

Evaluation of the objective structured clinical examination by the nursing students



Maria Blesilda B. Llaguno¹, Jay N. Ablao^{2,*}, Aida Domantay², Edwin C. Cancino³

¹Nursing Department, College of Applied Medical Sciences, King Faisal University, Hofuf, Saudi Arabia

²Department of Nursing, Faculty of Applied Medical Sciences, University of Tabuk, Tabuk, Saudi Arabia

³Public Health Department, College of Applied Medical Sciences, King Faisal University, Hofuf, Saudi Arabia

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ABSTRACT

The objective structured clinical examination (OSCE) represents a pivotal innovation in the assessment of clinical proficiency within nursing education. This method is crucial as nurses are anticipated to exhibit competence across diverse healthcare settings, ensuring comprehensive, safe, and high-quality care throughout the patient's lifespan. A key challenge in evaluating clinical competence lies in the inherent subjectivity and complexity of the task. This demands educators to perpetually seek and refine tools apt for gauging nursing competence. Our study, a descriptive cross-sectional analysis encompassing 150 undergraduate nursing students, utilized a modified standardized survey questionnaire to appraise student perceptions of their OSCE experiences. Findings indicate a predominant classification of the OSCE as "good," with a notable preference for the planning phase over the implementation phase. Pre-test orientation was highly valued, whereas the provision of materials was critiqued. Gender and academic year were identified as significant variables influencing OSCE evaluations, particularly in the implementation phase and regarding examiner roles. This research offers foundational insights for future studies aiming to enhance OSCE methodology and substantiates the necessity of integrating OSCE into nursing curricula for robust clinical competence assessment.

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1. Introduction

Nurses are expected to be competent in providing comprehensive, safe, and quality patient care in different health settings across the lifespan (Tønnessen et al., 2020). During the evaluation of clinical competence, subjectivity and complexity of the task are common challenges educators face, leading them to continuously search for and develop bespoke practices or tools to assess nursing competency. Most nursing and medical literature support the assertion that a multi-method approach is necessary to ensure reliable student evaluation of the knowledge, skills, and abilities, thus competence. The emergence of objective structured clinical examination (OSCE) is one possible approach to addressing the limitations and the problem of subjectivity noted in previous evaluative methods

(Walsh, 2007). The OSCE is a multisystem examination using actual or simulated patients to evaluate clinical skills, attitudes, and cognitive abilities. Nursing educators have reported it as a reliable, valid, and effective summative holistic assessment method to evaluate nursing students' clinical competencies in a simulated experiential learning environment (Gawade, 2018; Marcyjanik, 2016; Nulty et al., 2011). OSCE was first introduced to assess medical students' clinical competence objectively (Harden et al., 1975) in addressing the challenges of objective assessment in real-world clinical scenarios, variability among patient encounters, and the need for more structured checklists tailored to assess the given competency. The OSCE eliminated the extraneous variables in the real-world clinical setting by providing a controlled objective assessment of clinical competence. A set of instructions was published to help create valid, reliable, and practical OSCEs for assessing clinical competence (Harden and Gleason, 1979) adopted by allied health disciplines and later explored by nursing schools to objectively assess clinical competence (Gawade, 2018). The OSCE implemented at the University of Tabuk Nursing Department is a

* Corresponding Author.

Email Address: jaynantinablao@gmail.com (J. N. Ablao)

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Corresponding author's ORCID profile:

<https://orcid.org/0000-0002-9032-7116>

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'focused' examination to assess students in a series of stations, evaluating one to three aspects of nursing competence being tested at each station. It included different essential aspects of clinical experiences in nursing, such as problem-solving, physical examination, technical skills, interpersonal skills, decision-making, and nursing management.

