

■ Original article

Designing and psychometric the measure for determining the professional competence of nursing faculty members

Hedayat Jafari¹, Eesa Mohammadi^{2,*}, Fazlollah Ahmadi³, Anoshirvan Kazem-nejad⁴

(Received: 13 June 2014; Accepted 9 Aug 2014)

Abstract

Background and Purpose: of the significant processes for educational quality promotion is to evaluate the teachers' competency. This study has been conducted with the goal for Designing and psychometric the Measure for Determining the Professional Competence of Nursing Faculty Members.

Methods: the present research is the qualitative part of a sequential exploratory combined study of the concept known as competency where first through a qualitative study, a questionnaire with the appropriate items has been extracted from nursing teachers being evaluated by the students, and then this questionnaire has been psychometrically tested via a methodological study. The face validity has been evaluated by considering nursing students & nursing faculty staff & the content validity by nursing experts' judgment. The construct validity has also been done using exploratory factor analysis.

Results: in the content validity stage, the total mean of tool validity index has been calculated 0.92. The minimum item impact score obtained in qualitative face validity was 3.4. The results of the construct validity brought about 4 factors: commitment & follow-up for making the theoretical & clinical education effective, student nurturing, mastership ethics & character, the capability for educational & research management. Alpha-Cronbach was achieved 0.96 & reliability with re-test as 0.94.

Conclusion: the questionnaire has been designed using the main stakeholders' experiences & then psychometrically tested. And it can be employed for evaluating nursing faculty staff professional competency.

Keywords: Professional competency, Questionnaire, Nursing faculty staff, Psychometrics

Introduction

Competency is a complicated concept & one of the controversial issues in the field of health (1). Competency refers to any kind of knowledge, skill & capability displayed in behavior resulting in service excellence (2). Philpot et al. (2002) defined competency as a combination of the required skills, knowledge & attitudes in effective ways (3). Reviewing the studies has revealed that concepts such as competency, efficiency, performance and skill are paradoxically interchangeably used (4). A quick review of the documents indicates that these

definitions are different & imply lack of consensus about the concept of competency (5).

To promote the quality of education is of the important concerns for the universities educational authorities. For this purpose, special attention is paid to teachers' competency. Of the processes used to promote quality is teacher's rating. Rating is a systematic process for collecting, analyzing & interpreting data to determine the level the goals are realized (6). One of the frameworks for teachers' rating is to use the learners' experiences (7). Rating

¹ Department of Nursing, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.

^{2,*} Corresponding author: Department of Nursing, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.
Email: mohamade@modares.ac.ir

³ Department of Nursing, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.

⁴ Department of BioStatistics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.

by the students is a model of teachers' evaluation models (8).

Some studies have been conducted regarding the teachers' attitude about the students' ratings about the teachers, most of these studies indicate the teachers' dissatisfaction with the evaluations done about them (9-12). Some of the research cases suggest that in the best state, most of the existing scales (tools) don't have validity (13). Wong believes that questionnaires are the most prevalent scales to collect data since they are easy & simple to use (14).

Due to lack of a nursing psychometrically tested standard scales based on the scientific principles, the researchers apply self-built questionnaires or the ones developed by their own organizations. Considering the importance of nursing faculty staff evaluation, having an appropriate, specialized scale seems necessary for measuring competency. Designing the scale by using the faculty staff's & the students' experiences and employing a combined research method is viewed fresh in Iran. This study has been performed with the goal for Designing and psychometric the Measure for Determining the Professional Competence of Nursing Faculty Members.

Materials and Methods

This study is the report of a qualitative section of a sequential exploratory combined one. After doing a qualitative research, the scale items have been designed the results of which had been published before (15, 16). The initial scale had 46 items in Likert spectrum as Never (0), Rarely (1), Sometimes (2), Most of the time (3), and Always (4), then using qualitative study pursuing the goal to psychometrically test the scale for determining qualitative face validity with 10 nursing students & 10 nursing faculty staff rich in scale developing experience have been interviewed face to face & their views have been asked about the difficulty level, appropriateness degree and ambiguity of each one of the items. The qualitative face validity has been defined by calculating item impact score.

