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INTEGRATIVE REVIEW ARTICLE

PSYCHOMETRIC ANALYSIS OF PROPERTIES OF POSTOPERATIVE RECOVERY MEASUREMENT INSTRUMENTS: INTEGRATIVE REVIEW

ANÁLISE DAS PROPRIEDADES PSICOMÉTRICAS DOS INSTRUMENTOS DE MENSURAÇÃO DA RECUPERAÇÃO PÓS-OPERATÓRIA: REVISÃO INTEGRATIVA

ANÁLISIS PSICOMÉTRICO DE PROPIEDADES DE LOS INSTRUMENTOS DE MEDIDA DE RECUPERACIÓN POSTOPERATORIO: REVISIÓN INTEGRADORA

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ABSTRACT

Objective: to identify the post-operative recovery measuring instruments for their psychometric properties. **Method:** integrative review guided by the questions 'What are the instruments that measure the recovery of the patient during the postoperative period and their psychometric properties?' The bibliographic survey was done in PubMed, EMBASE, CINAHL, Web of Science, Scopus and LILACS in the period July to September 2012. Studies referring to the validation of instruments for the measurement of post-operative recovery and publications in Portuguese, English and Spanish were the inclusion criteria. **Results:** 18 Articles in the final sample and 13 instruments on the measurement of postoperative recovery. The analysis of the psychometric properties showed the superiority of some instruments. **Conclusion:** the existence of instruments that measure the post-operative recovery coupled with the clinical judgment of the nurse will be fundamental for the planning of nursing interventions. **Descriptors:** Recovery of Physiological Function; Validation Studies; Psychometrics.

RESUMO

Objetivo: identificar os instrumentos de medida da recuperação pós-operatória e suas propriedades psicométricas. **Método:** revisão integrativa norteada pelas questões 'Quais são os instrumentos que mensuram a recuperação do paciente durante o período pós-operatório e suas propriedades psicométricas?' O levantamento bibliográfico ocorreu nas bases de dados PubMed, EMBASE, CINAHL, Web of Science, Scopus e LILACS no período de julho a setembro de 2012. Estudos que abordassem a validação de instrumentos de mensuração da recuperação pós-operatória e publicações nos idiomas Português, Inglês e Espanhol foram critérios de inclusão. **Resultados:** 18 artigos compuseram a amostra final e 13 instrumentos sobre mensuração da recuperação pós-operatória. A análise das propriedades psicométricas demonstrou superioridade de alguns instrumentos. **Conclusão:** existência de instrumentos que mensuram a recuperação pós-operatória aliado ao julgamento clínico do enfermeiro serão fundamentais para o planejamento de intervenções de enfermagem. **Descritores:** Recuperação da Função Fisiológica; Estudos de Validação; Psicometria.

RESUMEN

Objetivo: identificar los instrumentos para medir la recuperación postoperatoria y sus propiedades psicométricas. **Método:** revisión integradora guiada por las preguntas '¿Qué son los instrumentos que miden la recuperación del paciente en el postoperatorio y sus propiedades psicométricas?' Se ha producido la literatura en las bases de datos PubMed, EMBASE, CINAHL, Web of Science, Scopus y LILACS en el período de julio a septiembre de 2012. Los estudios que abordan la validación de instrumentos de medida de recuperación postoperatoria y publicaciones en portugués, inglés y español son los criterios de inclusión. **Resultados:** 18 artículos fueron incluidos en la muestra final y 13 instrumentos para medir la recuperación postoperatoria. El análisis de las propiedades psicométricas demostró superioridad de algunos instrumentos. **Conclusión:** la existencia de instrumentos que miden la recuperación postoperatoria combinada con el juicio clínico de las enfermeras será fundamental para la planificación de las intervenciones de enfermería. **Descriptor:** Recuperación de la Función Fisiológica; Estudios de Validación; Psicometría.

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INTRODUCTION

The post-operative recovery process is dynamic and includes biological, physiological, psychosocial, and functional components, such components are important indicators for the assessment and identification of the patient's recovery.¹ The time required for the whole recovery process is completed and not defined in the literature, possibly because this time is influenced by different types of anesthetic and surgical procedures, as well as by the patient's clinical condition before surgery.² This question denotes the difficulty in monitoring the evolution of the recovery of the surgical patient, due to fault in the identification of the complete recovery.

