Design of a Competency Evaluation Model for Clinical Nursing Practicum, Based on Standardized Language Systems: Psychometric Validation Study

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Abstract

Purpose: To develop an evaluation system of clinical competencies for the practicum of nursing students based on the Nursing Interventions Classification (NIC).

Design and Methods: Psychometric validation study: the first two phases addressed definition and content validation, and the third phase consisted of a cross-sectional study for analyzing reliability. The study population was undergraduate nursing students and clinical tutors.

Findings: Through the Delphi technique, 26 competencies and 91 interventions were isolated. Cronbach's α was 0.96. Factor analysis yielded 18 factors that explained 68.82% of the variance. Overall inter-item correlation was 0.26, and total–item correlation ranged between 0.66 and 0.19.

Conclusions: A competency system for the nursing practicum, structured on the NIC, is a reliable method for assessing and evaluating clinical competencies. Further evaluations in other contexts are needed.

Clinical Relevance: The availability of standardized language systems in the nursing discipline supposes an ideal framework to develop the nursing curricula.

The training of future nurses encompasses a rigorous schedule that includes clinical experiences with patients and real clinical scenarios, supervised by licensed professionals who provide feedback and promote reflection. The complexity of the clinical context generates diverse learning opportunities, both formal and informal (Brown et al., 2011), with a high level of chronicity and multimorbidity, greater diversity of providers, and with contexts in which the decision-making process is increasingly affected by factors such as the high turnover of patients, restrictions in resources, and clinical safety requirements.

Nursing faculties have to educate future professionals to meet these challenges, with special emphasis on achieving essential skills for critical thinking and prioritization (Dillard et al., 2009) and being able to work autonomously in making decisions (Davies, 2008). In Europe, the convergence to the European Higher Education Area after the Bologna Process has led to a large-scale attempt to standardize education across countries, supported by pillars such as the focus on quality, mobility, and skills (Collins & Hewer, 2014). The Bologna Process was a reform of higher education systems carried out in 1999 in European Union (EU) countries. The main objectives were established to homologate European higher education in order to promote the free movement of students throughout the EU and to increase the international attractiveness of European education.

The need to develop policies to expand the opportunities to access to higher education for underrepresented groups in society, is claimed, as is the importance of promoting research in this area to avoid discrimination in higher education systems (European Higher Education Area, 2012; Egido Galvez, Fernandez Diaz, & Galan, 2014). In Spain, since 2010, nursing studies has become a 4-year degree requiring 240 European credits (European Credit Transfer System [ECTS]). This curriculum guidance is intended to support the training of professionals to meet the challenges described above. Within this curriculum, clinical training has an important relevance, accounting for 84 ECTS through clinical placements where students are evaluated in the acquisition of their clinical competencies.

Thus, clinical competencies get a strategic value in the development and design of nursing studies, and they have to address knowledge, skills, attitudes, and values to facilitate the student's ability to handle ambiguous situations and tolerate uncertainty and the decision-making process with limited information (Epstein & Hundert, 2002). Measuring the

clinical competence of nursing students is problematic because of the heterogeneity in the concept of competency (Pijl-Zieber, Barton, Konkin, Awosoga, & Caine, 2013; Yanhua & Watson, 2011).

There is extensive use of the term by different agents and contexts (education, employment, organizational, professional, etc.), with blurred boundaries between terms such as capacity, performance, and competence. There are also different approaches for their assessment, such as behavior observation, task performance, value acquisition, and attitude development (Watson, Stimpson, Topping, & Porock, 2002).

In 2002, a systematic review evaluated 61 studies of clinical competencies in nursing published in the last two decades of the twentieth century (Watson et al., 2002). The lack of methodological strength was shared in the results, as was a diffuse definition of concepts, in most of the studies. A similar review found that, a decade later, advances in the conceptual definition of the competencies had failed to clarify those uncertainties (Yanhua & Watson, 2011).

