Article

Evaluation of Nursing Students' Perspectives toward Objective Structured Clinical Examination

Izzeddin A. Bdair
https://orcid.org/0000-0002-0429-7265
Al-Ghad International Colleges for Applied Medical Sciences, Abha/KSA
Izzaden_1986@yahoo.com
iabubdair@gc.edu.sa

Abstract

Nurses need to master the core nursing competencies to perform their professional duties effectively. The Objective Structured Clinical Examinations (OSCEs) have been integrated as an innovative method of evaluating clinical skills in the nursing curriculum over the years. The study that directed this article aimed to assess nursing students' perception toward OSCEs. A cross-sectional descriptive design was used. A convenient sample of 429 undergraduate nursing students was enrolled. In addition to demographic data, the OSCEs' evaluation questionnaire was used to gather data. The questionnaire assessed nursing students' evaluation of the OSCEs' attributes, the quality of OSCEs' performance, and OSCEs' scoring and objectivity. Seven questions about the evaluation of the OSCEs' organisation were added. About two-thirds of the students were female (69.2%) and belonged to the age category of younger than 24 years (59.9%). The OSCEs were rated the most preferred assessment method for clinical competencies and fit for all student levels. Nursing students showed positive perspectives toward OSCEs' attributes, quality of performance, scoring and objectivity, and organisation. OSCEs have been used as an innovative method of evaluating clinical nursing skills. OSCEs are accepted well by nursing students. The study recommends that academic institutions have to design OCSEs well in terms of preparation, planning, equipping labs, organisation, implementation, follow-up, and monitoring, and they should consider faculty and students' feedback to make it more effective and valuable.

Keywords: assessment; competencies; nursing students; Objective Structured Clinical Examinations (OSCEs); perspectives

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Introduction

The nursing profession has a critical role in providing care to patients and their families during their illness. Therefore, nurses should be equipped with essential clinical skills to ensure high-quality performance and safe practice since they are accountable for their professional practice. The best strategy to achieve this goal is through evaluating students' competencies by utilising a standard evaluation method. The Objective Structured Clinical Examination (OSCE) is a standard, fair, comprehensive, objective, consistent, structured, reliable and valid competency-based assessment method (Majumder et al. 2019; Martin et al. 2020). OSCEs can be used to evaluate a wide range of students' underpinning knowledge, clinical competence, interviewing, teaching assessment skills, professional judgment, problem-solving skills, and interpersonal and communication skills in a time-sensitive, simulated environment; making the examination more rigorous than other conventional evaluation strategies (Graf et al. 2017; Lim et al. 2020; Naumann et al. 2016; Plakiotis 2017).

The aims behind establishing OSCEs were to standardise the exam, avoid subjectivity related to the examiner, minimise variables that may affect students' exam performance, and add objectivity to the assessment of clinical skills (Harden et al. 1975). Literature reveals that OSCEs have growing acceptance as an assessment tool in various health sciences disciplines worldwide (Majumder et al. 2019). There is a plurality of available evaluation methods for nursing students (including multiple-choice questions, written essay exams, case scenario discussions, oral exams, and procedure checklists) that rely on subjective assessments in non-standardised methods, which do not show students' ability to perform the required skills. Therefore, OSCE has been the gold standard for evaluating clinical skills (Shirwaikar 2015).

Advantages and Disadvantages of OSCEs

The advantages of OSCEs include a valid, reliable, stable, objective, fair, effective, comprehensive, efficient, practical and powerful assessment learning strategy—making it more rigorous (Ataro, Worku, and Asaminew 2020; Ferreira et al. 2020; Munkhondya et al. 2014). The OSCEs identify students' weaknesses, enhance nursing students' professional skills, and increase their drive to study and practise (El-Sheikh and Abd El Aziz 2015; Khan et al. 2021; Müller et al. 2019). The disadvantages of OSCEs include the following: it cannot evaluate holistic nursing skills (Kolivand, Esfandyari, and Heydarpour 2020); and it is a stressful and mentally demanding assessment format (Ferreira et al. 2020). Anxiety and stress might interfere with task demonstration, which may affect OSCEs' validity (Haleem et al. 2015). Ataro et al. (2020) state that lack of good OSCE organisation and preparation, shortage of time, as well as number and duration of stations affect OSCEs application. A lack of facilities and manpower, the fact that it is time-consuming, and high costs are challenging factors for applying OSCEs (Ali, Mehdi, and Ali 2012; Taala, Waggas, and Parisa 2019).