As a result, the decline in the surgical patient's hospitalization time due to the advancement of surgical and anesthetic techniques, improvement of preoperative preparation, access to technological resources and possibility of ambulatory surgery, many studies are directed to prepare the patient discharge and implementation of specific interventions that contribute to the recovery process experienced during this period. It is necessary that in parallel to the development of interventions that promote the surgical patient's recovery away from the hospital environment, that construction of instruments occurs, which make it possible to monitor and evaluate the recovery as a way to ensure the effectiveness of the proposed intervention by means of the post-operative recovery measurement.³

For the clinical use of measuring instruments, it is necessary they are minimally valid instruments, reliable and that have methodological quality during their development. In this sense, the measurement instruments in healthcare must possess basic attributes on the measurement properties. The main measurement properties contemplate the validity, reliability and responsiveness^{4,5}.

OBJETIVE

- Identifying the measuring instruments for post-operative recovery and their psychometric properties.

METHOD

Study developed, based on an integrative review method that consists in the synthesis of the literature on a particular phenomenon or a health problem for wide understanding of these. The phases for the development of the

review were delimitation of the subject and development of a research question, literature search and selection, categorization and evaluation of data, data synthesis and presentation⁶.

For the scope of the first step, this revision was developed, supporting the following guiding questions: ‘What are the instruments that measure the recovery of the patient during the postoperative period?’ and ‘What are the psychometric properties of the instruments available in the literature that measure the recovery of the patient during the postoperative period?’

The search for studies was conducted online during the period July to September 2012, in the following electronic databases: PubMed (National Library of Medicine and Nattional Institutes of Health), EMBASE, Cumulative Index to Nursing and Alied Health Literature (CINAHL), Web of Science, Scopus and Latin American and Caribbean Literature in Health Sciences (LILACS).

For study surveys, the following descriptors were used: convalescence, recovery of function, validation studies, psychometrics, validation studies the topic, scales, questionnaires and postoperative period, the descriptor postoperative recovery was important to in the survey of studies on the topic. It is noteworthy that in the electronic database LILACS the same descriptors and keywords were used, but in Portuguese for being a national database. The Boolean operators “AND” and “OR” were employed by enabling the achievement of combinations between the descriptors during the search for studies, being AND a combination and restrictive OR a combination additive. The descriptors related to surgical recovery were grouped using the OR operator such as: convalescence OR recovery of function OR postoperative recovery; the same was done for the descriptors related to measurement instruments for post-operative recovery as: validation studies OR psychometrics OR validation studies the topic OR scales OR questionnaires. The Boolean operator AND was employed between the group of descriptors related to post-operative recovery, group of descriptors related to measurement instruments of postoperative recovery and the descriptor postoperative period. In electronic databases SCOPUS and LILACS is not possible to perform groups of descriptors, therefore, as search strategy employed-if the crossing with a descriptor of each group per time associated with the descriptor postoperative period.

Inclusion criteria were studies referring to the validation of instruments for the measurement of post-operative recovery and publications in Portuguese, English and Spanish languages. The repetitions between the electronic databases were excluded. The range of years to search was not defined, thus the search included all articles published up to September 2012.

Initially the reading the titles and abstracts in identified articles was done in electronic databases from the search strategies, if the summary was not available the Article in its entirety sought to continue the analysis of the study. When the study met the established criteria, it was selected to compose the final sample of the analyzed articles.

For the data evaluation the articles were accessed in their entirety, analyzed and recorded the following data (in form built in MS Word): identification of instrument, year of publication, country and language for which the instrument has been validated, cultural adaptations of instrument for other languages, main objective of the study (construction and/or validation of the instrument), methodological aspects of the study (population, data collection period, instruments used for data collection, data collection strategies), procedures employed for the construction of the instruments and

psychometric properties analyzed. Moreover, they were analyzed according to quality criteria established in the literature for validity and reliability of the instruments.⁷

In the last step, the synthesis of the studies was established in a descriptive manner allowing a better understanding about the instruments for the measurement of post-operative recovery and identification of potential and weaknesses of their psychometric properties.

