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ORIGINAL PAPER

ASSESSMENT OF NURSING STUDENT PERFORMANCE IN CLINICAL SETTINGS – USEFULNESS OF RATING SCALES FOR SUMMATIVE EVALUATION

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Abstract

Aim: The aim of the study was to investigate the use and effectiveness of a valid and reliable rating scale for summative clinical evaluation of student performance. *Design:* A descriptive cross-sectional study. *Methods:* The study was carried out at two Slovak universities in the academic years of 2015 and 2016. The study sample included performance evaluations of 82 students made by different lecturers using the Nursing Student Clinical Performance Evaluation Scale (NSCPES), before the practical component of their final examinations. The students' performances were repeatedly evaluated by five lecturers. This evaluation was compared with the grade point for the students' clinical performance obtained in the practical component of their final examinations. The data were analysed using descriptive statistics, Pearson's chi-square test, Cohen's Kappa, factor analyses, and the p-value < 0.05 was taken to indicate statistical significance for all comparisons. *Results:* Significant positive correlations were noted between two evaluations – before the final examinations using the NSCPES rating scale, and standard clinical assessment during the final examinations (r = 0.334; p ≤ 0.01). The value of Cohen's Kappa was very low (0.04) and insignificant (p = 0.32), indicating low agreement between the two evaluations. The Slovak version was not conceptually consistent with the original version. In the Slovak version, two originally independent domains (professionalism and ethical principles) were merged into one variable – responsibility and professionalism. *Conclusion:* The multidimensional nature of clinical practice necessitates the use of a complex of assessment measures. A valid and reliable tool may allow an objective evaluation of nursing student performance in clinical settings. The Nursing Student Clinical Performance Evaluation Scale is useful for summative evaluation of student performance, allowing teachers and clinical mentors to rate performance over time, and to note patterns of performance.

Keywords: assessment, clinical practice, education, nursing, rating scale, reliability, validity.

Introduction

Nursing students are required to acquire core clinical competencies for professional practice during their education (Cant, McKenna, Cooper, 2013). One of the most fundamental objectives of nursing education is to develop and improve clinical competencies of nursing students (Karayurt, Mert, Beser, 2008; Wellard, Williams, Bethune, 2000). Therefore, the concept of clinical competence assessment has become central to nurse pre-registration, as well as post-registration educational programmes (Watson et al., 2002), and its value is accepted globally (Kajander-Unkuri et al., 2013). In addition, the traditional approach in nursing education based on a behavioral pedagogy approach has moved toward competency-based curricula, emphasizing individual learning processes and

flexible ways of achieving knowledge and performance outcomes (Raines, 2008; Yanhua, Watson, 2011).

There is strong empirical support from literature reviews and quantitative studies (Norman et al., 2002; Watson et al., 2002; Kajander-Unkuri et al., 2013; Oermann, Gaberson, 2014) confirming that clinical competence assessment traditionally relies on observation of student performance, which carries the risk of observer bias (Norman et al., 2002). Therefore, various clinical assessment methods have been developed to overcome this problem of bias. In this regard, important European nursing organisations (e.g., The European Federation of Nurses Associations – EFN; European Specialist Nurses Organisation – ESNO; European Nursing Students Association – ENSA and International Council of Nursing – ICN) also call for tools to facilitate learning outcome assessment (Salminen et al., 2010). In the introductory part of the article, we analysed the following key issues of summative clinical evaluation

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in nursing: the issue of complexity and objectivity of clinical competence assessment.

Although the concept of competence is widely used and discussed in nursing literature, a common understanding, consensus in definition, and measurement of competence is still not agreed upon (Watson et al., 2002; Yanhua, Watson, 2011; Kajander-Unkuri et al., 2013). In nursing literature, clinical competence mainly refers to the integration or combination of cognitive, psychomotor, technological skills, and attitudes – values that constitute effective performance by students in a practice setting (Cant, McKenna, Cooper, 2013; Oermann, Gaberson, 2014; Kajander-Unkuri, 2015). In their literature review, Kajander-Unkuri et al. (2013; 2015) focus on areas of nursing competence of nursing students in Europe. The authors (Kajander-Unkuri et al., 2013) identify eight main categories that form a comprehensive concept of nursing competence in Europe: professional and ethical values and practice; nursing skills and interventions; communication and interpersonal skills; knowledge and cognitive ability; assessment and improving quality in nursing; professional development; leadership, management and teamwork; and research utilisation. These categories or core competencies can provide a framework for faculty members to use in planning their clinical courses and for deciding how to evaluate student performance in clinical settings (Oermann, Gaberson, 2014).

