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Adaptation and validation of the Clinical Nursing Expertise Survey to the portuguese nursing population

Adaptação e validação da Clinical Nursing Expertise Survey para a população de enfermeiros portugueses

Adaptación y validación del Clinical Nursing Expertise Survey para la población de enfermeros portugueses

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ABSTRACT

Objective: To validate a reliable and valid measure to evaluate nursing clinical expertise, which could be used to research the contribution of nursing knowledge to the quality of care. **Methods:** After permission to translate and use of the Clinical Nursing Expertise Survey, we applied the instrument resulting from the conceptual validation process and the translation/retroversion process. **Results:** Response rate ranged between 98.4% and 100% per item. The construct validation process with the factor analysis extracted two factors which explain 74.19% of the variance. The reliability measured by Cronbach's alpha has a value of $\alpha = 0.987$, on the criteria validation we obtained a significant relationship between CNES and nurse education. **Conclusion:** We thus obtained a valid and reliable Portuguese version of CNES which can be used in clinical settings in Portugal.

Keywords: Validation Studies; Nursing; Clinical competence.

RESUMO

Objetivo: Validar uma medida confiável e válida para avaliar a experiência clínica de enfermagem, o que poderia ser usado para pesquisar a contribuição do conhecimento de enfermagem para a qualidade dos cuidados. **Métodos:** Após seleção e autorização para tradução e utilização da *Clinical Nursing Expertise Survey*, aplicamos, em junho de 2012, a uma amostra de enfermeiros, o instrumento que resultou do processo de validação conceitual e do procedimento de tradução/retroversão. **Resultados:** Taxa de resposta por item oscilou entre 98,4% e 100%. O processo de validação do constructo, pela análise fatorial, extraiu dois fatores que explicam 74,19% da variância, a fiabilidade medida pelo Cronbach alfa apresenta um valor de $\alpha = 0,987$, na validação de critério, obtivemos uma relação significativa entre a CNES e a formação dos enfermeiros. **Conclusão:** Obtivemos uma versão portuguesa da CNES válida e fiável que pode ser utilizada nos contextos clínicos em Portugal.

Palavras-chave: Estudos de Validação; Enfermagem; Competência clínica.

RESUMEN

Objetivo: Validar una medida confiable y válida para evaluar la experiencia clínica de enfermería, con el fin de investigar la contribución de los conocimientos de enfermería para la calidad de la atención. **Métodos:** Después de la autorización para traducción y uso del *Clinical Nursing Expertise Survey*, se aplicó, en junio de 2012, a una muestra de enfermeros, el instrumento que resultó del proceso de validación conceptual y de procedimientos de traducción/retrotraducción. **Resultados:** La tasa de respuesta por ítem ha oscilado de 98,4% a 100%. El proceso de validación del constructo, por el análisis factorial, ha excluido dos factores que explican 74,19% de la varianza: la confiabilidad medida por el Alfa de Cronbach es de $\alpha = 0,987$; en la validación de criterios, teníamos una relación significativa entre el CNES y la formación de enfermeras. **Conclusión:** Obtuvimos una versión portuguesa del CNES válida y confiable, que puede ser utilizada en Portugal.

Palabras-clave: Estudios de Validation; Enfermeria; Competência Clinica.

INTRODUCTION

In the complex environment of healthcare provision, nurses' experience and expertise are determinant for the quality of care and the achievement of positive outcomes for the patients[1,2]. In the "Keeping Patients Safe" report, presented by the Institute of Medicine, the nursing role was recognized as highly relevant to patients' safety[3].

There are, however, few measuring instruments for monitoring nurses' clinical expertise, and, in Portugal, validated instruments are as yet unknown. This makes difficult the research on its possible relation with patients' outcomes[4]. Studies in which only the nurse/patient ratio is measured and nurses' training and professional experience are described do not seem enough to differentiate clinical expertise, as they end up considering all nurses as an average. This differentiation incapacity raises theoretical, empirical and political issues[4].