The assessment and evaluation of competencies have deployed a diverse and heterogeneous set of methods and instruments. Many of these instruments have been developed with significant methodological limitations (Calman, Watson, Norman, Redfern, & Murrells, 2002; Pijl-Zieber, Barton, Konkin, Awosoga, & Caine, 2013), and many of them are unrelated to each other, despite having acceptable reliability, including the Nursing Competencies Questionnaire (Bartlett, Westcott, Hind, & Taylor, 1998), the Key Areas Assessment Instrument, and the Self-Evaluated Core Competencies Scale (Hsu & Hsieh, 2009). These instruments have shown good psychometric properties, but differ in the qualities they are intended to evaluate, so a multimethod strategy for clinical competence assessment is needed to assure that students have achieved the complex repertoire of knowledge required for competent practice (Calman et al., 2002).

Another impulse to identify the nurse competence framework has been the definition of core competencies, which are conditioned by the local context where they have been developed (McEwen & Brown, 2002; Ramritu & Barnard, 2001). More recently, standardized nursing language systems have been included as a guide for structuring the curriculum around competencies, grounded in the definitions that these systems provide

(King & Donahue, 2004; Powelson & Leiby, 2003). The availability of standardized language systems in the nursing discipline, such as the Nursing Interventions Classification (NIC; Bulechek, Butcher, & Dochterman, 2008), has generated an ideal framework to support nursing practice, and its development around the world has meant its inclusion in the information systems of different health services (Hyun & Park, 2002).

The NIC is a comprehensive, standardized classification of interventions that nurses perform in their daily journal, recognized by the American Nurses Association. It includes 542 interventions that cover the full range of nursing practice. It is based on research from 1987 and has used multiple methods for its development, being organized using a taxonomic structure that has been tested on clinical and educational settings and translated into 10 languages (Bulechek et al., 2008). It allows the description of nurse competencies in multiple clinical scenarios and facilitates the comparability between different contexts (from intensive ecare units to home care, geriatric care, and primary care).

Due to the implementation of the new regulation of nursing studies as a result of the Bologna Process, the Department of Nursing at the University of Malaga decided to innovate the methods for defining and evaluating the undergraduate students' clinical competencies throughout various clinical contexts. For this purpose, a tool based on the NIC was used, in combination with a portfolio that includes a reflexive diary through a blog, in addition to objective structured clinical examinations. The aim of this study was to develop and test the psychometric characteristics of an evaluation tool of clinical competencies of nursing students based on the NIC and to analyze its reliability and validity.

Methods

Design

The design of this study was psychometric validation.

Setting

The study was carried out at the Department of Nursing, Faculty of Health Sciences, at the University of Máaga. The study population was composed of all second-year students pursuing a degree in nursing, and follow-up was conducted between 2010 and 2012 (second and third years, respectively).

Theoretical Framework

The whole system of competency assessment is based on the evolution from novel to expert proposed models, like those of Dreyfus (Dreyfus & Dreyfus, 2005) or Benner, widely used in nursing (Altmann, 2007; Benner, 1982). This theoretical approach places the acquisition of proficiency with the highest state at the expert level, being able to deliver intuitive judgments in their final stages through deep knowledge and experience. The NIC (Bulechek et al., 2008) was used to establish operative indicators of competency assessment.

Design of the Instrument and Content Validation

An expert consensus panel with a modified Delphi technique was used. The panel was composed of 12 faculty staff experts with an average teaching experience of 20 years and 3 clinical lecturers with 15 years of teaching experience in nursing.

A first list of 43 competencies was proposed, based on a tentative list from three sources: competencies defined by the Ministry of Education for the degree in nursing, statements about competencies from the White Paper about the nursing degree in Spain, and those stated by the Andalusian Conference of Deans of Faculties of Nursing (Agreement of March 4, 2008; Real Decreto 1093/2010, 2010). This listing was submitted to panelists for consensus in two rounds, resulting in a total of 26 competencies that were grouped into nine domains. Subsequently, it was suggested to the experts to rule on NIC interventions to establish operational indicators that, in their opinion, could act as descriptors of competencies to guide the student through the acquisition and evaluation of skills. On an initial list of 100 interventions, an online survey was conducted with the Delphi technique based on the relevance of each intervention to assess the competency to which it referred. The resulting list of interventions was presented to 120 clinical nurses who were tutors of undergraduate nursing students during their clinical placements. They were asked, by an open panel technique, to test the face validity of the selected interventions to assess the proposed competencies.

