



## Research Article

### Change in knowledge, perception, and attitude of faculty toward designing Objective Structured Practical Examinations (OSPE)

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#### ABSTRACT

**Background:** The implementation of Objective Structured Practical Examination (OSPE) in medical education, a key component of competency-based medical education (CBME), faces challenges in implementation as most of the faculty members are accustomed to traditional methods of assessment such as spotters and struggle to grasp its true nature. Despite being introduced as a structured assessment tool in 2019, many medical colleges in India still use spotters under the guise of OSPE, limiting assessment to lower cognitive levels. This study addresses the perceptions and attitudes of faculty towards OSPE, highlighting the need for better understanding and integration to fully realize its potential in assessing practical skills in medical students. **Aim and Objectives:** The main aim of present study is to address the apprehensions and challenges of the faculty related to designing of OSPE stations, training them in designing OSPE stations, and preparing stations for future practical examinations. **Results:** The study included phase I biochemistry faculty members and demonstrators from different government medical colleges in Haryana, with pre and post-workshop questionnaires validated for reliability (Pre:  $\alpha=0.84$ , Post:  $\alpha=0.74$ ). Response to the questionnaire were scored 1–5 on a five-point Likert scale and analyzed. Statistical analysis confirmed a significant positive impact ( $p < 0.05$ ), emphasizing a positive influence of the workshop on participants' perceptions and skills in relation to OSPE. **Discussion:** This study addresses the knowledge gap in authentic OSPE station design despite abundant studies on OSPE. A workshop intervention positively impacted participants' perceptions and skills. Participants favored OSPE over Traditional Practical Examination (TPE), emphasizing its educational benefits and bias reduction. Challenges, including time constraints and manpower issues, were discussed with solutions during FGD. This pioneering effort in biochemistry lays the foundation for OSPE development. **Conclusion:** The study contributes to filling a critical knowledge gap in the authentic design of OSPE stations in biochemistry. Despite challenges acknowledged during the workshop, the intervention yielded positive outcomes, and solutions were proposed for identified challenges. Emphasizing the importance of meticulous OSPE station design is crucial for ensuring an accurate and comprehensive evaluation of practical competencies in the field of biochemistry.

#### Background

The concept of assessing the cognitive domain of medical students based on very short questions related to the practical part of the subject, popularly known as spotters, goes way back. The assessment of other domains in addition to cognitive can very well be carried out, and that too in a structured form through Objective structured practical examination (OSPE). It has not only been formally introduced as an assessment tool but also as a teaching-learning method in the competency-based medical education (CBME) program implemented in 2019. [1] Being a new concept, faculty have not completely warmed up to this idea and often avoid working on it. It is a well-known fact t-

-hat assessment is an engine that drives students' learning. [2] Medical colleges assess theory and practical aspects by using different tools. Practical examinations should mainly focus on skill and attitude, thus making it all the more important to design appropriate practical assessment tools. OSPE has now been introduced as an effective assessment tool for practical examinations in both pre- and para-clinical subjects as it is reliable, practical, and valid. [3] Although OSPE has been introduced in many medical colleges in India, the way they are designed does not reflect the true spirit of OSPE. Spotters, which were used as a method of assessment in the traditional system of assessment, are still being used in the name of OSPE in most places, but there are major differences between the two. [4] Spotters are usually re-

-stricted to assessing the "knows" level or at the most KH of Miller's pyramid, but OSPE is an excellent tool to assess up to the "shows how" level. [5] Integration is an essential step for OSPE. Students must be able to relate the station to the clinical scenario. But somehow, the faculty members involved in preparing OSPE stations find it difficult to comprehend the true nature and concept of OSPE, hence the struggle. So, the present study concentrates on this missing block so that OSPEs can be used in their actual form and students can benefit. Sensing the apprehensions related to this recent method of assessment, this study has been planned to gauge the perceptions and attitudes of faculty for OSPE.

### Aim and Objectives

- To address the apprehensions and challenges of the faculty related to designing of OSPE stations
- To train faculty to design OSPE stations.
- To prepare OSPE stations for future use in practical examinations.