The concept of nursing expertise may be added to a theoretical framework which helps delineate the organization of nursing care in order to ensure a positive evolution in patients' outcomes[5], since, in the theoretical and empirical plans, nursing expertise is associated with nursing care outcomes and the global quality of healthcare, there is a growing number of researchers who demonstrate a positive relation between nursing expertise levels in a team and the outcomes of the care they provide. The best professionals tend to remain in the best work teams. Furthermore, expertise is crucial to the performance of non-clinical nursing functions, such as coordination in a therapeutic team[6].

At political level, when this concept is valued, it is often confused with the capacity to do things which can and should be issued by protocol. Thus contradicting the opinions of authors who declare that expertise requires more than technical proficiency and the capacity to follow guidelines and protocols[1,7]. Although standard practice is important to assure people's safety and a minimum guarantee of the quality of care provision, the restrict protocol adherence, not considering situation specificities, limits expertise development[8]. To be an expert is also to be able to provide individualized and holistic healthcare. This assumption is the differentiating point between conformity ('one fits all') and quality. The misapprehension of this idea may lead to what in health economies is designated by substitution between the factors of production, i.e. the substitution of nurses for less qualified professionals in a mistaking perspective of efficiency gain[7].

In order to follow the paradigm that healthcare quality should be measured in a quantitative perspective, especially when cost containment is the driving force for decision making, the use of valid and reliable instruments to monitor nurses' clinical expertise, which lead to the conception and production of information, generating studies for managers and politicians on the effect of nursing expertise in healthcare results, becomes necessary.

THEORETICAL FRAMEWOK

In her book "From Novice to Expert", Patricia Benner[1] gave an important contribution to the description and explanation of the variability of clinical expertise among nurses and of its effect in the conception of care and the exercise of autonomy in decision making. This author considers clinical expertise as a hybrid between formal theoretical knowledge and practical knowledge (from experience). The ability to make critical decisions, faced with complex situations, is the differentiating element of nurses regarding their expertise. The same author states that expertise is achieved by going through five levels: novice, advanced beginner, competent, proficient and expert[1].

Novices are the students who are still in school. Advanced beginners are those who follow the rules and protocols in order to know how to act, when facing specific situations. Competent nurses already show intention in action but are not still capable of recognizing the global situation; they are task oriented and deliberately organize their work with their goals in mind. Proficient nurses are aware of the whole situation, and are more capable of recognizing and responding to change. Expert nurses, besides being capable of everything described above, they are able to identify unexpected clinical responses and potential problems; through intuitive understanding, they apprehend the whole situation and diagnose with precision, not wasting time with ineffective possibilities; due to their higher-level performance, these nurses are regularly consulted by their colleagues and referred by their superiors. Even though many nurses progress in their competence level, not all become experts[1].

Being an expert corresponds to the ability to provide a tailored, and the most correct, response to a situation. For Heidegger, apud Day[8], the expert nurse appeals to his/her previous experiences in order to act in a situation that looks similar. He/she uses previous experiences and the knowledge they provided to act[8]. His/her practice consists in the analysis of the subject, its environment and its decomposition in recognizable elements so as to act according to abstract rules[8] i.e. abstracting from guidelines and protocols. Expertise comprises an intuitive approach and evidence-based decision making. In an acute care context, this practice depends on the clinical variation of the patient, demanding an adjustment skill which Benner e Chelsea, apud Day[8], call 'thinking in action' or 'reasoning in transitions'.

Experience

An expert nurse and an inexperienced nurse can assess a patient in a similar way, but their responses to that observation are going to be different, because the expert observes subtle relevant changes (clues) which he/she is going to use to foresee subjacent problems. Nurses' years of experience are therefore an important factor to the quality of nursing care as they enable the recognition of many clues which, when related to the patient's condition, allow the identification of patterns (paradigmatic cases) and the elaboration of more effective

intervention plans, thus promoting higher performance levels[1,9]. However, it is important to stress that experience is a necessary but insufficient condition for expertise, as not all experienced nurses become experts. This is due to the fact that the years of experience may provide fluidity and flexibility but not the reflexive thinking necessary to expertise[5]. Benner[1] observed that several years of working in identical or similar situations can generate competence. However, the passage of time and the experiencing of occurrences, events and interactions do not automatically convey the expert status. She then concluded that there is a discontinuity or leap between competent, proficient and expert levels of knowledge.

