

Objective Structured Clinical Examination (OSCE) as a method of assessment of learning outcomes for students of Nursing

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ABSTRACT

Background: Traditional nursing education is based on the transfer of knowledge. However, education based on skills and competencies is focused not only on knowledge but also on professional attitudes and psychomotor skills. Such a notion of education provides for safe and effective nursing practice without the need of direct supervision. Its implementation requires the refinement of learning outcomes and the use of appropriate methods of assessment, e.g. Objective Structured Clinical Examination (OSCE). Aim of the study: The aim of this study was to evaluate the implementation of a new method of assessment of learning outcomes for nursing students – a shortened OSCE as part of the classes in Fundamentals of Nursing. Materials and methods: The study involved 298 students at their first year of full-time studies of 1st degree in Nursing at INM JU MC in Kraków. The study was performed twice at the end of the course in the skills laboratory: in January and April 2013. The course was credited by means of a shortened OSCE. That method formatted (shaped) the evaluation of the learning outcomes. After the examination, students filled in an evaluation questionnaire. The study used the method of diagnostic survey, the technique of survey questionnaire, and the research tool of proprietary evaluation survey questionnaire. Results: The method was highly praised by the majority of students as useful in the development of intellectual, practical and affective skills. In the students' opinion, examination in the form of mini-OSCE should be evaluated favorably both in terms of content and organization. It scored high and very high in the majority of categories. Conclusions: According to the authors' research, the scope of evaluation requires broadening and OSCE session needs multiple repetitions. The preliminary results obtained can be regarded as an attempt to objectify the new method in order to verify the effects of education among nursing students.

Keywords: *nursing, learning outcomes, OSCE*

INTRODUCTION

Education and verification of results are inseparable and inter-related elements of the process. Just like the learning outcomes and teaching methods leading towards them, the methods of verification of such learning outcomes exhibited by students can differ. It is particularly important that the methods not only verify the knowledge but also consider other categories of learning outcomes. The methods of skill verification should refer to these forms of classes which allow students to demonstrate their skills, i.e. to project-specific tasks and exercises in the skill laboratory. The learning outcomes (expected and achieved) should be regarded as superior to the study curriculum; they should be measurable and be expressed in terms of knowledge, psychomotor skills and social/affective skills. Verification of learning outcomes in the context of subject/training module (that is according to the terms used in an international environment, a broadly-defined subject or group of subjects) should be understood as a test of students' efforts and a decision related to meeting the learning outcomes defined for the subject/training module. This approach is the result

of the tasks contained in the Bologna Declaration signed on 19 June 1999 by the Ministers of Education of 29 countries, including Poland, and by the Ministers of other 11 countries in 2005, in order to create a harmonious system of higher education in Europe, and in the National Qualifications Framework for Higher Education in the amended Act – the Law on Higher Education in 2011 [1, 2, 3, 4, 5, 6, 7, 8].

The effectiveness of training is often used interchangeably with the ‘effectiveness of teaching,’ ‘teaching efficiency’ or the ‘efficacy of training.’ The term is not only understood differently, but also evaluated and investigated from different perspectives, e.g. in terms of educational, economic and sociological background. From a pedagogical point of view, it is the information related to the learning and teaching results achieved by students, reflected in assessments and in promotion to further years of study [9].

According to U. Jeruszka [10], the effectiveness of vocational training is the relevance between the effects of vocational training and the adopted objectives of that training, i.e. the degree of achievement, with evaluation of the scope and level of these objectives, considering the job requirements for their formulation, with minimal means and resources in the process of achieving these outcomes.

The effectiveness of training is often equated with the quality of education understood as ‘fitting for purpose’ or meeting social needs – the ones which are observed and expected. Constructing a training program based on professional qualification standards and their accreditation are some of the elements that guarantee the provision of educational quality [8, 11].

