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REVIEW PAPER

Pasquali's model of content validation in Nursing research

Modelo de validação de conteúdo de Pasquali nas pesquisas em Enfermagem
Modelo de validación de contenido de Pasquali en las investigaciones en Enfermería

Rosana Kelly da Silva Medeiros*; Marcos Antonio Ferreira Júnior**; Diana Paula de Souza Rêgo Pinto***; Allyne Fortes Vitor****; Viviane Euzébia Pereira Santos*****; Elizabeth Barichello******

Abstract

Background: The recognition of the quality of instruments that aim at verifying and assessing a given phenomenon, through the process of content validation, is essential for the legitimacy and credibility of research results.
Objective: To analyse the application of the Pasquali's model of content validation to Brazilian research studies in the Nursing field conducted over the past five years.
Methodology: Integrative literature review performed between July and August, 2013, using the Latin American and Caribbean Health Sciences Literature database (LILACS) and Nursing Database (BDENF), with controlled and uncontrolled descriptors.
Results: The studies adopted the Pasquali's methodological reference model based on three procedures (theoretical, empirical, and analytical). This required the completion of different steps, such as the construction of the instrument, feedback from judges and application of statistical procedures for content validation.
Conclusion: The process of content validation occurred during the theoretical procedure, in association with other types of validation to comply with the empirical and analytical procedures and achieve an effective validation.

Keywords: validation studies; nursing research; nursing.

Resumo

Contexto: O reconhecimento da qualidade dos instrumentos que procuram verificar e avaliar um fenómeno através do processo de validação de conteúdo, é fundamental para a legitimidade e credibilidade dos resultados de uma pesquisa.
Objetivos: Investigar a aplicação do modelo de validação de conteúdo de Pasquali nas pesquisas brasileiras em Enfermagem nos últimos cinco anos.
Metodologia: Revisão integrativa de literatura realizada no período de julho a agosto de 2013, nas bases de dados Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), Base de Dados de Enfermagem (BDENF), com uso de descritores controlados e não-controlados.
Resultados: Os estudos adotaram o referencial metodológico de Pasquali baseados nos três procedimentos (teóricos, empíricos e analíticos), que exigiu o cumprimento de etapas, tais como construção do instrumento, parecer dos juízes e aplicação de procedimentos estatísticos para a validação de conteúdo.
Conclusão: O processo de validação de conteúdo ocorreu no procedimento teórico e houve associação a outros tipos de validação para percorrer os procedimentos empíricos e analíticos, a fim de alcançar uma validação eficaz.

Palavras-chave: estudos de validação; pesquisa em enfermagem; enfermagem.

Resumen

Contexto: El reconocimiento de la calidad de los instrumentos, que buscan comprobar y evaluar un fenómeno por medio del proceso de validación de contenido, es fundamental para la legitimidad y credibilidad de los resultados de una investigación.
Objetivos: Investigar la aplicación del modelo de validación de contenido de Pasquali en las investigaciones en enfermería brasileñas en los últimos cinco años.
Metodología: Revisión integradora de literatura realizada en el período de julio a agosto de 2013 en las bases de datos Literatura Latinoamericana y del Caribe (LILACS) y Base de Datos de Enfermería (BDENF), para la cual se usaron descriptores controlados y no controlados.
Resultados: Los estudios adoptaron el marco metodológico de Pasquali y se basaron en los tres procedimientos (teóricos, empíricos y analíticos), lo que exigió el cumplimiento de etapas, tales como la construcción del instrumento, el parecer de los jueces y la aplicación de procedimientos estadísticos para la validación de contenido.
Conclusión: El proceso de validación de contenido tuvo lugar en el procedimiento teórico y hubo una asociación a otros tipos de validación para seguir los procedimientos empíricos y analíticos, con el objetivo de alcanzar una validación eficaz.

Palabras clave: estudios de validación; investigación en enfermería; enfermería.