Experience and expertise are therefore related but different concepts. Experience can be defined as the possibility to refine or refute preconceived notions and expectations through length of practice and self-reflection[1,10]. Hence, development in clinical situations and subsequent self-reflection are necessary for the nurse to achieve the expert level. What makes him/her different from the others is his/her experience related-knowledge and his/her critical thinking capacity to freely respond to each situation, this response being an important source for knowledge[8].

Few quantitative studies were able to simultaneously capture the transactional and temporal nature of experience and many limit the measurement of experience to the length of practice[11]. More experienced nurses reported the performance of more complex functions than the less experienced, and therefore the years of experience are associated with expertise[12], connected to an inferior occurrence of medication errors, an inferior rate of patients' falls[13] and with lower number of perforate-cutting lesions incidents[14].

Aiken and collaborators[15] evaluated the influence of the average of years of experience in surgical patients' mortality in 168 hospitals and concluded that experience is not a significant mortality predictor.

Education

Education can also be a variable which influences expertise, as it provides the theoretical support and practical knowledge which can be applied and tested in real situations[8]. Theoretical learning alone is not enough to generate expertise, so nursing instruction is mainly focused in clinical learning. Instruction is crucial for good clinical judgment[16]. Simulation strategies, of real clinical situations, offer important opportunities for nurses since they can apply and integrate theoretical. Without a deep knowledge, nurses risk making poor judgments and not having the necessary tools to learn from experience. A solid knowledge facilitates competence acquisition through experience. Theory and principles enable nurses to formulate the right questions so as to clarify patients' problems and provide care supported by adequate decisions[1,16]. Theory and principles allow nurses to formulate the right questions on patients' problems and are expected to lead to good clinical decision making and safe care provision[15,17].

OBJECTIVES

The main objective of this study was to validate a reliable and valid measure to evaluate nursing clinical expertise, which could be used to research the contribution of nursing knowledge to the quality of care. Therefore, the purpose is:

- To describe the adaptation process of the Clinical Nursing Expertise Survey (CNES), its translation process and the methods which ensure its validation to the Portuguese population;
- To evaluate the psychometric properties of the Portuguese version of CNES through the internal consistency of the scale;
- To validate the scale construct through the principal components analysis, the mean of inter-item correlation and the correlation between each subscale and the total.

METHODOLOGY

The Clinical Nursing Expertise Survey, created in 2002 and refined in 2007 by Lake[2,4], based on the nursing roles and functions formulated and developed in the Benner's book "From Novice to Expert"[1] was applied.

The CNES has 34 items which correspond to as many nursing roles and functions. Nurses answer by evaluating their capacity level for the position or function in a scale of 1 to 5 points which varies from competent to expert. The items are grouped as shown in table 1. This construction was based on a pre-test given to 95 nurses, and each item was properly evaluated and sequenced.

Table 1. Item groups in the Clinical Nursing Expertise Survey

	Items
Establishment of an effective communication and a relationship of trust with patients and families	1-13
Definition of priorities in the response to patients' needs and multiple requests	14-27, 29, 31-34
Creation and implementation of strategies in wound care which promote healing and comfort	28, 30

The psychometric priorities of the instrument were evaluated in the original version with this sample of 95 nurses. The expertise level of the nurses was assessed by their clinical director and by an advanced practice nurse of their clinical field. Each nurse filled in his/her self-assessment form and nominated three colleagues to, independently from one another, evaluate him/her. The three evaluation sources were used to evaluate the validity of the construct. Concurrent validation was carried out through seven indicators of advanced practice

and clinical activity (length of professional experience, nursing specialty certification, professional organization membership, subscription of a professional journal, committee membership and project participation). Validity was explored by the correlation of chi-square and variance analysis[4].

A new study was subsequently carried out to refine the instrument and identify the factors which could be grouped in subclasses. Lake applied the explanatory factor analysis and obtained a two factor model: 1) nurse-patient/family relationship; 2) clinical evaluation in nursing, its responses and the role of nurses in health teams. The expertise measure is the mean of the obtained values for each item.

For this new version, the author obtained a reliability of $\alpha = 0.97$. The construct and concurrent validity were supported by a strong and statistically significant correlation between the score obtained in the nurses' self-assessment and the opinion of the chiefs and colleagues who evaluated them.