A Likert scale from 1 to 5 was applied to the interventions, based on the competence progression inspired by Benner (1982). The designed scale combined two axes: the complexity of the clinical situation and the level of support required to deal with it. Two

grades of support are distinguished: clinical support, understood as the joint intervention of a professional conducting the intervention; and clinical supervision, defined as the presence of another professional to carry out the intervention that, although he or she is not directly involved, could potentially give advice or recommendations throughout the process. The combination of these axes provides five possible stages that were used by the students to judge their clinical competencies:

1. I do not feel able to perform this intervention in any clinical situation, even with support or clinical supervision.
2. I could only do this intervention in very simple clinical situations and with the support of another professional.
3. I could do this intervention in clinical situations of low complexity, but with supervision.
4. I can usually do this intervention without support or supervision, but not in complex clinical situations.
5. I feel proficient to perform this intervention without support or supervision, regardless of the complexity of the clinical scenario.

A new panel of experts composed of faculty members and clinical tutors was assembled to assess the level of proficiency that would be required of students for each intervention at the end of each clinical placement (using a Likert scale from 1 to 5). The evaluation system was converted into an online application (EVALComp [http://encuestas.uma.es/192557/lang-es]) where the clinical mentors and lecturers could access and score the evaluation of every student.

To further improve the guidance on how to acquire each competency, and being consistent with the Dreyfus model (Dreyfus & Dreyfus, 2005), each NIC intervention was described with up to 10 activities, included in this classification. Thus, the first step described by Dreyfus, in which the student requires the breakdown of the task into independent context features, was facilitated, so they could easily recognize the desired competence. These activities serve as guidelines for determining actions on the basis of these features. In addition, a number of resources that serve to support the acquisition of some skills (scales, instruments, indices, summaries of basic physiology, pharmacological management guide, multidimensional assessment, etc.) were selected. With all this material, a manual

called “Clinical Notebook” was designed, which was given to each student at the beginning of the clinical placement, and also accessible online.

Empirical Validation

Reliability and construct validity, as well as responsiveness, were tested by the evaluations performed by clinical mentors on 107 students over two consecutive years. Mentors introduced their evaluations in the EVALComp system during the clinical placement of the students assigned to them. Previously, all mentors had received information about how to use the evaluation system. The study received the approval of the Department of Nursing and the Research Committee of the Faculty of Health Sciences.

Analysis

The analysis of the Delphi panels was performed using descriptive statistics that included measures of central tendency (median) and dispersion (interquartile range). Consensus was defined as the 75th percentile or higher values in the score of each item obtained by the panelists and an interquartile range that was less than 3.

To analyze validity, an exploratory factorial analysis, with the principal axes and nonorthogonal rotations (Promax), was performed to determine the best factorial solution. Previously, Bartlett’s sphericity test and the Kaiser-Meyer-Olkin test were performed to determine the appropriateness of this analysis. Inter-item and item– total correlations were also carried out. For the analysis of sensitivity to change, bivariate analysis was conducted using Student’s t test for paired data. All the analyses were performed with IBM SPSS Statistics version 20.0 software
(SPSS/IBM, Chicago, IL, USA).

Data/Results

The Delphi phase required 3 rounds to achieve consensus. This method yielded a list of 73 NIC interventions that were associated with each of the 26 competencies (Table S1). These competencies were designed for second-year clinical placement, and using the same methodology, 18 additional interventions were identified to describe more clinical competencies to be achieved in the third year, reaching a total of 91 interventions (Table S2, available with online version of this article).

In the empirical phase, which took place between 2010 and 2012, 1,150 evaluations of interventions associated with the competencies were conducted. These assessments included 290 (25.2%) students in the second year and 860 (74.8%) students in the third year, because the rotations in the second year only covered one semester but in the third year covered the whole course.

