Original Article

Adaptation and validation of Cardiac Patients' Learning Needs Inventory for Brazilian patients*

Adaptação e validação do Cardiac Patients Learnings Needs Inventory para pacientes brasileiros

Adaptación y validación del Cardiac Patients Learnings Needs Inventory *para pacientes brasileños*

Luzia Elaine Galdeano[1], Lídia Aparecida Rossi[2], Rosana Aparecida Spadoti Dantas[3], Manuel Alves Rodrigues[4], Rejane Kiyomi Furuya[5]

ABSTRACT

Objectives: To culturally adapt the *Cardiac Patients' Learning Needs Inventory* for use in Brazil and to test its reliability (internal consistency and stability) in Brazilian patients with coronary artery disease. **Methods:** The study included 65 patients with acute myocardial infarction, hospitalized in a public hospital in the state of São Paulo. For data collection, we used an instrument for sociodemographics characteristics and the Portuguese version of the *Cardiac Patients' Learning Needs Inventory*. Internal consistency was estimated based on *Cronbach's alpha*. The stability was established using the *test-retest* method and calculated using the Student's t-test. The level of significance was 0.05. **Results:** We identified high internal consistency (0.96 in the first step, and 0.78 in the second). The domain that presented better internal consistency was *Risk Factors* (α = 0.91). Conclusion: The adapted version maintained conceptual equivalence, semantics and language of the original version, and presented adequate reliability and stability.

Keywords: Learning**;** Myocardial infarction; Patient education as topic; Validation studies

RESUMO

Objetivos: Adaptar culturalmente o *Cardiac Patients'Leaning Needs Inventory* para uso no Brasil e testar sua confiabilidade (consistência interna e estabilidade) em pacientes brasileiros com doença arterial coronariana. **Métodos:** Participaram do estudo 65 pacientes com infarto agudo do miocárdio, internados em um hospital público do interior do Estado de São Paulo. Para a coleta dos dados, foram utilizados um instrumento para caracterização sociodemográfica e a versão em português do *Cardiac Patients Leaning Needs Inventory*. A consistência interna foi estimada com base no *alfa de Cronbach*. A estabilidade foi medida apoiada no *teste-reteste* e calculada pelo teste t de Student. O nível de significância adotado foi 0,05. **Resultados:** Identificou-se consistência interna alta (0,96 na primeira medida e 0,78 na segunda). O domínio que apresentou melhor consistência interna foi *Fatores de Risco* (α= 0,91). **Conclusão:** A versão adaptada manteve as equivalências conceituais, semânticas e idiomáticas da versão original e apresentou confiabilidade e estabilidade adequadas.

Descritores: Aprendizagem; Infarto do miocárdio; Educação de pacientes como assunto; Estudos de validação

RESUMEN

Objetivos: Adaptar culturalmente el *Cardiac Patients Leaning Needs Inventory* para su uso en Brasil y probar su confiabilidad (consistencia interna y estabilidad) en pacientes brasileños con enfermedad arterial coronaria. Métodos: Participaron del estudio 65 pacientes con infarto agudo del miocardio, internados en un hospital público del interior del Estado de Sao Paulo. Para la recolección de los datos, se utilizó un instrumento para la caracterización sociodemográfica y la version en portugués do *Cardiac Patients Leaning Needs Inventory*. La consistencia interna fue estimada con base en el *alfa de Cronbach*. La estabilidad fue medida con apoyo en el *teste-reteste* y calculada por el test t de Student. El nivel de significancia adoptado fue de 0,05. Resultados: Se identificó consistencia interna alta (0,96 en la primera medida y 0,78 en la segunda). El dominio que presentó mejor consistencia interna fue *Factores de Riesgo* (α= 0,91). Conclusión: La versión adaptada mantuvo las equivalencias conceptuales, semánticas e idiomáticas de la versión original y presentó confiabilidad y estabilidad adecuadas.

Descriptores: Aprendizaje; Infarto del miocárdio; Educación del paciente como asunto; Estudios de validación

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** Study performed at the Clinics Hospital of the University of São Paulo, Ribeirão Preto Medical School.*

[1] PhD in Nursing from the Interunit Doctoral Program in Nursing, University of São Paulo, School of Nursing and University of São Paulo at Ribeirão Preto, College of Nursing – Ribeirão Preto (SP), Brazil.