RESULTS

Initially there were 2718 articles identified on search strategies, based on reading the title and abstracts of these were excluded from the articles that did not meet the inclusion criteria, i.e., this were not validation studies on instruments or were not published in English, Spanish or Portuguese. Thus, 68 articles were selected and the reading in full of these resulted in the exclusion of 50 articles, because three were not validation studies of instruments of postoperative recovery, two articles were published in German and 45 articles were repeated. In total 18 articles in the final sample, as shown in Figure 1.

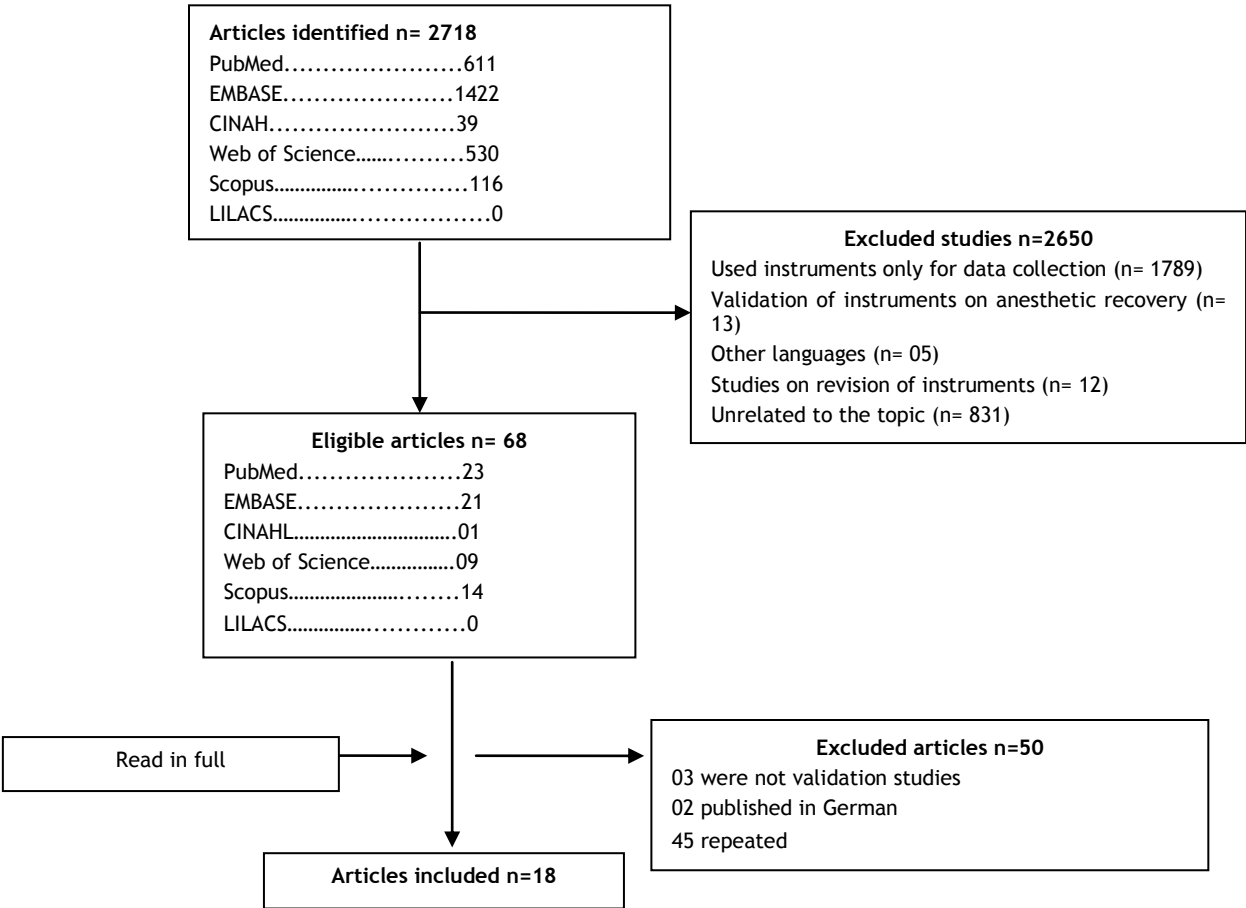


Figure 1. Flow identification, exclusion and selection of articles.

