



Learning and teaching in clinical practice

## Nurse Competence Scale – Psychometric testing in a Norwegian context

Sigrid Wangensteen <sup>a,\*</sup>, Inger S. Johansson <sup>a,b</sup>, Gun Nordström <sup>b,c</sup><sup>a</sup> Faculty of Health, Care and Nursing, Department of Nursing, Gjøvik University College, Norway<sup>b</sup> Faculty of Health, Science and Technology, Department of Health Sciences, Karlstad University, Sweden<sup>c</sup> Faculty of Public Health, Department of Nursing, Hedmark University College, Norway

### ARTICLE INFO

#### Article history:

Accepted 10 November 2014

#### Keywords:

Nurse competence  
Confirmatory factor analysis  
Exploratory factor analysis  
Psychometric testing

### ABSTRACT

The aim was to test the construct validity of the Nurse Competence Scale. The Nurse Competence Scale has been used in hospital settings for various purposes in several countries. Despite this, confirmatory factor analyses are scarcely reported. The present study is based on re-analyses of data from 2007 (i.e. psychometric testing) and 593 newly graduated nurses working in various contexts were included. Confirmatory as well as exploratory factor analyses (Principal Component Analysis) were carried out. The original 7-factor model of the Nurse Competence Scale (73 items) was not confirmed. The exploratory factor analyses resulted in a Norwegian Nurse Competence Scale consisting of 46 items in the following competence categories: Planning and delivery of care, Teaching functions, Professional leadership, Research utilization and nursing values and Professional awareness.

The results underline the needs for psychometric testing of an instrument after translation processes. The instrument is suitable for describing and comparing nurse competence for various reasons. It may also be helpful in creating competence development programs at an individual as well as at an organizational level. Further studies with a broader sample are recommended.

© 2014 Elsevier Ltd. All rights reserved.

### Introduction

Nurse competence may be measured for different purposes. Measuring nurse competence may be aimed at comparing nurses' competence in different hospitals (Bahreini et al., 2011), comparing competence between nurses and nurse managers (Meretoja and Leino-Kilpi, 2003) and creating a model for competence development (Meretoja and Koponen, 2012). Another purpose of measuring nurse competence is to evaluate nurse education programs both nationally and internationally and to compare nurse competence as an output of different nurse education programs. Although a common definition of nurse competence is still not agreed upon (Watson, 2002), Benner's description of nurse competence as the ability to perform a task with desirable outcome under various conditions of the real world (Benner, 1982) is often referred to. Evaluating competence development of nurses and other healthcare personnel is of interest for healthcare managers when developing and improving quality of care. Reliable and valid

tools for assessment of nurse competence is critical and make it possible to ensure that nurses have the required competence (Wilkinson, 2013).

### Background

Several instruments for measuring nurse or nurses' competence have been developed in different countries throughout the years (Cowan et al., 2008; Dagenais and Meleis, 1982; Liu et al., 2009; Meleis and Dagenais, 1981; Meretoja et al., 2004a; Nilsson et al., 2014; Schwirian, 1978). Both the European Healthcare Training and Accreditation Network Questionnaire Tool (EQT) (Cowan et al., 2008) and the Swedish Nurse Professional Competence Scale (NPC) (Nilsson et al., 2014) are based on National requirements for nurses' competence, whilst the Nurse Competence Scale (NCS) (Meretoja et al., 2004a) is based upon Benner's descriptions of knowledge in clinical practice. However, repeated use of instruments for measuring nurse competence has been rarely reported (Meretoja and Leino-Kilpi, 2001). The NCS was developed in Finland through an extensive process including conceptualization of nurse competence by means of literature review, expert analysis, factor analysis,

\* Corresponding author. Tel.: +47 611 35356, +47 951 32956.  
E-mail address: [Sigrid.Wangensteen@hig.no](mailto:Sigrid.Wangensteen@hig.no) (S. Wangensteen).

testing the instrument in different hospital settings and comparing competence assessments made by nurse managers and practising nurses (Meretoja, 2003; Meretoja et al., 2004a; Meretoja and Leino-Kilpi, 2003; Meretoja et al., 2004b). The NCS implies Benner's (1984) seven domains for practice and three levels of nursing practice (i.e. beginner, advanced beginner and competent) (Meretoja et al., 2004a). The NCS is recommended for measuring newly graduated nurses' competence (Cowin et al., 2008), and has been reported used in such samples (Hengstberger-Sims et al., 2008; Lima et al., 2014; Wangensteen et al., 2012). Furthermore the NCS has also been used in various countries, for example in Finland (Meretoja and Koponen, 2012; Salonen et al., 2007), Australia (Hengstberger-Sims et al., 2008; Lima et al., 2014), Switzerland (Müller, 2013), Lithuania (Istomina et al., 2011) Spain (Martinez, 2011), Iran (Bahreini et al., 2011), Norway (Wangensteen, 2010; Wangensteen et al., 2012), and in Italy (Dellai et al., 2009). The NCS has therefore been translated into different languages and has been used in different contexts.

Watson (2002) concluded in that there is little evidence for systematic approaches to competence assessments, and that there is no evidence for reliability and validity of instruments measuring nurse competence. The need for reliable and valid instruments for competence assessments has been reported for several years (Coates and Chambers, 1992; Meretoja and Leino-Kilpi, 2001; Nilsson et al., 2014; Takase and Teraoka, 2011; Wilkinson, 2013). Although improvements in this respect have been reported, there is still a lack of such instruments (Chen and Watson, 2011; Wilkinson, 2013).