Students' Perspectives regarding OSCEs

In the relevant reviewed literature, students have disclosed OSCEs' acceptance as an evaluation tool for their clinical skills (Ataro et al. 2020). Students were satisfied with the OSCEs' process in terms of structure, organisation and administration (Khan, Ayub, and Shah 2016; Taala et al. 2019). Students and faculty members perceived that OSCEs are a better assessment tool than other traditional assessment methods (Alsaid and Al-Sheikh 2017; Divya et al. 2019). In summary, students and instructors showed a positive attitude toward using the OSCEs as an evaluation method (Bdair, Abuzaineh, and Burqan 2019). However, despite students' acceptance of OSCEs, they raised the need for development and improvement (El-Sheikh and Abd El Aziz 2015).

OSCEs Process

In an OSCE, each student is required to demonstrate a series of clinical skills in a simulating real-life environment within a standard time limit (Battistone et al. 2017). Before the beginning of the OSCE, a cover sheet, instructions sheet, a sheet for each station, and checklists are prepared for clinical procedures. A trained examiner assesses students' performance, utilising similar stations according to a predetermined objective scoring criterion (Zhang and Walton 2018). The students are marked and evaluated as they go through a series of stations at the same time (Munkhondya et al. 2014). They move after a specific time from one station to another to cover all stations. A few minutes are given to move to the next station and to allow students to read the instructions. At the beginning of the task, students have a few minutes to familiarise themselves with the task and equipment, and they may ask questions at the station to clarify the task to perform if needed. The OSCEs' format, number of stations, cases, allowed time, and numbers of raters are standard for all students and courses.

Due to the large number of students who join nursing colleges, and also to ensure high-quality nursing competencies, there is a need to continuously evaluate OSCEs as an assessment method from students' perspectives. The results of this present study should help in improving the OSCE experience—and ultimately, the teaching process. Published studies regarding OSCEs are scarce. A literature review yielded a scarcity of articles examining the use of OSCEs in the study setting. The purpose of this research was to evaluate nursing students' perspectives toward OSCEs. The research question for this study was:

> What are the nursing students' perspectives toward OSCEs in terms of attributes, quality of performance, scoring and objectivity, and organisation?

Methodology

Design, Sample and Settings

This study utilised a web-based perspective, descriptive, cross-sectional, and correlational design. A non-probability convenience sample was used. The survey was

circulated to 500 students. With 429 returned questionnaires, the response rate was 85.8%. The inclusion criteria for this study were: nursing students who were at that time studying nursing in their second year and higher; and students who had had experience with OSCEs as an assessment tool. Preparatory students were excluded since they had not started the nursing programme. The study was conducted in 15 branches of private health colleges in Saudi Arabia. The study took place from February to March 2021.

Ethical Consideration

In compliance with research ethical guidelines, this study was approved by the Research Ethics Committee (approval number is: ECM#2021-3901). Participants were informed about the study and their right to withdraw from the study at any time. Informed consent was obtained from the eligible students through an attached introductory letter. All information elicited from the participants was treated as strictly confidential. The participants' data were anonymised before analysis.

Instruments

Demographic data were collected, including age, gender, level of study, type of study, and type of assessment that students prefer for clinical skills. The OSCE evaluation questionnaire by Pierre et al. (2004) was adapted for this study. The questionnaire consists of three sections with a total of 23 items. The first section assesses the evaluation of the OSCEs' attributes (12 items). The second section assesses the quality of OSCEs' performance (7 items). The third section assesses the OSCEs' scoring and objectivity (4 items). The fourth section regarding OSCEs' organisation was added for this study (6 items). The items were measured on a three-point Likert scale ranging: "not all"; "neutral"; and "to a great extent." The Cronbach's reliability value for the OSCE scale was 0. 923. Permission to use the tool was also obtained. The questionnaire was translated into an Arabic version and back-translated by two experts. Three teachers reviewed the questionnaire for clarity. Pilot testing was conducted on 25 randomly selected students to assess the applicability of the study tool, and these were excluded from the analysis. In order to offer clear meaning to the students, subtle modifications in some items were applied in the Arabic version.