Achievement of the expected learning outcomes is possible while respecting the taxonomy of purposes, or arranging them in order of importance. The taxonomy of educational objectives by B. S. Bloom is the most well-known taxonomy in and outside Poland. The theory and practice related to learning objectives in Polish didactics was extensively developed by B. Niemierko. He divided the purposes into cognitive, practical and motivational classes. The use of taxonomies in vocational education enforces the use of such modern teaching methods by academics that allow students to achieve their objectives independently [8, 12, 13, 14]. So far, in the vocational training of nurses, attempts were made to formulate learning objectives in terms of taxonomy, especially in the specialization subjects (the fundamentals of nursing, specialist nursing), and to a much lesser extent or not at all in the core subjects (anatomy, physiology, psychology, pedagogy) [15]. Development of educational objectives may become the basis for standardization of measurement tools [12].

Monitoring and evaluation are integral to the teaching-learning process [16]. Vocational training at schools of nursing should distinguish three types of assessment [8]:

- Formative assessment defined as current assessment carried out in the course of theoretical and practical training designed to detect and remove defects in students’ information and skills, stimulating their development, abilities and interests, and implementing self-control and self-evaluation.

- Summative or final assessment carried out at the end of an educational stage, .e.g. a module or year of study. The purpose of this assessment is to determine the degree of students’ achievement of educational goals adopted for a given stage. This assessment requires identifying at least one qualification for students to master at a given stage of education as separated from the whole structure of professional qualifications. It enables further education on a higher level. An applicant for admission to second-degree studies in nursing must already have the first-level qualifications (knowledge, skills, attitudes) and competences (qualifications, responsibility, authority) necessary for continuing education at second-cycle studies of nursing.

- Formal assessment carried out at the end of the whole cycle of training, the aim of which is to confirm the overall professional qualifications obtained by the student. It is used to formulate opinions on the effectiveness and accuracy of university’s work.

So far, there has been no single method identified as effective in all the cases of practical training assessment in relation to students of nursing. Literature presents various methods to evaluate the students of nursing and dentistry: a list of skills [17, 18], a form of clinical profile [8], a test with multiple-choice questions unrelated to the clinical context (*Multiple Choice Question*), a test with multiple-choice questions based on clinical cases (*Case-based Multiple Choice Question*), a written examination (*essay*), every-day clinical assessment (*daily evaluation*), one-time immediate observation (*single direct observation*), long-term evaluation (*longitudinal assessment*), immediate monitoring of procedural skills (*direct observation of procedural skills*), record review, Triple Jump Exercise, assessment based on portfolio (*portfolio*), self-evaluation performed by the student (*student’s self-assessment*), computer-based simulation, evaluation of the scientific report and presentation (*paper and presentation assessment*), assessment based on the number of required treatments (*unit requirements*), 360-degree assessment, critical and summative task assessment (*Critically Appraised Topic Summary*), Clinical Competency Examination and OSCE (*Objective Structured Clinical Examination*) [19, 20].

To date in Poland, there has been no study presenting the use of the OSCE-type examination methods in practice; few studies are devoted to theoretical considerations [19, 20, 21, 22]. Several years ago, that form of examination in selected subjects was introduced at the Medical Institute at the Faculty of Medicine and Dentistry in Kraków, and in 2013 in relation to Nursing and The Fundamentals of Nursing at the Faculty of Health Sciences for full-time first-degree studies. The above-mentioned form examination method was introduced after the teachers of nursing completed the course in "Advanced Techniques in Medical Education" as part of the project entitled "Pro bono Collegii Medici Universitatis Jagiellonicae" carried out in 2010-2013 by the Jagiellonian University Medical College under the Operational Programme Human Capital (Priority IV, Higher Education and Science, Measure 4.1 Strengthening and developing the didactic potential of universities and increasing the number of graduates of key importance to the knowledge-based economy, Sub-Measure 4.1.1 Strengthening the capacity of university teaching potential).