Of the 18 articles included, eight (44.44%) discussed the construction and validation of an instrument, one (5.56%) only the construction of the instrument, four (22.22%) addressed only the validation and 5 (27.78%) were on the transcultural validation and are presented in figura2, as well

as important characteristics of these articles. It is noteworthy that an instrument has two publications about its construction and validation process respectively.

Year	Instrument	Authors	No. items	Population	Original version language	Translations
1999	Quality of recovery score (QoR-9)	Myles et al ⁸	09	Gynecological, gastrointestinal, thoracic, orthopedic, plastic, urologic, vascular, otorhinolaryngologic and oral maxillofacial surgeries	English	Chinese ²⁰
2000	Quality of recovery score (QoR-40)	Myles et al ⁹	40	Gastrointestinal, gynecologic, orthopedic and urologic surgeries	English	Dutch ¹¹ Swedish ²¹ Japanese ²²
2000	Postdischarge surgical recovery scale (PSR)	Kleinbeck ³	15	Endoscopic (cholecystectomy and hernia), orthopedic and gastrointestinal surgeries	English	Swedish ²³
2004	Coronary revascularization outcomes questionnaire (CROQ)	Schroter; Lamping ¹⁰	52	Cardiac Surgery and angioplasty	English	-
2008	Convalescence and recovery evaluation (CARE)	Hollenbeck et al ²	18	Gastrointestinal, gynecological and urological surgeries	English	-
2008	Recovery index - 10	Kluivers et al ¹¹	10	Gynecological surgeries	German	English**
2009	Physical activity questionnaire (CHAMPS)	Feldman et al ¹²	41	Gastrointestinal Surgery (laparoscopic cholecystectomy)	English	-
2009	Functional Recovery Index (FRI)	Wong et al ¹³	14	Gynecological, gastrointestinal, thoracic, orthopedic, plastic, urologic and ophthalmic surgeries.	English	-
2009	FS-15	Bright et al ¹⁴	15	Cesarean section	English	-
2009	Postoperative quality of life scoring system (PQL scoring system)	Delaney et al ¹⁵	14	Gastrointestinal Surgery (colorectal)	English	-
2009	Postoperative recovery profile (PRP)	Allvin et al ¹⁶	19	Gynecological, orthopedical, urological and gastrointestinal surgery	Swedish	-
2011*		Allvin et al ¹⁷				
2011	Postoperative quality recovery scale (PQRS)	Royse et al ¹⁸	18	Gastrointestinal, orthopedic, urologic, gynecologic, cardiac, vascular, maxillofacial, plastic, neurological, thoracic and oncology surgeries.	English	German, Spanish, Chinese and French (cited in Article)
2011	Surgical Recovery Scale (SRS)	Paddison et al ¹⁹	13	Gastrointestinal Surgery (colonic)	English	-

Figure 2. Instruments for measuring postoperative recovery. *Two articles have been published describing the validation process of the Postoperative Recovery Profile (PRP) instrument** article on the translation and validation of an instrument for the Dutch.

There was a greater concentration of publications of validation studies of instruments that measure the post-operative recovery between the years of 2008 and 2009 which together totaled 50% of the articles, followed by the year of 2011 (22.22%) and 2000 (11.11%). It is worth mentioning that in the year of 2012 there were no articles found on the research topic.

Among the 13 analyzed instruments only the PSR³ was developed only by nurses, the QoR-9⁸, PRP¹⁶⁻⁷ and the PQL system¹⁵ were developed by nurses and other professionals (surgeons and/or anesthesiologists), all other instruments (53.85%) were developed only by medical professionals (surgeons and/or anesthesiologists). Among the six studies that turned to cross-cultural validation PRS Swedish²³ was developed only by nurses; the instruments Recovery index-10 Dutch, QoR-40 Dutch¹¹, the QoR-9 Chinese²⁰ and the QoR-40

Swedish²¹ were developed by doctors and the QoR-40 Japanese²² was developed by psychologists and surgeons.

Of the 13 instruments six are multidimensional^{2,9,13-4,17-8} and seven one-dimensional^{8,10-12,15,19,23}. The major dimensions raised in different instruments involve physical aspects^{2,9,13-4,17-8}, psychological^{9,13-4,17-8} and social recovery of post-operative^{13,17}.