After developing an instrument where exploratory factor analysis has been used, the recommended next step is to do a confirmatory factor analysis to test if the instrument has the same structure in another population (Costello and Osborne, 2005). Furthermore it is also recommended to carry out a psychometric evaluation with a large sample of respondents after an instrument translation process (Polit and Beck, 2012). Although the NCS has been used in different countries and for different purposes, confirmatory factor analyses are scarcely reported. Previous studies (Wangensteen, 2010; Wangensteen et al., 2012) have recommended carrying out factor analyses of the Nurse Competence Scale. Müller (2013) reported that the original seven factor model of the NCS was not confirmed. In this case the sample consisted of nurses working in a university hospital in Switzerland, and Müller recommended exploring the construct validity of the NCS in other contexts and languages (Müller, 2013). Validating instruments is an important step contributing to repeated use of instruments which make it possible to compare nurse competence across various contexts, countries and cultures. Thus a validation of the original NCS in a Norwegian context is of utmost importance.

#### *Aim of the study*

The aim of this study was to test the construct validity of the Nurse Competence Scale in a Norwegian context.

#### **Method**

##### *Design and sample*

A cross-sectional descriptive design was chosen. The study is based on a re-analysis of data collected in 2007 where the sample was based on 1900 newly graduated nurses (Registered Nurses) with a Bachelor degree from 18 university colleges. The inclusion criterion was to be working as a nurse. A detailed description of the data collection is reported elsewhere (Wangensteen et al., 2010). Respondents who had responded to fewer than 50% of the NCS items were excluded. A total of 593 newly graduated nurses were included in this study.

#### *Instrument*

The original Nurse Competence Scale consists of 73 items organized in 7 categories. The categories are Helping role, Teaching-coaching, Diagnostic functions, Managing situations, Therapeutic interventions, Ensuring quality, and Work role. The number of items in each category varies from 6 items (Ensuring quality) to 19 items (Work role) (Meretoja et al., 2004a). Responding to the instrument requires marking the level of competence for each item on a VAS scale (0–100 mm) and indicating how often the respondent actually use this competence in 4 response choices (very often, occasionally, very seldom, not applicable in my work) (Meretoja et al., 2004a). The responses to the VAS scale, where 0 indicated a very low level and 100 a very high level of competence (Meretoja et al., 2004b), were used in this study.

#### *Reliability and validity*

Cronbach's alpha values in studies where the NCS has been used are reported to be between 0.78 and 0.91 (Salonen et al., 2007), 0.79–0.91 (Meretoja et al., 2004a), 0.79–0.93 (Hengstberger-Sims et al., 2008), 0.76–0.85 (Bahreini et al., 2011) and 0.72–0.92 (Wangensteen et al., 2012).

In the present study the Finnish original version was used as a base for translation into Norwegian. A bilingual nurse with Finnish as her mother tongue carried out the initial translation from Finnish to Norwegian. This version was compared to a Swedish version (in Swedish), the English version published by Meretoja et al. (2004a) in a research group consisting of Norwegian, Swedish and English speaking people. A Finnish-speaking researcher was also consulted in this phase to ensure that the original content of the items were kept in the process of translating the items' content to a Norwegian context. A detailed description of the translation process is reported elsewhere (Wangensteen, 2010; Wangensteen et al., 2012).

#### *Data analysis*

The data was analysed using the PASW Statistics 18 and AMOS 18. Participants who responded to more than 50% of the items in each of the original NCS competence categories were included in the study. A Confirmatory Factor Analysis (CFA) was carried out to test the factor structure of the NCS. Maximum Likelihood was used as estimation method for the analysis. The  $\chi^2$  test expresses the goodness-of-fit of a model, and non-significant  $\chi^2$ -value is an expression for a model that fit the data well (Brown, 2006). This is however not a suitable measure for samples exceeding 400 cases (Kenny, 2011). A ratio between the  $\chi^2$  value and degrees of freedom less than 2 is reported as an acceptable measure of model fit (Tabachnick and Fidell, 2012). The Comparative Fit Index (CFI) is used to evaluate the fit of one model solution in relation to a more restricted baseline model. The possible CFI values range from 0.0 to 1.0, and CFI values <0.9 indicate that the model should be rejected (Brown, 2006). Tabachnick and Fidell (2012) define CFI value and Normed Fit Index (NFI) value above 0.95 as the lower acceptable value for a good fitting model. The Root Mean Square Error of Approximation (RMSEA) is an estimation of lack of model fit compared to a perfect model. RMSEA values of 0.06 or less indicate a good fitting model (Tabachnick and Fidell, 2012). No imputations were done for the CFA, as the AMOS program manages non-response items well (Arbuckle, 2010).

As the CFA did not confirm the original structure of the NCS, an exploratory factor analysis (EFA) was carried out. Before performing the EFA missing items were substituted with mean values for respondents included in the study. The Kaiser-Meyer-Olkin measure

Download English Version:

<https://daneshyari.com/en/article/366930>

Download Persian Version:

<https://daneshyari.com/article/366930>

[Daneshyari.com](https://daneshyari.com)