Data Collection and Analysis Procedures

Eligible participants were identified, approached, and invited directly to join in the study. Once participants had showed acceptance to participate, they were asked to complete the questionnaires. Generally, filling out the questionnaires took approximately 10 minutes. Finally, questionnaires were collected after participants had completed electronic forms.

The data were reviewed and evaluated for missing information, skewness, and outliers. Then the data were analysed according to the appropriate statistical technique determined by the level of measurement. After that, data were entered and analysed using the IBM SPSS Statistics 22. Descriptive statistics in the form of means, standard

deviations, frequencies, and percentages were computed to describe participants' demographic characteristics. ANOVA analysis was used to assess the mean differences among all examination formats. In all statistical tests, a value of $p< 0.05$ was considered significant.

Results

Characteristics of Study Participants

The basic demographic characteristics of the population sample are presented in table 1 below. It shows that 429 students voluntarily participated in the current study. About two-thirds of the students were female (n= 297, 69.2%) and belonged to the age category of younger than 24 years (n= 257, 59.9%). The majority of the students were studying in a regular approach (n=381, 88.8%) (those who attended the nursing programme after secondary school), whereas the others were bridging students who attended the nursing programme after completing a diploma course. Most of the students were in the fourth year of study (n=188, 43.9%). The OSCEs were rated as the most preferred assessment method for clinical competencies by 183 students (42.6%). Nursing students revealed that OSCEs fit all students' levels (n=174, 40.6%) and that they connect theoretical knowledge with practice (n=193, 45.0%).

Table 1: Demographic characteristics of the study group (N=429)

Variable	**N**	**%**
Age		
≤24 years	257	59.9%
>24 years	172	40.1%
Gender		
Male	132	30.8%
Female	297	69.2%
Study year		
2nd year	74	17.2%
3rd year	131	30.5%
4th year	188	43.9%
Internship	36	8.4%
Study type		
Regular	381	88.8%
Bridging	48	11.2%
Preferred format		
MCQ	157	36.6%
Oral	47	11.0%
Written	42	9.8%
OSCE	183	42.6%
OSCEs fit all students' levels	174	40.6%
OSCEs connect the theoretical part with clinical	193	45.0%

Students' evaluation of OSCEs' attributes, quality of performance, scoring and objectivity, and organisation (N=429) are presented in table 2 below. Almost one-third of the students agreed that OSCEs were fair (30.1%); cover a wide range of clinical skills (36.1%); are well-administered (38.2%); well-structured (30.1%); minimise the chance of failing (35.4%); allow students to compensate in some areas (38.7%); highlight areas of weaknesses (35.7%); are less stressful than other exams (35.9%); and students were aware of the level of information needed (36.1%). On the opposite, about half of the students showed that OSCEs need to allow more time at stations (45.9%).

The second section of table 2 presents students' evaluation of the quality of OSCE performance. The results showed that 187 (43.6%) agreed that they were fully aware of the nature of the OSCEs; 182 (42.4%) agreed that OSCEs' tasks reflect those taught; more than half of students had a neutral perception that time at each station was adequate237 (55.2%); and instructions were clear and unambiguous 240 (55.9%). About two-thirds of students had a neutral perception that tasks asked to perform were fair and that the sequence of stations was logical and appropriate. The majority of students revealed that OSCEs provide them with opportunities to learn.

Students' perception of the OSCE scoring and objectivity revealed that the majority of students thought that OSCEs provide a true measure of essential clinical skill; OSCE scores were standardised; OSCE was a practical and useful experience; and personality and social relations would not affect OSCEs scores.

Regarding the students' perception toward OSCEs' organisation, the majority of students agreed that the announcement of the venue of OSCEs was made in advance; the timetable of OSCEs was available and known to students early; the revision was done before the examination about different types of clinical procedures; students were given a general idea about the OSCEs before the exam process; the staff were cooperative to answer questions related to the organisation of examination; and the quality of the OSCEs' labs was good—from setting up and cleanliness, suitable lighting, quietness, and ventilation.

