



Objective Structured Practical Examination as a Tool of Assessing Practical Skills in Clinical Physiology: Perceptions of Medical Students and Faculty

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Abstract

Background / Aim: Competence can be acquired in medical education if the assessment of students is multidimensional. Traditional practical assessments focus on testing the cognitive domain and compromise practical skills evaluation. The Objective Structured Practical Examination (OSPE) assesses skill-based competencies. The present study evaluates the feasibility and acceptability of OSPE through the perception of students and mentors.

Methods: In this cross-sectional study, 100 medical students and 15 medical faculties enrolled from Pandit Deendayal Upadhyaya medical college, Churu (Rajasthan, India). The study included OSPE stations, conducted three OSPE sessions and obtained post-session feedback through a questionnaire, answered on 5 points Likert scale. The researchers calculated the response on various aspects of OSPE with percentages.

Results: Students showed 94.4 % agreement for OSPE as a good learning experience and 93.5 % were satisfied with the content of OSPE. Students' perception of OSPE as a reliable and fair tool for examination and administration was 94.66 % and 56.40 %, respectively. Although, 69.5 % of students agreed upon OSPE as a valuable tool compared with the traditional reviews. The overall agreement of faculty for the competence of OSPE was 75.74 %.

Conclusion: The acceptance of OSPE by medical students and faculty may lead to the introduction of this tool in assessing practical skills in medical teaching and helping students better acquire knowledge and skills and assisting faculty in teaching modifications, as per the needs of students. So, OSPE supplements the traditional methods in clinical physiology practical assessments.

Key words: Assessment; Cognitive domain; Competence; Medical teaching; OSPE; Practical skills.

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Introduction

Competence in medical education requires assessment at regular intervals.¹ Assessment of skills and attitude should be the central part of practical examination which is often lacking. Usually, practical tests assess knowledge alone. As known that "learning is assessment-driven",² changes in student learning behaviour are possible by changes

in evaluation tools and methods.³ The traditional evaluation methods in practical examinations are highly subjective, which breaks the correlation between marks awarded and the performance of the same candidate by different examiners.⁴ Examination skills and attitudes towards the patient are often not evaluated in conventional methods. Pro-

viding effective feedback about the performance is also lacking in traditional ways.⁵ The practical examinations are meant to assess "shows" and "shows how" aspects of Miller's pyramid of competence, but traditional methods mainly focus on the "knows" and "knows how" aspects alone.⁶ The Objective Structured Practical Examination (OSPE) is a method of objectively testing the practical knowledge and skills acquired during pre-clinical years of the medical curriculum.⁷ The OSPE focuses on the "shows" and "shows how" aspects at the base of Miller's pyramid of competence. The All India Institute of Medical Sciences, New Delhi, standardised this method.⁸ It is a modification of the Objective Structured Clinical Examination (OSCE).⁹ OSPE conduction requires setting up stations to assess various skills and attitudes related to patient history taking, examination and management, equipment usage in experiments, sequence of steps followed in experiments and data

interpretation. In a fixed time interval, students rotated within stations. The examiner silently observes the stepwise performance on a one-to-one basis.¹⁰ The examination validity improved in OSPE as this tool tests both the process and the product with much importance to individual competency.² The assessment tool decides the degree of improvement in student performance and its consequent effect on study strategy.¹¹

OSPE is a more comprehensive, objective, unbiased and structural assessment tool in evaluating higher levels of competence in Miller's Pyramid, so it was decided to introduce and receive the student's and faculty's perception regarding OSPE in clinical physiology assessments in this college. The present study assesses the feasibility and acceptability of OSPE through the perception of students and mentors.

Methods

This cross-sectional descriptive study assessed the perception of medical students and faculty regarding OSPE that examine practical skills of medical students. After approval from the institutional ethics committee, one hundred first-year undergraduate medical students aged 18 to 25 years and

15 mentors enrolled from Pandit Deendayal Upadhyaya medical college, Churu (Rajasthan, India). The first-year undergraduate medical students excluded from the study who were absent from the OSPE session.

