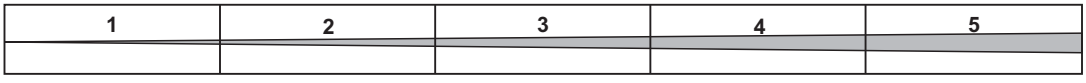
definitivamente não | não | não faz diferença ou não sei | sim | definitivamente sim

1.4 Eu espero fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês



definitivamente não | não | não faz diferença ou não sei | sim | definitivamente sim

1.5 Qual é a probabilidade de você fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês



improvável | pouco provável | não faz diferença | provável | muito provável

2. Atitude

Para mim, fazer caminhada, no mínimo 30 minutos, três vezes por semana no próximo mês será:

	1	2	3	4	5
2.1	Muito ruim	Ruim	Nenhum	Bom	Muito bom
2.2	Muito prejudicial	Prejudicial	Nenhum	Traz benefício	Traz muito benefício
2.3	Muito desagradável	Desagradável	Nenhum	Agradável	Muito agradável
2.4	Muito chato	Chato	Nenhum	Prazeroso	Muito prazeroso
2.5	Muita bobagem	Bobagem	Nenhum	Sensato	Muito sensato

3. Norma Subjetiva

3.1 Pessoas que sao importantes para mim acham que eu:

1	2	3	4	5
definitivamente não devo	não devo	nenhum	devo	definitivamente devo

Fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês

3.2 Pessoas que sao importantes para mim iriam:

1	2	3	4	5
definitivamente desaprovar	desaprovar	nenhum	aprovar	definitivamente aprovar

Que eu caminhe, no mínimo 30 minutos, três vezes por semana no próximo mês

3.3 Pessoas que sao importantes para mim querem que eu faça caminhada, no mínimo 30 minutos, três vezes por semana no próximo mês.

1	2	3	4	5
improvável	pouco provável	não faz diferença	provável	muito provável

3.4 Eu sinto que existe uma pressão para fazer caminhada, no mínimo 30 minutos, três vezes por semana no próximo mês.

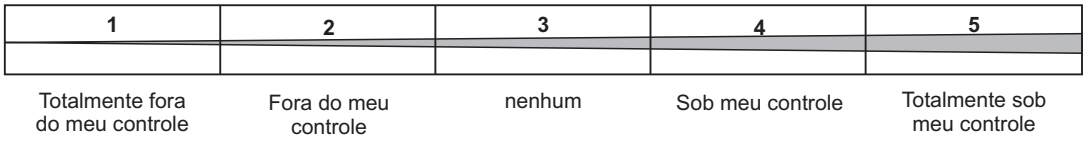
1	2	3	4	5
discordo totalmente	discordo	nenhum	concordo	concordo totalmente

4. Controle Comportamental Percebido

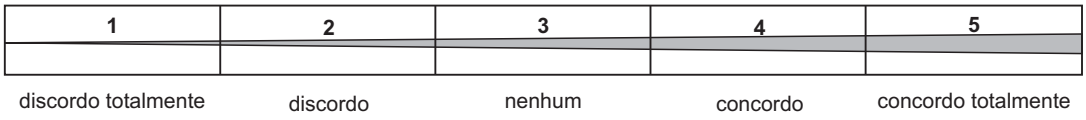
4.1 Fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês, depende só de mim.

1	2	3	4	5
discordo totalmente	discordo	nenhum	concordo	concordo totalmente

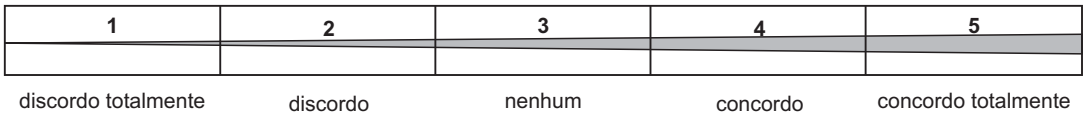
4.2 Quanto você acha que esta sob seu controle fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês.



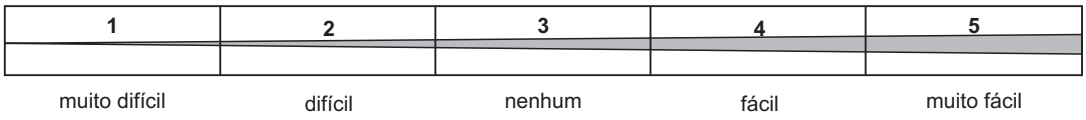
4.3 Eu gostaria de fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mes, mas realmente eu nao sei se consigo