[2] Full Professor, University of São Paulo at Ribeirão Preto, College of Nursing – Ribeirão Preto (SP), Brazil.

[3] Associate Professor, University of São Paulo at Ribeirão Preto, College of Nursing – Ribeirão Preto (SP), Brazil.

[4] PhD in Educational Sciences, Coordinator of the Research Unit: Nursing Domain at the Coimbra Higher School of Nursing – Portugal.

[5] PhD Candidate, Interunit Doctoral Program in Nursing, University of São Paulo, School of Nursing and University of São Paulo at Ribeirão Preto, College of Nursing – Ribeirão Preto (SP), Brazil.

Corresponding Author: **Lidia Aparecida Rossi**.
Avenida Bandeirantes 3900.Campus Universitário
Ribeirão Preto, SP, Brasil. CEP: 14040-902.
E-mail: rizzardo@eerp.usp.br. Telefone: (16) 3602-3402

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INTRODUCTION

The identification of learning needs is crucial for successful educating patients and producing behavior changes and risk-factor control [1]. Nevertheless, it should be stressed that knowledge of disease, treatment and risk factors alone does not lead to behavior changes [2]. Therefore, one might ask, what is important for patients to learn about disease and treatment? What information will motivate patients to comply with their healthcare team's recommendations [1]?

Several studies show that healthcare professionals do not always correctly identify patients' learning needs [3] and that patients and healthcare professionals attribute different degrees of importance to the various learning needs [3]. To identify patients' learning needs correctly, healthcare professionals must have access to a reliable instrument. Although prior studies have emphasized the importance of measuring patients' learning needs [3], studies of specific instruments for this purpose are rare.

The *Cardiac Patients Learning Needs Inventory* (CPLNI) developed by Gerard and Peterson[4] seeks to identify patients' individual learning needs regarding various aspects of heart disease and its treatment. Several authors have already applied this instrument to their studies, and it has served as the basis for constructing other instruments [6].

The use of a valid and reliable instrument to identify cardiac patients' learning needs will assist healthcare teams in planning rehabilitation programs. The lack of Brazilian instruments to identify or measure cardiac patients' learning needs led us to validate the CPLNI. Therefore, the aim of this study was to perform a cross-cultural adaptation of the CPLNI and to test its reliability (internal consistency and stability) in Brazilian patients with coronary artery disease.

METHODS

This methodological study was approved by the Research Ethics Committee of the Clinics Hospital of the University of São Paulo, Ribeirão Preto Medical School (Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo – HCFMRP-USP) under Protocol nº 9331/2008. All participants were given written and oral information regarding the study and expressed their agreement to participate by signing an informed consent form. The participants' anonymity was ensured.

The inclusion criteria of the study were as follows: hospitalization in the cardiology ward or coronary unit; ability to communicate verbally and/or in writing; and no alterations in consciousness. Included patients were also required to attain the following scores on the Mini Mental State Examination: patients with no schooling and a score equal to or higher than 13; patients with one to seven years of schooling and a score equal to or higher than 18; and patients with eight or more years of schooling and a score equal to or higher than 26 [7]. A total of 65 patients admitted to the HCFMRP-USP for acute myocardial infarction were interviewed.

Instruments

Data for sample characterization – A questionnaire was constructed to collect and record the participants' age, sex, education and length of hospitalization. The questionnaire was subjected to face and content validation.

Mini Mental State Examination (MMSE) – The version proposed by Bertolucci et al. [7] was used to assess patient orientation and memory and to detect possible cognitive impairments. The MMSE (with scores ranging from 0 to 30) was administered to identify which patients had the cognitive capacity to respond to the instruments.

Cardiac Patients Learning Needs Inventory (CPLNI) cross-culturally adapted for Brazil – The CPLNI was developed by P. S. Gerard and L. M. Peterson and was published in 1984 [4] for use in the United States of America. This instrument was later validated and applied by other researchers [5-6].

The CPLNI consists of 43 items grouped into eight categories (*Introduction to the Critical Care Unit - CCU, Anatomy and Physiology, Psychological Factors, Risk Factors, Medication Information, Diet Information, Physical Activity* and *Other Pertinent Information*). Each item in the instrument starts with the phrase "*I need to know*". The possible answers range from 1 to 5 according to their level of importance, as follows: 1 = *not important*, 2 = *somewhat important*, 3 = *moderately important*, 4 = *important*, and 5 = *very important*. The internal consistency of the CPLNI, as obtained by Gerard and Peterson, was adequate; Cronbach's alpha was 0.91[4]. Authorization to adapt the original version of the CPLNI was granted by Dr. Peggy S. Gerard via e-mail.