The physical aspects of the post-operative recovery were identified in several studies as physical comfort, physical independence⁹, movement of the lower limbs¹³, physical activity^{2,13,18}, physical functional status^{2,14 14,17}, pain, vitality¹⁴, physical symptoms¹⁷ and physiological aspect¹⁸. The PQRS instrument is the only one that has assessment of cognitive dimensions and on the general expectation of the patient.¹⁸

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The psychological aspects were found as emotional state^{9,18}, psychological functions¹⁷ and mental health¹⁴. The social aspects of the post-operative recovery when analyzed involved the social support⁹ and social activity.¹³

The instruments are a one-dimensional analysis of the main recovery aspects by means of its items, being that some do evaluation of more specific form for a given aspect, such as the CHAMPS that describes the physical activity as an indicator of post-operative recovery, therefore, its items are especially made for the analysis of physical functions.¹²

The QoR has two versions, the first is composed of 9 items and is a one-dimensional scale⁸ and the second is a multidimensional version consists of 40 items⁹.

The instruments Croq and FS-15 were developed to assess the postoperative recovery of specific surgeries, CABG and / or angioplasty and cesarean respectively.^{10,14}

The majority of the instruments is composed of closed questions and the answers are analyzed by means of Likert scale^{2,8,9,13,15,17,19,23}, the instrument, CROQ offers service both in addition to closed questions has an open one¹⁰, the PQRS makes a combination between closed questions that also employed a Likert scale and specific tests for the assessment of the cognitive dimension in specific, their authors describe that these tests are widely used for this evaluation.¹⁸ CHAMPS uses calculation of energy expenditure in the different activities carried out in the course of the day and thus estimates the load of weekly physical activity

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correlating it with the post-operative recovery.¹² The authors did not describe the FS-15 The system of analysis and score of the items.¹⁴

Regarding the time of application of the instrument to validate it in different populations, four studies examined during the first postoperative week^{3,9,13-4,18}, three until two weeks^{20,21,23}, three until 30 days^{12,18,22}, two until 60 days^{15,19}, a until 90 days^{3,10-1} and only one study measured the post-operative recovery for a period of one year.¹⁷

Among the instruments identified in this review, three have published studies on the translation and cultural adaptation for use in other languages being the QoR in two versions^{8,9} and the PSR³. The QoR, both with nine as 40 items, are instruments constructed in English language⁹, its version with 40 items was translated to Swedish²¹, Dutch¹¹ and Japanese²² while the QoR with 9 items⁸ was translated into Chinese²⁰. The PSR is an instrument originally developed in English³, and was translated into Swedish²³. The Recovery Index-10 was originally constructed in German and was translated to the Dutch¹¹.

• Analysis of the psychometric properties

In Figure 3 are presented the instruments found in the review, the psychometric properties analyzed and the analysis of these centered on the criteria established in the literature for validity and reliability.⁷

Instrument	Validity			Reliability	Responsiveness	Criteria	
	Cont ents	Construct	Criteri on			Validity	Reliability
Quality of recovery score (QoR-9)	x	x	-	x	x	*	*
Quality of recovery score (QoR-40)	x	x	-	x	x	**	**
Postdischarge surgical recovery scale (PSR)	x	x	-	x	x	**	**
Coronary revascularization outcomes questionnaire (CROQ)	x	x	-	x	x	*	**
Convalescence and recovery evaluation (CARE)	x	x	-	x	-	**	**
Recovery index - 10	-	x	-	x	x	**	**
Physical activity questionnaire (CHAMPS)	-	x	-	-	x	**	0
Functional Recovery Index (FRI)	x	x	-	x	x	**	**
FS-15	-	x	-	-	-	*	0
Postoperative quality of life scoring system (PQL scoring system)	x	-	-	x	-	0	**
Postoperative recovery profile (PRP)	x	x	-	x	x	**	*
Postoperative quality recovery scale (PQRS)	x	-	-	-	x	0	0
Surgical Recovery Scale (SRS)	x	x	-	x	x	**	**

Figure 3. Identified psychometric properties and quality criteria for validity and reliability. x = present; - = absent; Criteria⁷: 0 = No numerical results reported;? = Results were not specified or interpretable, * = The evidence suggests reliability or validity weak; ** = Reliability or validity appropriate.