Table 2: Students' evaluation of OSCE attributes, quality of performance, scoring, objectivity and organisation (N=429)

Evaluation of OSCE attributes	**Not at all**		**Neutral**		**To a great extent**	
	N	**(%)**	**N**	**(%)**	**N**	**(%)**
The exam was fair.	28	6.5	272	63.4	129	30.1
Wide knowledge area covered.	20	4.7	254	59.2	155	36.1
Needed more time at stations.	40	9.3	192	44.8	197	45.9
Exams were well administered.	27	6.3	238	55.5	164	38.2
Exams are very stressful.	123	28.7	220	51.3	86	20.0
Exams were well-structured and sequenced.	30	7.0	270	62.9	129	30.1
Exam minimised the chance of failing.	56	13.1	221	51.5	152	35.4
OSCE is less stressful than other exams.	64	14.9	211	49.2	154	35.9
Allowed students to compensate in some areas.	38	8.9	225	52.4	166	38.7
Highlighted areas of weaknesses.	57	13.3	219	51.0	153	35.7
The exam is intimidating.	71	16.6	235	54.7	123	28.7
Students are aware of the level of information needed.	23	5.4	251	58.5	155	36.1
Evaluation of the quality of OSCE performance						
Fully aware of the nature of the exam.	24	5.6	218	50.8	187	43.6
Tasks reflected those taught.	33	7.7	214	49.9	182	42.4
Time at each station was adequate.	71	16.6	237	55.2	121	28.2
Instructions were clear and unambiguous.	17	4.0	240	55.9	172	40.1
Tasks asked to perform were fair.	19	4.4	264	61.6	146	34.0
Sequence of stations logical and appropriate.	18	4.2	271	63.2	140	32.6
Exam provided opportunities to learn.	13	3.0	229	53.4	187	43.6
Perception of the OSCE scoring and objectivity						
OSCE scores provide true measure of essential clinical skills.	20	4.7	231	53.8	178	41.5
OSCE scores are standardised.	40	9.3	231	53.9	158	36.8
OSCE practical and useful experience.	13	3.0	222	51.7	194	45.3
Personality and social relations will not affect OSCE scores.	44	10.3	235	54.8	150	35.0
Students' perception regarding OSCE organisation						
The announcement about the venue of the OSCE examination was made well in advance.	39	9.1	216	50.3	174	40.6
The timetables of the OSCE examination were available and known to students early.	28	6.5	213	49.7	188	43.8
The revision was done before the examination of the different types of clinical procedures.	39	9.1	218	50.8	172	40.1
Gave general idea about the OSCE before exam process.	35	8.2	215	50.1	179	41.7
The staff were cooperative to answer your questions related to the organisation of the examination.	26	6.1	206	48.0	197	45.9
The quality of the OSCE labs was good, from set-up and cleanliness, suitable lighting, quietness and ventilation.	53	12.4	220	51.2	156	36.4

Table 3 depicts the comparison between examination characteristics and examination formats. The results show that OSCEs have higher total scores compared with the other examination formats in terms of the attributes: quality of performance, scoring and objectivity, and organisation. Post Hoc ANOVA analysis showed significant mean differences among all examination formats, where the overall score for OSCEs was (69.08 ± 9.93), compared to MCQ (63.70 ± 10.53), oral exams (66.44 ± 8.08), and written exams (63.14 ± 9.09).

Table 3: Associations between exam characteristics with the examination formats (n=429)

Variable / Total score	Format				
	MCQ M ±SD	**Oral M ±SD**	**Written M ±SD**	**OSCE M ±SD**	**P value**
Attribute	26.21 ± 3.77	26.61 ± 3.10	25.81 ± 3.68	27.50 ± 3.57	0.002
Quality of performance	15.31 ± 2.92	16.20 ± 2.62	15.10 ± 2.67	17.20 ± 2.94	<0.001
Scoring and objectivity	8.90 ± 1.90	9.32 ± 1.75	8.50 ± 1.81	9.85 ± 1.80	<0.001
Organisation	13.27 ± 3.10	14.32 ± 2.65	13.73 ± 2.72	14.53 ± 2.86	0.001
Overall	63.70 ±10.53	66.44 ± 8.08	63.14 ± 9.09	69.08 ± 9.93	<0.001