Procedures

The stages prescribed by the literature for cross-cultural adaptation were followed [8]: forward translation, synthesis of translations, back-translation, expert panel, semantic validation and pretest.

Forward translation of the original CPLNI into Portuguese was performed by two Brazilian translators who were fluent in English and had been informed of the study's aims and the concepts related to the instrument. The forward translation did not exhibit any discrepancies, and the meaning of each item was retained.

The two Portuguese translations were compared and reviewed by the principal investigator and the translators

to obtain a consensus version. The consensus version was back-translated into English by two different native English-speaking translators who not associated with the health field, resulting in Back-Translations 1 and 2. The final version of the back-translation was assessed by Dr. P. S. Gerard, who is one of the authors of the original CPLNI.

An expert panel assessed and reviewed all versions of the instrument (both the forward and back-translations). The expert panel comprised two nurses who were professors at the University of São Paulo at Ribeirão Preto, College of Nursing (Escola de Enfermagem de Ribeirão Preto – EERP-USP) and specialists in the subject (cardiology) and the CPLNI; two EERP-USP healthcare professionals fluent in English; and the principal investigator. To assess equivalences, the experts were given a copy of the original version of the CPLNI, the consensus versions, both back-translations and the suggestions made by the author of the original instrument. The consensus version was read and discussed. Modifications were made when at least four of the five experts agreed. The expert panel drafted the pre-definitive version of the instrument for use in Brazil.

Before pretest, the pre-definitive version of the CPLNI was subjected to semantic validation [9-10] to establish whether the instrument was understandable and whether modifications were needed to improve the understandability of its items' semantics, pertinence and cultural relevance [8-11].

During the semantic validation, which was performed between July 2009 and January 2010, no modifications were suggested by Brazilian patients. All participants verbally expressed their desire not to alter or add anything to the instrument.

The pretest was subsequently performed using the pre-definitive version in interviews with 10 patients. When the cross-cultural adaptation process ended, face and content validation took place followed by the analysis the adapted CPLNI's reliability.

Six nurses participated in the face and content validation. Four of the nurses specialized in cardiology and two were experts in the CPLNI. These professionals reported that the items in the CPLNI Brazilian version were clear and accurately written and coherently represented the learning needs of cardiac patients.

The reliability analysis of the adapted version of CPLNI was performed between January and June 2010 via individual interviews. The sample was selected by convenience based on the number of patients admitted during the study period who agreed to participate. Sixty-five patients diagnosed with acute myocardial infarction participated in this stage. It is traditionally believed that 10 participants per instrument item are needed, which would require a total of 430 individuals. However, this recommendation has been questioned recently. Several researchers analyzed different sample sizes and found that samples of 50 to 100 participants are adequate for proving instrument validity via exploratory factorial analysis. They further observed that the number of individuals did not substantially influence Cronbach's alpha, which was lower in samples with fewer than 50 individuals [12].

To verify the instrument's stability, the participants were invited to respond to the CPLNI in interviews performed at two different times with a 24-hr interval (test-retest). This interval was considered adequate because it allowed participants to forget the answers they gave during the first measurement, and it minimized the effects that a longer interval might have on patient knowledge [13]. Furthermore, shorter intervals decrease the number of potential losses between the first and second measurements.

The analysis of the adapted CPLNI items' internal consistency was performed using the data provided by both measurements.

Statistical analysis

The variables were coded and organized in a database that was created with *Microsoft Office Excel*. The data were analyzed using the Statistical Package for Social Science (SPSS) software Version 15.0 (SPSS for Windows, Rel. 15. 2006. Chicago: SPSS Inc.). Descriptive analysis was performed for all variables. Measurements of central tendency (mean and median) and dispersion (standard deviation) were determined for continuous variables.

The internal consistency was calculated using Cronbach's alpha, and values between 0.70 and 0.95 were considered positive results [14]. The stability was measured by test-retest and calculated using student's t-test for dependent samples. The level of significance was set at 0.05.