*Master, Nursing, Federal University of Rio Grande do Norte. RN, Member of the research group Centre for Studies and Research in Clinical Nursing/UFRN, CEP 59078-970, Natal, Brasil [rosana_kelly@hotmail.com]. Contribution to the article: bibliographic search, article writing. Address for correspondence: Rua Minas Novas, 37, Bloco IV, Ap. 203 - Neópolis, CEP: 59088-725 – Natal-RN, Brasil.
**Ph.D., Health and Development, Mid-Western Region, Federal University of Mato Grosso do Sul. Federal University of Rio Grande do Norte/UFRN. RN. Leader of the research group Centre for Studies and Research in Clinical Nursing/UFRN. Professor, Nursing Department, Post-graduate Programme in Nursing, Federal University of Rio Grande do Norte, CEP 59078-970, Natal, Brazil [marcos_nurse@hotmail.com]. Contribution to the article: guidance of data analysis and discussion.
***RN. Ph.D. student of the Post-graduate Programme in Nursing at the Federal University of Rio Grande do Norte. Member of the research group Centre for Studies and Research in Clinical Nursing/UFRN, CEP 59078-970, Natal, Brazil [diana-rego@hotmail.com]. Contribution to the article: bibliographic search.
****Ph.D., Nursing, Federal University of Ceará. Federal University of Rio Grande do Norte/UFRN. Vice-leader of the research group Centre for Studies and Research in Clinical Nursing/UFRN. Professor of the Nursing Department and Post-graduate Programme in Nursing at the Federal University of Rio Grande do Norte, CEP 59078-970, Natal, Brazil [allynefortes@yahoo.com.br]. Contribution to the article: data analysis and discussion.
*****Ph.D., Nursing, Federal University of Santa Catarina. Federal University of Rio Grande do Norte/UFRN. RN. Vice-leader of the research group Research Laboratory of Care, Safety and Technology in Health and Nursing/UFRN, Professor, Nursing Department, Post-graduate Programme in Nursing, Federal University of Rio Grande do Norte, CEP 59078-970, Natal, Brazil [vivianeepsantos@gmail.com]. Contribution to the article: data analysis and discussion.
******Ph.D., Nursing, University of São Paulo, Mineiro/UFTM. RN. Adjunct Professor at the Federal University of Triângulo Mineiro/UFTM, Federal University of Triângulo Mineiro/UFTM, UBERABA, MG. CEP 38025-180, Brazil [lizabaric@gmail.com]. Contribution to the article: data analysis and discussion.

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Introduction

Any research study requires specific planning for its implementation, in order to ensure that its scientific method is duly implemented in all its aspects. Thus, it is essential to use procedures that ensure reliable indicators, especially during data collection, so that the quality of the research study is achieved.

The search for quality in research studies reflects the concern to analyse the results of the various studies carried out with the purpose of achieving the excellence and quality required in the course of society's evolution (Ventura, Ferreira, Loureiro, Oliveira, & Cunha, 2009).

In many studies in the health area, it is possible to observe the availability of growing number of questionnaires and scales which aim at analysing and assessing a given phenomenon (Alexandre & Coluci, 2011). However, it is imperative that these instruments be reliable and valid to minimise the possibility of subjective judgments (Raymundo, 2009). Thus, the recognition of the quality of these instruments becomes a key aspect for the legitimacy and credibility of the findings of a study, which reinforces the importance of the validation process.

Validation is a key factor to be used in the selection and/or application of an instrument and is measured by the extent or degree to which data represent the concept that the instrument aims at measuring (Bittencourt, Creutzberg, Rodrigues, Casartelli, & Freitas, 2011).

The most common methods used by psychometrists to validate an instrument are construct validity, criterion validity and content validity (Pasquali, 2009).

Construct or concept validity is the direct way of checking the extent to which an instrument corresponds to the theoretical construction of the phenomenon to be assessed. The concept of validity is also designated as intrinsic validity, factorial validity and, even, apparent validity, which demonstrates the confusion surrounding the definition of this construct (Pasquali, 2009).

The construct has constitutive and operational definitions. The constitutive definition relates to the definition of terms in dictionaries and encyclopaedias, *i.e.* concepts, which are abstract realities, while operational definitions correspond to the definition of the construct through concrete operations, by means of physical behaviours in which the construct is expressed (Pasquali, 2010).

