The Review Of
DIABETIC
STUDIES OPEN ACCESS

Development Of Ospe Module In Anatomy For Phase I Medical Undergraduates

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Abstract

Background The Objective Structured Practical Examination (OSPE) has emerged as a structured and reliable tool to assess anatomy skills within a competency-based framework. Despite its advantages, the lack of clear implementation guidelines presents a challenge. This study aimed to develop and implement an OSPE module as a formative assessment tool for first-year MBBS students and also to assess the perception learners and facilitators about this assessment tool.
Methodology We developed a module for implementation of OSPE which was followed by implementation & feedback from learners and facilitators for MBBS batch (2024). Each OSPE session consisted of 12 stations, including six response stations, four observer stations, and two rest stations. Student and faculty feedback was collected via a structured Likert-scale questionnaire, and performance scores were analyzed using a paired sample t-test.
Results Mean scores of OSPE in both the sessions (28.43 ± 7.5, 36.33±7.7) were significantly higher than in traditional practical exams (23.38 ± 7.6,30.68±7.4), with a p-value <0.00,with indicating better performance in OSPE.84% of students agreed that the time allocated per station was adequate. 88.7% felt that OSPE tested a broad range of knowledge and skills.80% of faculty members endorsed OSPE as a fairer and more objective assessment method.87% of students supported OSPE's continuation as an evaluation tool**.**
Conclusion The current study confirms OSPE as an effective and well-received assessment tool in anatomy education.

Introduction

Competency-based medical education (CBME) in India places emphasis on demonstrable skills, professional attitudes, and context-appropriate application of knowledge across the early years of training (1). In anatomy, many competencies are expected at the "shows-how" level of Miller's pyramid, necessitating assessment formats that directly sample performance rather than proxy indicators of competence. The Objective Structured Practical Examination (OSPE), adapted from the OSCE paradigm, provides such a format by organizing multiple, blueprint-linked stations assessed with explicit checklists and standardized instructions (2). By widening content sampling, reducing examiner subjectivity, and aligning scoring with observable behaviors, OSPE is well-suited to the assessment needs of preclinical anatomy within CBME.

Evidence from anatomy and related basic sciences has documented several advantages of OSPE, including clearer criteria, enhanced transparency, and favourable acceptance among learners and faculty (3–6,9,10,12,14). Studies have reported perceived fairness and reduced inter-examiner variability attributable to checklist-based marking and standardized station design (10). At the same time, the literature notes pragmatic challenges, such as increased preparation and conduct time for faculty, and variable stress levels among students when compared with conventional practical examinations (4,6,7). With respect to learning outcomes, some investigations describe improved or comparable performance under OSPE relative to traditional practical examinations, while others report better scores in conventional formats, highlighting the importance of local adaptation and continuous review of station banks and logistics (3,11–14).

Despite its promise, two gaps remain evident. First, there is limited practical guidance on routine OSPE implementation within busy anatomy departments, covering blueprinting across sub-disciplines, faculty development, validation of stations and checklists, and structured orientation for learners. Second, few reports have integrated communication-focused competencies (AETCOM) within an anatomy OSPE circuit; many prior implementations focus narrowly on specific domains such as embryology or selected regional content (7,8). Addressing these gaps is essential for sustainable adoption in Indian medical colleges where resources, faculty numbers, and time are constrained.

The present study responds to these needs by developing and implementing a formative OSPE module for Phase-I MBBS Anatomy that spans gross anatomy, embryology, histology, radiology, and AETCOM. The module was blueprint-driven and checklist-based, underwent expert validation, and was preceded by structured sensitization of students and faculty. We evaluated (i) student performance in OSPE relative to traditional practical examinations, and (ii) stakeholder perceptions, students and faculty, regarding clarity, fairness, workload, stress, and feasibility. By combining performance data with systematic feedback, the study aims to provide actionable evidence for departments planning to embed OSPE within routine formative assessments, while recognizing context-dependent considerations highlighted in prior work (3–6,9–14).
In summary, OSPE aligns closely with CBME expectations for observable competence in anatomy by enabling reliable, criterion-referenced judgments at the "shows-how" level (1,2). Prior studies suggest benefits for transparency and breadth of sampling, with mixed results on comparative performance and workload (3–6,9–14). Building on this foundation, our study offers an integrated, multi-domain OSPE including AETCOM and examines both outcomes and acceptability to inform scalable, department-level implementation within the Indian undergraduate context.