OSCE is an effective facilitator for learning clinical skills to achieve professional competency; however, its objectivity must be ensured so this assessment can assess what students "can do" rather than "what they know" (Gawade, 2018). Likewise, OSCE is labor-intensive for the faculty, time-consuming, and expensive (Obizoba, 2014). Furthermore, nurse educators need reliable and valid tools that have undergone rigorous testing to evaluate students' clinical competency and performance during high-stakes testing like simulation and OSCE (Hayden et al., 2014). Having an assessment tool that comprehensively assesses students' clinical competencies is challenging, especially with numerous students. Indeed, determining evaluation quality is an ongoing challenge for all educators (Vijayalakshmi and Revathi, 2017), yet many studies noted OSCE as beneficial and essential for evaluating students' clinical performance in the allied health disciplines (Bhowate et al., 2014).

The OSCE has faced criticism for not effectively assessing the highest levels of clinical competency. While there have been many research studies on the use of OSCE in the field of medicine, there have been fewer studies on its use in nursing within Saudi Arabia, particularly regarding how the OSCE is carried out. Against this backdrop, a research study was conducted to understand how nursing students perceive their OSCE evaluations. This study also aimed to explore any differences in perceptions of the OSCE among students at different levels of their academic journey and between male and female students.

This study aimed to determine the students' evaluation of their OSCE. Such judgments on the quality of OSCEs provide a valuable basis for considering what areas are supported in extending both the range and quality of future examinations in the department. The findings of this study also serve as a springboard for the continuous quality improvement initiatives in the department.

Hypothesis: There is a significant difference between the student's evaluation of the OSCE across academic year levels and between genders.

2. Methods

This study adopted a cross-sectional descriptive approach to investigate the perspectives of nursing students on the OSCE at Tabuk University in Saudi Arabia, specifically within both the male and female divisions of the Nursing Department. The research included a purposeful selection of 150 undergraduate nursing students from the third year, fourth year, and internship levels. First-year

students were not considered for this study as they had not yet been introduced to practical and clinical subjects and second-year students were also excluded due to their limited exposure to OSCE, which could potentially lead to unreliable findings.

To gather data, the study used a modified survey questionnaire, initially based on the work of Pierre et al. (2004), among other resources. This questionnaire's content validity was verified by expert members of the department's Examination Review Committee, achieving a Cronbach's alpha of 0.917, indicating high internal consistency. The survey specifically focused on evaluating the planning/preparation and execution stages of the OSCE, intentionally omitting the debriefing phase as this research aimed to capture students' views during their primary examination period, and debriefing was not part of this scope.

Data collection occurred over a month, starting after receiving ethical approval. Students received the survey via a Google form distributed through their social media and email, including a consent form outlining the study's purpose, potential risks and benefits, procedure, data anonymity, and confidentiality. Contact information was provided for any questions or need for clarification. Data were automatically sent to the researcher upon survey completion, which took about five minutes for respondents.

Analysis of the collected information was performed using STATA 13.1, incorporating descriptive statistics such as frequencies, rates, means, standard deviations, and t-tests. Evaluations of the OSCE by students were categorized into five levels ranging from Very Poor to Very Good based on their scores. Comparative analyses, including paired sample T-tests and ANOVA, assessed differences in OSCE evaluations between genders and among academic years during the planning and execution phases, with a significance threshold set at a p-value of less than 0.05. All statistical tests conducted were two-tailed.

3. Results

Table 1 presents the socio-demographic characteristics of the students involved in the study. Regarding age, a majority of the students, 75%, are between 20 and 22 years old. This is followed by 21% of the students who are between 23 and 25 years old, and 4% are between 26 and 28 years old. In terms of gender distribution, the majority of the respondents, 65%, are female, while 44% are male. The students' academic year levels vary, with 35% being in their third and fourth years of study and 30% serving as interns.

OSCE is a meaningful, fair, and practical method for evaluating nursing students' clinical performance because of its objectivity and fairness. This study probed the students' perspective of OSCE across its planning and implementation phases. The students' overall evaluation of the OSCE is "good."