Criterion validity is the correlation between the measure being assessed and another measure or instrument that serves as assessment criterion and has equal or similar attributes; two of its criteria are both predictive validity and concurrent validity (Pasquali, 2009).

Content validity initiates the process of association between abstract concepts and measurable indicators, and represents the extent to which each item of the instrument confirms the phenomenon of interest and the dimension of each item within the scope of the topic to be analysed. Content validity is divided into two steps: the development of the instrument and the analysis and judgment of specialists (Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003). The analysis of judges or content analysis is necessarily based on the judgment of a group of judges experienced in the area, who will be responsible for examining whether the content is correct and appropriate for its purpose (Moura, Bezerra, Oliveira, & Damasceno, 2008).

With the collaboration of specialists, content validity studies may provide information on the representativeness and clarity of each item, but there are limitations to these types of studies that need to be addressed, since experts' analysis is subjective and may lead to bias (Rubio et al., 2003).

The Pasquali's model, despite being used in Psychology and consisting of the theory of development of psychometric scales applicable to the construction of professional psychological tests, personality inventories, and psychometric attitude and semantic differential scales, is also observed in Nursing studies. It involves the development of instruments for measuring subjective phenomena, using three sets of procedures: theoretical, empirical (experimental) and analytical (statistical) (Pasquali, 2010).

The first procedure implies the theoretical rationale of the construct at the basis of the measurement instrument to be developed, *i.e.* the definition of its properties, and the dimensionality of those attributes, as well as their constitutive and operational definition, the construction of the items, and the content validation. The second procedure consists of the steps and techniques used to apply the pilot instrument, as well as the data collection process that may be used to assess the psychometric properties of the instrument. The third one comprises the

analytical procedures used in the statistical analyses of data with a view to validate the instrument developed (Pasquali, 2010).

In addition, the Pasquali's methodological reference model includes 12 criteria to assess the items of an instrument and support its content validation. However, these criteria cover the field of apparent validity, since they assess the psychometric properties of the instrument, which indicate whether the items are understood by the target population. These criteria are as follows: behaviour, objectivity, simplicity, clarity, relevance, accuracy, variety, modality, typicality, credibility, breadth and balance (Pasquali, 2010).

In view of the foregoing, this study aims at analysing the application of the Pasquali's model of content validation to Brazilian research studies in the Nursing field over the past five years.

Methodological Procedures of Integrative Review

This integrative literature review aims at developing a comprehensive literature analysis to contextualise the topic under discussion by restricting itself to relevant studies that point out to new data related to the research objectives so as to contribute to discussions on methods and results, as well as a reflection on the development of future studies (Crossetti, 2012).

The integrative review was carried out in five steps: 1) Problem identification; 2) Literature search; 3) Data evaluation; 4) Data analysis and 5) Presentation of the results (Whittemore & Knafl, 2005). The following guiding question was formulated to identify the problem in this study: How is the Pasquali's methodological reference model applied to Brazilian research studies in the Nursing field related to the content validation of instruments or protocols that take into account the quality of Nursing care by means of the content validation of educational models, Nursing care scales or Nursing procedures?

The search was conducted using the Virtual Health Library (VHL), which included the Latin American and Caribbean Health Sciences Literature database (LILACS) and the Nursing Database (BDENF), as they allowed searching for Portuguese descriptors and more easily identifying Brazilian studies. This aimed at ranking Brazilian content validation studies in the Nursing area, with a view to characterise the application of the methodological reference model of a Brazilian researcher - Luiz Pasquali.

The interest in the use of the Pasquali's methodological reference model for brazilian research studies in the Nursing field relates to the choice of Psychometrics, since it supports the construction and completion of a valid instrument capable of measuring whatever is expected. Among the three procedures which are at basis of this reference model, the procedures that include content validation stand out, although other forms of validation may also be involved (Pasquali, 2010).

Although we cannot guarantee that all brazilian studies on the topic are to be found in the abovementioned databases, the way in which the search was conducted aimed at including the largest amount of brazilian studies conducted over the past five years.