Aim:
To introduce OSPE module as Formative assessment tool for phase I Medical undergraduates.

Objectives:
1.To develop a OSPE module for phase Imedical undergraduates.
2.To implement this module-based assessment on a pilot basis for phase I medical undergraduates.
3.To assess the perception of phase I medical undergraduates and the teaching staff (faculty & residents) about OSPE.

Material And Methods
Study place- Department of Anatomy ABVIMS & Dr.RML Hospital
Study Design- Interventional study with cross over design
Study Duration-3months
Study Participants-1stYear MBBS Students Batch 2024-25
Sample size -100,convenient sampling
The study was conducted over a period of three months (October- December 2024) in the Department of Anatomy ABVIMS & Dr. RML Hospital, on 100 1st Year MBBS Students Batch 2024-25 (29 Girls ,71 boys), after taking necessary approval from the Institutional Ethics Committee. No.768(81/2024) IEC/ABVIMS/RMLH/216 Dated 4/10/24.

Inclusion Criteria
- Students who consented to participate

Exclusion Criteria
- Students who did not wish to participate in the study.

Methodology:
Development of OSPE module was done as per the following steps:
Step 1:
The faculty and senior residents of the department of Anatomy were sensitized about OSPE an assessment tool topic were identified along with the competencies to be addressed from Upper limb and thorax in gross

anatomy and from embryology, histology, AETCOM, Radiology during the study duration for development of OSPE modules.
Step 2
OSPE Module was developed along with the blueprint.
Step 3
The module and the checklist were reviewed for validation by 3 internal and 2external faculty members and their suggestions were incorporated.
Step4
Students underwent sensitization sessions with suitable examples four weeks prior to OSPE implementation.
Step5
A total of 100 students were divided into two groups, A and B, with 50 students in each group.
The study was conducted in two sessions:

First Session: Group A was subjected to TPE (Traditional Practical Exam), which included a practical viva voce on the hard and soft parts of the upper limb (20marks each) with 10 marks spotting on -related radiology, and general embryology, general histology. Group B was subjected to OSPE.

Second Session: Conducted after two weeks, this session followed the same examination pattern, with a focus on the viva voce covering the thorax, including its hard and soft parts, related radiology, and the development of the cardiovascular system in embryology, along with spotting. In this session Group B was subjected to TPE and Group A to OSPE.
The OSPE consisted of 12 stations: six response stations, four observer stations, and two rest stations, with three minutes allotted per station. The observed station had two faculty and two senior residents with check list.Each station carried five marks.OSPE stations included topics from Hard parts,soft parts,embryology, radiology Histology and AETCOM (Fig1).Out of these 10 OSPE stations, 9stations were structured in a way to test the cognitive skill, psychomotor skills with analytical thinking in a clinical scenario and one station was on AETCOM to test communication skills (convince the subject for voluntary body donation/ for eye donation /organ donation). Marks obtained in TPE and OSPE along with checklist was discussed with the students by Focussed group discussion.