Literature mentions different terms for OSCE: as a form, a method of examination, and a clinical skills assessment tool [19, 20, 21, 22]. For the purposes of this article the authors adopted the term of 'the method of assessment of learning outcomes'. OSCE is considered the "gold standard", a model for the assessment of clinical skills in the field of clinical sciences [23]. In Western Europe (especially the UK), the United States of America and in Canada it has been used for several years now and already is an integral part of medical education, although, as based on the questionnaire surveys among 93% of dental schools (43/45) in the USA, Albino et al. [as cited in: 20, pp. 469] showed that the most common method in the evaluation of training results/outcomes of dental students is a multiple-choice test based on clinical cases (16%) and OSCE is rarely used (3%). The method was introduced in 1970 by R. Harden. It is used for standardized assessment of skills in simulation conditions. It can be also used as formative or formal examination. It is designed to assess such competencies as interviewing the patient, performing physical examination, dealing with ethical issues in a variety of clinical situations, patient education and counseling, exhibiting technical skills (blood pressure measurement), coping with life-threatening conditions (for the patient), being able to communicate, evaluating the patient's mental status and interpreting clinical data [21, 22, 24, 25]. For the training of nurses and midwives, it can be used to monitor vital signs or perform personal hygiene activities [19], etc. Competencies are assessed by special lists (*checklists*) while rotating students through a series of stations where they perform specific tasks. These actions are observed by the examiners. Typically, each task is awarded 1 or 0 points. However, exceptions to this rule are possible, depending on the importance of the assessed activity. Negative points are usually not awarded, except the cases of gross negligence. It is assumed that the optimal number of stations is 14-18, with about 10 minutes to perform each of them (the acceptable range is 7-20 minutes, depending on the complexity of task). The time for each station also depends on the total number of tasks and people taking part in the examination [24, 26]. Stations may also be related to one another: one examines clinical skills, another one examines the synthesis of information, another one assesses the ability to interpret the information and the ability to think critically. Thematic division of stations is possible, e.g. if the examination consists of 10 stations, 3 of them deal with the physical examination, another 3 deal with patient interview, another 3 are related to communication, and 1 station contains a question that must be answered [27].

AIM OF THE STUDY

The aim of this study was to evaluate the implementation of a new method of assessment of learning outcomes for nursing students – a shortened OSCE as part of the classes in Fundamentals of Nursing.

MATERIAL AND METHODS

The study involved 298 students of Nursing at their first year of full-time 1st degree studies at the Institute of Nursing and Midwifery, Faculty of Health Sciences in the Jagiellonian University Medical College. The study was performed twice at the end of the course in the skills laboratory as part of the subject entitled 'The Fundamentals of Nursing – classes' in January (the winter semester) and April (the summer semester) 2013. The course could be credited by means of a shortened OSCE. The method formatted (shaped) the evaluation of learning outcomes. Due to the limitations of staff and time and its pilot nature, the study took a shortened form. Also some of its assumptions were modified, i.e. a student would draw a ticket with one of the 4 stations, but it would take him/her 15 minutes to do the entire task because the preparatory, proper and cleaning activities making up the performance of a given procedure (nursing, diagnosis, treatment, rehabilitation) were linked. In accordance with a special list (*checklist*) tasks were evaluated in terms of knowledge (each station resulted with a response to one of the several questions prepared), technical skills (the first (winter) semester: re-making the bed with the patient in it, arterial blood pressure taking, insulin administration using an insulin pen, inhaling the patient; the second (summer) semester: measuring capillary blood drawn from the patient's finger and determining the level of blood glucose, inserting an intravenous cannula, preparing and connecting drip infusion, sterile perineum washing) and communication skills. The correctness of each task performed by individual students in simulation conditions was verified by two teachers.

The study used the method of a diagnostic survey, the technique of survey questionnaire, and a research tool of proprietary evaluation survey questionnaire.

Statistical calculations were performed using Statistica 7.1. For all statistical calculations the assumed level of significance "p" did not exceed the value of .05. Calculations were performed using the chi-square test.