Discussion

This study aimed to evaluate nursing students' perceptions regarding OSCEs as an assessment tool for clinical skills. The OSCE is an innovative, clinical competencies assessment tool for nursing tasks in a simulated environment, since it is practically difficult to measure students' performance on real patients. Understanding students' views toward OSCEs is essential to develop the best practices guidelines for OSCEs' implementation and to improve students' performance. Interesting findings in this study were that nursing students rated OSCEs as the most preferred assessment method for clinical competencies, fit for all students' levels and connecting the theoretical part to the clinical. Supportive results were documented by the work of Gelan, Essayas, and Gebressilase (2015), where the majority of students viewed OSCEs as the best assessment method of practical exams. These findings are in agreement with a study conducted by Eldarir, Nagwa, and Hamid (2013) that OSCEs help students to translate theoretical knowledge into practice. Taylor, Haywood, and Shulruf (2019) have found that using OSCEs improved students' clinical competencies. On the other hand, Liddle (2014) found a contradictory finding that students were unable to connect OSCEs with real clinical practice due to a lack of direct feedback from the examiners after the exams.

The current study findings of students' views toward OSCEs' attributes revealed that students showed favourable responses that OSCEs were fair. Eswi, Samy, and Shaliabe (2013) studied Saudi nursing students' perspectives toward OSCEs and concluded that

the majority of the students perceived OSCE as a fair evaluation method. This could be related to using predetermined evaluation criteria with minimum raters' bias. In terms of OSCEs implementation, students highlighted that OSCEs covered a wide range of clinical knowledge and skills, were well administered, well-structured, minimised the chance of failing, allowed the student to compensate in some areas, and highlighted areas of weaknesses. These findings are in agreement with a study conducted by Esri et al. (2013).

Examinations are generally stressful; however, students in this study reported that OSCEs were less stressful than other examination styles, and students were aware of the level of information needed. These results are in agreement with those of Ali et al. (2012) and Gelan et al. (2015). This might be related to hands-on applications with standard criteria and students' awareness about the examinations' nature with clear instructions. On the other hand, other studies reported that students found the OSCEs more stressful than other examination methods (Zayyan 2011). Haleem et al. (2015) report that examination-related anxiety and stress may interfere with students' demonstration of actual competence and so interfere with OSCEs' validity. Moreover, familiarising students with the OSCE process may reduce examination-related anxiety. Concerning the students' opinions regarding the obstacles to OSCEs, about half of the students stated that OSCEs need more time at the stations. Eldarir et al. (2013) have reported similar results, namely that students complain of inadequate time at OSCE stations.

According to the students' views toward the quality of OSCEs' performance, overall, students' perception was positive regarding their awareness of the nature of the examination, the reflection of the taught tasks, clarity of instructions, opportunities to learn, and logical sequence of the stations. This is in line with other studies (Ali et al. 2012; Amr and Amin 2012).

Regarding the scoring reliability, our study's students revealed that OSCEs' scores were standardised and offered a true measure of essential clinical skills and reflected their actual performance. El-Sheikh and Abd El Aziz (2015) reported that the majority of their study sample agreed that OSCE scores were consistent. This might be related to using objective scoring criteria where there is no raters' bias. Nursing students in the current study found that OSCEs were a practical and useful experience. This could be interpreted in light of the fact that, in OSCEs, students have to practise the required tasks with a hands-on demonstration rather than just memorising the pure knowledge. Several authors have come to a similar conclusion that the OSCE experience is practical for nursing students. More than one-third of the students in this study reported that personality and social relations did not affect their OSCE-obtained grades. These results are congruent with the study of El-Sheikh and Abd El Aziz (2015).

Regarding students' perspectives toward the OSCEs' examination organisation, the results revealed that the OSCEs' dates, timetables, and venues were announced clearly

to them in advance. Furthermore, revisions of procedures and general ideas were conducted in advance. This was to make students more familiar with the examinations. Mahmoud and Mostafa (2011) reported that students were satisfied with the examination's announcement. About half of the students agreed to the greatest extent that the examiners were cooperative to answer students' concerns. Finally, regarding the quality of the OSCE labs, facilities, equipment, and examination environment in terms of cleanliness, suitability, lighting, quietness, and ventilation, only a small portion of students rated that these were not good. Supporting results were documented by Hosseini et al. (2011).

The comparison among all examinations' formats showed that the OSCEs have higher total scores compared with the other examination formats in terms of the attribute, quality of performance, scoring and objectivity, and organisation. These results are congruent with the overall study results, where students preferred OSCEs as an assessment tool to measure their clinical skills. Other studies in Saudi Arabia supported these findings (Entesar 2019). Meanwhile, Siddaram and Anil (2018) found that conventional examinations were more convenient and applicable in nursing education. This could be related to the requirements for the successful implementation of the OSCEs.