ADAPTATION AND VALIDATION TO THE PORTUGUESE NURSES

The CNES was translated for a semantic and cultural validation by the translation and retroversion method, and it was also evaluated by a group of experts. In order to adapt and apply the instrument, permission was requested and granted by the author.

The validation of the concept of nursing expertise was carried out by a group of nurses and nursing professors with whom not only the concepts, but also each function and role included in the instrument were discussed. After obtaining a consensus on the pertinence of the concept and its cultural equivalence, the translation phase started.

The instrument was translated by two professional bilingual translators, from English to Portuguese. The two obtained versions were then compared to obtain a consensual translation, equivalent both semantically and in contents, and this final document was translated to the English language by yet another bilingual translator. Later on, the initial translators were confronted with the retroversion and it was considered as equivalent. The instrument was therefore ready to be validated.

The definitive version was applied in June 2012 to a sample of nurses of the medicine and surgery wards of 4 acute care hospitals of the centre of Portugal in a transversal, descriptive, correlational study. All nurses of these wards were explained the objective and scope of the study, as well as assured anonymity and data confidentiality. They were then invited to voluntarily participate in the study. All nurses in administrative positions or others not directly involved in care provision were excluded from the study.

For the study of the instrument's psychometric characteristics, the option was for the internal consistency method, evaluated by the Cronbach's alpha coefficient as an estimate of its reliability, which only implies a measurement process and is considered the best indicator[18]. Alpha values higher than 0.70 are acceptable.

A response pattern based on the counting of the unfilled items (missing values) was used to evaluate responders' adherence which may suggest higher or lower completion acceptability.

Criterion validity evaluation was performed through the variables length of professional experience and academic training, since, as seen before, there seems to be some evidence of that relation.

Given that a high value for the reliability does not mean that we are in the presence of a uni-factorial scale, since this value gives us no information about the dimensionality of the instrument, construct validity was evaluated by the explanatory factor analysis so as to determine the items' joint variation patterns, i.e. variance explained by each factor.

The Kaiser-Meyer-Olkin (KMO) and Barlett's test of sphericity were applied and the main components analysis with Varimax rotation was used. To support the decision on the number of factors to extract, kaiser's eigenvalues greater than one method was used. For the items to be included in each factor, coefficients values higher than 0.30 were considered. A semantic evaluation was applied to each item in order to decide whether or not an item should remain in each factor[18].

For the statistical analysis, *t*-test and Anova on factor were used. For the acceptance of nullhypothesis $p > 0.05$ was considered.

All statistical analyses were performed with the support of SPSS version 19 for Windows.

ETHICAL CONSIDERATIONS

This study was elaborated in the scope of a larger project, with the aim to measure the quality and effectiveness of nursing care and its development was authorized by the boards of the 4 hospitals involved in this project. All instruments used in the study were mentioned in the authorization request and after evaluation by the ethics committees; the application of all instruments was given assent.

RESULTS

Sample

Of a total of 587 nurses working in the medicine and surgery wards of the four hospitals which authorized the realization of this study, 370 questionnaires were answered, a sample of 63.0% of the total. This adherence is largely due to the fact that, when the questionnaires were collected, some nurses were already on holiday.

Respondents' age varies from 24 to 59 years, with an average of 39.3 years and a standard deviation of 8.1 years. The length of professional experience is between 2 and 37 years, with a mean of 12 years and a median of 10 years.

The response rate per item fluctuated between 98.4% and 100%. The item with an inferior response rate was CNE 10 - Help the patient and family integrate change in their lifestyle due to disease or recovery.

The overall average figure obtained by nurses in CNES is 3.46, with a pattern deviation of 0.82 with 50% of the sample presented values higher than 3.62, being 3.91 the most frequent value. The application of the Kolmogorov-Smirnov Z test indicates that the CNES distribution values can be assumed as normal ($p > 0.05$). These values show that, in what concerns the performance of the roles included in the Clinical Nursing Expertise Survey, nurses classified themselves between proficient and expert.

Construct Validity

The measure of sampling adequacy was calculated previously to the factor analysis (KMO = 0.981) and was considered excellent. Bartlett's test of sphericity was also relevant ($p < 0.001$).