To determine the qualitative content validity, the

experts' viewpoints & to define the qualitative content validity, Content Validity Ratio (CVR) and Content Validity Index (CVI) have been used. To set SVR, the experts have been required to express their ideas about the necessity of each item in 3-point Likert spectrum. Regarding 10 persons of the panel members, the minimum content validity ratio has been selected 0.62 based on Lawshe table. To determine CVI, also 10 persons out of the experts' members have been asked to comment on "the relatedness, simplicity & clearness" of each of the items in 4-point Likert spectrum.

To set the construct validity, the exploratory factorial analysis has been employed. 265 ones out of the students have been picked considering KMO level for this step the results of which have been analyzed using SPSS-16.

At the beginning of the factorial analysis, Kaiser-Meyer - Olkin (KMO) sampling competency index test has been performed (17). To get assured of the data for factorial analysis based on correlative matrix, Bartlett's Test has been applied (18). In this study, the factorial loading cut-off point has been chosen 0.3 (17). To determine the number of factors, the Eigenvalue has been used (19, 20). In the present research, to evaluate the scale reliability, the internal consistency & re-test have been applied (20). To set the internal correlation in each of the subscales & the whole scale, α -Cronbach has been utilized. In order to define the scale reliability, correlation test ICC has been used.

Ethical Considerations: This study was approved by the Ethics Committee of Tarbiat Modares University. The participants signed the written informed consent for voluntary participation in the study before completing the questionnaires.

Results

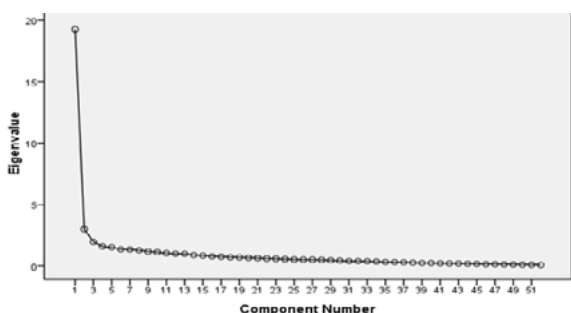
In determining face validity by qualitative method from the item impact score, all of the items had score higher than 1.5 (20). 21 items based on the content validity ratio & 3 items from Waltz-Basel content validity index had CV less than 0.79 so that they have been revised, besides that 2 items jointly hadn't got the

accepted CVI & CVR score. After doing the required modification & removing the invalid items & adding the experts' suggestions, 52 items remained. The total mean validity index has been calculated 0.92. To analyze reliability by factorial analysis, Kaiser- Meyer - Olkin (KMO) sampling index test $KMO=0.92$ & Bartlett's Test of Sphericity (BT), $P=0.001(21)$ have been used.

The number of the constituents of the questionnaire has been identified using the components analysis method & Eigenvalue in table 1. The scree plot (plot 1) also has confirmed choosing 4 factors (21).

Table 1. total variance values determined for 4 extracting factors of professional competency rating scale

Component	Initial Eigenvalues of period			Sum of squares factor loadings of period			Sum of squares factor loadings of post-period		
	Cumulative %	Variance %	Total	Cumulative %	Variance %	Total	Cumulative %	Variance %	Total
Commitment & follow-up to make theoretical –clinical education effective	19.261	37.041	19.261	37.041	37.041	19.261	20.729	20.729	10.779
Student nurturing	42.795	5.754	2.992	42.795	5.754	2.992	32.591	11.863	6.169
Mastership ethics & character	46.563	3.767	1.959	46.563	3.767	1.959	41.701	9.110	4.737
Capability for educational /research management	49.599	3.036	1.579	49.599	3.036	1.579	49.599	7.897	4.107



Plot 1. Scree plot for choosing the factors

The 1st factor has been called commitment & follow-up for making the theoretical & clinical education

effective with 25 items, the 2nd factor as student nurturing with 14 items, the 3rd one is mastership ethics & character with 6 items and the 4th one is the capability for educational & research management with 4 items (table 2).