Recommendations

Based on the findings of the current study, it is recommended that OSCEs should be integrated as an assessment strategy for undergraduate students in nursing programmes in combination with other evaluation methods to ensure safe practice. To improve the OSCEs' implementation and to mitigate possible difficulties, it is recommended to obtain students' and instructors' feedback after each OSCE session. Further studies are recommended involving different samples of students and faculty members to evaluate the OSCEs' effectiveness within nursing education programmes. Qualitative studies to investigate both students' and instructors' lived experiences are highly recommended.

Limitations

The results of this study have implications for nursing education to adopt OSCEs as an integral part of nursing students' assessment in producing high-quality nurses. Nevertheless, every study has its limitations. The first limitation was data collection at one point. The results might have been different according to the time of data collection, for example, before, during, or after the OSCE. Another limitation was inadequate follow-up. The study was limited to one private institution, which might limit the generalisability of findings.

Conclusion

The OSCE has been integrated as an innovative method of evaluating clinical skills in the nursing curriculum over the years. OSCEs are accepted well by nursing students,

and they prefer OSCEs over the traditional clinical examination. Nevertheless, it needs some development and improvement to make it more effective and valuable. Academic institutions should design OSCEs well in terms of preparation, planning, equipping labs, organisation, and implementation. They should do follow-up and continuously monitor and consider faculty and students' feedback to improve OSCEs. In addition to the mentioned suggestions, the combination of different assessment tools can overcome the limitations of OSCEs.

Author Biography

Izzeddin A. Bdair (RN, PhD) is an assistant professor of critical health nursing, and Head of the Nursing Department at Al-Ghad International Colleges for Applied Medical Sciences, Abha/KSA.

References

Ali, G., A. Y. Mehdi, and H. Ali. 2012. "Objective Structured Clinical Examination (OSCE) as an Assessment Tool for Clinical Skills in Sohag University. Nursing Students' Perspective." *The Journal of Environmental Studies*, no. 8: 59–69. https://doi.org/10.21608/jesj.2012.189915.

Alsaid, A. H., and M. Al-Sheikh. 2017. "Student and Faculty Perception of Objective Structured Clinical Examination: A Teaching Hospital Experience." *Saudi Journal of Medicine and Medical Sciences* 5 (1): 49–55. https://doi.org/10.4103/1658-631X.194250.

Amr, M., and T. Amin. 2012. "Assessment Methods of an Undergraduate Psychiatry Course at a Saudi University." *Sultan Qaboos University Medical Journal* 12 (2): 214–220. https://doi.org/10.12816/0003115.

Ataro, G., S. Worku, and T. Asaminew. 2020. "Experience and Challenges of Objective Structured Clinical Examination (OSCE): Perspective of Students and Examiners in a Clinical Department of Ethiopian University." *Ethiopian Journal of Health Sciences* 30 (3): 417–426, 417. https://doi.org/10.4314/ejhs.v30i3.13.

Battistone, M. J., A. M. Barker, J. P. Beck, R. Z. Tashjian, … G. W. Cannon. 2017. "Validity Evidence for two Objective Structured Clinical Examination Stations to Evaluate Core Skills of the Shoulder and Knee Assessment." *BMC Medical Education* 17 (1): 1–8. https://doi.org/10.1186/s12909-016-0850-7.

Bdair I., H. Abuzaineh, and H. Burqan. 2019. "Advantages and Disadvantages of the Objective Structured Clinical Examination (OSCE) in Nursing Education: A Literature Review." *International Journal of Trend in Scientific Research and Development* 3 (2): 270–274. https://doi.org/10.31142/ijtsrd20269.

Divya, K. Y., B. P. Valsaraj, M. G. Qutishat, and K. R. S. A. Abri. 2019. “Planning and Implementing Objective Structured Clinical Examination (OSCE) as a Clinical Examination Method in Mental Health Nursing: Perceptions of Undergraduate Nursing Students in Oman: A Pilot Study.” *International Journal of Nursing Education* 11 (4): 186–190. https://doi.org/10.5958/0974-9357.2019.00116.8.

Eldarir, S. A., A. Nagwa, and A. Hamid. 2013. “Objective Structured Clinical Evaluation (OSCE) versus Traditional Clinical Students’ Achievement at Maternity Nursing: A Comparative Approach.” *IOSR Journal of Dental and Medical Sciences* 4 (3): 63–68. https://doi.org/10.9790/0853-0436368.