### Methodology

This is a prospective, descriptive, and cross-sectional study which was conducted in the Department of Biochemistry, Pt. B D Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak, after obtaining clearance from the Institutional Ethics Committee (IEC). Phase I Biochemistry faculty members and demonstrators from Pt. B D Sharma, PGIMS, Rohtak and other institutes affiliated to UHS, Rohtak were sensitized about the project, and the consenting members were included in the study. They were briefed about the project, and a pre-designed and validated questionnaire regarding their apprehensions and challenges before designing OSPE stations was given to them. The responses to most of the questions were based on a Likert scale, and some open-ended questions were also included. A workshop to apprise the participants regarding the proper design of OSPE stations was conducted. The workshop featured an engaging and interactive talk delivered by a guest faculty expertly trained in medical education. Following a comprehensive u-

nderstanding of the fundamentals of the OSPE process, the participants were organized into six teams. Each team was assigned a specific topic and tasked with designing two OSPE stations including checklist and instructions for examiner and students. The newly designed OSPE stations were subsequently presented to and discussed by other teams under the guidance of resource persons. This hands-on and collaborative approach aimed to enhance the participants' practical skills in designing effective OSPE stations.

A questionnaire related to the challenges now faced in designing OSPE stations was given to them. Response to the questionnaire submitted was collected and analyzed. Each item was scored 1–5 on a five-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). The OSPE stations prepared during workshop were validated by the experts. The challenges identified were discussed with experts through a focus group discussion (FGD). The possible remedial measures were conveyed to the faculty, and the well-designed OSPE stations were incorporated into the upcoming MBBS annual exam.

The collected data was checked for completeness, accuracy and consistency. Descriptive analysis was done. The mean and standard deviation were computed and p value was calculated.

### Observation and results

Only those questionnaire responses which were completed in all aspects were included in the study. A total of four government colleges of Haryana (Pt B D Sharma PGIMS, Rohtak; Kalpana Chawla Government Medical college, Karnal; Bhagat Phool Singh Government Medical College for Women, Khanpur; Maharaja Agrasen Medical college, Agroha) participated in the study. The pre and post workshop questionnaire were validated by the experts and the reliability analysis was also performed. The Cronbach Alpha value from Konting et al (2009) was used to interpret the reliability. [6] The results were 0.84 in pre and 0.74 in post workshop questionnaire which reflected very good reliability as shown in Table 1.

**Table 1: Reliability statistics**

Questionnaire	Cronbach's alpha	Interpretation	No. of items
Pre-workshop	0.84	Good	10
Post-workshop	0.74	Good and acceptable	10

Forty-three participants gave consent for enrollment in study, 24 of which were males and 19 were females. Among them, 86% (37) were aware of OSPE, and 48.8% (22) had actively participated in its designing pre-workshop. A strong majority, 97.7% (42) participants, firmly believed that OSPE can effectively serve as a tool for teaching and learning methods and 69.8% (30) believed that while using OSPE as

an assessment tool, they will be able to assess what they intend to. Table 2 and Figure 1, as well as Table 3 and Figure 2, illustrate the pre and post-workshop perceptions of faculty members. Post workshop, a majority of participants expressed agreement that the perception of designing OSPE stations as difficult task is a misconception, and they reported acquiring the necessary expertise for this task. Additionally,

they perceived OSPE as more structured and superior in assessing skill and attitude domains compared to Traditional Practical Examination. Notably, there was a relatively higher level of agreement, with a mean score of 3.10, on the item emphasizing the need for students to have integrated knowledge to pass OSPE. They hold the belief that it eliminates examiners' bias and it should be incorporated as a

regular method of assessment. The statistical analysis in table 4 confirms a significant difference in the mean scores before and after the workshop ( $p < 0.05$ ), indicating a positive impact of the workshop on participants' perceptions and skills related to OSPE. Table 5 shows post-workshop responses to open ended questions.

Table 2: Percentage distribution of responses prior to designing of OSPE stations across different categories (SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree), as well as the mean score.

Q. No	I feel that,	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean
1.	designing OSPE stations is difficult	4.7	4.7	20.9	46.5	23.3	2.79
2.	I would require additional training to construct an OSPE	9.3	9.3	30.2	34.9	16.3	2.40
3.	designing OSPE involves lots of planning	0	2.3	30.2	53.5	11.6	2.70
4.	the observed OSPE stations will demand a lot of manpower	11.6	9.3	32.6	34.9	11.6	2.26
5.	it is not easy to design OSPE stations of equal difficulty level for different batches to maintain uniformity	2.3	23.3	27.9	41.9	4.7	2.23
6.	conduction of OSPE during the university exam is time consuming	2.3	20.9	34.9	32.6	9.3	2.26
7.	students with less knowledge will also pass the exam easily	16.3	37.2	27.9	14	4.7	1.53
8.	OSPE will be better structured than TPE	4.7	2.3	41.9	39.5	11.6	2.51
9.	OSPE will be better in assessing the domains of skills & attitude than TPE	11.6	7	25.6	39.5	16.3	2.42
10.	OSPE will be less stressful for students than TPE	4.7	11.6	46.5	30.2	7	2.23