Table 1: Questionnaire for students to get feedback about the perception of The Objective Structured Practical Examination (OSPE)

Section A: Is OSPE a better learning stimulus		SD	D	N	A	SA
Question No	Question description					
Q1	OSPE encourages us to pay more attention to the practical examination.					
Q2	OSPE tests details of procedures in steps.					
Q3	OSPE covers a wide range of knowledge.					
Q4	OSPE helps in identifying lacunae in the clinical skills.					
Q5	OSPE is a good form of examination as well as a learning experience.					
Section B: Content of OSPE						
Q1	OSPE measures practical skills better.					
Q2	OSPE covers relevant and essential topics consistent with the learning objectives of the syllabus.					
Section C: Is OSPE a reliable and fair examination						
Q1	Checklists provide a fair and unbiased system of marking.					
Q2	OSPE decreases the element of luck in examination.					
Q3	OSPE is more uniform and objective.					
Section D: Administration of OSPE						
Q1	The instructions were clear and adequate.					
Q2	There is ample time given at each station.					
Q3	OSPE is less stressful (less fear of examiners).					
Q4	It is confusing to switch from one station to another.					
Q5	OSPE is physically tiring.					

Question No	Question description	SD	D	N	A	SA
Section E: Value of OSPE as an assessment method compared to the traditional examination						
Q1	OSPE is more satisfying compared to the traditional method of assessment.					
Q2	One cannot pass OSPE without attending practical classes.					
Q3	OSPE reduces the chance of failing in exams compared to traditional examinations.					
Q4	The traditional examination has more interaction compared to OSPE.					

Likert scale: SD - strongly disagree, D - disagree, N - neutral, A - agree, SA - strongly agree.

Table 2: Questionnaire for mentors to get feedback about the perception of OSPE

Question No	Question description	SD	D	N	A	SA
Q1	OSPE is more uniform and objective.					
Q2	OSPE covers relevant and essential topics consistent with the learning objectives of the syllabus.					
Q3	OSPE measures practical and clinical skills better.					
Q4	OSPE needs critical thinking.					
Q5	OSPE is more time-saving compared with the traditional examination.					
Q6	OSPE eliminates examiners' bias.					
Q7	OSPE decreases the element of luck in the examination.					
Q8	OSPE will be tiring to conduct.					
Q9	Students will be able to perform the given task in the prescribed time.					
Q10	OSPE is suitable for all levels of students.					
Q11	OSPE can be replaced for practical table viva.					
Q12	The introduction of OSPE for evaluation will be favorable to students.					
Q13	OSPE helps in identifying lacunae in teaching clinical skills.					
Q14	The introduction of OSPE for evaluation should be done in formative assessment.					
Q15	The introduction of OSPE for evaluation should be done in summative assessment.					

Likert scale: SD - strongly disagree, D - disagree, N - neutral, A - agree, SA - strongly agree. OSPE - The Objective Structured Practical Examination;

Conduction of OSPE sessions

1. Before the actual conduction of OSPE sessions, both faculty and students sensitisation to the OSPE as an assessment tool.
2. Preparation and validation of OSPE station checklists.
3. OSPE sessions were conducted on three different days in 3 batches for participating undergraduate medical students. Researchers framed five procedural stations from the clinical physiology practical syllabus and allotted 3 minutes to each station.

- Station 1 – Cardiovascular system examination
- Station 2 – Respiratory system examination
- Station 3 – Examination of abdomen
- Station 4 – Cranial nerve examination
- Station 5 – Central nervous system examination

After every OSPE session, feedback was given to the students to reinforce the positive aspects and to correct the mistakes committed during the examination.

Post-session feedback

Post-session feedback regarding feasibility and acceptability of OSPE was taken from the students and faculty using a questionnaire^{12, 13} graded on a Likert scale (Tables 1 and 2).

The assessment evaluated various perception attributes using a questionnaire, divided into many sections and each section consisted of multiple questions.

Statistical analysis

The responses acquired through the questionnaire were on a Likert scale. The responses were positive (strongly agree, agree), neutral, or negative (disagree and strongly disagree). The averaged reactions of each section (including various questions) showed in percentage. The level of significance was considered at 5 %. The researchers used Microsoft Excel 2019 and MATLAB for statistical analysis.

Results

There was 94.40 % agreement for OSPE as a good learning experience among medical students and 93.50 % were satisfied with the content of OSPE. Students' perception of OSPE as a reliable and fair tool for examination and administration was 94.66 % and 56.40 %, respectively. Although, 69.5 % of students agreed upon OSPE as a valuable

tool compared with traditional tests. The overall agreement of faculty for the competence of OSPE was 75.74 % (Table 3).