Clinical evaluation in nursing education is a process by which judgments are made about these professional students' competencies in clinical practice (Oermann, Gaberson, 2014). Rigorous, valid and reliable evaluation of student competence is vital to ensure readiness for practice. Watson et al. (2002), in the first systematic review investigating trends in the evaluation of clinical competence in nursing students and newly qualified nurses, concluded that the measurement of competence was unsystematic, and the reliability and validity of measurement tools or strategies was seldom reported. Objective structured clinical examination (OSCE) has been increasingly utilised as a method to objectively assess clinical competencies of nursing students. In a more recent review, Yanhua and Watson (2011) found some progress had been made in measurement development. Methods and instruments to measure complex competence are under systematic development and testing for reliability and validity. Kajander-Unkuri (2015) analysed the results of 12 studies focusing on the development of an assessment method of nursing students' nursing competence. The most common methods were structured or non-

structured instruments based on self-assessment. In addition, observation and portfolios are used. Instruments with tested psychometric properties were originally developed for practising nurses. Only one instrument, the *Nursing Competencies Questionnaire* (Bartlett et al., 1998) was originally developed for evaluation of nursing competence of nursing students (Kajander-Unkuri et al., 2013). Clinical summative evaluation includes not only evaluation of student performance (evaluation of student work), but also personnel evaluation (evaluation of students). Therefore, for assessing clinical competence of nursing students, a multi-method approach (combining several methods, e.g., rating scales, observation, portfolios, self-assessment) is recommended (Mahara, 1998; Norman et al., 2002). The evaluation of the nursing competence of graduating nursing students is part of the quality assurance of nurse education, particularly as graduating nurses transit from school to clinical practice (Kajander-Unkuri, 2015). As nursing skills are the foundation of nursing competence, along with scientific knowledge and moral development, it is necessary to include these skill components in nursing students' nursing competence assessment.

Aim

There have been no studies on a valid and reliable rating scale for the summative evaluation of nursing student performance in clinical settings in Slovakia. Based on a literature review, we decided to use the *Nursing Student Clinical Performance Evaluation Scale* (NSCPES; Karayurt, Mert, Beser, 2008) as this instrument takes account of the entire domain of evaluation criteria of Slovak nursing students. The aim of this cross-sectional descriptive study was to investigate the usefulness and implementation of a valid and reliable rating scale in summative clinical evaluation of student performance.

Methods

Design

A descriptive cross-sectional study.

Sample

The study was carried out at two Slovak universities in the academic years of 2015 and 2016.

The study sample included performance evaluations of 82 students made by different lecturers four weeks before the practical component of their final examinations. The students' performances were repeatedly evaluated by five lecturers. This evaluation was compared with the grade point for the

students' clinical performance obtained in the practical component of their final examinations. The NSCPES was used for the summative evaluation before the practical component of their final examinations.

Data collection

The study was carried out at two Slovak universities (Comenius University in Bratislava, Jesseniuss Faculty of Medicine in Martin and University of Prešov in Prešov, Faculty of Health Care) in the academic years of 2015 and 2016. There were 111 third-year nursing students at these two universities in the academic years of 2015 and 2016. The third year students had practice in medical disease, surgical, and paediatric clinics. Student performances were evaluated by five lecturers who taught the above fields of studies. The study sample included 111 performance evaluations of the 111 third year students made by different lecturers in different clinical settings, four weeks before the practical component of the final examinations. 29 performance evaluations (26.12%) were excluded from the study because the NSCPES was not complete. The grade point for students' clinical performance in the practical component of their final examinations was obtained from the protocols of the final examinations.