• Content Validity

Seven instruments were content validation by patients and experts, being: the PSR³,

PQRS¹⁸, FRI¹³, CROQ¹², QoR-40⁹, QoR-9⁸ and the PRP¹⁶. Among these, for the PSR a concordance index was used among the

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experts who analyze the instrument established by Kappa³; the FRI was analyzed by frequency of endorsement of items when they are applied to a group of patients¹³.

The content of the CARE was evaluated only by experts² while the PQL scoring system only by patients.¹⁵

In a large part of the studies, in addition to the analysis and development of items from the experience of patients and experts with the post-operative recovery. A digester if specific strategies for reducing the number of items such as score analysis of correlation total inter-items in QoR-40⁹, frequency of item endorsement in FRI instruments¹³ e CROQ¹⁰; exploratory factor analysis in the PSR³, FRI¹³, CROQ¹⁰ and PQL scoring system¹⁵. The internal consistency was also a strategy for the reduction of items during the development of the PSR³, FRI¹³ and CROQ¹⁰. In the study on the PQRS¹⁸ the ceiling-floor effect was employed for the reduction of the items.

The SRS content was established by patients, but their authors employed a system based on the frequency of use of each item during the use of this scale by a group of patients.¹⁹ In the other instruments there was not a mention about the content validation by their authors.^{11-2,14}

• Internal Consistency

The great majority of studies employed the Cronbach's alpha for internal consistency analysis of the instruments. In the CHAMPS instruments¹², FS-15¹⁴, PRP¹⁷ and PQRS¹⁸ information were not mentioned on this type of analysis.

It was noted also that factorial analysis was employed as a way of assessing the reliability in 5 instruments, being the PSR³, FRI¹³, CROQ¹⁰, PQL scoring system¹⁵ and the CARE².

Construct Validity

The construct validity was analyzed in most instruments identified in the review, with the exception of two of them, the PQL scoring system¹⁵ and the PQRS¹⁸.

The construct validity modalities accessed were convergent validity^{2,3,8,9,10,12-4,18-9}, discriminant validity^{2,3,8} and validity between known groups^{2,3,8,9-11,13,19}.

• Criterion Validity

This type of validity analysis was not identified in any of the instrument development studies for the measurement of post-operative recovery.

Reliability

The reliability was accessed in seven instruments; six of them employed analysis by

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means of test-retest reliability using the intra-class correlation coefficient, being the QoR-40⁹, QoR-9⁸, FRI¹³, CROQ¹⁰, CARE² and Recovery index-10¹¹. The reliability of the PSR was accessed through the intra-observer test³.

• Responsiveness

The responsiveness was accessed by the majority of the studies, with the exception of the FS-15¹⁴, PQL scoring system¹⁵ and CARE². As for the method employed in these studies to assess the responsiveness of instruments the QoR-40⁹, PSR³ and CHAMPS¹² used the average of standardized response between the different measurements. The FRI¹³ in this point used the Friedman test; QoR-9⁸, CROQ¹⁰, PRP¹⁷ and PQRS¹⁸ they based the analysis of the scores changes between the different evaluation times. The analysis method of the important minimum change was employed in SRS.¹⁹

• Ceiling-floor effect

This effect was analyzed in the instruments PSR³, CROQ¹⁰, CHAMPS¹², CARE² and Recovery index-10¹¹; being that only in the latter, the ceiling or floor effects were not obtained.

• Interpretability

This property was analyzed only in SRS instruments¹⁹ by the minimal important change method.