The search in the databases listed above was conducted using the controlled Health Sciences descriptors (DeCS) *Estudos de Validação* (Validation Studies), *Pesquisa em Enfermagem* (Nursing Research) and *Enfermagem* (Nursing), and the non-controlled descriptor *Validação de Conteúdo* (Content Validation). With the purpose of increasing the specificities of the studies, pairs of descriptors were cross-compared.

In this way, five cross-comparisons were performed in the abovementioned databases, which included the following pairs of descriptors in each database: *Estudos de Validação* and *Pesquisa em Enfermagem*; *Estudos de Validação* and *Enfermagem*; *Estudos de Validação* and *Validação de Conteúdo*; *Pesquisa em Enfermagem* and *Validação de Conteúdo*; and *Enfermagem* and *Validação de Conteúdo*.

The search was conducted between July and August, 2013, and the inclusion criteria for the selection of articles were as follows: written in portuguese, spanish and english; addressing the Pasquali's content validation model applied to brazilian studies in the Nursing field; and being published after 2008, including the latest validation studies on the quality of Nursing care, by means of content validation of either educational models applied to Nursing, Nursing care scales, or Nursing procedures. Studies in which the proposed questionnaire was not used or were duplicates were excluded, as well as publications in the form of abstracts, dissertations, theses, editorials and notes to the editor.

After reading the data collected, the articles were organised in two tables using Microsoft Office Excel 2010.

This stage involved the development of an instrument for data collection, with the purpose of extracting the key information from each article selected.

The adopted instrument included the following items: identification of the study (place of publication, location of the study and year); objectives (data from the study); and methodological characteristics (analysis technique, judges and number of stages).

Results and Interpretation

In the first search, 383 publications were found. After reading the titles and abstracts, 98 (25.6%) were pre-selected, while 206 (53.8%) were excluded because they were duplicates.

Among the 98 pre-selected publications, 91 (92.8%) were excluded after full-text reading as they did not meet the inclusion criteria. This resulted in a final sample of seven selected studies. The selected studies were Nursing research studies developed in Brazil and conducted over the past five years.

Following the selection of the seven articles which met the inclusion criteria, data were extracted regarding their places of publication, locations where the studies had been conducted, year, study objectives and content validation model used, as shown in Table 1.

Table 1

Distribution of the articles selected according to their place of publication, authors, location of the study, year, objective and validation model

Place of Publication/ Database	Authors	Location/Year	Objective of the study
Ata Paulista de Enfermagem/ LILACS	Freitas et al.	Fortaleza-CE/ 2012	To describe the development and validation of an educational hypermedia for undergraduates and nurses about the technique of physical examination in the prenatal period.
Revista Brasileira de Enfermagem/ LILACS	Honório et al.	Fortaleza-CE/2011	To verify the adequacy of the content of the items in the proposed standard operating procedures (SOPs) related to access, heparinizasation and dressing of totally implanted catheters, from the judges' opinion.
Online Brazilian Journal of Nursing/ LILACS and BDENF	Martins & Mejias,	Londrina, PR/ 2011	To perform the cross-cultural adaptation and validation of the Nurse Parent Support Tool (NPST) to Portuguese, which assesses the perceptions of parents of NBs hospitalised in Neonatal ICUs regarding Nursing support.
Revised APS/ LILACS	Moura et al.	Fortaleza-CE/ 2008	To validate an educational game aimed at the nutritional education of diabetes mellitus patients.
Texto & Contexto Enfermagem/ LILACS and BDENF	Oliveira et al.	Fortaleza-CE/ 2008	To validate an educational handbook for self-care among women undergoing a mastectomy rehabilitation regarding the content and apparent validity.
Revista da Escola de Enfermagem da USP/ LILACS and BDENF	Vituri & Matsuda,	Londrina, PR/ 2009	To validate the contents of an instrument to assess nursing care composed of Nursing Care Quality Indicators in Adverse Event Prevention.
Revista da Escola de Enfermagem da USP/ LILACS and BDENF	Yamada & Santos,	São Paulo, Minas Gerais and Ceará/ 2009	To develop the wound version from the translation of a general Quality of Life instrument.