RESULTS

The study group consisted of 294 women and 4 men. The age of respondents ranged between 19 and 25 years of age. 154 students participated in completing the shortened OSCE at the end of winter semester; 144 students took part in the exam in the summer semester.

The respondents were asked if they had previously participated in that type of examination. Almost all participants (98.7%) confirmed that they had never taken part in such an examination.

Those surveyed assessed the suitability of a shortened OSCE in terms of knowledge, practical skills and affective abilities. As seen from the data obtained, 48.0% of the respondents considered the type of examination as partially useful; 42.6% claimed that it is very useful in the verification of theoretical knowledge. When asked whether it has verified their practical skills (manual/technical, organizational skills), more than half of the respondents (51.0%) confirmed its very high usefulness and 43.0% confirmed a partial usefulness of this form of examination. Only 4% of students stated that it was "probably not useful"; 1.0% of the respondents claimed that it was "not useful" at all. Students also assessed their affective/communication skills as part of the shortened OSCE. 44.3% of students confirmed that the examination was partially useful in the verification of such skills and 38.3% claimed that it was very useful (Fig. 1).

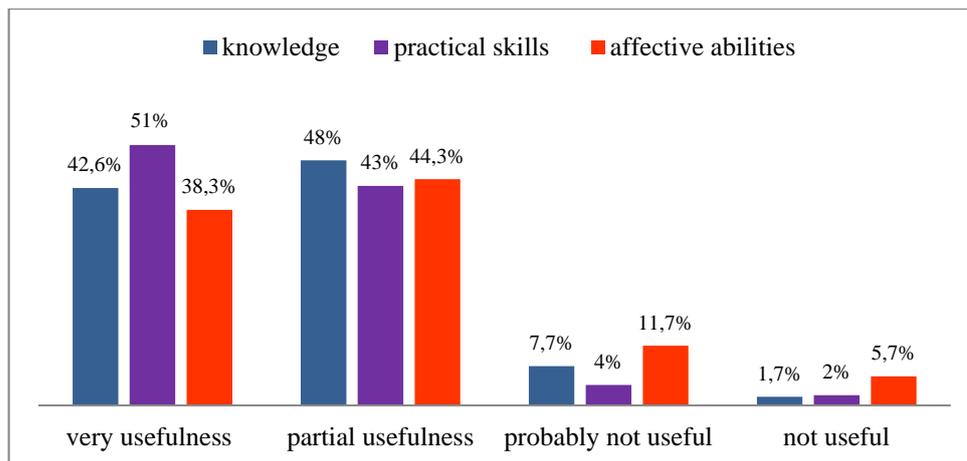


Fig. 1. Usefulnesses of the credit of the type shortened OSCE at an angle of the knowledge, practical skills and attitudes in opinions examined

The respondents were also asked to assess the shortened OSCE in terms of content and organization. Their task was to assess each category on a scale from 1 to 5 (1 = low, 5 = high). In terms of "adapting tasks to the curriculum in the skills laboratory", more than half of the students (54.0%) chose the highest value, while only 1.0% of them felt that it was not an important factor and chose 1 point. In the evaluation of the category described as "the clarity of tasks description", 57.7% of respondents chose the value of 5 points, while only 2.3% of them chose 2. Another category being assessed was the "organization of the examination." Almost half of the respondents (43.3%) chose the highest value for organization and 1.7% chose the lowest value. The evaluation also related to the category of "management of examination time". Nearly 70.0% of the respondents considered that as an important factor and awarded it 5 and 4 points (34.2% and 33.2%, respectively). Almost half of the students (48.7%) assigned the maximum value to the category described as "the method of evaluation." The method was of little importance only to 0.7% of respondents. The final factor to be evaluated was the category related to "the atmosphere during the examination". As many as 53% of respondents awarded the highest value to that category, while only 3.7% of them chose the lowest value.

As many as 75.4% of the students confirmed that the classification of a shortened OSCE encourages them to systematically pursue further education; 15.2% of them felt that it strongly motivates them to develop further, and only 8.0% of the respondents would refrain from answering the question.