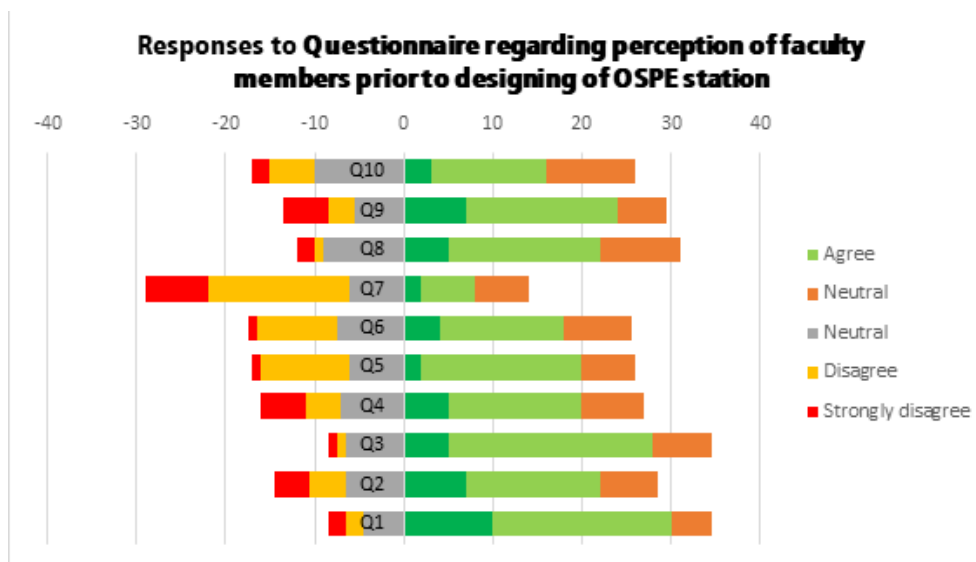
Table 3: Percentage distribution of responses during designing of OSPE stations after attending workshop across different categories (SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree), as well as the mean score.

Q. No	I feel that,	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean
1.	it is a misconception that designing OSPE stations was difficult	2.4	21.4	9.5	52.4	14.3	2.55
2.	I have necessary expertise to frame an OSPE stations	0	0	19	64.3	16.7	2.98
3.	a lot of planning is required for developing an OSPE station	0	4.8	11.9	66.7	16.7	2.95
4.	additional manpower will be required to conduct the observable OSPE station	0	7.1	9.5	64.3	19	2.95
5.	it is not difficult to create comparable OSPE stations for various batches	2.4	14.3	23.8	50	9.5	2.50
6.	conduction of OSPE during the university examination will consume a considerable amount of time	0	19	14.3	52.4	14.3	2.62
7.	students should have an integrated knowledge to pass OSPE	0	2.4	9.5	64.3	23.8	3.10
8.	OSPE is better structured than TPE	0	4.8	11.9	54.8	28.6	3.07
9.	OSPE is better in assessing the domains of skill and attitude than TPE	0	0	11.9	57.1	31	3.19
10.	OSPE is stressful for students than Traditional Practical Examination	11.9	47.6	21.4	11.9	7.1	1.55

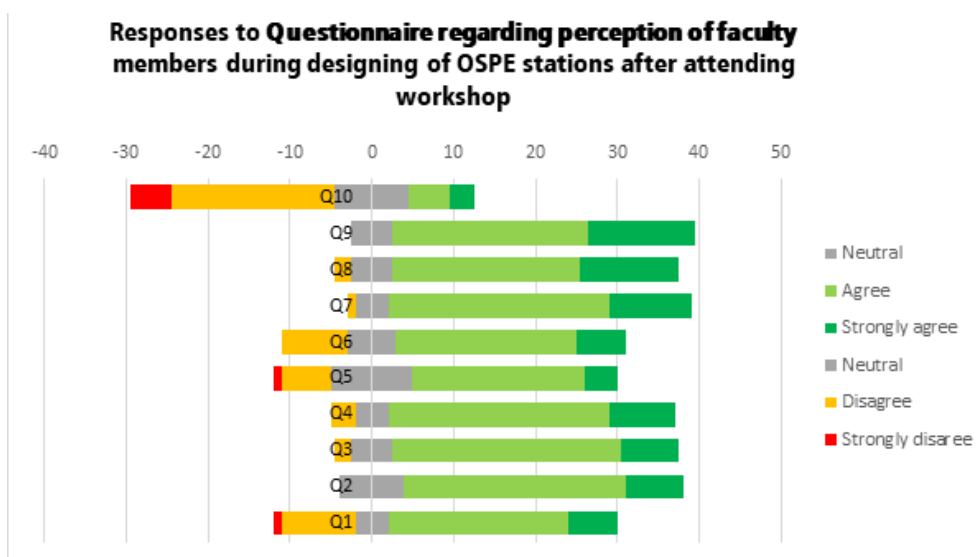
they perceived OSPE as more structured and superior in assessing skill and attitude domains compared to Traditional Practical Examination. Notably, there was a relatively higher level of agreement, with a mean score of 3.10, on the item emphasizing the need for students to have integrated knowledge to pass OSPE. They hold the belief that it eliminates examiners' bias and it should be incorporated as a