Factor	Item	Factorial loading
1-commitment & follow-up for making the theoretical & clinical education effective	1-he /she uses various educational skills & suitable in teaching.	0.693
	2-he /she use appropriate educational tools in teaching.	0.395
	3-the class atmosphere is cheerful & suitable for teaching.	0.414
	4-in the 1 st session, a comprehensive curriculum plan has been presented to the students.	0.490
	5-he/she is master in the course discussions.	0.525
	6-he/she is capable in responding the students' questions.	0.517
	7-he/she is expressive & eloquent.	0.650
	8-he/she uses reliable & new references in teaching.	0.770
	9-he/she tries hard to transfer course concepts & skills.	0.658
	10-he/she has sufficient time for the students' questions-answers.	0.513
	11. he/she revises his/her teaching methods through feedback.	0.597
	12-he/she focuses on nursing process usage in clinical education.	0.457
	13-he/she monitors the students' performance in educational aspects.	0.620
	14-he/she mentions the students' educational errors on time.	0.712
	15-he/she focuses on the students' care skills learning in clinic.	0.703
	16-he/she plays the role of a facilitator in the students-treatment personnel communicating with each other.	0.414
	17-he/she creates a link between the theoretical basics & clinical skills.	0.704
	18-he /she demonstrate practically to the students how to use educational method for client.	0.713
	19-he/she treats the client respectfully.	0.640
	20-in educational evaluations, he/she pays attention to the students' clinical skills.	0.398
	21-he/she does the students' evaluation matching with the earned skill & knowledge.	0.668
	22-he/she does continuous evaluation of the students during the educational period.	0.646
	23-he/she observes nursing codes & standards at the educational centers.	0.524
	24-he/she teaches the students nursing management standards.	0.551
	25-he/she tries to value his/her profession.	0.481

Factor	Item	Factorial loading
2-student nurturing	26-he/she is interested in guiding the students for research.	0.466
	27-he/she has suitable plans during special annual occasions.	0.572
	28-he/she reminds the students the profession-related ethics.	0.669
	29-he/she tries to create positive motivation in the students.	0.55
	30-he strives for raising the students 'confidence.	0.601
	31-he/she promotes dynamic & critical thinking in the students.	0.508
	32-he does his/her best in consulting & guiding the students.	0.600
	33-he/she encourages the students to actively participate in class discussions.	0.477
	34-he/she plays the role of a model by being punctual.	0.621
	35-in treating with the students, he/she uses the right words.	0.625
	36-he/she welcomes the students' suggestions & criticism.	0.579
	37-he/she tries to promote the students' moral & ethical aspects.	0.357
	38-he/she is accessible to the students & answers their potential questions.	0.407
	39-he/she strengthens the students' positive aspects.	0.306
3-mastership ethics & character	40-he/she supports the students logically & avoids their rights getting violated.	0.509
	41-he/she does their duty in the best way.	0.653
	42-her/she dresses neatly & presentably.	0.633
	43-he / she is fond of education.	0.437
	44-he/she tries to show their professional value in their behavior.	0.429
4-capability for educational & research management	45-he/she tries to discover the reasons behind the students' failure.	0.484
	46-he /she conducts suitable educational planning for the students at the educational centers.	0.553
	47-he/she motivates the students to do research.	0.542
	48-at the end of the educational period, he/she does the final evaluation of the students.	0.522
	49-he/she treats the students fairly.	0.496

Therefore, in the scale exploratory factorial analysis stage with 52 items, it changed into 49 items with 4 factors .Based on the factors formed resulting from the exploratory factorial analysis, the nursing faculty staff professional competency is as the following the nursing teachers' commitment & follow-up for making the theoretical & clinical education effective, student nurturing, mastership ethics & character and the capability for educational & research management the

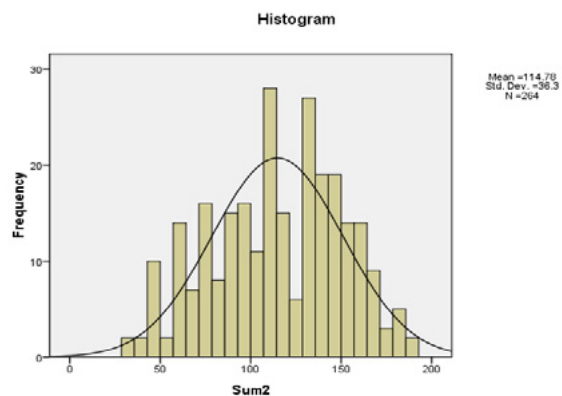
nursing teachers feel & are simultaneously perceived by nursing students.