The reliability analysis was performed globally on the 91 interventions, and also grouped the interventions into each of the nine competency dimensions. Cronbach's overall α and those for each dimension are shown in Table S3 (available with the online version of this article). The value of overall α was 0.96 and varied from 0.73 to 0.96 between dimensions. The overall average score of the items was 3.98 (SD = 0.26). Eighteen factors were isolated from the overall factorial exploratory analysis, explaining 68.82% of the total variance. Table S1 (available with online version of the article) also shows the identified factors in each dimension, and the total variance is explained.

The overall interitem correlation was 0.26, and total– item correlation ranged between 0.66 and 0.19 (Table S4, available with the online version of this article). Sensitivity to change analysis showed how the scores on common interventions during clinical placements 1 and 2 changed significantly. Thus, the mean score in the second year was 3.10 (SD = 0.37) and the mean score in the third year was 4.14 (SD = 0.24; $p < .0001$; Figure 1, available with online version of this article).

Discussion

The aim of this study was the development and validation of an instrument to evaluate clinical competencies of students pursuing a nursing degree based on the NIC. This purpose faced the literature about the methodological difficulties that have been reported in this regard (Watson et al., 2002). Traditionally, clinical competencies have been assessed frequently through general impressions from repeated encounters between professionals, clinical tutors, and students, with obvious limitations due to heterogeneity and lack of assessment criteria. Many of these limitations are obviated by using an elaborated conceptual support, such as the NIC, that, together with the review and selection by experts, provided high content validity (King & Donahue, 2004; Krenz, 2003; Powelson & Leiby, 2003). The set of selected interventions was constantly

subjected to the competencies that they have to represent, which covered the multidimensional approach that clinical skills should have (Epstein & Hundert, 2002). It includes capabilities for communication, clinical knowledge, technical skills, clinical reasoning, and promotion of values for the benefit of both individuals and communities.

Some studies have reported objections from students relating to the simplicity in the management of competency assessment instruments, regardless of their theoretical basis or design, as well as concerns about their understanding and handling by clinical nurses (Calman et al., 2002). The familiarity of students and professionals with standardized language systems minimizes many of these potential barriers. In addition, support with information and communication technologies makes its accessibility permanent, facilitating its dynamic use by students, tutors, and teachers.

The internal consistency obtained is very high and exceeds the traditional methodological limitations of reliability and validity mentioned in the literature (Calman et al., 2002). However, this system represents one more in the spectrum available in nursing (Bartlett et al., 1998) and does not solve the problem of heterogeneity of the available instruments and the variability of areas assessed by each one. For example, the portfolio of competency assessment is widespread in nursing, although some researchers have highlighted difficulties related to poor reliability and validity (McCready, 2007). It will require comparative studies with other universities and tools to compare the criterion validity and the possible variation in the constructs addressed.

This instrument has a dual purpose: as a tool for formative assessment, guiding the learning process to clinicians and students, and as a combined assessment. The evaluation system, using a Likert scale that combines the difficulty of the scenario with the degree of support required and the progressive autonomy acquired by the student, allows for valuing the transition from novice to expert, consistent with the models of Dreyfus and Benner. It is possible that this grading system has avoided the usual complaints reflected in the literature about the difficulty implementing the Benner model due to the difficulties in understanding its terminology (Calman et al., 2002).

The main limitation of the results of this study is that it has been carried out in only one university, and a multicenter evaluation in other universities would be needed to assess

the external validity of the model. However, by employing a standardized language, the opportunities for widespread use are much greater, and the familiarity of clinical mentors with the NIC contributes to improving its external validity. It would also be useful to ascertain the satisfaction of students and clinical tutors with this evaluation system of clinical competencies, which we are addressing in a new study.

Conclusions

The evaluation of clinical skills through the NIC provides a framework for reliable and valid assessment, allowing for the description of interventions, in a standardized and comparable way, that help the student to acquire clinical skills. This model, by using a standardized international system, provides some of the objectives of the Bologna Process, such as curriculum comparability.

Clinical Resources

- Royal Decree 1093/2010 from the Spanish Official Bulletin about National Health System: http://www.boe.es/diario_boe/txt.php?id=BOE-A-2010- 14199
- European Higher Education Area (EHEA) official website: http://www.ehea.info/

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