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Original article

Undergraduate Dental Students' Perceptions of OSCE in Restorative and Endodontic Department at University of Tripoli, Libya: A Cross-Sectional Study

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Abstract
This study aimed to determine dental students' perceptions of the fairness, their sense of ability, and the reliability and validity of OSCEs as a method of assessing clinical competence in restorative and endodontic departments, with specific objectives including comparing the perception of OSCEs between male and female students. This study involved a survey of 141 dental final-year students who had completed OSCE examinations. The survey collected demographic data and assessed participants' perceptions of OSCE impartiality, complexity, educational value, and preferred frequency compared to other evaluation methods. All the data were recorded and subjected to statistical analysis. The level of significance is set at a P value of <0.05. The study revealed that while 52.5% of 141 dental students (87 female, 54 male) found the OSCE fair, 54.6% experienced high stress levels, and 56% believed external factors influence scores. The study found that while most dental students recognize the value of OSCEs in assessing their skills, they also raised concerns about fairness, time limits, and the potential impact of factors like personality on their performance.
Keywords. Dental Education, Undergraduate Students, Objective Structured Clinical Examination.

Introduction

Operative dentistry is a field that focuses on the treatment of diseases in dental hard tissue, such as caries[1,2]. A dental graduate must possess a multifaceted skill set encompassing research, problem-solving, effective communication, and clinical proficiency. However, clinical evaluations have traditionally utilized non-standardized, subjective criteria, which often lead to significant inter-assessor variability[3,4]. Objective Structured Clinical Examinations (OSCEs) were initially introduced by Ronald Harden in 1975, developed for medical evaluations before being adapted for dental education[5–7]. OSCE has become a standard assessment method for both undergraduate and postgraduate medical students. Also, the OSCE has become a cornerstone of modern healthcare education. By providing a standardized framework for assessment, it offers a high degree of reliability and validity in measuring clinical competence, effectively mitigating the inconsistencies often found in traditional observational methods[4,8].

The OSCE framework consists of a sequence of timed stations where candidates encounter standardized clinical scenarios. Each station utilizes predefined assessment rubrics and objective scoring systems to ensure a rigorous and uniform evaluation of clinical proficiency. The OSCE typically integrates binary checklists with global rating scales to capture both technical accuracy and overall clinical judgment[4,9,10]. Unlike traditional written and oral assessments, which primarily evaluate Miller's second level of competency ('Knows How'), the OSCE is designed to assess the third level: 'Shows How'[4,11]. Originally described as a timed exam where students interact with simulated patients in various stations, the OSCE evaluates skills like history-taking, physical examination, counseling, and patient management[5,12–14].

Immediately recognized as the gold standard for clinical assessment, OSCEs offer several advantages over traditional "long case" examinations. An OSCE is a standardized assessment that evaluates clinical skills in a structured setting. Traditional methods of assessing medical students' clinical competence, such as short cases, long cases, and oral examinations, have been criticized for their lack of structure, inconsistent grading, and susceptibility to examiner bias(15). Compared to traditional exams, OSCEs offer a more objective evaluation [7]. These include greater control over evaluation factors and conditions, clear learning objectives for both students and teachers, and the ability to comprehensively assess a wide range of student knowledge and skills[12,13]. UK dental schools are currently reviewing their curricula in response to the General Dental Council's (GDC) 1997 publication, "The First Five Years - The Undergraduate Dental Curriculum." This document emphasizes the need to identify and demonstrate essential components of the undergraduate dental program, including core knowledge, skills, and attitudes. A key strength of OSCE exams is their objectivity.

By minimizing the influence of patient and examiner variability, they focus solely on assessing the candidate's abilities. Additionally, OSCEs are flexible and versatile, allowing for the evaluation of a wide range of skills and disciplines, even combining multiple competencies within a single station[12]. Over the past few decades, the OSCE has proven to be a reliable and valid assessment tool capable of evaluating all three learning domains—

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cognitive, affective, and psychomotor—as well as demonstrating "shows how" skills, a key level of competence[15]. The educational efficacy of the OSCE is closely tied to student perception.