RESULTS

Sixty-five patients diagnosed with acute myocardial infarction participated in the analysis of the CPLNI's reliability. The patients' average age was 62 years (standard deviation [SD] = 12.0). Most patients were male (n = 40; 61.5%) and had an average of four years and five months of schooling (DP = 3.7 years; Table 1). Thirty-five patients participated in the retest, and the remaining patients (n = 30) did not participate for several reasons: some refused to participate; some were undergoing diagnostic or therapeutic procedures; and some did not exhibit a clinical condition favorable to answering the inventory items.

The average MMSE score was 22.5 (range: 13 to 30), and the average length of hospitalization before the interview was four days (ranging from one to 15 days; Table 1).

Table 1. Descriptive analysis of the patients' sociodemographic characteristics (n = 65), Ribeirão Preto, SP, 2010

Variables	n (%)	Mean (SD)	Median	Interval
Sex				
Male	40 (61.5)			
Female	25 (38.5)			
Age (years)		62.3 (12.0)	62	35 to 87
20 to 39	2 (3.1)			
40 to 59	25 (38.5)			
60 to 79	31 (47.7)			
80 to 99	7 (10.8)			
Education (years)		4.4 (3.70)	4	0 to 21
Zero	10 (15.4)			
1 to 4	37 (56.9)			
5 to 7	6 (9.2)			
8 to 10	6 (9.2)			
11 to 13	5 (7.7)			
More than 16	1 (1.5)			
Hospitalization length (days)		4.0 (2.7)	3	1 to 15
1 to 5	45 (69.2)			
6 to 10	18 (27.7)			
11 to 15	2 (3.1)			
Mental Mini Examination score		22.5 (3.7)	23	13 to 30
13 or lower	1 (1.5)			
14 to 18	9 (13.8)			
19 to 26	43 (66.2)			
26 or higher	12 (18.5)			

The data in Table 2 show the frequency of the answers to each of the 43 items of the CPLNI during the first measurement. During the interviews, most patients expressed a number of doubts regarding the disease and treatment and exhibited little to no health knowledge. The patients tended to respond with the maximum score for the scale (5); i.e., they rated all information related to disease and treatment as *very important*. All CPLNI items except for 12 and 36 were rated *very important* by more than half of the sample.

Table 2. Distribution of the frequencies of answers to the 43 *Cardiac Patient Learning Needs Inventory* (CPLNI) items at first measurement (n = 65). Ribeirão Preto, SP, 2010