The Nursing Student Clinical Performance Evaluation Scale (NSCPES; Karayurt, Mert, Beser, 2008) was used to measure student performance before the practical component of their final examinations. The rating scale consists of 26 items which are grouped into three domains: nursing process, professionalism, and ethical principles. The instrument has been found to be reliable and valid for measuring students' clinical performance (Karayurt, Mert, Beser, 2008) in a Turkish study. Each item was scored between 1–10. The maximum score a student could attain in clinical practices was 100. For this reason, the score each student received from the scale was expressed as a grade point out of 100 for clinical practices. To determine the grade point for students' clinical performance, the total score of the scale was divided by the number of items and multiplied by 10. In this scale, the scores 90–100 corresponded to A (excellent); 80–89 corresponded to B (very good); 70–79 corresponded to C (good); 60–69 corresponded to D (satisfactory); and 50–59 corresponded to E (pass). The students with 49 or below are considered "unsatisfactory" and must repeat the practice (Fx – fail). First, we obtained official approval from the authors to use the NSCPES. Second, a Slovak translation of the questionnaire was made. This was performed by two independent translators who agreed on a single final

version, which was then reverse translated into English and compared with the original. The subsequent phase of linguistic validation involved an assessment of the Slovak version by a panel of experts consisting of three experienced nursing teachers, who reviewed the relevance of the items in the Slovak translation and their applicability to the Slovak social-cultural context. After linguistic validation, the Slovak version of the tool was further tested in a pilot study (Gurková, Cibríková, Žiaková, 2015) regarding its psychometric properties – factor structure (construct validity) and reliability (internal consistency). We identified high internal consistency in three subscales "nursing process", "professionalism" and "ethical principles". Chronbach alphas for each of the eight subscales in the Slovak version ranged between 0.94–0.97; the alpha for the global scale was 0.98. (Gurková, Cibríková, Žiaková, 2015). Psychometric properties (the construct validity and the internal consistency) of the NSCPES have been tested in only two studies (Karayurt, Mert, Beser, 2008; Gurková, Cibríková, Žiaková, 2015). The Slovak validation study and the original Turkish study suggest that this scale can be used to evaluate nursing student performance in clinical settings.

Data analysis

Statistical analysis was performed using a statistical software package with IBM SPSS Statistics version 24.0. Descriptive statistics, including means and standard deviations were calculated for the domains of the NSCPES. Proportion comparisons were carried out with Pearson's chi-square test. The construct validity of the scale was evaluated with factor analyses. Inter-rater reliability was measured with Cohen's Kappa. To determine the associations and correlations between variables, parametric Pearson correlations were used. A p-value < 0.05 was taken to indicate statistical significance for all comparisons.

Results

The highest rated items were items in the domain of ethical principles and professionalism. The lowest score was achieved for items from the domain of nursing process (Table 1). We also identified low agreement between two ratings – before the final examinations using the NSCPES rating scale, and standard clinical assessment (using observation, evaluation of knowledge etc.) during the practical component of the final examinations (Table 2). The Cohen's Kappa value was very low (0.04) and insignificant (p = 0.32). We found significant differences between universities in the grading of the

Table 1 Descriptive characteristics of NSCPES items

Items	n	min.	max.	mean	SD
Discharge planning	76	1	9	5.05	2.12
Assessment of the outcomes of patients' education	80	1	10	5.10	1.88
Appropriate education for individuals and families	80	1	10	5.26	1.94
Identification of educational needs of individuals and families	80	1	10	5.35	1.88
Determination of the criteria for evaluation of the outcome	76	2	9	5.67	2.09
Determination whether the desired outcome has been achieved and changes in interventions when they are not effective	81	2	10	5.86	1.93
Self-determination of students with educational needs	81	3	10	5.99	1.88
Prioritizing of the patients' problems	81	2	10	6.05	2.29
Determination of the patients' problems	81	2	10	6.05	2.11
Documentation of nursing care	81	2	10	6.23	2.22
Systematic data collection from the relevant sources	81	2	10	6.32	1.94
Using opportunities for learning and improving skills	81	2	10	6.49	2.34
Informing the nurse personnel about program and responsibilities	75	1	10	6.68	2.14
Knowing own strengths and weaknesses	81	1	10	6.81	2.24
Responsibility and autonomy of student	81	2	10	6.94	2.10
Stress management and coping strategies	80	1	10	6.95	2.03
Performing nursing interventions appropriate and safe for individuals	80	3	10	6.98	1.96
Appropriate technical skills in nursing interventions	80	1	10	7.08	1.91
Informing the nurse personnel about the patients	81	1	10	7.17	2.47
Comminication skills techniques while communicating with individuals, families, friends, and other health staff	81	1	10	7.18	2.05
Openness to criticism	81	1	10	7.25	1.91
Teamwork and collaboration	81	1	10	7.25	1.99
Informing the nurse personnel that student will leave the clinic	81	1	10	7.47	2.29
Following the rules, ethical principles, and laws related to the care for individuals and families.	81	2	10	7.90	1.82
Respect for individuals' privacy during the process of nursing care	80	4	10	8.13	1.38
Respect for economic status, personal attitudes, and behaviors of individuals and families	79	3	10	8.15	1.46