Current research indicates that the format can be a significant source of psychological stress; indeed, a recent cross-sectional study found that most dental students reported moderate to high levels of anxiety during the examination process. Understanding these perceptions is crucial for refining assessment strategies to ensure they accurately reflect competence rather than just stress resilience[16]. Literature indicates a dual perception of the OSCE among students; while many regard it as a comprehensive and valid instrument for evaluating clinical skills, others find the experience significantly stressful. Notably, Pierre et al. emphasize that OSCE sessions serve a diagnostic purpose, effectively highlighting specific strengths and deficiencies within a student's clinical competence profile[10].

Despite the associated stress, large-scale surveys demonstrate that a significant majority of students perceive the OSCE as a more equitable, well-organized, and thorough assessment of clinical proficiency than traditional examination formats[16]. Written exams, such as essays and multiple-choice questions, primarily assess cognitive knowledge, which is just one component of overall competence. Traditional clinical exams focus on a limited range of clinical skills, observed by typically two examiners during a single patient case. These exams mainly evaluate patient history-taking, physical examination techniques, and basic technical skills. Their reliability in assessing student performance is questionable due to significant variability between examiners[17]. OSCEs can provide a comprehensive and accurate assessment of students' clinical competence. Unlike traditional methods, OSCEs excel at evaluating critical healthcare skills such as problem-solving, information comprehension, and patient interaction[13].

Published findings of researchers on OSCE from its inception in 1975 to 2004 have reported it to be reliable, valid, and objective, with cost as its only major drawback (see Table 1)[17]. The OSCE, however, covers a broader range like problem solving, communication skills, decision-making, and patient management abilities[14]. Unlike traditional exams judged by a few examiners, OSCEs involve multiple evaluators stationed across various assessment points. This benefits both students and institutions by reducing bias, establishing broader standards through collective input, and allowing for efficient evaluation of more students across a wider range of subjects in less time[18]. The OSCE is the standard method for assessing competency, clinical skills, and counseling abilities in leading medical schools in the United Kingdom, the United States, Canada, and beyond. It effectively complements traditional knowledge-based exams like essays and multiple-choice questions[14,15].

Table 1. Advantages & Disadvantages of the OSCE exam

Advantages of OSCE Objectivity	**Disadvantages**
Uniform scenarios for all candidates	Organizational training
Availability	The idealized textbook scenarios may not mimic real-life situations
Safety, no danger of injury to patients	Expensive
No risk of litigation	
Feedback from actors (simulators)	
Allows for recall	
Stations can be tailored to the level of skills to be assessed	
Allows for teaching audit	
Allows for demonstration of emergency skills	

In an OSCE, dental students rotate through a series of stations designed to evaluate their clinical abilities. These stations assess diagnostic, clinical, and communication skills, all grounded in relevant knowledge. Standardized tasks, time limits, and checklists ensure objectivity in scoring. By covering a broad range of skills, OSCEs provide a comprehensive evaluation of students' clinical competence[19]. "Therefore, this study aimed to determine dental students' perceptions of the fairness, their sense of ability, and the reliability and validity of OSCEs as a method of assessing clinical competence in restorative and endodontic departments, with specific objectives including comparing the perception of OSCEs between male and female students.

Methodology

This study aimed to find out how dental students feel about OSCEs. A total of 141 students who had taken OSCE exams within the final years (2023-2024) were surveyed. A 12-item English questionnaire was administered to gather data on demographics and participants' perceptions of OSCE components (planning, guidance, performance). The questionnaire also evaluated the OSCE's effectiveness compared to other assessment methods using a 4-point Likert scale to measure agreement levels for most items, and a 3-point

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scale for impartiality, complexity, educational value, and preferred frequency. Recorded data were analyzed using the statistical package for the social sciences, version 26.0 (SPSS Inc., Chicago, Illinois, USA).
Qualitative data were expressed as frequency and percentage. The following tests were done: The Comparison between groups with qualitative data was done by using the Chi-square test and Fisher's exact test, instead of the Chi-square test only when the expected count in any cell is less than 5. The confidence interval was set to 95%, and the margin of error accepted was set to 5%. So, the p-value was considered significant as follows: P-value <0.05 was considered significant, P-value <0.001 was considered highly significant, and P-value >0.05 was considered insignificant.