CPLNI	Not important	Somewhat important	Moderately important	Important	Very important	Not applicable
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Item 1	1 (1.5)	0	0	12 (18.5)	52 (80)	0
Item 2	2 (3.1)	0	2 (3.1)	12 (18.5)	49(75.5)	0
Item 3	1 (1.5)	3 (4.6)	3 (4.6)	20 (3.8)	38 (58.5)	0
Item 4	0	3 (4.6)	0	16 (24.6)	44 (67.7)	2 (3.1)
Item 5	4 (6.2)	3 (4.6)	4 (6.2)	13 (20)	41 (63.1)	0
Item 6	0	2 (3.1)	0	12 (18.5)	51 (78.5)	0
Item 7	0	2 (3.1)	0	15 (23.1)	48 (73.8)	0
Item 8	1 (1.5)	2 (3.1)	4 (6.2)	16 (24.6)	42 (64.6)	0
Item 9	0	1 (1.5)	0	18 (27.7)	46 (70.8)	0
Item 10	1 (1.5)	0	2 (3.1)	16 (24.6)	46 (70.8)	0
Item 11	1 (1.5)	0	1 (1.5)	17 (26.2)	46 (70.8)	0
Item 12	0	1 (1.5)	0	14 (21.5)	30 (46.2)	20 (30.8)
Item 13	5 (7.7)	1 (1.5)	4 (6.2)	18 (27.7)	37 (56.9)	0
Item 14	1 (1.5)	0	1 (1.5)	22 (33.8)	38 (58.5)	0
Item 15	2 (3.1)	0	3 (4.6)	15 (23.1)	42 (64.6)	3 (4.6)
Item 16	1 (15)	3 (4.6)	1 (1.5)	15 (23.1)	44 (67.7)	1 (1.5)
Item 17	3 (4.6)	0	1 (1.5)	13 (20)	45 (69.2)	3 (4.6)
Item 18	4 (6.2)	0	3 (4.6)	13 (20)	45 (69.2)	0
Item 19	4 (6.2)	1 (1.5)	1 (1.5)	10 (15.4)	49 (75.4)	0
Item 20	3 (4.6)	0	1 (1.5)	9 (13.8)	52 (80)	0
Item 21	2 (3.1)	0	3 (4.6)	12 (18.5)	48 (73.8)	0
Item 22	1 (1.5)	1 (1.5)	1 (1.5)	13 (20)	49 (75.4)	0
Item 23	0	0	2 (3.1)	17 (26.2)	45 (69.2)	1 (1.5)
Item 24	0	0	0	23 (35.4)	39 (60)	3 (4.6)
Item 25	1 (1.5)	0	1 (1.5)	13 (20)	50 (76.9)	0
Item 26	1 (1.5)	1 (1.5)	2 (3.1)	13 (20)	48 (73.8)	0
Item 27	1 (1.5)	1 (1.5)	1 (1.5)	16 (24.6)	46 (70.8)	0
Item 28	2 (3.1)	0	2 (3.1)	14 (21.5)	46 (70.8)	1 (1.5)
Item 29	4 (6.2)	1 (1.5)	3 (4.6)	10 (15.4)	46 (70.8)	1 (1.5)
Item 30	2 (3.1)	1 (1.5)	3 (4.6)	14 (21.5)	45 (69.2)	0
Item 31	3 (4.6)	1 (1.5)	3 (4.6)	12 (18.5)	46 (70.8)	0
Item 32	4 (6.2)	1 (1.5)	0	16 (24.6)	39 (60)	5 (7.7)
Item 33	1 (1.5)	2 (3.1)	3 (4.6)	16 (24.6)	43 (66.2)	0
Item 34	0	0	6 (9.2)	19 (29.2)	40 (61.5)	0
Item 35	2 (3.1)	0	4 (6.2)	17 (26.2)	42 (64.6)	0
Item 36	0	0	1 (1.5)	14 (21.5)	32 (49.2)	18 (27.7)
Item 37	0	0	2 (3.1)	18 (27.7)	45 (69.2)	0
Item 38	0	0	2 (3.1)	18 (27.7)	45 (69.2)	0
Item 39	1 (1.5)	0	2 (3.1)	15 (23.1)	47 (72.3)	0
Item 40	0	0	0	14 (21.5)	51 (78.5)	0
Item 41	1 (1.5)	0	2 (3.1)	15 (23.1)	47 (72.3)	0
Item 42	0	0	2 (3.1)	13 (20)	50 (76.9)	0
Item 43	1 (1.5)	0	3 (4.6)	10 (15.4)	51 (78.5)	0

For Items 12 (*Why my heartbeat may be irregular or I may have "skipped beats"*) and 36 (*When can I engage in sexual activity*), the answers were concentrated between "*important*" and "*very important*". Twenty (30.8%) and 18 (27.7%) patients rated Items 12 and 36, respectively as not applicable to their condition.

The data in Table 3 correspond to the descriptive statistics of the CPLNI and internal consistency in the first and second measurements and the comparison of the mean scores from both assessments. There was no statistically significant difference in the mean scores between measurements in any domain, which confirms the instrument's stability.

The instrument as a whole exhibited adequate internal consistency; Cronbach's alpha was 0.96 for the first measurement and 0.78 for the second measurement. Table 3 shows that no domain exhibited negative internal consistency during the first measurement because Cronbach's alpha ranged from 0.72 (domain: *Medication Information*) to 0.91 (domain: *Risk Factors*). Additionally, no domain exhibited negative internal consistency during the second measurement; Cronbach's alpha ranged from 0.74 (domain: *Medication Information*) to 0.95 (domain: *Risk Factors*; Table 3).

DISCUSSION

This study aimed to adapt and make available for use in Brazil an instrument designed to identify cardiac patients' learning needs regarding their conditions. Our interest in validating and adapting the CPLNI arose from the observation that patients understand and more effectively assimilate disease- and treatment-related information when they feel motivated to learn about it.

The selection of educational information must be based on what the patient knows and needs to learn. Therefore, the teaching process must be guided by each patient's individual needs [15]. Conversely, the presentation of situations and experiences that do not meet the patient's learning needs might generate anxiety and fear [1].