DISCUSSION

The use of instruments that measure the state of health based on patient responses and expectations is linked to patient-centered care strategies; the use of these results in practice and in clinical research is growing in addition to being important for the evolution of health care.^{7,24} The number of studies in this review demonstrates the interest among researchers in different countries, in the surgical area regarding this approach to assessment of the patient who is in the post-operative period. In the literature, there are notes that the high number of instruments for the measurement of post-operative recovery makes the comparison of results between the clinical studies and that further studies are needed to describe the experience of the use of these instruments in clinical practice and research.²⁴⁻⁵

With respect to the language of origin of instruments identified in revision 84.62% (11) are in the English language, and therefore to be used in another country in which the original language is not English need to be adapted culturally, is what has been identified in five studies. Brazilian Researchers in various healthcare areas are

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pointing to the predominance of instruments constructed in the English language.⁵

There is a greater number of one-dimensional instruments. There is a need for brief and easy instruments to be used for better acceptance of use by professionals and patients²⁵⁻⁶, and this justification is present in most of these studies. Therefore, in an attempt to meet this need a few instruments can be considered truly validated and present relevant content to identify the surgical recovery.^{2,4} There are criticisms especially on one-dimensional questionnaires, because some researchers believe that the post-operative recovery is multifaceted it also varies according to the surgical procedure performed, because it can distribute the average of changes in the health status of the entire domain conceptual and masking the true difference in the recovery.²

The dimensions investigated among the different multidimensional tools^{9,2,13-4,17,18} are in line the presented in the literature by scholars in the area of post-operative recovery^{1,9,16} and demonstrate understanding of the entire post-operative recovery process.

The proper development of the post-operative recovery by means of specific nursing instruments contributes to the standardization of terms employed. In this period the patient's safety is increased the accuracy of communication between the team of health and improve the quality of nursing care, being criteria for the assessment of the health status and indicators of the established nursing interventions results.²⁷ however, it is crucial that these instruments possess adequate psychometric properties in order to adequately capture the complexity of the concept of post-operative recovery.²⁴

Among the instruments identified, in relation to a particular type of validity, criterion validity was not evaluated in any work, because it requires a correlation between the scores obtained from an instrument with a previously established golden standard.⁴ Regarding to the postoperative recovery, there is no gold standard for evaluation, which compromises this specific type of validation and possibly this is the reason it is not found in the studies.^{9,18,28.}

Content validity is to adjust the content and extent of items that are sensitive to reflect the domain of interest and construct validity establishes the degree to which the instrument measures what it is designed to measure.⁵ The validities of the content and construct validity were assessed in the majority of the instruments. However, the

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validity of the content was not clearly presented in large part of the work (n = 9), which may be indicative of a weakening in the quality of the instrument.^{4,7} While that the construct validity of not only was evaluated in two instruments at the time.

Internal consistency refers to the extent to which the items of an instrument are inter-related.⁶ It is shown in the literature as a specific property and as a form of reliability.^{4,6,28} Among the studies analyzed there was a presentation in two ways, by means of the methods of factor analysis and Cronbach's alpha coefficient, being that the latter widely proposed in the literature and the most used in the validation studies in this review. The instruments PSR³, FRI¹³, CROQ¹⁰, PQL scoring system¹⁵, SRS¹⁹, CARE² and Recovery Index-10¹¹ obtained Cronbach's alpha between 0.80 and 0.95, i.e. suitable results for this property, once the literature recommends coefficients around 0.90.⁴

Reliability is the ability of the instrument to produce reproducible and consistent results, this property is investigated mainly by means of the correlation between the results of the repeated measures over time (test-retest reliability) and by the correlation of measures established between different observers (inter-observer reliability).⁵ There are authors that use different terms for reliability as reproducible, reliability and repeatability.^{4,5}

Among the instruments that employed the test-retest reliability (n= 6), in two there was no reference on the time interval between two measurements, examined measures carried out on the same day (at different times), among other an established 24 hours interval, the other two three days or more. The time interval for the completion of the test-retest reliability is an important issue, since time can influence the outcome of the instruments reliability. A time for this period may not be short enough so that the respondent remembers the answers from the first measure and not so long that the state of health if change to the point that does not allow for the comparison of the responses.⁵

In addition, the test-retest reliability of the instruments of post-operative recovery is difficult to be analyzed, because as it is a dynamic process hardly similar results are obtained between two measures in a time interval.²⁸ Before addition, some studies (n= 2), employed the analysis of inter-observer reliability, which consists in applying the questionnaire by two different interviewers.