Results

Of the 141 dental students evaluated, 87 (61.7%) were female, and 54 (38.3%) were male (Figure 1). The evaluation process revealed a variety of student performance outcomes among both male and female students, 52.5% of participants agreed that the examination was fair, while 22.7% disagreed. 61% of participants felt they required additional time to complete the examination. 51.1% of participants were satisfied with how the examination was conducted. 54.6% of participants reported that the examination generated a high level of stress. 45.4% of participants believed the examination was properly organized. 43.9% of participants felt the stress level associated with the OSCE was lower than that of the routine examination. 52.4% of participants felt the OSCE assessed a wide range of clinical skills. There is no statistically significant difference between females and males according to dental student perceptions of OSCEs, with a p-value (p>0.05) (Table 2).

Table 2. Frequency and percentage distribution of the studied dental student perceptions of OSCEs (between female and male) (n= 141)

Dental Student Perceptions of OSCEs	Gender	Agree		Disagree		Neutral		No comment		Total		x2	p-value
		No.	%	No.	%	No.	%	No.	%	No.	%		
Was the examination fair?	Female	41	29.1%	19	13.5%	16	11.3%	11	7.8%	87	61.7%	4.866	0.182
	Male	33	23.4%	13	9.2%	5	3.5%	3	2.1%	54	38.3%		
Do you require additional time to complete it?	Female	47	33.3%	21	14.9%	10	7.1%	9	6.4%	87	61.7%	6.694	0.082
	Male	39	27.7%	9	6.4%	1	0.7%	5	3.5%	54	38.3%		
Was the examination conducted in a satisfactory manner?	Female	42	29.8%	17	12.1%	12	8.5%	16	11.3%	87	61.7%	5.821	0.121
	Male	30	21.3%	13	9.2%	1	0.7%	10	7.1%	54	38.3%		
Did the examination generate a high level of stress?	Female	44	31.2%	23	16.3%	9	6.4%	11	7.8%	87	61.7%	6.882	0.076
	Male	33	23.4%	12	8.5%	0	0.0%	9	6.4%	54	38.3%		
Was the examination properly organized?	Female	39	27.7%	21	14.9%	15	10.6%	12	8.5%	87	61.7%	5.223	0.156
	Male	25	17.7%	12	8.5%	15	10.6%	2	1.4%	54	38.3%		
Was the stress level associated with the OSCE lower than that of the routine examination?	Female	35	24.8%	25	17.7%	12	8.5%	15	10.6%	87	61.7%	4.389	0.222
	Male	27	19.1%	17	12.1%	7	5.0%	3	2.1%	54	38.3%		
Did the OSCE assess a wide range of clinical skills?	Female	47	33.3%	15	10.6%	10	7.1%	15	10.6%	87	61.7%	0.613	0.893
	Male	27	19.1%	11	7.8%	5	3.5%	11	7.8%	54	38.3%		

Using: x^2: Chi-square test for Number (%) or Fisher's exact test, when appropriate
*P-value >0.05 is insignificant; *p-value <0.05 is significant; **p-value <0.001 is highly significant*

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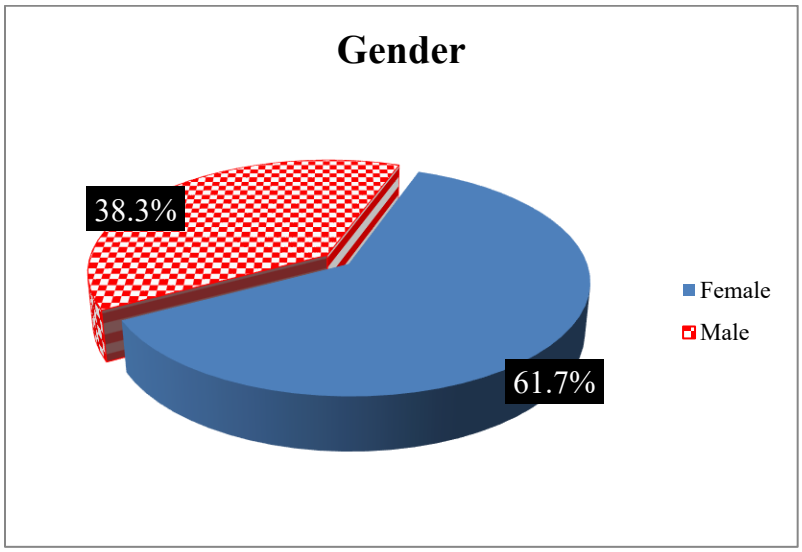