Further analysis of various attributes of perception was performed.

Table 3: The response of medical students and faculty regarding various attributes of perception

Attributes of Perception	SD	D	N	A	SA
Is OSPE a better learning stimulus	0.20	0.60	4.80	33.20	61.20
Content of OSPE	0	1	5.50	31.50	62
Is OSPE a reliable and fair examination	0	0	5.33	39	55.66
Administration of OSPE	960	11.20	22.8	30.20	26.20
Value of OSPE as an assessment method in comparison with the traditional examination.	0	3.75	26.50	19.50	50
Overall perception about acceptance by faculty	1.40	5	17.87	19.27	56.47

Likert scale: SD - strongly disagree, D - disagree, N - neutral, A - agree, SA - strongly agree. Values are presented in percentages.
OSPE - The Objective Structured Practical Examination;

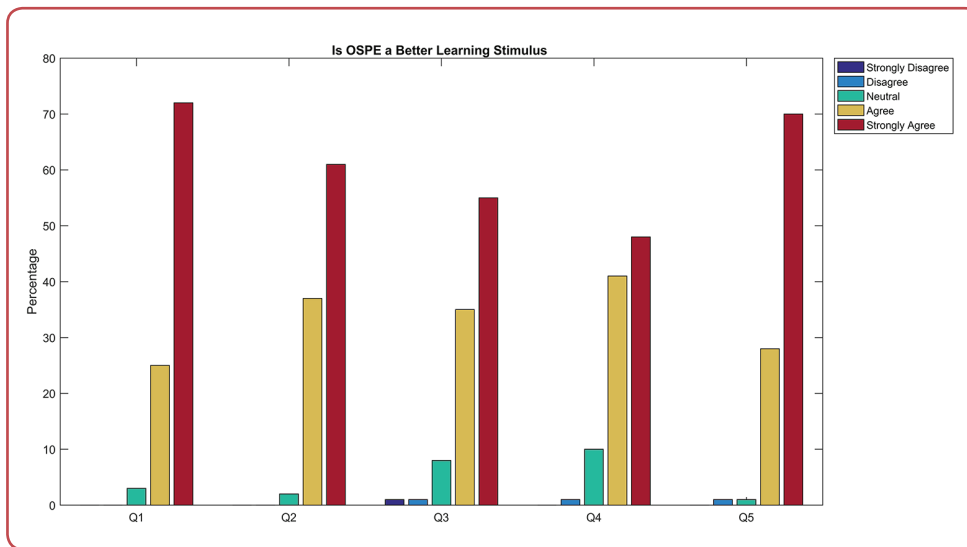


Figure 1: Bar plot showed medical students' responses for Section A: Is OSPE a better learning stimulus OSPE - The Objective Structured Practical Examination;

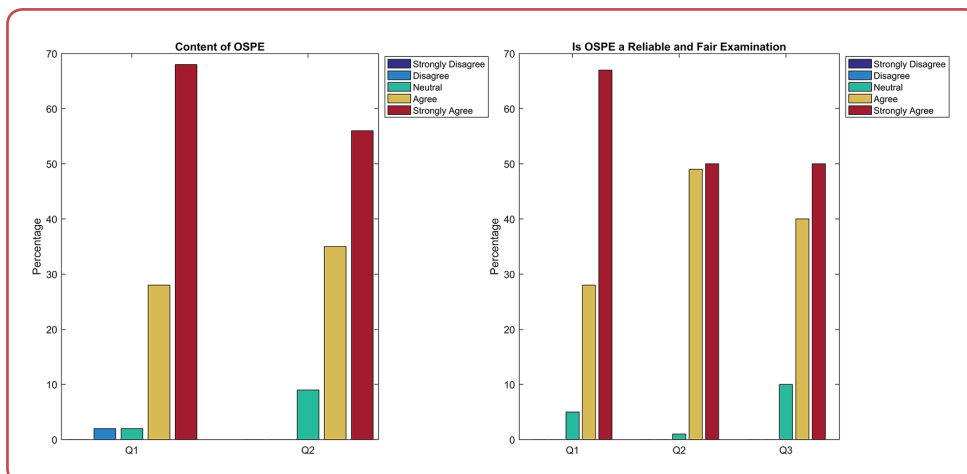


Figure 2: Bar plot showed medical students' responses for (a) Section B: Content of OSPE' (b) Section C: Is OSPE a reliable and fair examination OSPE - The Objective Structured Practical Examination;

Section A: Is OSPE a better learning stimulus

72 % of the students felt that the OSPE paid more weight to the practical details of the clinical procedure. They also felt that OSPE helps in identifying the weakness in their performances. Around 70 % of the students strongly agreed that OSPE is a good examination form and a learning experience.