In determining the questionnaire reliability, α -Cronbach has been obtained 0.961 & in doing test, re-test, ICC=0.94.

Questionnaire Scoring: In order to score the professional competency level, the questionnaire scores distribution has been analyzed in 3, 4 & 5 level classes that by considering the means & variances, the scoring of 4 has been closer to the normal distribution (table 3 & plot 2). Table 4 also displays the competency levels & competency score range.

Table 3. Scores distribution chart in 4-level classification.

N Valid	264
Missing	0
Mean	114.78
Median	115.00
Std. Deviation	36.300
Variance	1.318E3
Skewness	176.-
Std. Error of Skewness	150.
Kurtosis	770.-
Std. Error of Kurtosis	299.
Minimum	34
Maximum	191



Plot 2. Scores distribution chart in 4-level classification.

Table 4: the scale competency levels & the questionnaires score range

Competency levels	Competency score
Low Competency	0-75
Average Competency	76-120
Good Competency	121-153
Excellent Competency	154-191

Discussion

A quick review of the literature indicates that the scales used haven't been built purposefully & specialized, such as the teachers' competency evaluation form being used in most of the medical sciences universities (22). This form which has 15 items for some universities & 22 for the other ones just focuses on the teacher's competency in the theoretical courses. Its not being specialized for nursing major & not paying attention to the teachers' competencies in the clinic is of the differences it has from the present study findings. Comparing the present scale & the existing one, it is found out that:

1-In that scale for the research, mastership management & character activities, no item has been taken into account.

2-That scale isn't specialized for nursing major teachers.

3-It doesn't consider both aspects as theoretical & clinical.

4- The experiences & perceptions of the main stakeholders (teacher & student) haven't been used in building it.

The rating form items in Nursing & Midwifery University of Minnesota are just 22 that of course have been designed for clinic. All the items of that university overlap with the existing one, but the majority of the existing scale items don't overlap in the clinic.

The scale built by Raoufi (2010) has been designed by reading the literature & only from the students' view in the clinic (22). While in the present study, the nursing teachers' & students' experiences in various educational levels both in the theoretical & clinical areas have been employed.

Slate Nursing Competencies Rating Scale (SNCRS) items are in line with the management, skill, scientific information capabilities & the other nursing competencies in care at the clinical centers. That scale is similar to the present one in terms of management, skill & scientific potentials. It is possible to state that that scale measures the instructors' capability in clinic while that scale isn't as comprehensive as the present

built one.

The questionnaire built by Stalmeijer including 28 questions is about 6 educational roles (being a role model, exploratory, rethinking, being an instructor, frame working, expression) (23). That scale has been made similar to the present one in terms of the educational dimensions, being an instructor, being a role model and paying attention to clinical behaviors.

Generally speaking, the items focusing on the teacher's function in the research, clinical, management & mastership character dimensions deserve contemplation in this scale implying insufficiency of the common countrywide available rating form.

Conclusion

According to the concept definition, the existing scale developed considering the theoretical-clinical perspective about nursing faculty staff competencies in the dimensions as educational, research, and etc. and also scientific psychometric testing can be employed by nursing students to determine nursing teachers' competency.

Research limitations: Since the current study initially seems qualitative & the information looks indigenous, the potential to generalize it internationally is limited.

Conflict of interests

The authors declare that they have no competing interests.

Author's contributions

H.Jafari study conception and design, data collection and analysis, drafting of manuscript; E.Mohammadi study conception and design, critical revisions for important intellectual content, drafting of manuscript, supervision; F.Ahmadi study conception and design, critical revisions for important intellectual content, drafting of manuscript, supervision; A.Kazemnejad study design.

Acknowledgements

This manuscript is part of the first author's PhD thesis, sponsored by Tarbiat Modares University. The authors would like to thank all participants who sincerely participated in this study.