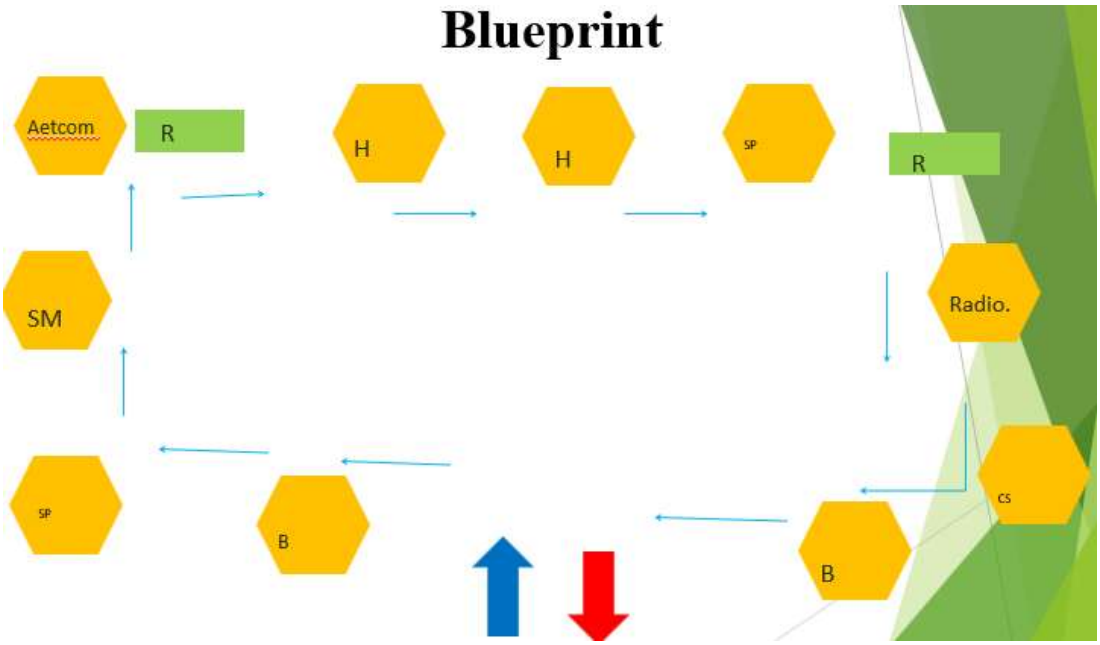


Fig1: OSPE blueprint

Feedback was gathered through a pre-designed Likert-scale questionnaire distributed via Google Forms. Faculty provided comparisons between OSPE and routine examinations, while students shared their overall perspectives on the OSPE process. Responses were captured on a five-point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). The faculty questionnaire comprised eight questions, including

seven closed-ended and one open-ended question, whereas the student questionnaire featured nine items, with eight closed-ended and one open-ended question. Open-ended responses provided additional insights, and the data was analyzed.

Statistical analysis

Data was compiled on excel sheet and analysed using IBM SPSS v26.0 The numerical data was summarized as mean + standard deviation and analysed using paired sample t test with p value <0.05 taken as significant.

Result

The study involved 100 Phase I MBBS students, with 92 students submitting their feedback on the Objective Structured Practical Examination (OSPE). Additionally, 3 faculty members and one Senior resident /senior demonstrator participated in the module. The results revealed significant insights into both student and faculty perceptions of OSPE, as well as a comparison of student performance between OSPE and traditional practical exams.

Students feedback on OSPE (Table 1)

Students feedback on OSPE was overwhelming 84% of students(Fig2) agreed that the time allocated for each station was adequate. Over 96% of students agreed that the instructions were clear. Approximately 83% of students felt that OSPE helped them learn in-depth, and 88.7% agreed it tested a wide range of knowledge and skills.(Fig3) While 78.6% were comfortable with OSPE, 87% supported its continuation as an assessment tool(Fig 4) 20%student felt OSPE is More Stressful compared to traditional exam whereas 96% felt OSPE is easier to score .As per the reflections taken from them Majority of students felt OSPE emphasized critical thinking, problem-solving, and time management.Feedback helped in identifying strengths and areas for improvement. It also underscored the importance of clear communication, as several stations required precise explanations of procedures or findings. The structured feedback helped identify areas of strength and those requiring improvement, motivating them to focus on enhancing their weaker areas. While comparing with traditional practical viva voce exam (Table 3) Mean scores of OSPE in both the sessions (28.43 ± 7.5, 36.33±7.7) were significantly higher than in traditional practical exams (23.38 ± 7.6,30.68±7.4), with a p-value <0.001,with indicating better performance in OSPE