CE - Ceará/ PR - Paraná/ NB - newborn/ SP - São Paulo/ ICU - Intensive Care Unit

All selected studies were methodological studies using the Pasquali's methodological reference model for content validation and applying validation techniques, such as the number of judges and the number of steps in this process, among others, as shown in Table 2.

Table 2
Distribution of content validation techniques according to the method of data collection and analysis, the judges, and the number of steps involved

Authors	Analysis Technique	Judges	No. of steps
Freitas et al.	Interrater agreement index	Seven nurses from the area of Obstetrics and three informatics specialists.	Two steps
Honório et al.	Interrater agreement index/ Weighted average proposed by Fehring/ Measures of central tendency and variability, and Mann-Whitney test	Nine judges with experience in the areas of oncology, haematology and nosocomial infection.	Three steps
Martins & Mejias,	Cronbach's Alpha	Seven nurses - two professors, one specialist and Ph.D., one master, one specialist and master's student, and the two researchers.	Three steps
Moura et al.	Interrater agreement index	Two nurses, three nutritionists, one physician, and one pedagogue.	Two steps
Oliveira et al.	Interrater agreement index	Three physicians, five nurses, three physical therapists, one occupational therapist, one pedagogue, and one social communicator.	Two steps
Vituri & Matsuda,	Reliability Index/ Content Validity Index/ Delphi Technique	Nine PhDs in Nursing	Three steps
Yamada & Santos,	Cronbach's Alpha/ Measures of central tendency and dispersion	Five experienced professionals	Three steps

The analysed studies adopted the Pasquali's methodological reference model (2010) based on the three major axes or procedures - theoretical procedures, empirical procedures (experimental) and analytical procedures (statistical).

Theoretical Procedures

Among the studies that specified the theoretical procedures adopted to build the items, Freitas et al. (2012) and Moura et al. (2008) addressed the construction of educational materials for the Nursing area. The authors used material of public domain, as well as aspects related to the use of technologies to produce care through the recognition of a practical problem, formulation of the problem, search for scientific principles supporting the problem, design of the instrument or process based on the mentioned principles, prototype to be experienced, and assessment of the results obtained.

Another study that detailed the theoretical procedure addresses the development of a clinical performance and the construction of an instrument based on three criteria: importance of the care activity to be measured, its improvement potential and the degree of control. The health care professionals' degree of control over the mechanisms enables the desired improvement, allowing for the implementation of the four steps for the construction of the items that will correspond to the care aspect to be submitted for assessment: selection of indicators within each area, construction of a reliable and valid measure, and submission to judges to verify the clarity and relevance of the items, thus allowing for the construction of an Operational Manual for each item, duly based on a scientific reference model (Vituri & Matsuda, 2009).

Yamada and Santos (2009) contemplated the constitutive definition of a theoretical reference model, which they proposed to build for later validation, in addition to including the analysis of the literature on other instruments that measure the same construct. This corroborates with Pasquali (2010), since the sources of the items may derive from the literature by means of other tests measuring the same construct.

As regards the assessment of the content using a Likert scale, the following scale was used in four studies: *fully adequate, adequate, partially adequate and inadequate*, *i.e.* 4-point scales were used to collect information with the purpose of assessing the instruments' items (Moura et al., 2008; Freitas et al., 2012; Honório, Caetano, & Almeida, 2011; Oliveira, Fernandes, & Sawada, 2008).

The Likert scale usually has three or more points, in which the research judge expresses whether he/ she agrees, is in doubt or disagrees with the item

regarding its ability to measure what the instrument is supposed to measure (Pasquali, 2010).

To this end, the items should be assessed by judges, which are not to be representative samples of the population for which the instrument was built. To participate in this analysis, the judges ought to be experts in the specific area of the instrument, as they are responsible for judging whether the assessed items are in line with the purpose of a given instrument or not. An interrater agreement of at least 80% may serve as a criterion for deciding on the relevance and/or acceptance of the item which it theoretically refers to (Pasquali, 2010). This percentage of interrater agreement was reported in five of the analysed studies (Moura et al., 2008; Honório et al., 2011; Oliveira et al., 2008; Vituri & Matsuda, 2009; Yamada & Santos, 2009).