Table 1: Students' demographic profile

Variable	N=150	Percentage
Age		
20 to 22 years old	112	75
23 to 25 years old	32	21
26 to 28 years old	6	4
Gender		
Male	66	44
Female	84	56
Academic year		
3 rd year	53	35
4 th year	53	35
Internship	44	30

3.1. Planning phase

This segment of the OSCE received a "good" rating overall. Notably, the aspect that was most positively reviewed was the amount of time designated for orientation prior to the examination. Providing an in-depth orientation on the OSCE guidelines several days before the exam helps ensure that students have a comprehensive understanding of what to anticipate before, during, and after the examination. Nonetheless, while the clarity of the guidelines for the OSCE was also deemed "good," it was identified as the area with the lowest rating within this context.

3.2. Implementation phase

The evaluation covered four key aspects: the examination itself, the venue, the materials used, and the examiners. On a general level, the examination received a "good" rating. Specific elements such as the content of the OSCE, its relevance to the course, and its comprehensive coverage of various clinical skills also garnered a "good" rating. The venue was similarly rated as "good," with the organization of the OSCE stations being the most praised aspect and the sufficiency of ventilation in the examination room being the least satisfactory, yet still considered "good." Regarding materials, the overall assessment

was "fair." The highest scores were given for the availability of materials, followed by their adequacy for the number of examinees and their condition, indicating that some materials and equipment were outdated and required replacement. The examiners were rated as "good" overall, with their consistency in grading and expertise in the subject matter receiving the highest approval. However, fairness in grading was viewed as an area needing improvement.

In summary, the students' overall assessment of their OSCE experience was "good." Both the planning and implementation phases of the OSCE were deemed "good," with the planning phase receiving slightly higher approval (4.01 Weighted Mean) compared to the implementation phase (3.63 Weighted Mean), as detailed in Table 2.

Table 2: Students' overall evaluation of the OSCE

Indicators	Weighted mean	Adjectival description
I. Planning phase	4.01	Good
II. Implementation phase	3.63	Good
a. Exam: Content/topics, flow, and timetable	3.81	Good
b. Venue	3.81	Good
c. Materials	3.19	Fair
d. Examiners	3.71	Good
Grand total	3.82	Good

Table 3 indicates a meaningful difference ($p < 0.001$) in the evaluations of the OSCE between male and female students, particularly in the planning phase and concerning the materials used during the implementation phase ($p < 0.010$). Specifically, female students rated the planning phase more favorably than male students. Conversely, male students provided higher evaluations than females for the materials used in the OSCE. Moreover, the analysis showed no significant difference in how male and female students evaluated other aspects of the OSCE's implementation phase.

Table 3: Students' evaluation of OSCE between genders

Indicators	Mean \pm SD			P-value
	Total (n=150)	Male (n=66)	Female (n=84)	
I. Planning phase	4 \pm 0.77	3.77 \pm 0.88	4.18 \pm 0.61	0.001
II. Implementation phase				
a. Exam: Content/topics, flow, timetable	3.81 \pm 0.66	3.76 \pm 0.72	3.85 \pm 0.61	0.408
b. Venue	3.81 \pm 0.83	3.77 \pm 0.89	3.84 \pm 0.78	0.629
c. Materials	0.36 \pm 0.39	0.46 \pm 0.44	0.29 \pm 0.33	0.010
d. Examiners	3.71 \pm 0.91	3.57 \pm 0.95	3.71 \pm 0.87	0.091

Table 4 shows a significant difference ($p < 0.006$) between year levels in evaluating their examiners during the implementation phase. The juniors gave the highest rating compared to the other year levels.

However, the ratings of the others are similar in the remaining domains under the implementation and planning phases.

Table 4: Evaluation of OSCE between academic year levels

Indicators	Mean \pm SD			P-value
	3 rd year (n=53)	4 th year (n=53)	Internship (n=44)	
I. Planning phase	4.08 \pm 0.72	4.94 \pm 0.56	3.85 \pm 1	0.291
II. Implementation phase				
a. exam: Content/topics, flow, timetable	3.90 \pm 0.64	3.8 \pm 0.55	3.7 \pm 0.81	0.323
b. Venue	3.89 \pm 0.89	3.68 \pm 0.82	3.86 \pm 0.75	0.376
c. Materials	0.42 \pm 0.43	0.39 \pm 0.39	0.27 \pm 0.32	0.127
d. Examiners	3.98 \pm 0.77	3.42 \pm 0.88	3.75 \pm 1.02	0.006

