



# Improvement of the Quality of Basic Clinical Skills Training and Evaluation of the Efficacy of Objective Structured Clinical Examination (OSCE): An Action Research with a Mixed Method

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## Abstract

**Background:** One of the main goals of action research is to improve the quality of education at both individual and organizational levels. Management enables organizations to improve their performance in areas, which have the greatest impact on students' learning and empowerment, without compromising the quality of education.

**Objectives:** In this study, we aimed to improve the quality of basic clinical skills training for nursing students in an action research, using the available resources.

**Methods:** In this action research, a sequential mixed method was applied. The participants in the qualitative phase included experts in the field of education, students, and stakeholders responsible for training at the nursing skills, midwifery, and medical-surgical nursing units of Razi Faculty of Nursing and Midwifery in Kerman, Iran. Assessment of facilities and resources in the quantitative phase was also carried out using a data collection form, a student survey form, and a checklist of basic clinical skills. The stages of action research included action planning for problem-solving, implementation, evaluation, and reflection. The students' problems with the basic clinical skills and their possible causes were also identified. The most effective and practical solutions for quality improvement included improvement of the educational environment of skill laboratories, followed by the enhancement of skills assessment process using an objective structured clinical examination (OSCE).

**Results:** The conventional method failed in the assessment of students' competence and lacked adequate objectivity and reliability. A significant difference was observed in the mean scores of basic clinical skills (e.g., injection, measurement of vital signs, and dressing) between the conventional method and OSCE ( $P < 0.05$ ). From the viewpoint of students, OSCE is more reliable and accurate than the conventional method and uses more suitable educational materials and facilities.

**Conclusions:** Based on the findings, by improving the educational environment of clinical skills laboratories and implementation of OSCE, nursing students can translate their knowledge of basic clinical skills into practice. We can also improve the quality of health services and clinical care for patients and reduce the incidence of practical errors made by nursing students.

**Keywords:** Education, Clinical Skills, Nursing, Midwifery, Students, Action Research

## 1. Background

One of the important parts of educational development in a country is improvement of education quality through modifying and balancing educational goals with educational performance and activities. According to the literature, theoretical and practical aspects of an efficient educational system should be reviewed and revised unceasingly in order to meet the current and future needs of the community (1-3).

The "principles and techniques" course is a basic

course related to the clinical activities of nursing and midwifery students. Identification of the current and desired status of theoretical, practical, and clinical training is of great importance in this course (4). The clinical experience acquired during this course by nursing and midwifery students is in fact their first experience and earliest clinical exposure in the first year of education (5).

The students' preparation for safe clinical activities, without making any errors or experiencing anxiety, is important in clinical skills training and student learning. Learning through practice in a simulated environment be-

fore exposure to the actual workplace can facilitate the students' acquisition of clinical skills. However, the quality and quantity of health services provided by nursing and midwifery students indicate that these students have failed to meet the educational goals.

The low quality of health services may be partly attributed to deficiencies in the curriculum and teaching methods applied by instructors (6, 7). As mentioned earlier, the educational content presented in the "principles and techniques" course is the first exposure of students to professional and clinical environments and has great impacts on their academic achievement and clinical practice. The quality of this course depends on accurate and efficient planning, engagement of proficient instructors, and effective assessment (8).

In order to improve the process of educational decision-making and practice, students' cooperation and participation, along with an understanding of experts' experiences, are essential. Moreover, knowledge of the viewpoints of students (as recipients of education) about educational activities is valuable for instructors (as leaders of the educational process), especially when changes are introduced in the educational process (2, 3, 9).

Modification of the management structure and increasing productivity are among factors, which not only improve the quality of health services, but also lead to the achievement of competitive advantages. Clinical education is known to play an important role in nursing education and is recognized as a key factor in shaping the professional identity of nursing students (10, 11). Also, application of theoretical concepts in practice is the main reason for acquiring professional and clinical skills (8).