According table 2, the factorial analysis, using the principal components method with Varimax rotation extracted two factors: 1) nurse-patient/family relationship; 2) clinical evaluation in nursing, its responses and nurses' role in health teams, which explain 74.19% of the variance and is in compliance with the conceptual framework of the original scale[2].

For items 4 and 13, the Marôco's recommendation[18] was used. Due to an evaluation of the semantic meaning, it was decided to keep these items in factor 1, even though they presented a greater weight for factor 2.

Pearson Correlation between the two factors is r = 0.898, and between each factor and the total scale was r = 0.959 e r = 0.986, respectively, which also shows a strong correlation between them.

Reliability

Instrument reliability analysis by Cronbach's alpha revealed a value of α = 0.987, which corresponds to a very good internal consistency. The evaluation of Cronbach's alpha presented for each dimension indicated values of 0.969 for the items (1 to 13) which correspond to the nurse-patient/family relationship, and of 0.982 for the items (14 to 34) which correspond to activities related to clinical evaluation in nursing and its responses, and the role of nurses in the health team.

Criterion validation

For criterion validation, the variables length of professional experience and professional qualifications were used. When the correlation between CNES and the length of professional experience was analysed, a very low non-significant correlation of r = 0.037, $p = 0.496$ was found. Between each factor and experience the correlation was r = 0.028 for factor 1 and r = 0.042 for

Table 2. Ranking of ítems per factor and factor weight

Itens	Factor	
	1	2
CNE25 - To administer medication correctly and safely.	.865	
CNE28 - To prevent and intervene in case of skin lesions.	.813	
CNE30 - To elaborate and implement strategies for skin care and wound treatment which contribute to the healing and comfort.	.808	
CNE27 - To evaluate the effects of medication according to therapeutic goals.	.807	
CNE24 - To manage intravenous therapies with minimal risks and complications.	.797	
CNE26 - To detect medication adverse effects: reactions, toxicity and incompatibilities.	.788	
CNE31 - To modify the care plan as the patient's health status alters.	.776	
CNE33 - To define priorities to effectively coordinate and respond to the multiple needs and solicitations of the patient.	.737	
CNE22 - To provide comfort measures adjusted to the needs of the patient/family	.712	
CNE29 - To prevent pulmonary and cardiovascular complications resulting from immobility.	.710	
CNE20 - To Interpret the type and degree of pain of the patient.	.709	
CNE21 - To Implement adequate strategies for pain management.	.687	
CNE19 - To preserve patient dignity in extreme situations.	.686	
CNE15 - To communicate significant changes in the patient's health status.	.676	
CNE23 - To facilitate a peaceful death to the patient.	.676	
CNE34 - To collaborate with a multidisciplinary team to provide the highest level of care.	.666	

Continued Table 2.

Itens	Factor	
	1	2
CNE14 - To detect the deterioration of the patient's health status before alteration of vital signs or other objective parameters.	.619	
CNE10 - To help the patient and family to integrate change in their lifestyle due to disease or recovery.		.817
CNE6 - To maximize families' positive role in patient treatment and recovery.		.810
CNE9 - To help the patient and the family deal with the difficult aspects of disease/health status.		.801
CNE5 - To help the patient and the family understand disease and treatment.		.770
CNE11 - To maximize the patient's capacity to keep a significant activity level when undergoing temporary or permanent life changes.		.748
CNE12 - To evaluate the patient's response potential to various treatment strategies.		.745
CNE7 - To offer emotional support to the patient's family and provide information whenever necessary.		.737
CNE8 - To Recognise the patient's readiness to learn and evolve.		,731
CNE3 - To be aware of and understand the patient's interpretation of the disease.		.715
CNE16 - To manage a crisis in the patient.	.507	.684
CNE2 - To be present, ensuring direct recognition, contact and communication with the patient.		.671
CNE1 - To establish a relationship of trust and good communication between patient and family.	.503	.670
CNE13 - To anticipate patient care needs and how to cover them.	.544	.665
CNE4 - To provide care oriented by the patient's concerns and preferences.	.463	.660
CNE17 - To meet demands by a quick resource selection in complex situations.	.560	.646
CNE18 - Experienced performance in life threatening emergency situations.	.528	.576
CNE32 - To obtain timely adequate medical responses.	.517	.528

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; a. Rotation converged in 3 iterations.

factor 2. On the other hand, when the Anova test was applied to a factor in order to verify if there was a difference in the expertise mean between nurses with different professional qualifications, it was concluded that that difference is significant ($p = 0.019$).