Table 1. Student feedback on OSPE

S.no.	Your Observation	Strongly Agree %	Agree %	Neutral %	Disagree %	Strongly Disagree%
A.	The time given for each station was adequate	27.3%	56.8%	13.6%	2.3%	0%
B.	The instruction given was clear	38.6%	58%	3.4%	0%	0%
C.	OSPE helps to learn in depth.	27.3%	55.7%	14.8%	2.2%	0%
D.	OSPE tests a wide range of knowledge and skills.	33%	55.7%	11.3%	0%	0%
E	OSPE is more stressful compared to traditional examination.	10%	10%	27%	53%	0%
F	Scoring of marks was easier in OSPE	40%	56%	4%	0%	0%
G	The OSPE should be continued as an assessment tool for evaluation.	30.4%	56.6%	10.7%	2.3%	0%
H	Overall we were comfortable with OSPE.	22.9%	55.7%	21.4%	0%	0%
I	Right reflections on your personal experience with OSPE	(Maximum 100 words)				

Faculty Feedback on OSPE

Faculty acknowledged OSPE as a better way to assess knowledge domains (80% agreement) and remove examiner variability.100% supported the continuation of OSPE, though 40% perceived as more exhausting than conventional methods (Table 2).

Table 2Faculty Feedback on OSPE:

S.no.	Your Observation	Strongly Agree %	Agree %	Neutral %	Disagree %	Strongly Disagree%
A.	The instructions during the examination were clear	100%	0%	0%	0%	0%
B.	The time allotted for each station as adequate	80%	20%	0%	0%	0%
C.	OSPE is a better way to assess the different domains of knowledge of student	60%	20%	20%	0%	0%
D.	Checklists in OSPE provides a fair system of marking	80%	20%	0%	0%	0%
E.	The factor of variability of examiner can be removed in better way by OSPE	100%	0%	0%	0%	0%
F	OSPE is more exhausting compared with conventional method	20%	20%	40%	20%	0%
G	OSPE should be continued as an assessment tool for evaluation.	80%	20%	0%	0%	0%
H	Right reflections on your personal experience with OSPE	(Maximum 100 words)				