According to studies by Baxter (12) and Corlett (13), application of a management plan and an action research model is necessary for eliminating the gap between theoretical knowledge and its application in actual work environments. This approach is also considered suitable for revising problem-solving strategies in the development of educational methods, introducing new educational methods and combining them with the conventional ones, and finally improving methods of clinical assessment (14). Identification and management of interrelated processes in the educational system, application of the acquired knowledge in the clinical environment, and optimization of educational planning can also improve the efficiency of educational organizations in achieving their goals (15-17).

Action research is a multi-purpose approach for collecting data from a target group. It is a process through which problems and revisions are described and identified. One of its main goals is to improve education at both individual and organizational levels. Generally, the most important phases in the implementation of action

research include "problem appraisal", "action planning", "implementation", "evaluation", and "reflection" (14).

Systemic management, which is used to integrate and classify different processes, is considered the best strategy for achieving the preset organizational goals. This approach also enables the organization to focus on the key processes and fosters a sense of trust, adjustment, efficiency, and growth among stakeholders (18-20). On the other hand, action research is an appropriate solution for problems such as educational problems, leading to the development of novel and creative solutions and improvement of unfavorable conditions. In this approach, theoretical solutions are replaced by practical solutions (4).

Action research is a type of systematic study and a focused attempt for improving the quality of organizational performance. The researcher and the involved team conduct action research, and the researcher is an active participant in the process of change. The main stages of action research include action planning for problem-solving, implementation, evaluation, and reflection (21). The participants concentrate on problem appraisal and providing effective solutions to improve performance with the participation of all people involved in the process (22).

## 2. Objectives

With this background in mind, the aim of this study was to improve the quality of basic clinical skills training for students, using action research based on the available resources.

## 3. Methods

This action research was performed using a sequential mixed method. Mixed method research, due to the use of both quantitative and qualitative methods, can present acceptable and reproducible results (1). One of the unique characteristics of action research is the interaction between researchers, stakeholders, and research samples, which is accomplished through review and revision, along with accurate observation and continuous outcome assessment (17).

In this study, experiences of nine faculty members (seven women and two men) from midwifery, nursing skills, and medical-surgical nursing units were evaluated regarding basic clinical skills training through focus group discussion and individual interviews by asking questions, such as "How do you evaluate the status of nursing skills training and assessment?" and "What are your experiences of theoretical and practical training?" The interviews continued for 45 to 60 minutes. All interviews were

transcribed, re-read, and analyzed. MAXQDA version 10 was used for the management and analysis of qualitative data, and semantic units, categories, and main themes were extracted through text analysis.

In the quantitative phase, a total of 80 students (27 midwifery and 53 nursing students), who were enrolled in the “techniques and principles” program, were recruited, using purposive sampling method. The students’ skills were assessed using the conventional test (random selection of a card related to a skill), followed by objective structured clinical examination (OSCE).

The students’ mean score of skill assessment was calculated using a check list. The efficacy of OSCE was measured using a questionnaire, which consisted of 20 questions and was rated on a Likert scale, ranging from completely disagree (score 1) to completely agree (score 5) (score range, 20 - 100). Finally, five open questions were presented to the participants about the tests, and the drafts were collected. Ethical concerns, including anonymity of the questionnaires, disclosure of research objectives, and confidentiality of data, were considered during the study.

Data were analyzed using descriptive (mean and standard deviation) and inferential (independent *t*-test and Pearson’s correlation coefficient test) statistics in SPSS version 19 (SPSS Inc., Chicago, IL).

The required revisions and corrective measures, with a descending order of priority, were as follows: Promotion of practical training through mastery of practical skills; development of basic practical skills of nursing and midwifery students by modifying the educational setting of skill laboratories and use of hospital-based simulations; availability of all required equipment and facilities for nursing and midwifery skills training; and improvement of the process of practical skills assessment by conducting OSCE in the clinical skill laboratory. The students were evaluated using both conventional and OSCE tests.