Figure 1. Percentage distribution of the students' dental according to their gender

Table 3 shows that a majority (50.4%) strongly agree that the OSCE offers a highly accurate assessment of clinical dental skills. A significant proportion (49%) agrees that there is a high degree of standardization in OSCE exams. A majority (51%) believe the OSCE is a practical tool for improving student outcomes. A significant majority (56%) believe OSCE scores are influenced by personality, ethnicity, or gender. There was a statistically significant difference between females and males according to dental student perceptions of OSCEs' reliability, about OSCE scores are not influenced by personality, ethnicity, or gender, with p-value ($p<0.05$); while the rest of the parameters have an insignificant difference, with p-value ($p>0.05$).

Table 3. Frequency and percentage distribution of the studied dental student perceptions of OSCEs' reliability (between female and male) (n= 141)

Dental Student Perceptions of OSCEs' Reliability	Gender	To a significant degree		Neutral		Definitely not		Total		x2	p-value
		No.	%	No.	%	No.	%	No.	%		
OSCE offers a highly accurate assessment of clinical dental skills.	Female	40	28.4%	30	21.3%	17	12.1%	87	61.7%	1.753	0.416
	Male	31	22.0%	15	10.6%	8	5.7%	54	38.3%		
There is a high degree of standardization in OSCE exams:	Female	41	29.1%	29	20.6%	17	12.1%	87	61.7%	1.032	0.597
	Male	28	19.9%	19	13.5%	7	5.0%	54	38.3%		
The OSCE is a practical tool for improving student outcomes:	Female	45	31.9%	25	17.7%	17	12.1%	87	61.7%	0.040	0.980
	Male	27	19.1%	16	11.3%	11	7.8%	54	38.3%		
OSCE scores are not influenced by personality, ethnicity, or gender:	Female	24	17.0%	21	14.9%	42	29.8%	87	61.7%	6.896	0.032*
	Male	6	4.3%	11	7.8%	37	26.2%	54	38.3%		

Discussion

The Objective Structured Clinical Examination (OSCE) has become an internationally recognized standard for evaluating clinical competencies across the spectrum of medical and dental education[20]. The OSCE is increasingly favored over traditional Multiple-Choice Questions (MCQs) in healthcare education due to its ability to provide an objective assessment of practical proficiency rather than mere theoretical recall[4].

The OSCE is widely recognized for its diagnostic precision in identifying gaps in clinical competence. Furthermore, the American Dental Education Association (ADEA) Commission on Change and Innovation has categorized it as an exemplary format for assessing a comprehensive range of competencies, with particular efficacy in evaluating diagnostic and treatment-planning skills[21]. In the United Kingdom, the OSCE is firmly established as a high-stakes summative assessment, serving as a critical determinant for academic progression and graduation. Furthermore, by incorporating structured feedback, dental schools are increasingly implementing OSCEs earlier in the curriculum to serve a dual purpose: supporting student learning (formative) while assessing clinical judgment (summative)[22].