Regarding the number of judges, some authors clarified the adoption of Pasquali's recommendations (2010), suggesting between 6 and 20 individuals, with at least three individuals being needed in each group of selected professionals (Freitas et al., 2012). The studies of Moura et al. (2008) and Oliveira et al. (2008) had already used an odd number of judges to avoid a tie (Vianna, 1982).

The criteria for the selection of judges varied between studies. Freitas et al. (2012) used the Barbosa's scoring criterion (2008) by selecting specialists on a *five*-point scale for nurse-midwives with a thesis or dissertation on prenatal topic, final paper work of graduation or specialization, having participated in groups/research projects involving prenatal care, having teaching experience in prenatal care, practice experience in prenatal care, guidance in studies on the theme of prenatal period, being authors of two papers about the prenatal period published in journals, and having participated on examination of academic papers in prenatal care and a *three*-point scale for informatics experts – professionals or experts in the development of websites, with professional experience in the development of VLEs and specialisation in the web area. On the contrary, Honório et al. (2011) recommended a minimum range of *five* points, as proposed by Fehring (1994), including academic titles, professional experience and scientific publications in the area.

Criteria for studies were adopted, with a minimum score of three points regarding the title, scientific production, and length of time working with the topic under discussion or at least two points on the following criteria: working with health education for patients with diabetes, having professional experience in the area for more than two years, having knowledge about nutrition for diabetics, having scientific studies on diabetes, having knowledge about educational technology and knowledge about the process of instrument validation (Moura et al., 2008; Oliveira et al., 2008).

In relation to the theoretical and semantic analysis of the items, in Honório et al. (2011) and Vituri and Matsuda (2009) the content validation occurred until the constitutive and operational definition of the items was replaced with the use of criteria adapted from the 12 criteria suggested by Pasquali (2010): behaviour, objectivity, simplicity, clarity, relevance, accuracy, variety, modality, typicality, credibility, breadth and balance. In Vituri and Matsuda (2009), the scientific strength of the measure was also tested to confirm the clarity and relevance of the items which characterise apparent validation.

Other criteria were used by Moura et al. (2008) and Oliveira et al. (2008), such as objectives, structure, presentation, and relevance. These studies addressed the development of educational materials; however, the origin of the adopted criteria was not specified.

Empirical Procedures

In relation to empirical procedures, the pilot test was applied in four studies to assess the psychometric properties of the instrument: Martins and Mejias (2011), Oliveira et al. (2008), Vituri and Matsuda (2009), and Yamada and Santos (2009).

In the study of Martins and Mejias (2011), the pilot test was used to check the relevance of the items, as well as the clarity and internal consistency of the instrument. In the study of Vituri and Matsuda (2009), the test was carried out through the application of the reformulated instrument, following the judges' assessment to verify its applicability in the study. In the study of Yamada and Santos (2009), the pilot test was established by being applied to the target population through an interview conducted to a minimum of eight people for each item of the instrument. This was in line with Pasquali's recommendations (2010), since the purpose of the pilot test was to check whether the subjects understood the instructions and the purpose of the interview was to ask the representatives of the instrument's target population to give their

opinion on what type of behaviour the construct was manifested.

However, such aspect already involves the semantic analysis, which is a subsequent apparent validation with a view to verify if all items are understandable to all members of the target population. Such procedure was present in the studies of Martins and Mejias (2011), Oliveira et al. (2008), Vituri and Matsuda (2009), and Yamada and Santos (2009), who performed content validation. In the study of Oliveira et al. (2008), the brainstorming technique was used. This technique has proven to be more effective in assessing the items' clarity through the creation of a group of up to four people from the lowest stratum of the target population. This is because it is assumed that if people in this stratum understand the items, then people in the most sophisticated stratum will also understand them. Items were presented one by one to people in this group, who were asked to reproduce them. If the item reproduction raises no doubts, then the item was properly understood. On the contrary, if differences occur in the item reproduction or the researcher believes that the item is misunderstood, then it is considered to be a problematic item (Pasquali, 2010).