Section B: Content of OSPE

96 % of the students felt that OSPE measures practical skills better. Around 56 % of the students strongly agreed that OSPE covers relevant and essential topics consistent with the learning objectives of the syllabus (Figure 2).

Section C: Is OSPE a reliable and fair examination

95 % of the students favoured checklists as a method of unbiased and honest evaluation. Around 50 % of the students strongly agreed that

OSPE is a uniform method of examination that reduces the element of luck (Figure 2).

Section D: Administration of OSPE

The majority of students were satisfied by the arrangements of the OSPE. Almost 48 % felt OSPE was less stressful. The majority of the students also did not feel the presence of examiners at the observed stations intimidating. OSPE was physically tiring and switching from one station to another showed a mixed response (Figure 3).

Section E: Value of OSPE as an assessment method in comparison with traditional examination

A total of 54 % of the students found OSPE more satisfying than the traditional assessment method. Nevertheless, at the same time, around 70 % of the students also felt a lack of interaction (Figure 4).

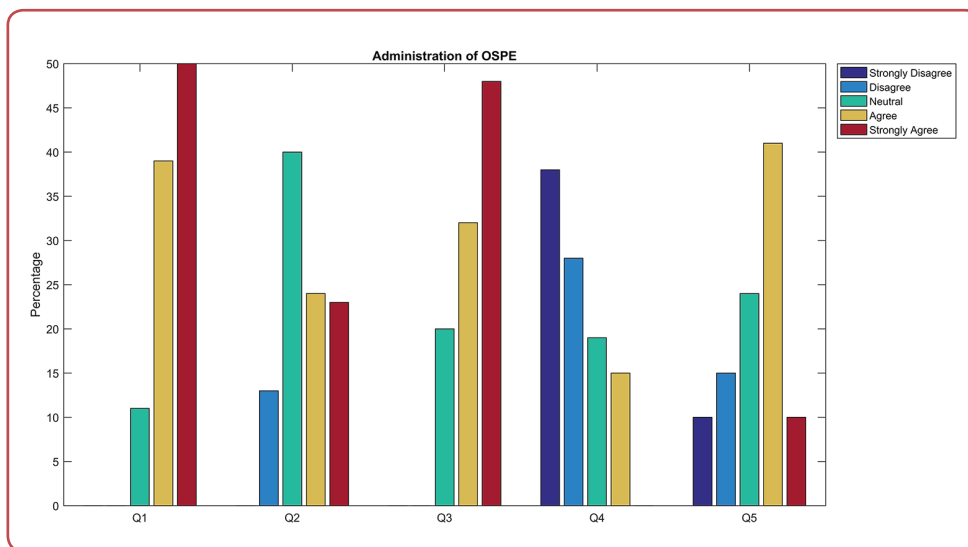


Figure 3: Bar plot showed the responses of medical students Section D: Administration of OSPE - The Objective Structured Practical Examination;