regular method of assessment. The statistical analysis in table 4 confirms a significant difference in the mean scores before and after the workshop ( $p < 0.05$ ), indicating a positive impact of the workshop on participants' perceptions and skills related to OSPE. Table 5 shows post-workshop responses to open ended questions.

**Figure 1: Graphical representation of responses to questionnaire regarding perception of faculty members prior to designing of OSPE station**



**Figure 2: Graphical representation of responses to questionnaire regarding perception of faculty members during designing of OSPE stations after attending workshop**



**Table 4: Comparison of responses (total items = 10) to questionnaire evaluating the perception of faculty members pre and post workshop**

Questionnaire	Mean ± SD	p value
Pre-workshop	2.33 ± 0.34	0.029*
Post-workshop	2.74 ± 0.48	

\* (Statistically significant)

**Table 5: Post-workshop responses to open ended questions.**

What are the shortcomings of OSPE in comparison to other assessment methods in biochemistry	<ul style="list-style-type: none"> <li>• Planning requires time</li> <li>• Time consuming</li> <li>• More manpower required</li> </ul>
How OSPE is better than other methods of assessing skills and attitudes?	<ul style="list-style-type: none"> <li>• Removes examiner bias</li> <li>• Objective</li> <li>• Assessment of all three domains - cognitive, psychomotor and affective</li> <li>• Well structured</li> <li>• Step-wise methodological and integrated</li> <li>• Uniform</li> </ul>
Any other comments/suggestions	<ul style="list-style-type: none"> <li>• Great workshop</li> <li>• Very informative</li> <li>• Quite enjoyable</li> </ul>

Following the workshop, notable concerns emerged among participants. A significant number of participants expressed the belief that designing an OSPE station entails extensive planning, and there was consensus that additional manpower would be necessary for the execution of observable OSPE stations. While a majority agreed that creating comparable OSPE stations for different batches is not challenging, there was a shared perception that the conduction of OSPE would consume a substantial amount of time. These challenges were deliberated upon in an FGD with experts and the solutions were sought.

**Discussion**

Despite the abundance of studies on the implementation of OSPE and its comparison with TPE in various pre and para clinical subjects as available on numerous search engines, there exists a knowledge gap concerning the authentic design of OSPE stations. [7-10] Harden and Gleeson were the first to describe Objective Structured Clinical Examination (OSCE) to assess the practical competencies in clinical subjects, later on it was modified to OSPE for pre-and para-clinical subjects. [11] In spite of being adopted as an assessment tool with the introduction of CBME in 2019, there is a perceived discrepancy in its utilization, lacking the realization of its true essence. [1] In response to this issue, the current study was planned to address and explore these aspects. An intervention in the form of a workshop was conducted, and both pre and post-workshop questionnaires were administered and subsequently analyzed to assess the impact and changes resulting from the workshop. The statistical analysis revealed a notable disparity in the mean scores before and after the workshop ( $p < 0.05$ ), suggesting a positive influence of the workshop on the participants' perceptions and skills associated with OSPE.

All participants learned the designing of OSPE sta-

tions and are more confident than earlier. 81% agrees that now they have necessary expertise to frame OSPE stations. All participants took part in preparing OSPE bank. 78.5% were enthusiastic about implementing OSPE as a regular method of assessment. Consistent with findings from other studies, a majority of participants in the present study reached a unanimous consensus- 88.1% believe that OSPE is a superior assessment tool as compared to TPE, has a positive impact on education [12-14], 90.5% are of opinion that it removes examiners' bias [15, 16] and 78.5% were enthusiastic about implementing OSPE as a regular method of assessment. [17, 18] 88.1% agreed that OSPE is less stressful than TPE and only students with integrated knowledge can pass the exam. [19] Less stressful environment increases the efficiency of students and so the scores. They can perform practical in relaxed manner. The findings reported by Relwani et al., Rajkumar et al., and Wadde et al. corroborate the same observation. [20] While the workshop brought forth numerous positive aspects, it is often noted that with increased knowledge comes the emergence of doubts and challenges. This held true for this workshop as well. Despite gaining substantial insights into the design process and hands-on experience, participants identified certain challenges. Specifically, they highlighted the time-consuming nature of preparing each OSPE station, including the formulation of instructions and checklists. Furthermore, given the limited staff in most of the participating colleges, the issue of manpower became apparent, as designing and conducting OSPE during exams demand significant personnel. Additionally, considerable planning was deemed necessary to determine which competencies to include and how to assess integrated knowledge.