4. Discussion

The Saudi Vision 2030 brought a massive transformation in the kingdom, increased demands to a changing healthcare landscape, and tremendous challenges to the nursing profession. Nursing policymakers are challenged to improve nursing care by addressing the nursing shortage, generating nursing education improvement strategies, and establishing the scope of practice guidelines (Al-Dossary, 2018). The bright employment outlook resulted in an influx of expatriate healthcare workers, extensive improvements in the local nursing program, a corresponding increase in the number of institutions offering the nursing program, and a surge of enrolment in nursing schools.

The profile of student-respondents is consistent with some studies that Saudi nurses are relatively young (mean age 27 years), inexperienced (77% have worked less than five years), and not highly educated (83% diploma holders) (Natarajan and Thomas, 2014). The youth and inexperience of nurses in the said study may result from the Saudization program heavily targeting nursing (Alboliteeh et al., 2017). This upward enrolment in nursing schools is due to an increased demand for healthcare professionals driven by massive healthcare transformations under Saudi Vision 2030.

Nursing is female-dominated, but over the last decade, there has been an increase in male Saudi nurses, resulting in a balanced gender distribution in the workforce (Alboliteeh et al., 2017). Gender and cultural-related issues like gender segregation significantly challenged Saudi nursing students' academic preparation. Male students need the opportunity for training and exposure to female units such as the maternity/pediatric floors, delivery room, and nursery, demanding nursing schools provide advanced simulation laboratories to satisfy training needs in these areas (Aljohani, 2020).

Gender differences can also be a variable in the students' evaluation of the OSCE. In the planning phase, females gave higher OSCE evaluations than males, implying that females may be more prepared and organized during OSCEs. As with the materials, students rated male instructors higher than females due to variability between both sections regarding adequacy, intactness, and availability. As with the *examiners*, although there is no significant difference in the responses for both participants, females got a slightly higher mean than males, implying that female examiners are more consistent in assigning marks and organizing during OSCE than males.

This result suggests that the planning and implementation phases were considered "good." The adequate orientation time before the examination was the highest for the planning phase, while the explanation of the OSCE guidelines got the lowest score. Orientation of the examinees, examiners, and standard patients (SP) about the OSCE is done ahead of schedule. Other studies emphasized the importance of adequate preparation and orientation about OSCE nature and procedures (El-Nemer and

Kandeel, 2009); most respondents were well-prepared with the nature of the exam and required tasks to ensure satisfactory examination performance (El-Nemer and Kandeel, 2009).

Preparation for orientation is challenging and necessitates team effort. Proper synchronization of all exam components must be implemented as planned. Adequate orientation time before the examination was one of the strengths of this undertaking that needs to be sustained. Likewise, the bulk of information tested and the details about examination conduct can significantly overwhelm the students. It is suggested that although most students consider the examination quality to be excellent, there is still a need for careful preparation and organization of the exam (Mahmoud and Mostafa, 2011).

For smooth exam conduct, the OSCE team must address exam complexity, time consumption, accelerated stress, and student perception (Natarajan and Thomas, 2014). The inclusion of various skills and competencies achieved through a test blueprint or matrix is another vital issue during examination design. Appropriate assessment tools or marking schemes are prepared to ensure objectivity, validity, reliability, educational impact, and utility index during a scenario or test item construction. If the whole examination presents an unbalanced and overlapping distribution of competencies tested, the value of OSCE is diminished. To ensure specialist competence meets the standards required for a valid, credible, and defensible test, the OSCE must only be undertaken by experts and experienced individuals (SCFHS, 2014).

This study's strengths and weaknesses can guide nursing school administrators. The *exam and venue* are the most crucial aspects during implementation. The OSCE is a product of concerted efforts from test blueprint preparation, deliberation, scrutiny, review, and approval by the Examination and Review Committee and Department Head. These details are then disseminated to examinees during the orientation and finally reiterated a few weeks before the examination. The venue should be prepared and needed materials to be made available, adequate, and in good shape.