References

- O'Neale M, Kurtz S. Certification: perspectives on competency assurance. *Semin Perioper Nurs*. 2000; 10(2): 88-92. PMID: 15129515.
- Cannon MD, Witherspoon R. Actionable feedback: Unlocking the power of learning and performance improvement. *Academy of Management Executive*. 2005; 19(2): 120-134.
- Shabani H. Educational skills. Theran: Samt; 2012 (Persian).
- McMullan M, Endecott R, Gray MA, Jasper M, Miller CML, Scholes J, et al. Portfolios and assessment of competence: a review of the literature. *J Adv Nurs*. 2003; 41 (3): 283–294. PMID: 12581116.
- Bagheri-Nesami M, Rafiee F, Parvizi S, Esmaeili R. Concept analysis of competency in nursing. A hybrid model. *J Mazandaran Univ Med Sci*. 2008; 18(67): 35-42.
- Safe AA. Methods of measurement and educational evaluation. Tehran: Doran; 2013 (Persian).
- Wolf R A. The accreditation of higher education institutes in the United States. *Higher Education in Europe*. 1993; 18(3): 91-99.
- Gourman J. The Gorman report: A rating of graduate professional programs in American and international universities, New York: Princeton Review; 1997.
- Centra JA, Gaubatz NB. Is There gender bias in student evaluations of teaching? *J Higher Edu*. 2000; 71(1): 17-33 (Persian).
- Avi-Itzahak T, Kremer L. An investigation into the relationship between university faculty attitudes toward student rating and organizational and background factors. *Educational Research Quarterly*. 1986; 10(2): 31-38.
- Birnbaum MH. A survey of faculty opinions concerning student evaluations of teaching. Available from: <http://psych.fullerton.edu/mbirnbaum/faculty3.htm>; 2011.
- Sharifi M, Jourabchi Z, AlipourHeydari M. Teachers effectiveness on student assessment of teachers and the course. *Journal of Qazvin University Medical Sciences*. 2002; 6(2): 81-87.
- Williams B, Coyle J, Healy D. The meaning of patient satisfaction: an explanation of high reported levels. *SocSci Med*. 1998; 47(9): 1351–1359. PMID: 9783878.
- Wong W S, Fielding R, Wong CM, Hedley AJ. Psychometric properties of the nine-item chinese patient satisfaction questionnaire (ChPSQ-9) in Chinese patients with hepatocellular carcinoma. *Psychooncology*. 2008; 17(3): 292-299. PMID: 17647218.
- Jafari H, Mohammadi E, Ahmadi F, Kazemnejad A, Shorofi SA. The experience of nursing instructors and students on professional competency of nursing academic staff: A qualitative study. *Global J Health Sci*. 2014; 6(4), 128-135. PMID: 24999130.
- Jafari H, Mohammadi E, Ahmadi F, Kazemnejad A. The perceptions of nursing students and their teachers about professional competency of academic staff: A qualitative study. *J Mazandaran Univ Med Sci. (JMUMS)* . 2014; 23(110): 2-15.
- Doas DL. Surveying social studies. Translated by Nayebi H, NEI publication, Tehran; 1996.
- Watson R, Thompson Dr. Integrative literature reviews and meta analysis . *J Adv Nurs*. 2006; 55(3): 330-341.
- Fabrigar LR, Wegener DT, Mac Callum RC, Strahan EJ. Evaluation the use of exploratory factor analysis in psychological research. *Psychol Methods*. 1999; 4(3): 272-299.
- Munro H B. Kazemnejad A, Heidary M, Noruzzadeh R (tr). *Statistical methods for health care research*. 5th ed, Tehran: Salemi; 2005.
- Bryman A, Cramer D. *Quantitative data analysis with SPSS12 and 13. A Guide for Social Scientists*. 1st ed. London, Routledge; 2005.
- Raoufi S, Seikhian A, Ebrahimzade F, Tarahi M, Ahmadi P. Designing a novel sheet to evaluate theoretical teaching quality of faculty members based on viewpoints of stakeholders and charles E. *Bimonthly Journal of Hormozgan University of Medical Sciences*. 2010; 14 (3): 167-176 (Persian).
- Stalmeijer RE, Dolmans D, Wolfhagen I, Muijtjens R, Scherpbier A. The development of an instrument for evaluating clinical teachers: involving stakeholders to determine content validity. *Med Teach*. 2008; 30(8): 272–227. PMID: 18946815.