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According to Chambers (1999) and Schoonheim-Klein et al. (2008), OSCEs offer a more accurate reflection of authentic clinical practice than conventional examination formats[19,23]. The findings of this study, regarding the fairness of the OSCE, 52.5% of the 141 surveyed dental students (87 females; 54 males) provided a positive assessment. Such findings align precisely with Gandhi et al. (2023), who similarly reported that 52.5% of their cohort viewed the examination as a fair evaluative tool[16]. Significant concerns regarding time constraints were evident, with 61% of students indicating a need for additional time to complete the examination. This finding is consistent with earlier research [16] and is similar to the work of Daouahi (2026)[4], who noted that while 36.1% of students remained neutral, a portion of the cohort specifically identified insufficient station timing as a primary concern. Collectively, these data suggest that time pressure remains a critical target for exam refinement[16]. High stress levels were reported by 54.6% of students, highlighting a need for targeted interventions to mitigate anxiety. While the OSCE appears to induce a manageable degree of stress for the majority, these findings—consistent with Daouahi et al. (2026)—indicate that a specific subset of students requires additional psychological support[4].

A notable finding was the perception that OSCE scores could be influenced by external factors—such as personality, ethnicity, or gender—held by a significant majority (56%) of the students. In contrast, previous research indicated a more divided perspective, with only 25% of students agreeing that scores were independent of these variables, while over 37% remained neutral or disagreed[16]. This widespread perception underscores the critical necessity of ensuring equity and minimizing implicit biases in both the design and implementation of the OSCE. Despite these concerns, the study highlighted several positive perceptions of the OSCE. A majority of participants (51%) expressed satisfaction with the examination's administration, and 43.9% regarded the stress levels as lower than those of traditional routine exams. This finding aligns with the results of Gandhi et al. (2023), who also reported that a substantial proportion of students (78.3%) perceived the OSCE as less stressful than conventional assessment formats [16]. Notably, more than half of the participants (50.4%) strongly agreed that the OSCE provides a highly accurate assessment of clinical dental skills, while 49% acknowledged its superior degree of standardization. Furthermore, 51% of students recognized the practical value of the OSCE in enhancing educational outcomes. These results represent a significant shift from previous findings, which reported that 51.8% of students remained neutral regarding standardization and only 36.3% viewed the OSCE as an effective measure of clinical competency[16].

It is usually attributed to specific methodological or contextual factors. In alignment with existing literature, which reported that 75.7% of students agreed or strongly agreed on the consistency of the assessment across various groups[4,24]. Our study found a similarly high level of consensus. This shared finding further validates the perceived objectivity of the OSCE format and suggests that standardization protocols are being effectively implemented and recognized by the student body. These findings suggest that while OSCEs hold promise as a valid and objective assessment method, further refinements are necessary to address student concerns regarding time constraints, stress levels, and potential external influences on performance.

Strategies to mitigate stress, optimize time allocation, and ensure fairness and equity across all student groups should be explored and implemented to enhance the overall student experience and maximize the effectiveness of OSCEs in dental education. This discussion provides a comprehensive overview of the study findings, highlighting both the strengths and weaknesses of OSCEs as perceived by dental students. It emphasizes the need for continuous improvement in OSCE design and implementation to ensure a fair, valid, and effective assessment experience for all students.

Limitations and recommendations

While the high response rate bolsters the reliability of these findings, the study is limited by a lack of qualitative data, which restricts a deeper understanding of the lived student experience. Furthermore, as this research was confined to a single institution and utilized a non-piloted questionnaire, the generalizability of the results may be limited. Future research should adopt a more rigorous methodological approach by incorporating pilot-tested instruments, qualitative inquiries, and multicenter designs. Additionally, integrating OSCEs early into clinical curricula—complemented by digital resources and formative 'mock' sessions—could enhance student readiness and mitigate examination-related anxiety.

Conclusion

The study found that while most dental students recognize the value of OSCEs in assessing their skills, they also raised concerns about fairness, time limits, and the potential impact of factors like personality on their performance. The OSCE style of clinical assessment, given its obvious advantages, especially in terms of objectivity, uniformity, and versatility of clinical scenarios that can be assessed, shows superiority over traditional clinical assessment. It allows evaluation of clinical students at varying levels of training within a relatively short period, over a broad range of skills and issues. OSCE removes prejudice in examining students

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and allows all to go through the same scope and criteria for assessment. This has made it a worthwhile method in medical practice.

Competing interests

All authors declare no competing interests.

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