Therefore, the studies followed the Pasquali's methodological reference model, since the items of the instruments were selected following the analysis of their theoretical rationale. The sources of the items derived from the literature through other tests that measured the construct and interviews to the target population (Pasquali, 2010).

Analytical Procedures

The analytical procedures of the studies consisted of data analysis using statistical tests. The Cronbach's alpha was used in the study of Martins and Mejias (2011) due to its capacity to reflect the level of inter-item agreement. In that sense, the closer to the eigenvalue, the closer the inter-item agreement was to 100%. Yamada and Santos (2009) adopted a Cronbach's alpha coefficient of less than 0.70 to exclude items from the instrument.

The Cronbach's alpha coefficient assesses the reliability of the internal consistency of questionnaires and also the interrater reliability. Considering that all items of a questionnaire use the same measurement scale, the alpha coefficient is calculated based on individual item variances and inter-item covariances (Freitas & Rodrigues, 2005).

The use of alpha coefficients in the various areas of knowledge is broad and comprehensive; however, there is still no consensus among researchers about the reliability of a questionnaire obtained based on this coefficient - in general, a research instrument with a Cronbach's alpha greater than or equal to 0.70 is considered to be satisfactory (Freitas & Rodrigues, 2005).

The Content Validity Index (CVI) and the Interrater Agreement Index of the items of the instrument were observed in some studies (Moura et al., 2008; Honório et al., 2011; Oliveira et al., 2008; Vituri & Matsuda, 2009; Yamada & Santos, 2009). The CVI assessed the inter-rater agreement as to the representativeness of the instrument with regard to its specific content, by dividing the number of judges who deemed the item as extremely relevant or relevant by the total number of judges (CVI for each item), which resulted in the number of judges who considered the item to be valid (Rubio et al., 2003).

The reliability test or interrater agreement test were used in the study of Vituri and Matsuda (2009) to assess the level of clarity and relevance of all items of the instrument. The Delphi technique was equally used and aimed at obtaining consensus on the specialists' opinion through a series of structured questionnaires, referred to as phases. The answers to each questionnaire were taken into account to reformulate the subsequent questionnaires. In this way, each new phase was built on the answers of the previous phase. The process continued until consensus among all participants was reached (Vituri & Matsuda, 2009).

Therefore, the methodological models of content validation related to the application of techniques that aimed at validating the content of a given instrument in the studies analysed. This process required the implementation of phases from the construction of the instrument to the opinion of judges and application of various statistical procedures.

Conclusion

The analysed studies used technologies created by nurses in brazilian research studies as instruments that contribute to their daily work, with a view to providing safe and quality care to patients.

The development of instruments (protocols, care scales or educational materials in Nursing), as well as their content validation based on the Pasquali's methodological reference model confirm the advances in the Brazilian scientific Nursing, with a specific need for the use of reliable measures in research studies.

The analysed studies used the Pasquali's three procedures as the basis for their development, although the process of content validation had already occurred in the theoretical procedure. Furthermore, statistical analyses were adopted aiming at the content validation of the instrument and apparent validation was conducted by means of semantic analysis in pilot tests and/or the use of the Pasquali's criteria so as to psychometrically assess the instruments in some studies.

Although the process of content validation involves aspects related to the development of the instrument and the specialists' analysis and judgment, it is important to combine them with other validation processes for the instrument to have the expected impact, *i.e.* to be able to measure what has been proposed.

This study helps us understand the content validation procedure, which is essential for building reliable measures and instruments in the Nursing area, which provide the knowledge to a safer care practice. Thus, the validation of care standardisation instruments becomes useful to properly implement procedures specific to Nursing.

However, other validation models need to be used and analysed in Nursing studies so as to contribute to the development of protocols, care scales and educational materials in Nursing, thus promoting a safer care practice.

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