The difference of means of total CNES and by factor between specialised nurses was analysed, that difference was considered statistically significant, as specialized nurses obtained a higher mean, according table 3.

Table 3. Relation between specialisation and clinical expertise

	Expertise - total	Factor 1	Factor 2
Specialised	3.8359	3.9249	3.6571
Not specialised	3.3932	3.5047	3.2382
	T = 3.870 $p < 0.001$	T = 3.656 $p = 0.000$	T = 3.553 $p < 0.001$

DISCUSSION

The quality of nurses, from the perspective of their expertise, is very important for obtaining positive outcomes in patients and for ensuring a global quality in care provision[4,13,15]. The existence of instruments which allow the realization of studies to analyse how nurses' differentiation affects evolution and outcomes is quite meaningful.

It seems clear that nurses' expertise must be included in a theoretical framework of reference connecting hospital organization to outcomes in nursing care. A growing body of literature suggests that the level of nurses in a team influences the outcomes of care provided to persons[3,13,15]. Most studies have, so far, only been focused on the number of nurses, but that means they are not considering a key component in the nursing care dimension which must also be taken into account in the results: nurses' expertise in clinical practice. Nurses' expertise/experience may be the only and the most powerful influence in the quality of nursing technical interventions. Moreover, expertise is crucial for nurses' non-clinical functions, namely coordination in a therapeutic team. The concept "nursing expertise" must therefore be added to the theoretical framework which helps delineate the organization of nursing care for a positive evolution in patients.

The development and validation of valid and reliable instruments is, therefore, an important issue. The use of instruments developed in other contexts and languages requires a cultural and psychometric validation to ensure the integrity of the studies wherever they may be applied. The results obtained in this study demonstrate that the final version, resulting from the

translation/retroversion process of the Clinical Nursing Expertise Survey (CNES) is valid and reliable and measures two domains of expertise where nurses act. On the one hand, the relationship they build with the patient/family and, on the other hand, their role in the health team. These domains represent 74.19% of the variance and meet the model proposed by Lake[2]. Regarding the reliability, alpha de Cronbach is α = 0.969 for the relationship with the patient and family domain and, α = 0.982 for the nurses role in the health team. The global alpha is α = 0.987. These values are also in line with those of the original scale.

Regarding criterion validation, the data obtained from the correlation between the score of CNES and the length of professional experience are not significant, with p = 0.496. This result meets some authors' statements, when they refer that professional experience, despite being a necessary condition, does not produce the reflexive thinking capacities which are important to clinical expertise[1,10]. The Anova test used to verify the relationship between clinical expertise and professional qualifications, obtained result of p = 0.019 which means that the relation between professional qualifications and CNES's score is significant. The same occurred when the statistical significance of the difference of means between specialised and non-specialised nurses was calculated. This data confirms the opinion of those authors who consider nursing education as a variable which, as it offers a theoretical and practical knowledge foundation, can influence clinical expertise[8,16]. Benner even claims that without knowledge, judgments are poor and the nurses are left with few tools that enable them to learn from experience[1].

Through the descriptive analysis of the data, it is possible to attest that the nurses, which are part of the sample, are in the proficient level, as the average score is 3.46 and that the distribution is approximately normal.

As to limitations of the study is the composition of the study sample, composed only of nurses from 4 hospitals, even if they are representatives, which can compromise the generalization of the results.

CONCLUSION

The methodology applied in the validation is a thorough methodology and, from the obtained results, it is possible to conclude that the Portuguese version of the Clinical Nursing Expertise Survey is a valid and reliable scale which can be used in hospital contexts to understand nurses' competence profile in the wards and its implications both in the dynamics of the creation of favourable practice environments and the results obtained from the practice.

This research measure and the use of this instrument look promising for research on nurses' expertise and its association with the quality of care and patients' outcomes.

The application of this instrument and the obtained results may be an interesting source to knowledge management, an increasingly important field to organisations in general and to health in particular.

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