In OSCE, the examination stations were designed to focus on a sample of clinical competencies, which were randomly selected from the training materials. All students were exposed to similar simulation conditions and examination stations. The assessment checklist was designed in accordance with each situation (11, 22-25) and was approved by the team members during group meetings. After obtaining the final confirmation, the examination stations were designed for evaluating clinical competence and implemented.

The facilities required for each test were available in the examination stations, and the examiner was identified by an identification card. After the students were sequentially exposed to the stations, the test was initiated by the examiner, and different stages of the practical exam were conducted within the specified timeframe. After finishing

each station, the students moved to the next station for the next test. All students were evaluated in six stations and left the facility after the end of the exam. Code of ethics of this study was K. 90.11.

#### 4. Results

Based on the analysis of qualitative data and review of expert experiences, the main reasons for the inadequacy of clinical skills among nursing students were lack of a coherent curriculum, unavailability of qualified instructors, unsuitable educational environment, and unreliable evaluation. On the other hand, the corrective measures included: Development of educational processes; engagement of experienced instructors; curriculum optimization; optimization of the educational environment of skill laboratories; and assessment of basic clinical skills in OSCE (Table 1).

The analysis of quantitative data showed that the mean age of the students was  $18.57 \pm 3.8$  years (range, 18 - 30 years). In total, 37 (46.5%) participants were male, and 43 (53.5%) were female. In terms of marital status, two (2.2%) students were married, and 78 (98%) were single. With respect to the field of study, 27 (33.7%) participants were midwifery students, and 53 (76.3%) were nursing students. In addition, 31 (38.8%) students were non-native, while 49 (61.2%) were native.

Based on the findings, there was a significant difference in the scores of basic clinical skills, including injection, evaluation of vital signs, and dressing, between the conventional method ( $2.24 \pm 0.13$ ) and OSCE ( $2.13 \pm 0.14$ ) ( $t = 6.05$ ;  $P < 0.050$ ). From the viewpoint of students, OSCE had acceptable reliability and accuracy, and the stations were relevant to the educational content and fully equipped. There was a significant positive correlation between the students’ opinions about the exam and its effectiveness ( $P = 0.030$ ) (Table 2).

According to the analysis of open questions, students stated that OSCE increased their motivation and effort for exam preparation. They also pointed out that participation in OSCE scenarios reduced their anxiety and fear of real-life clinical situations and familiarized them with the principles of clinical practice.

#### 5. Discussion

According to the qualitative data analysis, four main themes, including “students’ understanding of the field of study”, “unsuitable educational environment and facilities”, “coherent and efficient educational management”, and “effective assessment” were extracted in this study.

**Table 1.** Themes and Categories Extracted from the Data Analysis

Themes	Categories
<b>Improved student understanding of the field</b>	Students' perceptions and feelings about their professional future
	Students' perceptions and feelings about the clinical environment
	First exposure to the simulated clinical environment and early exposure to the clinical setting
<b>Unsuitable educational environment and facilities</b>	Inappropriate facilities for teaching and practicing basic nursing and midwifery skills in traditional practice rooms
	Non-standard training environments dis similar to real-life clinical setting sand lack of professional or occupational similarities
<b>Coherent and efficient educational management</b>	Development of an uncoordinated educational curriculum based on routine methods
	Inconsistency between the curriculum and different professional skills requirements and basic skills
	Need for experienced instructors and a strong professional background
<b>Effective assessment</b>	Ambiguity in assessment and inaccurate analysis of training
	Inadequate practical efficacy and poor preparation of students
	Disregard for critical situations in clinical settings and need for early preparation
<b>Corrective measures (i.e., curriculum optimization, engagement of experienced instructors, optimization of the educational environment of skill laboratories, and application of OSCE)</b>	Restrictive factors: Inadequate preparation and poor clinical competence of students, unsuitable training environments, and unsuitable assessment methods

Abbreviation: OSCE, objective structured clinical examination.