El-Sheikh, O. Y. SC D., and M. A. Abd El Aziz. 2015. “Evaluation of Objective Structured Clinical Examination: Nigerian Nursing Students’ Perspective.” *Egyptian Nursing Journal:* 62–69.

Entesar, M. 2019. “Saudi Nursing Students’ Outcomes and Perspectives about an Objective Structured Clinical Examination in Obstetrics and Gynaecological Nursing Course.” *International Journal of Medical Research and Health Sciences* 8 (3): 19–25.

Eswi, A., A. Samy, and H. Shaliabe. 2013. “OSCE in Maternity and Community Health Nursing: Saudi Nursing Students’ Perspective.” *American Journal of Research Communication* 1 (3):143–162.

Ferreira, É. D. M. R., R. Z. Pinto, P. M. M. Arantes, É. L. M. Vieira, A. L. Teixeira, F. R. Ferreira, and D. V. Vaz. 2020. “Stress, Anxiety, Self-efficacy, and the Meanings that Physical Therapy Students Attribute to their Experience with an Objective Structured Clinical Examination.” *BMC Medical Education* 20 (1): 1–9. https://doi.org/10.1186/s12909-020-02202-5.

Gelan, E. A., R. Essayas, and K. Gebressilase. 2015. “Perception of Final Year Medical Students about Objective Structured Clinical Examination in the Department of General Surgery.” *Ethiopian Medical Journal* 53 (4): 183–190.

Graf, J., R. Smolka, E. Simoes, S. Zipfel, F. Junne, F. Holderried, … and A. Herrmann-Werner. 2017. “Communication Skills of Medical Students during the OSCE: Gender-Specific Differences in a Longitudinal Trend Study.” *BMC Medical Education* 17 (1): 1–9. https://doi.org/10.1186/s12909-017-0913-4.

Haleem, D. J., S. Haider, T. Perveen, and M. A. Haleem. 2015. “Serum Leptin and Cortisol, related to Acutely Perceived Academic Examination Stress and Performance in Female University Students.” *Applied Psychophysiology and Biofeedback* 40 (4): 305–312. https://doi.org/10.1007/s10484-015-9301-1.

Harden, R. M., M. Stevenson, W. W. Downie, and G. M. Wilson. 1975. “Assessment of Clinical Competence using Objective Structured Examination.” *BMJ,* no, 1: 447–451. https://doi.org/10.1136/bmj.1.5955.447.

Hosseini, S. A., N. Fatehi, J. Eslamian, and M. Zamani. 2011. “Reviewing the Nursing Students’ Views toward OSCE Test.” *Iranian Journal of Nursing and Midwifery Research* 16 (4): 318–320.

Khan, A., M. Ayub, and Z. Shah. 2016. “An Audit of the Medical Students’ Perceptions regarding Objective Structured Clinical Examination.” *Education Research International*, no. 1: 1–4. https://doi.org/10.1155/2016/4806398.

Khan, S. A., S. Aaraj, S. Talat, and N. Javed. 2021. “Students’ Perception and Scores in Paediatrics End-of-clerkship and Final Professional Objective Structured Clinical Examination (OSCE): A Comparative Study.” *Pakistan Journal of Medical Sciences* 37 (2): 1–6. https://doi.org/10.12669/pjms.37.2.3422.

Kolivand, M., M. Esfandyari, and S. Heydarpour. 2020. “Examining Validity and Reliability of Objective Structured Clinical Examination for Evaluation of Clinical Skills of Midwifery Undergraduate Students: A Descriptive Study.” *BMC Medical Education* no. 20: 1–7. https://doi.org/10.1186/s12909-020-02017-4; https://doi.org/10.21203/rs.2.10419/v2.

Liddle, C. 2014. “The Objective Structured Clinical Examination.” *Nursing Times*. Accessed March 20, 2021. http://tinyurl.com/ptbbwbv.

Lim, A. S., S. W. H. Lee, N. Karunaratne, and S. Caliph. 2020. “Pharmacy Students’ Perceptions and Performance on the Use of an Online Virtual Experience Tool for Practicing Objective Structured Clinical Examinations.” *American Journal of Pharmaceutical Education* 84 (11):1467–1475. 7920. https://doi.org/10.5688/ajpe7920.