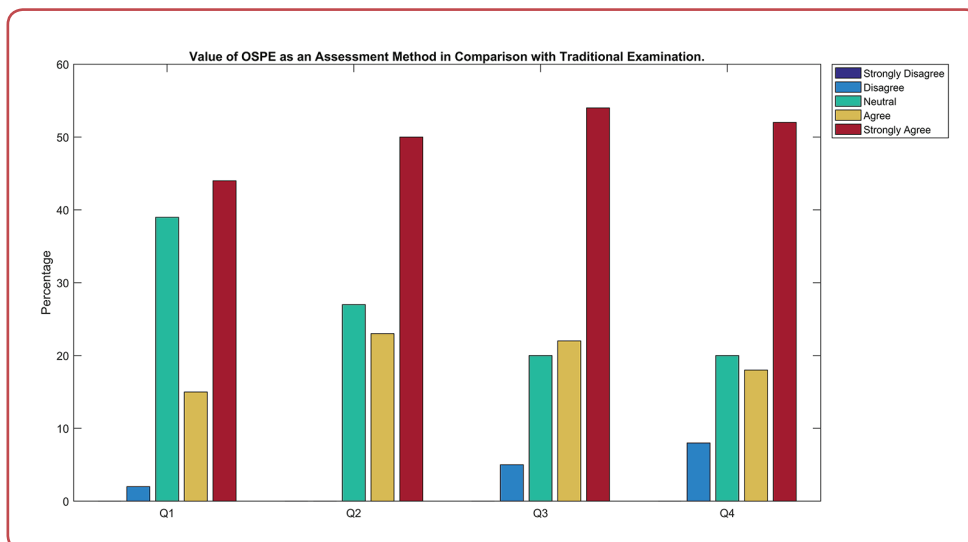


Figure 4: Bar plot showed medical students' responses Section E: Value of OSPE as an assessment method compared to the traditional examination OSPE - The Objective Structured Practical Examination;

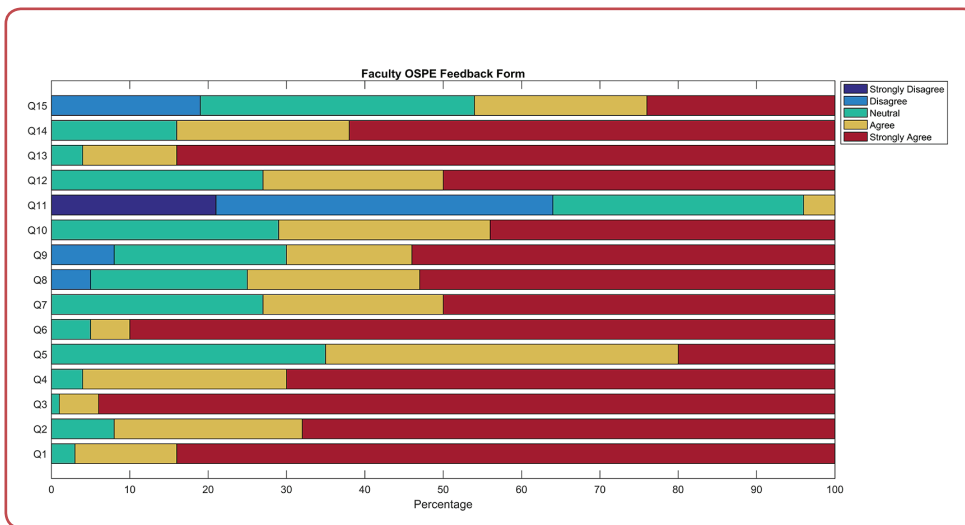


Figure 5: A stacked bar plot showed mentors' responses regarding the acceptability of OSPE
OSPE - The Objective Structured Practical Examination;

The majority of the students felt the need to conduct OSPE at regular intervals. Some thought it to perform along with the traditional method. Among 15 faculties who participated in the present study, more than 80 % believed that OSPE helps test objectivity and skills, promotes critical thinking in students, is suitable for all students and helps enhance teaching skills. A total of 63 % of the faculty believed that it is time-saving and at the same time, 76 % said it is tiring to conduct OSPE. More than 80 % of faculty thought that OSPE is a uniform assessment tool, there is no examiner's bias. More than 50 % of faculty members disagree with including OSPE in the summative assessment (Figure 5).

The majority of the faculty felt that preparing OSPE station checklists is a tough job and faculty needs training in it. Some faculty highlighted the lack of interaction with the students. Some appreciated this method as it can assess all the domains simultaneously.

Discussion

Medical students and faculty's feedback about various assessment methods is meaningful and valuable for the continuous improvement of medical education. The present study assesses the acceptability and feasibility of OSPE among students and faculty as it was a relatively new assessment tool. Such studies form the basis of future development to reform and refine the OSPE as an assessment tool. Overall, the present study showed favourable feedback for implementing OSPE as an assessment method.