n – number; min. – minimum; - max. maximum; SD – standard deviation

Table 2 Crosstabulation between evaluations and kappa statistic

Practical exam		Grading according NSCPES						
		A (1)	B (1.5)	C (2)	D (2.5)	E (3)	Fx (4)	Total
A (1)	Count	1	0	0	0	0	0	1
	Expected Count	0.2	0.3	0.3	0.1	0.1	0.0	1.0
B (1.5)	Count	5	3	1	0	0	0	9
	Expected Count	2.1	2.3	2.7	0.8	0.9	0.3	9.0
C (2)	Count	2	4	2	2	0	0	10
	Expected Count	2.3	2.6	3.0	0.9	1.0	0.3	10.0
D (2.5)	Count	5	5	9	2	4	0	25
	Expected Count	5.7	6.4	7.5	2.1	2.5	0.7	25.0
E (3)	Count	1	4	4	1	3	1	14
	Expected Count	3.2	3.6	4.2	1.2	1.4	0.4	14.0
Fx (4)	Count	2	2	5	1	0	1	11
	Expected Count	2.5	2.8	3.3	0.9	1.1	0.3	11.0
Total	Count	16	18	21	6	7	2	70
	Expected Count	16.0	18.0	21.0	6.0	7.0	2.0	70.0

*A – excellent; B – very good; C – good; D – satisfactory; E – sufficient/pass; Fx – fail/unsatisfactory; *Kappa statistic = 0,04; p = 0,32*

practical component of the final examinations (Table 3). On the other hand, we did not find significant differences between universities in grading using the between two ratings – before the final examinations using the NSCPES rating scale, and standard clinical assessment (with using observation, evaluation

NSCPES rating scale four weeks before the practical component of the final examinations (Table 4). However, significant positive correlations were noted of knowledge etc.) during the final examinations (r = 0.334; p ≤ 0.01). By means of principal component analysis, we extracted three factors with

their own values ≥ 1 (Table 5). Up to 77.2% of original variable variance in the checked group was explained by a three-factorial solution. Variance extracted by factor 1 (responsibility and professionalism) was the highest, and this factor was also responsible for the largest share of variance (37.54%). Factor loading of the items in an existent factor was in the range between 0.67 a 0.84. Factor 2 "planning and realisation", accounted for a response variance of 23.49%. Factor 3 "assessment and diagnostic", accounted for a response variance of 16.21% (Table 5). The Slovak version was not conceptually consistent with the original version.

Table 3 Differences between universities in grading of practical component of final examinations

	Grading*						
	A **n (%)**	**B** **n (%)**	**C** **n (%)**	**D** **n (%)**	**E** **n (%)**	**Fx** **n (%)**	**Total** **n (%)**
University 1	11 (13.6)	11 (13.6)	11 (13.6)	0 (0.0)	0 (0.0)	0 (0.0)	33 (40.7)
University 2	9 (11.1)	10 (12.3)	11 (13.6)	9 (11.1)	7 (8.6)	2 (2.5)	48 (59.3)
Total	20 (24.7)	21 (25.9)	22 (27.2)	9 (11.1)	7 (8.6)	2 (2.5)	81 (100.0)

*A – excellent; B – very good; C – good; D – satisfactory; E – sufficient/pass; Fx – fail/unsatisfactory;*Pearson's chi-square test = 16.01; p = 0.007*