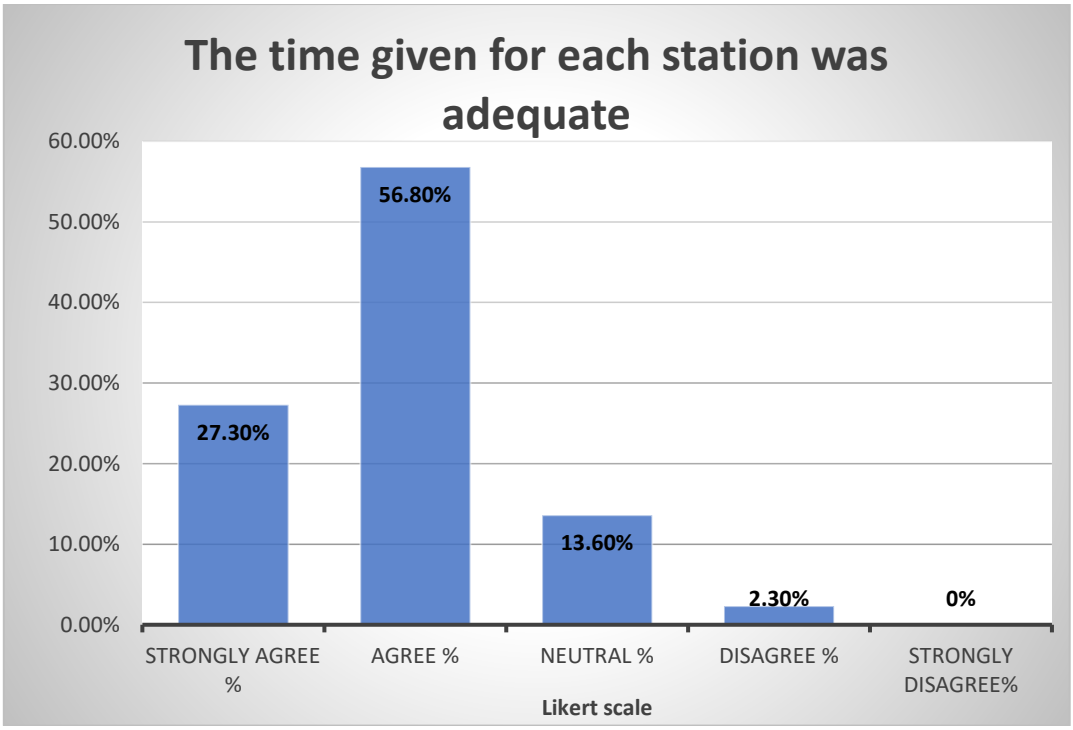
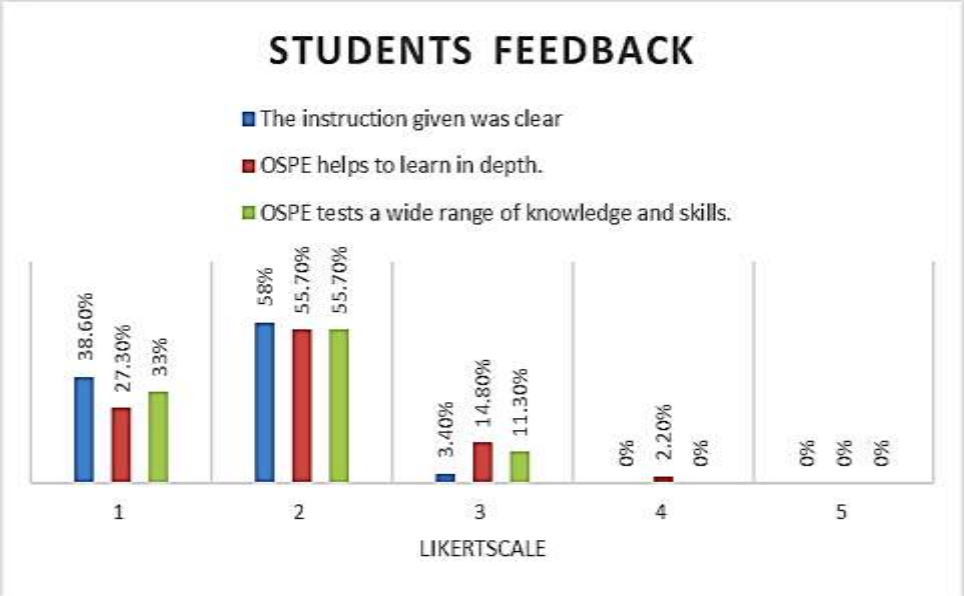


Fig2: Perception of students on whether the time given for each station was adequate



1.Strongly Agree, 2-Agree, 3-Neutral, 4-Disagree, 5-Strongly disagree

Fig 3: Students perception on A) clarity on instructions B) its ability to learn and test in-depth knowledge.