4.4 Eu tenho certeza de que se eu quisesse, eu poderia fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês.

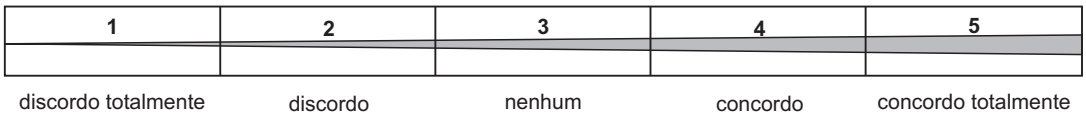


4.5 Para mim, fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês é:

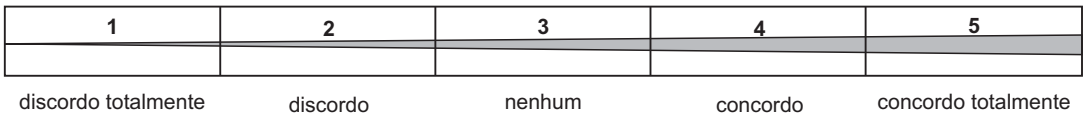


5. Auto-eficácia

5.1 Mesmo que eu ache difícil eu sou capaz fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês.



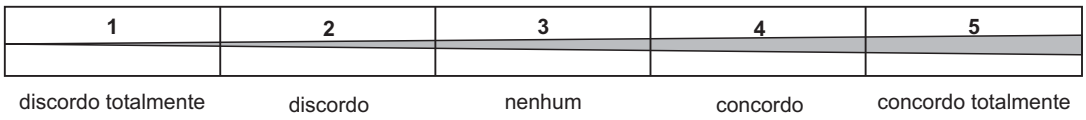
5.2 Estou certo de que sou capaz de fazer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mes.



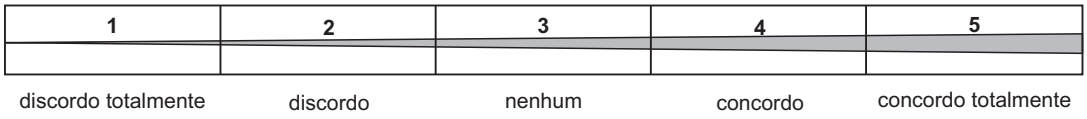
6. Hábito

Antes do meu ataque do coração, caminhar foi algo que:

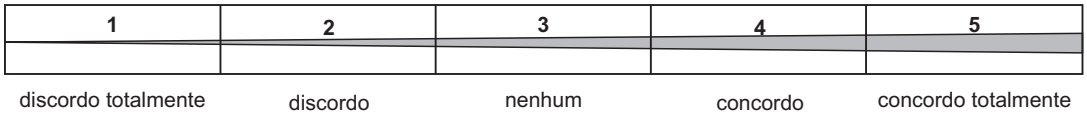
6.1 Eu fazia freqüentemente



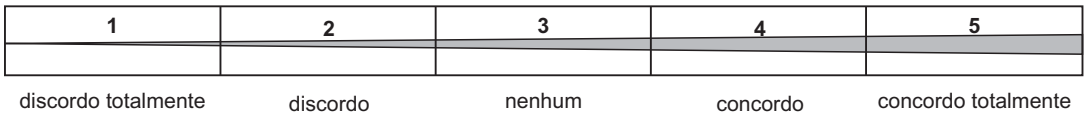
6.2 Se eu não fizesse me sentia estranho



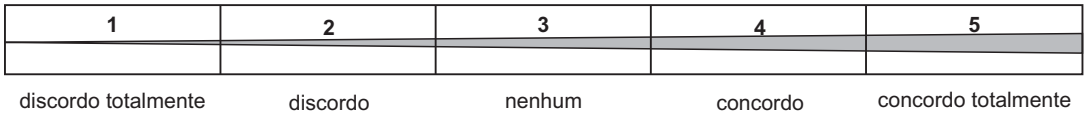
6.3 Foi parte da minha rotina diária



6.4 Eu sentia falta, se não fizesse

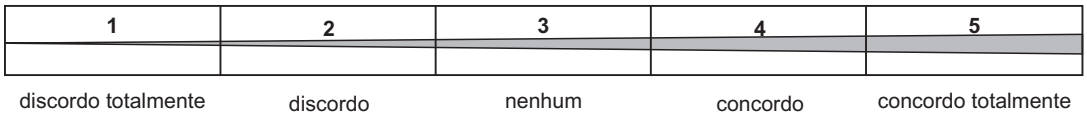


6.5 Eu fiz há muito tempo

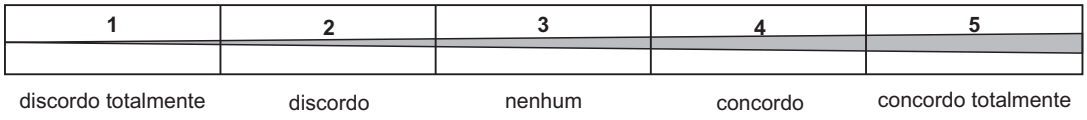


7. Risco Percebido

7.1 Se eu fizer caminhada, no mínimo 30 minutos, três vezes por semana no proximo mês, a chance de eu ter um novo ataque do coração será menor



7.2 Eu penso que caminhar, no mínimo 30 minutos, três vezes por semana no proximo mês, me coloca em risco de sofrer um outro ataque do coração



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