A qualitative study that sought to identify heart disease-related knowledge and learning needs in patients with hypertension and revascularization undergoing rehabilitation observed that patients had many doubts, found it difficult to express what they knew and used vague and confused descriptions to characterize their disease. The patients' interest in learning more about their disease increased considerably when they felt motivated to understand the factors that had led to illness [16].

Specific instruments for identifying learning needs are rare. Among the studies describing the construction and validation of instruments to identify the cardiac patients' learning, Ghisi et al. [17] performed the cross-cultural adaptation and validation of the *Maugerl CaRdiac preventiOn-Questionnaire* (MICRO-Q) for use in Brazil. This instrument, which was originally published in Italian, is used to assess coronary artery disease (CAD) patients' knowledge regarding secondary prevention. The MICRO-Q is a self-applied questionnaire consisting of 26 statements (18 true and eight false) with the answer options "true", "false", and "I do not know". The items are distributed among four domains: *Risk Factors* (nine items), *Diet* (eight items), *Pre-Hospital Admission* (four items) and *Heart Disease* (five items).

The *Congestive Heart Failure Patient Learning Needs Inventory* (CHFPLNI), which seeks to assess patients' and nurses' perceptions of learning needs regarding congestive heart failure, was based on the CPLNI [4]. The CHFPLNI was subjected to face and content validation; however, descriptions of the instrument reliability analysis are not yet available. Later, other authors used the CHFPLNI to assess congestive heart failure patients' and nurses' learning needs regarding patient self-care [6].

Similar to other studies performed with cardiac patients[1,6,17], our study sample was predominantly composed of males.

Table 3. Descriptive statistics and internal consistency of the full scale and its domains during the test and retest measurements. Ribeirão Preto, SP, 2010

CPLNI	First measurement (N= 65)			Second measurement (N= 35)			p value*
	Mean (SD)	Median (interval)	*Cronbach's alpha*	Mean (SD)	Median (interval)	*Cronbach's alpha*	
Total (43 items)	192.8 (20.0)	201 (130 to 215)	0.96	193.0 (24.6)	208 (132 to 215)	0.78	0.17
Introduction to the Critical Care Unit (six items)	27.2 (3.5)	29	0.78	26.8 (4.1)	30	0.85	0.94
Anatomy and physiology (six items)	26.3 (3.2)	25	0.86	26 (3.5)	25	0.90	0.39
Psychological factors (five items)	21.7 (4.0)	23	0.78	22.4 (3.2)	24	0.83	0.87
Risk factors (four items)	18.2 (3.4)	20	0.91	18.0 (3.8)	20	0.95	0.19
Medication information (four items)	18.3 (2.1)	20	0.72	18.4 (2.2)	20	0.74	0.88
Diet information (six items)	27.1 (4.6)	30	0.87	27.0 (4.3)	30	0.89	0.65
Physical activity (five items)	20.9 (3.4)	20	0.77	21.9 (3.8)	23	0.86	0.09
Other pertinent information (seven items)	32.8 (2.7)	34	0.79	32.1 (3.7)	35	0.84	0.58

* *p* value for student's t-test.

The internal consistency of the instrument was 0.96 (Table 3). The validation of the original CPLNI [4] reported a Cronbach's alpha of 0.91 for the instrument overall. Regarding the reliability of each CPLNI domain, all domains of the adapted version exhibited adequate internal consistency because Cronbach's alpha was above 0.70 [14]. The domains *Anatomy and Physiology* (α= 0.86), *Medication Information* (α= 0.72), *Diet Information* (α= 0.87), *Physical Activity* (α= 0.77) and *Other Pertinent Information* (α= 0.79) exhibited lower Cronbach's alphas compared with the same domains in the original version [4] (α= 0.96, 0.89, 0.89, 0.81 and 0.84, respectively).

One limitation of this study was the inclusion of only 35 patients in the retest stage.

CONCLUSION

We conclude that the version of the CPLNI adapted for use in Brazil maintained the conceptual, semantic and linguistic equivalences of the original version and exhibited adequate reliability and stability. Nevertheless, we recommend further studies that apply the instrument to patients with different sociodemographic characteristics.

The lack of validated instruments in the Portuguese language for measuring the learning needs of patients with common characteristics (e.g., patients with coronary artery disease) gives considerable clinical and theoretical importance to this study, which makes a valid and reliable instrument available for use in Brazil.

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