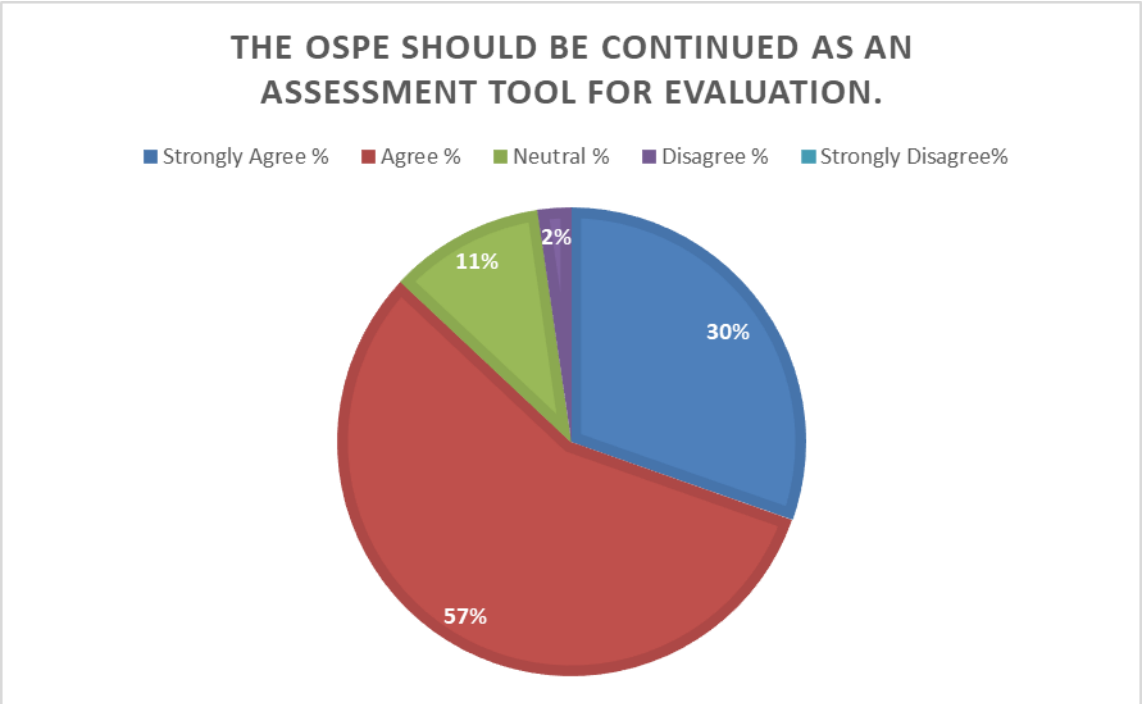


Fig 4: Perception of students whether OSPE can be continued as an assessment tool for evaluation.

Table 3: Comparing Traditional practical marks score with OSPE using paired Student T-Test

Session	Assessment Type(50M)	Mean± SD	p value
Session I Group A+B(n=100)	Objective Structured Practical Exam (OSPE)	28.43±7.5	<0.001*
	Traditional Practical Exam	23.38±7.6	
Session -II Group A+B (n=100)	Objective StructuredPractical Exam (OSPE)	36.33±7.7	<0.001*
	Traditional Practical Exam	30.68±7.4	

*Significant (pvalue<0.05)

Discussion

The adoption of the Objective Structured Practical Examination (OSPE) in Anatomy education has demonstrated significant potential in enhancing both assessment quality and student learning. This study highlights the successful integration of OSPE while emphasizing the need for faculty training and student orientation to ensure its effectiveness. By examining perspectives from both students and faculty, the study provides valuable insights into OSPE's strengths and challenges, supporting its continued use in anatomy education.The present study focused on implementing an OSPE module in anatomy for Phase I medical undergraduates, revealing substantial improvements in student performance compared to traditional practical exams. A unique addition to this OSPE module was AETCOM (Attitude, Ethics, and Communication Skills), where students were evaluated on their ability to effectively communicate in real-life scenarios, such as convincing individuals for voluntary body donation which is not been done in earlier studies(3-6).While some authors limited to Embryology(7)or soft parts of abdomen(8).