In a survey conducted by Duffield on 381 students at Newcastle Medical School, authors evaluated the fairness of assessment using a 19-item questionnaire. The response rate was 82 % and most of the students (> 95 %) agreed that assessment should ensure competence, feedback and guidance.¹⁴ In a similar study at the University of Zahedan, Imami implemented Objective Structured Clinical Examination (OSCE) in the final examination of paediatric students. They found strong acceptance of OSCE concerning transparency (87 %), comprehensiveness (90 %), the authenticity of the required tasks (58-78 %) and fairness (57 %) as similar to the present study. However, students were anxious during the assessment.¹⁵ Woodburn used objective structured clinical examination (OSCE) to assess clinical skills in podiatry (chiropody) students. The program revealed relatively low levels of repeatability and high levels of construct and stability in performance over time.¹⁶ Pierre explored OSCE at the University of the West Indies assessed students at the final examination in medicine and therapeutics. They found comprehensiveness (90 %), transparency (87 %), fairness (70 %) and authenticity of the required tasks (58-78 %) as similar to the previous study.¹⁷ Brand measured anxiety levels, self-perception of preparation and expectation of success induced by OSCE and its effects on assessment. They found OSCE was a more anxiety-provoking assessment method than other examinations. The expectation to succeed was also found higher and state anxiety was associated with the level of preparation but not with scores obtained. During the written examination, the state anxiety showed a positive relationship with the scores obtained, however, not with preparation or expectation to succeed.¹⁸ Adome introduced a twelve-point questionnaire on a 1-10 Likert scale

to evaluate students' perceptions of OSCE after their examination. They found that over 65 % of students prefer OSCE to ward-based review. In addition, 80 % disagreed with preferring viva voce to OSCE. Over 70 % indicated OSCE is instrumental and relevant to their study and the type of work after graduation.¹⁹

Gujjala studied the perceptions of 50 faculties engaged in medical education training at Government Medical College, Ananthapuramu andhra Pradesh, India. They found strong agreement regarding OSPE as an excellent and valuable learning tool (96 %) and assessment tool (98 %), while 100 % thought that OSPE assesses all three domains. Further, 80 % agreed upon transparency, comprehensiveness and fairness. However, 90 % viewed the tool as mentally and physically tiring and needed additional faculty. The present study observed similar findings. Although 100 % agreed that combining with traditional practical examination produced better results, 84 % favoured replacing standard practical examination with OSPE.²⁰ Verhoeven determined the effect of an individual written assessment on objective structured clinical examination, including 38 volunteers from Maastricht Medical School. They found added value in combining the two formats. The written component compensated for the loss of reliability due to fewer stations in the OSCE.²¹

Rafique conducted a study at Nishtar Medical College, Multan, Pakistan and got feedback on various teaching and assessment methods. Although there was no consensus on the best assessment tool among the students, they agreed that OSPE was satisfactory. Most of the students (74 %) decided that multiple modes of assessment improved their skills and knowledge.²² Ranga conducted a cross-sectional study on 158 second-year medical students at the Department of Pathology, Dr Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation, Chinnaoutpalli. They compared traditional practical examination (TPE) with OSPE with all the students undergoing TPE and OSPE. They found significantly higher performance scores in OSPE (13.73 ± 2.49) than TPE (9.27 ± 1.86). The majority of students agreed that OSPE was transparent and fairer than TPE. Most faculty members opined difficulty in the arrangement of OSPE. However, 91 % favoured the inclusion of OSPE as a method of assessment. Most of the studies showed a positive perception of medical students and faculty regarding the implementation of OSPE as an assessment tool.

Conclusion

The present study concluded that OSPE is acceptable and feasible as a tool of practical skill assessment by students and faculty. However, multi-centric studies are required to determine the effect of traditional formats compared to OSPE on students' clinical performance and to ascertain the long-term impacts of OSPE on the clinical management of patients. The existing traditional method for assessing all learning domains in medical education requires supplementation with OSPE.

Limitations of study

The study involved students and faculty from a medical college. Due to time constraints, the study involved three sessions of OSPE, one for each batch. Ideally, the significance and results of the study required more sessions and data to conclude before a conclusion about improvement in students' learning outcomes.

Ethical Statement

RUHS College of Medical Sciences, Jaipur, the Ethical Committee approved the study (Letter No RUHS-CMS/Ethics Comm/2019/41 dated 10/6/2019).

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Conflict of interest

None.

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