**Table 2.** Association of the Participants' Viewpoints About OSCE with Variables: Test Score, Effectiveness and Average Score

Students' Characteristics	OSCE Characteristics					
	Test Score		Effectiveness		Average Score	
	P Value	r	P Value	r	P Value	r
<b>Station relevance</b>	0.506	0.04	0.055	0.13	0.099	0.100
<b>Equipment and facilities</b>	0.338	060.06	0.717	0.02	0.466	0.500
<b>Test time</b>	0.353	0.06	0.493	0.04	0.846	0.010
<b>Test accuracy and reliability</b>	0.431	0.05	0.914	0.08	0.967	0.003
<b>Total score</b>	0.662	0.03	0.030	0.15	0.080	0.120

Abbreviation: OSCE, objective structured clinical examination.

The underlying causes of problems and deficiencies in the clinical skills and preparation of nursing and midwifery students included inefficient curriculum development, lack of qualified instructors, unsuitable educational environment, and unreliable assessment. Engagement of experienced instructors in teaching nursing and midwifery techniques is of particular importance in strengthening the organizational structure.

The corrective measures in this study included curriculum optimization, optimization of the educational environment of skill laboratories, and basic clinical skills assessment using OSCE. The quantitative analysis of one of the corrective measures, i.e., implementation of OSCE, was

indicative of its effectiveness. Based on the findings, there was a significant difference in the students' skill scores between the conventional method and OSCE ( $P < 0.050$ ). In a study by Alinier, 93% of students and 94.4% of instructors reported that OSCE was a useful and appropriate method for clinical evaluation. It should be noted that this test has particular requirements in terms of space, facilities, environment, and financial and human resources (26).

We did not face any particular problems during the study, as the OSCE examiners were experienced instructors or involved in the training of nursing principles and skills. Due to space limitations of the skill laboratory, the designed examination stations had limited space. There-

fore, efforts were made to administer the exam in a suitable environment with a pre-fabricated wall in an organized manner, and one of the training classes was renovated.

From the perspective of students, OSCE is more reliable and accurate than the conventional method and increases their motivation, effort, and preparation for the test. The results of multiple studies have confirmed the satisfaction of instructors and students with this evaluation method. In this regard, a study by Furlong et al. reported that OSCE is an objective evaluation method rather than a subjective one (27). Generally, the possibility of random responses reduces in clinical assessments using OSCE. In addition, OSCE has relatively higher validity and reliability than the conventional method; therefore, it is possible to carefully examine the skills using an appropriate tool (checklist) for each skill. Newble also reported that objectivity increases in the OSCE method due to the use of checklists by examiners (28).

Validation of nursing education plays an important role in improving the quality of education. Use of proper educational and evaluation methods has increasingly expanded in academic education (15, 29). For many years, healthcare professionals have been looking for valid and reliable methods, which could effectively measure the clinical competence of students. Evidence suggests that routine assessment of students is limited to their acquired knowledge and discards their clinical skills. In fact, evaluation determines how well the educational system's performance is in accordance with its objectives (15, 30).

Previous research shows that OSCE is a clinical examination, which improves the students' performance and promotes their professional roles. It is also a valid method for assessing the students' technical and clinical skills, with the highest validity, reliability, and applicability (31). Nursing faculties need to move towards improving the quality of their educational processes, using action research as part of higher education in medical sciences, to continuously correct and overcome the existing deficiencies (4).

Although there is often no systematic mechanism in clinical skills education centers to control or improve educational quality and balance performance with goals, evaluation of the course of "nursing and midwifery principles and techniques" and continuous improvement of the quality of educational processes in these centers are essential through optimal use of resources for describing nursing education standards. It is also necessary to improve nursing clinical skills training in order to assign standards for nursing education and promote the quality of clinical education in nursing.

The limitations of this study included barriers to teamwork for coordination, lack of educational and assessment

facilities, props, and space, and dual role of the researcher (research and organizational roles). In order to investigate the effectiveness of corrective measures and actions and to improve the quality of clinical education, action research studies and assessments in other related domains are suggested.

### Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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### Footnotes

**Authors' Contribution:** Esmat Nouhi: The design and development of the proposal run and collect data Compilation of the article; Hakime Hosainrezaee: Collaborate on the implementation of the project.

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