The points were discussed during FGD with solutions to these challenges. Although OSPE preparation looks time co-

-nsuming, but once prepared it will develop a streamlined process. Collaboration among different staff members can help optimize the efficiency of OSPE implementation during exam, ensuring a more effective and manageable assessment process. Addressing the manpower challenge can be effectively tackled by adopting a delegation strategy. Tasks related to OSPE preparation, such as designing observed and unobserved stations, creating checklists, formulating student instructions, and lab preparation, can be assigned to specific individuals or teams. Seeking external support or resources may be considered to alleviate the workload. Paramedical staff can contribute significantly by handling tasks such as lab preparation, station observation, time recording, and other logistical responsibilities, thus optimizing the available manpower for a more efficient OSPE implementation. Efficient distribution of responsibilities, effective teamwork, and exploring ways to maximize the use of available manpower can contribute to a more manageable and successful implementation of OSPE. Additionally, incorporating training programs to enhance the skills of existing staff members may also contribute to overcoming the challenges associated with manpower requirements in OSPE.

To the best of our knowledge, this study represents the pioneering effort in the field of biochemistry, specifically focusing on the design of OSPE stations in biochemistry. This will serve as the foundation for further development of the OSPE as an evaluation tool.

### Conclusion

The study addresses a significant knowledge gap in the authentic design of OSPE stations in biochemistry. Despite challenges identified during the workshop, the intervention had a positive impact and solutions to all the challenges identified were proposed. Indeed, OSPE offers a superior approach to assess practical skills in Biochemistry. However, the effectiveness of OSPE is inherently linked to the quality of its design. Recognizing the significance of meticulous OSPE station design is crucial for ensuring the accurate and comprehensive evaluation of practical competencies in the field of Biochemistry.

### Implications

The findings of this study affirm the effectiveness of workshop centered around the design of OSPE stations. It helped in capacity building and will have a positive impact on medical education. The collaboration among participants and interactive environment during workshop fostered a deeper understanding of concepts and promoted knowledge-sharing among peers. Many concepts regarding blueprint and scoring became clear. This exposure will further inspire them to incorporate new strategies into their teaching learning practices including assessment methods, ultimately

benefiting the students.

### Acknowledgements

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## Appendix- I

### **Title of the project: Perception of faculty regarding designing of Objective Structured Practical Examination (OSPE) in Biochemistry**

### **Questionnaire regarding perception of faculty members prior to designing of OSPE stations PARTICIPANT'S DATA**

Name: \_\_\_\_\_ Age: \_\_\_\_\_

Gender: Male/ Female

Email id: \_\_\_\_\_

Designation: \_\_\_\_\_

Name of the college: \_\_\_\_\_

Teaching experience (in years): \_\_\_\_\_

### **QUESTIONS**

Mark Tick (√) in the appropriate box in front of the statement. Please mark only one answer.

1. Are you aware of the concept of OPSE?
  - YES
  - NO
2. Have you ever participated in designing of OPSE's as contributor of facilitator?
  - YES
  - NO
3. Do you believe that OSPE can be used as a tool for teaching learning method?
  - YES
  - NO

(SD- Strongly Disagree, D- Disagree, N- Neutral, A- Agree, SA- Strongly Agree, TPE- Traditional Practical Examination)

Q. No	I feel that,	SD	D	N	A	SA
1.	while using OSPE as an assessment tool, will I be able to assess what I intend to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	designing OSPE stations is difficult	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	I would require additional training to construct an OSPE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	designing OSPE involves lots of planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	the observed OSPE stations will demand a lot of manpower	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



6.	it is not easy to design OSPE stations of equal difficulty level for different batches to maintain uniformity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.	conduction of OSPE during the university exam is time consuming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	students with less knowledge will also pass the exam easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	OSPE will be better structured than TPE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.	OSPE will be better in assessing the domains of skills & attitude than TPE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.	OSPE will be less stressful for students than TPE	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Any other apprehensions/concerns?