The department's skills laboratories are utilized as examination venues considering the reduction of noise/distraction, placement of signages, adequate space, proper ventilation, and adequate lighting. Proper scheduling and traffic patterns of the examiners and students, including the physical set-up for the holding area, examination area, and debriefing areas, are equally crucial. A study reported that OSCEs are stressful compared to other traditional examination formats due to factors like the complexity and time-pressured tasks to perform, poorly designed stations, or a mismatch between what is tested with the curriculum and teaching/learning program (Harden, 2015). Another study highlighted the exam as the weakest area of the study, thereby contradicting the result of this undertaking (Zahran and Taha, 2009). However,

most students agreed that the content and organization of the exam covered a wide range of knowledge and clinical skills (Mitchell et al., 2009). The high rating for female examiners reflects faculty shortages in the male section, preventing them from ensuring intensive OSCE planning/ implementation.

Although OSCEs are costly and resource-intensive, student engagement can be enhanced throughout all levels of the nursing curriculum. Examiners must be well-trained and oriented in the OSCE assessment and method, like the appropriate matching of the examination's nature and degree of difficulty to the learners' educational level. High-stakes examinations like the OSCE can ensure that graduates are safe and competent practitioners. The assessment of procedural knowledge, how-to, schematics, and why can be assessed using OSCE as a summative, performance-based, objective method (Mitchell et al., 2009).

The shortcomings identified in this study highlight areas for improvement for the department. Despite all aspects of the implementation phase receiving a "good" rating, the materials used in the OSCE received the lowest scores. Specifically, concerns regarding the "intactness" of these materials and their "adequacy for the number of examinees" were rated lowest. A notable issue is the scarcity of materials, particularly in the female section, which is attributed to a higher number of female students compared to male students. This finding contrasts with the conclusions of Hosseini et al. (2011), who reported that students rated their equipment and facilities favorably.

The OSCE is designed to evaluate a candidate's clinical skills across three distinct levels as defined by Miller (1990): "knows how," "shows how," and "does." In the context of medical education, competence refers to the application of clinical skills within a controlled examination environment. The areas of competence evaluated are divided into four main categories: communication skills, physical examination skills, procedural skills, and decision-making skills. Candidates are assessed on their proficiency in these domains, which includes performing various clinical tasks, operating and monitoring specific therapeutic and diagnostic devices, and using a range of medical equipment as specified by SCFHS (2014).

Hence, emphasizing the importance of having the correct, complete, intact, and adequate materials further suggests an upgrade for future OSCEs in the department. A study also suggested preparing and piloting new OSCE examinations and marking tools carefully, considering the length, number, and interdependence of OSCE stations, and refraining from relying on OSCE as a sole means of practitioner assessment (Rushforth, 2007). Notably, when used carefully, OSCEs can make a helpful and meaningful contribution to the education of health professionals.

Although OSCEs have become a widely accepted, valid, and reliable assessment strategy for nursing clinical competence, they are still in the early implementation stage as a summative assessment

method. SCFHS (2014) had yet to implement the Nurses' Licensure Examination. Cognizant of the department's efforts to be at par with the current trends in nursing education worldwide, the initial implementation of the OSCE for clinical courses was done in 2016. Being in its infancy stage, ensuring continuous quality improvement is imperative to determine its strengths and weaknesses. Numerous studies done not only in medical education but also in dentistry, nursing and midwifery, physiotherapy, dietetics, and pharmacy reported a positive and direct significant correlation between using OSCE sessions in training and OSCE examination, shown by students' positive feedback on its quality, organization, format, validity, and reliability (Makhlouf, 2019).

The comparison of students' OSCE evaluation between genders is a unique aspect of this study. Gender segregation is observed in public places in Saudi Arabia, like schools. However, uniformity in all curricular implementations must be ensured. The comparison of the OSCE evaluation between genders will ascertain if there are differences in evaluation between the male and female sections. It can serve as a springboard to suggest future improvements.