Those surveyed had a chance to suggest a better course of a shortened OSCE. The vast majority of the respondents (85.9%) did not provide any suggestions, while 12.8% indicated the following suggestions or difficulties

encountered during the examination:

- extension of the time allocated for the candidates to complete a task,
- more tasks to perform;
- overly precise criteria for task evaluation;
- excessive stress experienced during examination, especially in the first semester;
- not being familiar with the location (the laboratory where each student would draw a ticker with the station task to complete).

The research also considered any statistical relationships between the assessment of a shortened OSCE given by students and the semesters after which the examination was conducted. Analysis of data from the winter and summer semesters resulted in finding the relationship between the maximum grade point related to "the management of examination time" and the winter and summer semesters. The students performing assessment in the summer semester significantly more often attributed a higher point value to better "management of the examination time" in the summer semester as opposed to the winter semester (chi-square = 24.468; df = 4; p = .00). A similar trend was observed in the assessment of "the method of evaluation" (chi-square = 19.981; df = 4; p = .01). Respondents in the summer semester, as compared to the winter semester respondents, also significantly more often pointed to a higher point value associated with "the atmosphere during the examination" (chi-square = 17.620; df = 4; p = .01) (Tabl. 1). There were no significant statistical relationships between the other variables.

Tabl. 1. The interpretation of the estimation of the atmosphere under of the credit for variable the semester winter - and of summer (the cross-shaped table, chi-squared test)

The estimation of the atmosphere under of the credit	The credit the winter- semester	The credit the summer - semester	Whole of a public
1	8	3	11
2	11	4	15
3	22	11	33
4	46	31	77
5	64	94	158
Whole of a public	151	143	294

	Value	df	Essentiality asimptomatic (two-sided)
Chi-square Pearsona	17,620	4	,001
Quotient of credibility	17,947	4	,001
N Important observation	294		

SUMMARY

Any of the learning results assessment methods, including OSCE, must: provide the ability to distinguish between safe professional practice and risk-posing practice; reflect the progress from simple to more complex tasks; be linked to the achievement of expected results of practical training. The methods should also be reliable and accurate.

Among the many methods used in the assessment of learning outcomes exhibited by nursing students are certain

ways to comprehensively assess multiple domains/components of qualifications and competences. Extremely important is the choice of appropriate methods of assessment that would answer the question of whether a competent nurse resulted from his/her training. It seems that the OSCE-type examination can be the recommendable method to assess one's readiness to take professional responsibility as a student nurse in the context of a triangular model of the assessment in terms of qualifications and competences. Still, as in Rushforth's publication [23], the method is not the "gold standard."

Studies to evaluate that method are conducted in countries where the OSCE-type examination is used in nursing education. Most reports state that it is a good method for assessing clinical skills. Candidates evaluate it as fair and comprehensive, that is covering a wide range of knowledge. It consists of multiple tasks and allows to compensate for any deficiencies of knowledge or skills. It is practical, useful and it eliminates objectivity bias, but it is also expensive (from EUR 31.51 to EUR 145.23 per individual) [28, 29, 30].

The authors' own studies showed that the method was highly praised by the majority of students as useful in the development of intellectual, practical and affective skills. According to the students, examinations in the form of shortened OSCE should also be evaluated favorably both in terms of content and organization. They scored high and very high in the majority of categories.

According to the authors' own research, the scope of evaluation requires broadening and OSCE session needs multiple repetitions. The preliminary results obtained can be regarded as an attempt to objectify the new method in order to verify the effects of educating nursing students.

CONCLUSIONS

Based on the analysis of literature and the results of the authors' own study, OSCE:

- Orients the process of educating nursing students to gaining skills and qualifications;
- Is an alternative method of verifying the effects of education, including the verification of knowledge, psychomotor skills and social/affective skills;
- Can be used for formative and formal assessment of the students' skills and thus for the 3-year cycle of nursing training.

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