Table 4 Differences between universities in grading using the NSCPES rating scale before practical component of final examinations

	Grading*						
	A **n (%)**	**B** **n (%)**	**C** **n (%)**	**D** **n (%)**	**E** **n (%)**	**Fx** **n (%)**	**Total** **n (%)**
University 1	0 (0.0)	5 (7.1)	4 (5.7)	9 (12.9)	6 (8.6)	9 (12.9)	33 (47.1)
University 2	1 (1.4)	4 (5.7)	6 (8.6)	16 (22.9)	8 (11.4)	2 (2.9)	37 (52.9)
Total	1 (1.4)	9 (12.9)	10 (14.3)	25 (35.7)	14 (20.0)	11 (15.7)	70 (100.0)

*A – excellent; B – very good; C – good; D – satisfactory; E – sufficient/pass; Fx – fail/unsatisfactory;*Pearson's chi-square test = 8.009; p = 0.16*

Table 5 Factor structure of the NSCPES rating scale

Item	F1	F2	F3
Systematic data collection from the relevant sources			0.66
Determination of the patients' problems			0.77
Prioritizing of the patients´problems			0.81
Determination of the criteria for evaluation of the outcome			0.80
Appropriate technical skills in nursing interventions		0.64	
Determination whether the desired outcome has been achieved and changes in interventions when they are not effective		0.59	
Discharge planning		0.64	
Performing nursing interventions appropriate and safe for individuals		0.62	
Identification of educational needs of individuals and families		0.86	
Appropriate education for individuals and families		0.83	
Assessment of the outcomes of patients´ education		0.84	
Self-determination of students with educational needs	0.67		
Comminication skills techniques while communicating with individuals, families, friends, and other health staff	0.72		
Informing the nurse personnel about program and responsibilities	0.73		
Openness to criticism	0.82		
Stress management and coping strategies	0.73		
Documentation of nursing care	0.68		
Using opportunities for learning and improving skills	0.79		
Responsibility and autonomy of student	0.83		
Knowing own strengths and weaknesses	0.84		
Teamwork and collaboration	0.81		
Informing the nurse personnel about the patients	0.64		
Informing the nurse personnel that student will leave the clinic	0.82		
Following the rules, ethical principles, and laws related to the care for individuals and families	0.85		
Respect for economic status, personal attitudes, and behaviors of individuals and families	0.82		
Respect for individuals' privacy during the process of nursing care	0.84		

F – factor

Discussion

Assessment of clinical competence or clinical evaluation of nursing students is, in the long term, an area of controversy and concern. The multidimensional nature of clinical practice necessitates a complex of assessment measures, such as the use of valid and reliable tools, direct observation of patient care, clinical simulations, or reflective journals. Summative clinical evalution is characterized by a multi-method approach, meaning a combination of diverse methods – rating scales, observation, portfolios, self-assessment etc (Mahara, 1998; Norman et al., 2002).

The clinical evaluation process is multifactorial, in which nursing teachers and clinical mentors must evaluate data from many sources to reach a decision as to whether or not students have successfully passed the clinical course (Oermann, Gaberson, 2014). Results of previous qualitative studies (DeBrew, Lewallen, 2014; Rafiee et al., 2014) indicate that clinical evaluation decisions can be ambiguous and inconsistent, based on student characteristics and behaviors, and influenced by faculty factors. DeBrew and Lewallen (2014) argue that although there are tools that educators can use for clinical evaluation, executing the process is still problematic. The established clinical evaluation tools used by faculty are derived from course learning outcomes, which tend to be broad and abstract, and may have little connection to actual specific clinical behaviors that lead to success or failure in a clinical setting. Moreover, Rafiee et al. (2014) reveal that most students consider their clinical evaluation (by using clinical evaluation forms) inaccurate and disagree with it. Their teachers have similar doubts regarding the reliability of clinical evaluation.

In Slovakia, each nursing faculty uses evaluation criteria they themselves have created for the evaluation of student performance in clinical settings. A valid and reliable instrument for clinical summative evaluation to determine whether a student passes may provide both objectivity and a database for further studies and disscussion (Karayurt, Mert, Beser, 2008).