In the planning phase, the females gave higher ratings than males, with a significant difference ($p < .001$) in the OSCE evaluation of both genders. The administration should adequately address this evaluation gap to ensure the OSCE exams' reliability in both sections. Specific instructions regarding relevant principles of assessment, item construction, exam construction, and examination logistics must be followed (SCFHS, 2014).

The observed disparity in ratings, wherein male faculty members received higher evaluations for materials, implies a relative sufficiency in the provision of necessary materials and equipment compared to their female counterparts. This finding intersects with Standard 7 (Facility and Equipment) as delineated in the National Commission for Academic Accreditation and Assessment (NCAAA) guidelines of 2015. These guidelines mandate that educational institutions which administer programs across dual campuses must ensure parity in student resources. Additionally, there is an imperative for these institutions to conduct consistent monitoring of both the quality of program delivery and the overall program integrity at each campus (NCAAA, 2015).

This study also emphasizes the differences in how students from various academic years perceive their examiners during the OSCE's implementation phase. Junior students from both genders gave their examiners higher ratings compared to senior students, suggesting that the examiners for the juniors were more consistent in their marking and organization during exams. It's important for the administration to investigate and address this variation to ensure fairness and eliminate any bias in grading. Additionally, to mitigate such discrepancies and enhance the OSCE process, faculty members can adopt five strategies as suggested by Obizoba

(2014): administrative and technical support, involving clinical instructors in evaluations, educating faculty about OSCE, focusing validations on essential professional skills, and fostering collaboration among all faculty involved in the course. It's also critical to acknowledge that, despite clear instructions and the comprehensive nature of the OSCE, students still experience significant anxiety and intimidation, as noted by Aljohani (2020). Therefore, adopting a continuous quality improvement approach to examine and refine all aspects of the OSCE, based on student feedback, can lead to enhancements in future administrations of the exam, as recommended by Mahmoud and Mostafa (2011).

5. Conclusion and recommendations

The conclusions from this study can be summarized as follows: (1) Since students rated the OSCE as good overall, it is recommended that nursing leadership develop a plan to enhance OSCE's implementation. (2) The planning and execution phases of the OSCE were evaluated as good by nursing students. However, there is room for improvement, especially regarding the adequacy of materials/equipment, which received the lowest rating in this study. (3) There was no significant difference in how male and female students evaluated most aspects of the OSCE's implementation phase. Yet, notable differences were observed in their evaluations of the planning phase and materials used during the implementation phase, with statistical significance ($p < 0.001$ and $p < 0.010$, respectively). (4) A significant difference ($p < 0.006$) was found in how students from different academic years assessed their examiners during the implementation phase. Addressing this discrepancy is crucial to ensure equitable assessment of student performance in the OSCE.

This study further supports neophyte educators utilizing OSCE as a valuable summative assessment strategy to promote safe, competent nursing practice (Aljohani, 2020). Findings from this study provide additional evidence of its applicability to inform further improvements in the development and delivery of this evaluation method. Vital elements must be in place before, during, and after the OSCE—like diligent preparation, competent/ well-oriented examiners, conducive setting, and availability, adequacy, and intactness of materials. Examiners were more consistent in marking and organized during examinations.

5.1. Implications

Future researchers may utilize this study to compare the results to improve the OSCE experience of nursing students further. The nursing leaders may use this study as a justification that OSCE should be used as an integral part of the standardized method of measuring clinical competence. In addition, this

study will serve as a springboard to improve in conducting OSCE in their respective programs.

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Compliance with ethical standards

Ethical considerations

Before starting this undertaking, administrative clearance was initially sought, followed by an ethical clearance from the Research Ethics Committee at the Department of Nursing, Research Unit Log No. RU-0011 shows that the students will not be exposed to any risks during the study. The respondents' participation in the study was strictly voluntary, and the completion of the questionnaire was used to verify participants' consent to participate in the study. Respondents were assured of the confidentiality of the data taken and will only be used solely for the purpose mentioned.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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