Mahmoud, G. A., and M. F, Mostafa. 2011. “The Egyptian Nursing Student’s Perceptive View about an Objective Structured Clinical Examination (OSCE).” *Journal of American Science* 7 (4):730–738.

Majumder, M. A. A., A. Kumar, K. Krishnamurthy, N. Ojeh, O. P. Adams, and B. Sa. 2019. “An Evaluative Study of Objective Structured Clinical Examination (OSCE): Students’ and Examiners’ Perspectives.” *Advances in Medical Education and Practice* no. 10*:* 387–397. https://doi.org/10.2147/AMEP.S197275.

Martin, R. D., N. Ngo, H. Silva, and W. R. Coyle. 2020. “An Objective Structured Clinical Examination to Assess Competency Acquired During an Introductory Pharmacy Practice Experience.” *American Journal of Pharmaceutical Education* 84 (4). https://doi.org/10.5688/ajpe7625.

Müller, S., I. Koch, U. Settmacher, and U. Dahmen. 2019. “How the Introduction of OSCEs Has Affected the Time Students Spend Studying: Results of a Nationwide Study.” *BMC Medical Education* 19 (1): 1–7. https://doi.org/10.1186/s12909-019-1570-6.

Munkhondya, T. E. M., G. Msiska, E. Chilemba, and M. D. Majamanda. 2014. “Experience of Conducting Objective Structured Clinical Evaluation (OSCE) in Malawi.” *Open Journal of Nursing* 4 (10): 705–712. https://doi.org/10.4236/ojn.2014.410075.

Naumann, F. L., S. Marshall, B. Shulruf, and P. D. Jones. 2016. “Exploring Examiner Judgment of Professional Competence in Rater-based Assessment.” *Advances in Health Sciences Education* 21 (4): 775–788. https://doi.org/10.1007/s10459-016-9665-x.

Pierre, R. B., A. Wierenga, M. Barton, J. M. Branday, and C. D. Christie. 2004. “Student Evaluation of an OSCE in Paediatrics at the University of the West Indies, Jamaica.” *BMC Medical Education* 4 (1): 1–7. https://doi.org/10.1186/1472-6920-4-22.

Plakiotis, C. 2017. “Objective Structured Clinical Examination (OSCE) in Psychiatry Education: A Review of its Role in Competency-based Assessment.” *Advances in Experimental Medicine and Biology:*159–180. https://doi.org/10.1007/978-3-319-56246-9_13.

Siddaram, S., and S. Anil. 2018. “A Comparative Analysis between Objective Structured Clinical Examination (OSCE) and Conventional Examination (CE) as Formative Evaluation Tool.” *International Journal of Nursing Education*, no. 10*:* 102–105. https://doi.org/10.5958/0974-9357.2018.00076.4.

Shirwaikar, A. 2015. “Objective Structured Clinical Examination (OSCE) in Pharmacy Education—a Trend.” *Pharmacy Practice* 13 (4): 627–631. https://doi.org/10.18549/PharmPract.2015.04.627.

Taala, W., D. Waggas, T. Parisa. 2019. “Utilization of Objective Structured Clinical Examination (OSCE) in Ensuring Clinical Competence of Nursing Students: A Case of FCMS.” *Open Access Library Journal* 6 (3): 5209–5221.1. https://doi.org/10.4236/oalib.1105209.

Taylor, S., M. Haywood, and B. Shulruf. 2019. “Comparison of the Effects of Simulated Patient Clinical Skill Training and Student Roleplay on Objective Structured Clinical Examination Performance among Medical Students in Australia.” *Journal of Educational Evaluation for Health Professions* 16 (3): 1–7. https://doi.org/10.3352/jeehp.2019.16.3.

Zayyan, M. 2011. “Objective Structured Clinical Examination: The Assessment of Choice.” *Oman Medical Journal* 26 (4): 219–222. https://doi.org/10.5001/omj.2011.55.

Zhang, N., and D. M. Walton. 2018. “Why so Stressed? A Descriptive Thematic Analysis of Physical Therapy Students’ Descriptions of Causes of Anxiety during Objective Structured Clinical Exams.” *Physiotherapy Canada* 70 (4): 356–362. https://doi.org/10.3138/ptc.2016-102.e.