Student Perception of OSPE(Table1)

Most students found OSPE to be well-structured, with clear instructions and adequate time allocation, aligning with previous studies(6,8,9). A majority (88.7%) recognized OSPE as an effective tool for assessing knowledge and skills, reinforcing its role in enhancing conceptual understanding and problem-solving abilities. However, 20% of students in this study reported higher stress levels with OSPE compared to traditional exams. In contrast, a study by Roy et al. (4)involving 200 students found that 48% experienced similar stress, while Lone et al.[6]reported an even higher percentage, with 60% of students feeling increased stress under OSPE.The structured format and time constraints were identified as primary sources of stress.

Faculty Perception of OSPE(Table2)

Unlike some previous studies(3-5, 8),this research also considered faculty perspectives. Faculty members strongly supported OSPE, with 100% agreeing that the instructions were clear and 80% endorsing it as a fair assessment method. A key advantage identified was OSPE's ability to minimize examiner variability and ensure fairness, a finding supported by(10). However, 20% of faculty members considered OSPE more demanding than conventional assessment methods due to the increased preparation requirements, a challenge also noted by other authors(7).Some studies have also reported that a combination of OSPE and Conventional Practical Examination (CPE) was preferred(11), whereas others advocated for a complete transition to OSPE(2,3).

Performance Comparison: OSPE vs. Traditional Practical Exams (Table3)

A paired Student's t-test compared student scores in traditional practical exams and OSPE (Table 3).The results indicated a statistically significant improvement in OSPE performance (p-value < 0.05). These findings align with earlier studies(3, 12), which also reported higher scores and improved student comprehension under OSPE's structured framework. However, some studies found higher scores in traditional practical exams compared to OSPE, suggesting the necessity of ongoing evaluation and refinement of OSPE as an assessment tool (13,14).Unlike traditional exams, OSPE does not primarily assess rote recall but instead evaluates applied skills, problem-solving, and structured responses. Additionally, OSPE employs a structured checklist and randomized stations, reducing subjectivity and ensuring that performance improvements reflect skill application rather than memorization.

Limitations of the Study

1. **Limited Sample Size:** The study was conducted on 100 first-year MBBS students from a single institution, which may not be representative of a larger population.
2. **Short Study Duration:** The study spanned three months, which might not be sufficient to assess long-term student adaptation and the effectiveness of OSPE in fostering deep learning.
3. **Potential Examiner Fatigue:** Faculty members acknowledged that OSPE required more effort compared to conventional methods, as reported in previous research. Given the limited number of faculty members, preparing OSPE stations and checklists was a time-consuming process. However, with continued use, departments can develop an OSPE bank to streamline future implementation.
4. **Subjective Stress Perception:** While most students found OSPE fair and structured, 20% reported experiencing increased stress levels.

Conclusion

This study confirms OSPE as an effective and well-received assessment tool in anatomy education. Beyond evaluation, OSPE facilitates feedback-based learning and enhances student engagement. Both students and faculty advocate for its continuation, recognizing its structured format, objectivity, and comprehensive skill assessment. While faculty workload and student stress remain concerns, these challenges can be mitigated through strategic logistical planning and gradual OSPE integration. Therefore, OSPE should be incorporated into routine assessments as a valid and reliable method for evaluating student competencies in anatomy.

Implications

The findings of this study have significant implications for medical education:

- OSPE provides a structured and unbiased evaluation method, ensuring fairness in student assessment.
- Given its effectiveness, OSPE can be integrated into formative and summative assessments across medical institutions.
- Since OSPE requires meticulous planning and execution, faculty training programs should be emphasized to ensure smooth implementation.
- Future studies should assess the impact of OSPE on long-term student learning, skill retention, and clinical application.

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Acknowledgement

I would like to convey my heartfelt gratitude to MEU Team of NMC Nodal center for Faculty Development ,MAMC ,New Delhi for their constant support in completion of my project.

I must thank the MBBS students of phase I for active participation in this project.
I would like to extend my heartfelt gratitude to everyone who has supported and contributed to the successful completion of this project.