A valid and reliable tool may allow an objective evaluation of nursing student performance in clinical settings. Rating scales of student performance in clinical settings is one evaluation method. Rating scales are most useful for summative evaluation of student performance; after observing students over a period of time, the teacher arrives at conclusions about performance, rating it according to the scale provided with the tool (Oermann, Gaberson, 2014). In this study, we have focused not only on testing the selected rating scale of clinical competence assessment, but also on an analysis of current appoaches to student assessment in Slovakia, which could contribute to increasing objectivity of assessment in clinical settings, whether by academic staff or clinical mentors. We believe that valid and reliable scales are not commonly used in clinical competence assessment to reduce subjectivity of clinical evaluation in Slovakia. Although researchers constantly draw attention to the importance of rigorous, valid and reliable evaluation of student competence, there is a lack of studies investigating methods of assessment of nursing students' nursing competence in Slovakia, including OSCE with checklists. Clinical summative evaluation of nursing students in Slovakia is mainly focused on behavioral aspects of competence – nursing skills and intervention. Observation of student performance and evaluation of nursing process documentation are the most common clinical assessments in Slovakia. Attention has yet to be paid to assessing more complex areas (e.g., professional and ethical practice, personal and professional development, teamwork, communication and interpersonal competency, safety) to reflect a comprehensive concept of nurse competence in a European context. The aim of the study was to investigate the usefulness and implementation of a valid and reliable rating scale for summative clinical evaluation of student performance. The NSCPES can be used to evaluate nursing student performance in clinical settings as part of a summative evaluation. The strengths of the instrument are that it can determine the grade point for students' clinical performance (A – Fx), and the complexity of the scale (including wide competence areas).

The factor structure of the Slovak version was not conceptually consistent with the original version. In the Slovak version, two originally independent domains (professionalism and ethical principles) were merged into one variable – responsibility and professionalism. Differences in the content of the Slovak and English versions can be explained by a number of influences, such as the effort not to separate the areas of evaluation, and possible cultural differences in the understanding of items. Possibly Slovak nursing teachers put greater emphasis on instrumental technical skills in performing nursing interventions and the reporting of nursing processes. The lower rating of items in the area of nursing process and higher rating of items in the area of ethical principles might confirm this supposition. A lack of skills or experience in the assessment of the selected competence areas (e.g., professional and ethical practice) could explain the tendency to rate

students toward the high end of the scale (leniency error). On the other hand, we found that items from nursing process were rated very similarly (logic errors). These kinds of errors are some of the most common that can occur with rating scales applied to rating clinical performance. Leniency error often occurs with tools that have multiple points on the scale for rating (Oermann, Gaberson, 2014). Logic errors are mainly characteristic of scales that are too long and detailed. Teachers evaluated each item on the NSCPES using the ten-point Likert scale. The NSCPES also consists of 26 wide items and thus logic errors could occur. Students who were better rated before the final examinations using the NSCPES rating scale were better graded in standard clinical assessment (using observation, evaluation of knowledge etc.) during the final examinations. Nevertheless, agreement between these two ratings was very low.

Our data have some limitations that require elucidation. Major limitations include the cross-sectional design, selection process and sample size (students of only two universities were included in the study). We did not perform a power analysis to estimate the required sample size, meaning that general validity of the observed data is limited. Another limitation may be the limited explanation of guidelines for using scales for clinical evaluation for teachers participating in the study, as well as the limited content of measuring instruments, which may be susceptible to bias due to different cultural perceptions.

Conclusion

The multidimensional nature of clinical practice necessitates a complex of assessment measures. A valid and reliable tool may allow an objective evaluation of nursing student performance in clinical settings. The NSCPES is useful for summative evaluation of student performance, allowing teachers and clinical mentors to rate performance over time, and to note patterns of performance.

Ethical aspects and conflict of interest

All respondents were fully informed of the research objectives, and agreed to participate in the research process. The authors declare that they had no conflict of interest, and followed ethical guidelines when conducting the research.

Author contribution

Conception and design (EG, KZ), data collection, data analysis and interpretation (EG, KZ, MZ, AH, SC), manuscript draft (EG, KZ), critical revision of the manuscript (EG, KZ), final approval of the manuscript (EG, KZ).

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