Almost all the instruments reviewed showed responsiveness analysis. This

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psychometric property is considered fundamental for health care measurements, because it consists of the evaluation of the instrument's ability to accompany changes with the passing of time in the state of health. In the case of post-operative recovery, such a property is fundamental for the identification of problems during this process being the extension of recovery, evaluation of the patient during the postoperative period and the establishment of complete recovery after surgical procedures.²⁸

It was possible to identify among the 13 different instruments, which comprised this review that the QoR-40⁹, PSR³, CARE², the FRI¹³ and the SRS¹⁹ showed in their respective studies the analysis of the main psychometric properties and also adequate results from these analyses based on the criteria established in the literature and adopted in this study to examine the validity and reliability.⁷

The QoR-40⁹ is currently the most widely used in clinical studies²⁴ and was validated in a population that is recovering from different types of surgeries, such as orthopedic, neurological, cardiovascular among others.²⁹

In a review of the quality of the instruments for measuring the recovery of outpatient surgeries ²⁴, the QoR-40⁹ was identified as the best instrument for this situation, by having the best psychometric properties.

In another review, designed to identify the measurement instrument of post-operative recovery with the best psychometric properties ²⁸, in addition to the QoR-40⁹ the PSR³ also had their use recommended by the authors, by considering these instruments with better quality psychometric properties.

It is noteworthy that the strengthening of the quality of the psychometric characteristics of these instruments is related to their extensive use, whether in validation studies in different populations, in larger samples, in clinical studies also in the clinical practice of professionals who work in post-operative area.

Of the 18 articles analyzed, only one used the clinometric approach for validation of instruments QoR-40 and Recovery Index-10 for the Dutch language. ¹¹ The clinometric back-if the instruments that measure or describe the clinical phenomena in general such as: measurement of signs and symptoms of various health conditions, severity of illness, effects related to comorbidities, stages of progression of diseases, functional capacity and other characteristics of diseases. ³⁰ The clinometric is used when there is an attempt

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to measure various attributes in a single scale while in psychometrics a single attribute is measured by means of a scale with multiple items⁵.

The clinometric composes rules for the development of instruments for the measurement and evaluation of clinical phenomena such as development of the items, criteria for internal consistency and validity thereof, in order to ensure the quality of clinical instruments. ³⁰ There are two basic aspects incorporated in the strategy standardization and sensitivity, being that the first lap-if the reliability and validity of the instruments and the second for the property discriminative of instruments such as the responsiveness and sensitivity. The latter denote the ability of the instrument to identify changes in clinical conditions over time. ³⁰ We analyzed instruments that employed this approach to reliability and responsiveness were investigated, there was no construct validity performed between the other instruments.

The instrument validation process that measure the state of health in general is not an easy task, it is hardly possible to say that the constructed instrument is valid in all the populations. The results obtained in the sample can be safely extrapolated to the population, because the validity is a complex task and is not finite, it is necessary accumulate the greatest number of possible evidence of the instruments⁶.

FINAL REMARKS

In total 13 instruments developed for measuring postoperative recovery were identified in this review and also which psychometric properties investigated in the respective studies. Because it is a complex construct, which does not have a gold standard for evaluation. None of the instruments found here have all the psychometric properties proposed in the literature, but there are well-developed instruments and that meet the majority of psychometric properties, being the instruments; Post discharge surgical recovery scale, Postoperative quality score with 40 items, Convalescence and recovery evaluation and Surgical Recovery Scale, Functional Recovery Index and Surgical Recovery Scale.

The instruments that were found in this review, and that served the main psychometric properties are possibly a focus of attention for future nationwide validation studies. Once that no instrument to measure the post-operative recovery was identified in Brazilian studies, a fact that denotes a

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shortcoming of this type of study in the surgical area, as well as this approach to evaluation of the surgical patient; emphasizing the need for studies of cross-cultural adaptation and validation of instruments for surgical recovery measurement.

While limitation of this review is possible that there are other validation studies of postoperative recovery measuring instruments, especially at national level, however, were not identified between different search strategies in the searched electronic databases. The terminology for the psychometric properties is variable according to the theoretical framework adopted by researchers, which can affect the understanding of the results obtained among the studies.

The existence of a specific instrument that allows the post-operative recovery measurement coupled with the nurse's knowledge and clinical judgment will be fundamental in identifying situations in which occur, such as; a delay in the recovery process, development of specific interventions and directed to this clinical event as well as construction guidelines for postoperative care, as well as the development of protocols for hospital discharge planning.

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