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Research Article

Effectiveness of OSPE as A Tool in the Assessment of Practical Skills in Biochemistry Among Medical Students as Per CBME Curriculum

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ABSTRACT

Introduction: Medical education aims to develop clinical competency among medical students by appropriate teaching and assessment methods. Undergraduate medical examination is undergoing extensive re-evaluation and new examination systems to test the objectives have been designed. OSPE, a versatile multipurpose evaluation tool is one of them. It assesses competency, based on objective theory through direct observation and the procedures are standardized, ensuring objectivity and maximizing reliability. Hence the present study is mainly done to assess competency and various domains such as cognitive, psychomotor and affective domains of medical students by OSPE.

Objectives:

1. To evaluate the MBBS students by using teaching tools like Didactic lecture & OSPE.
2. To evaluate the perceptions of MBBS students in Biochemistry regarding Didactic Lecture & OSPE using a questionnaire.

Materials and methods: Study included total of 150 MBBS students of 2024-25 batch. First a didactic lecture on Urine Analysis was delivered. OSPE was conducted for MBBS students on the same topic "Urine Dipstick analysis", with one procedure station and marks were awarded. Google form questionnaire on Didactic Lecture & OSPE was circulated among the students. Their responses were recorded on Excel sheet. Statistical Analysis done and percentage graphs & student's' test using MS Excel were used.

Statistical analysis: Statistical analysis done & student's test using MS Excel were used.

Results: From the following figures & Questionnaire tables, we found that 64% of our First year Undergraduate Students found that Didactic lectures were not interactive,67% found the topics difficult to understand.48% found the lectures monotonous, whereas 57% had low attention span during the Lectures.

For 71% of students OSPE helped them in clarity on practical aspects,65% in enhancing their skills,69% found Clinical Application helpful,75% found them more easy in scoring marks, Around 76%students preferred OSPE over Didactic Lectures for better understanding & clarity of the subject.

Conclusion: In conclusion, OSPE is feasible & have good reliability for evaluating practical skills of Undergraduate Medical Students apparent by the Examiners & students.

Keywords*: OSPE, Didactic Lecture, Assessment, Questionnaire.*

INTRODUCTION

The goal of medical education is to develop clinical competency among medical students by appropriate teaching and assessment methods. While the theory exams assess cognitive domain, the practical exams should be designed to assess

the cognitive, psychomotor and effective domains like knowledge, attitude and skill. The scoring obtained may only reflect the overall performance of the student rather than the individual competencies (1). The traditional practical examination (TPE) of Biochemistry includes the qualitative experiments and practical viva voce, which students have to perform. This type of assessment does not provide the examiner, an opportunity to assess the skill of the student and the scoring by this pattern may be subjected to examiner bias. As a result, only, few learning outcomes was assessed by conventional methods (2). The CBME curriculum in medical education inherently incorporates assessment as a crucial element, involving objectivity, uniformity, validity and reliability as various modes of assessment, thus promoting a cohesive approach to teaching, learning and evaluation. The old conventional teaching method failed to satisfy all the elements of assessment (3). Hence a new pattern of objective structured evaluation was introduced and the competence is tested uniformly and objectively for all the students, taking up the practical examination (3b). The OSPE is a versatile multipurpose evaluation tool, that assess competency, based on objective testing through direct observation (4). The four levels of Miller's pyramid: "Knows", "knows how", "shows how" and "does", are incorporated in OSPE (5). The OSPE in CBME curriculum, is a comprehensive assessment method. It evaluates skills, competencies and professionalism in an objective, structured and standardized manner, thus aiming at removing bias and ensuring fairness and consistency (6). It comprises of multiple assessment stations where students are assessed by certified assessment facilitators where various competencies are evaluated in a comprehensive, consistent and structured manner (7). The OSPE has a very great potential, as the students can gain insights into the elements making up competencies as well as feedback on personal strengths and weaknesses (8). Thus, the present study aims to compare the performance of first-year MBBS students in traditional practical examination method versus the OSPE format, and also assess their efficacy as assessment tools.

OBJECTIVES

3. To evaluate the MBBS students by using teaching tools like Didactic lecture & OSPE.
4. To evaluate the perceptions of MBBS students in Biochemistry regarding Didactic Lecture & OSPE using a questionnaire

MATERIALS AND METHODS

The current study was a questionnaire-based study conducted from February to June 2025 in department of Biochemistry at Mamata Academy of Medical sciences, Bachupally, Telangana. The study included total of 150 MBBS students of 2024-25 batch. First a didactic lecture on Urine Analysis was delivered. OSPE was conducted for MBBS students on the same topic "Urine Dipstick analysis", with one procedure station and marks were awarded. Google form questionnaire on Didactic Lecture & OSPE was circulated among the students. Their responses were recorded on Excel sheet. Statistical Analysis done and percentage graphs & student's' test using MS Excel were used. The study approved by the institutional ethical committee **(IEC/MAMS/2025/172 Dtd 26/08/2025)**.

Inclusion criteria: The phase 1 MBBS students from 2024 batch who were voluntarily willing to participate were included in the study.

Exclusion criteria: Students who were not willing to participate, and students who were absent on the day of OSPE, as well as those from other batches and courses were excluded from the study.

The chosen topic by the faculty was "urine abnormal analysis", a qualitative practical procedure and "dipstick analysis of urine", OSPE. The topic for didactic lecture and OSPE was identified from the biochemistry competencies with the competency number BI-11.20. A practical demonstration session was taken for abnormal urine analysis. The students were made to perform the practical qualitatively, and another demonstration session of dipstick analysis of urine, with a procedure in the form of checklist is provided along with distribution of marks for each step in the checklist, and the procedure was performed by the students under faculty supervision. A well-structured and pre-validated questionnaire in the form of google form for both abnormal analysis of urine and dipstick analysis were made with 20 questions for each procedure and the students were asked to submit the feedback. The students responses collected and analyzed by statistician.

Procedure:

The students were divided into 4 batches and four OSPE stations were setup for all the students. The scoring was based on student performance, pre-procedure, procedure and post procedure. The total marks allotted were 5 marks and five minutes time was allotted for each student. ***(table)***. The faculty assessed the student with the aid of predesigned checklist and allocated marks accordingly. The feedback questionnaire was prepared as per the need of the study and given to the student at the end of the session. The responses were documented and analyzed.

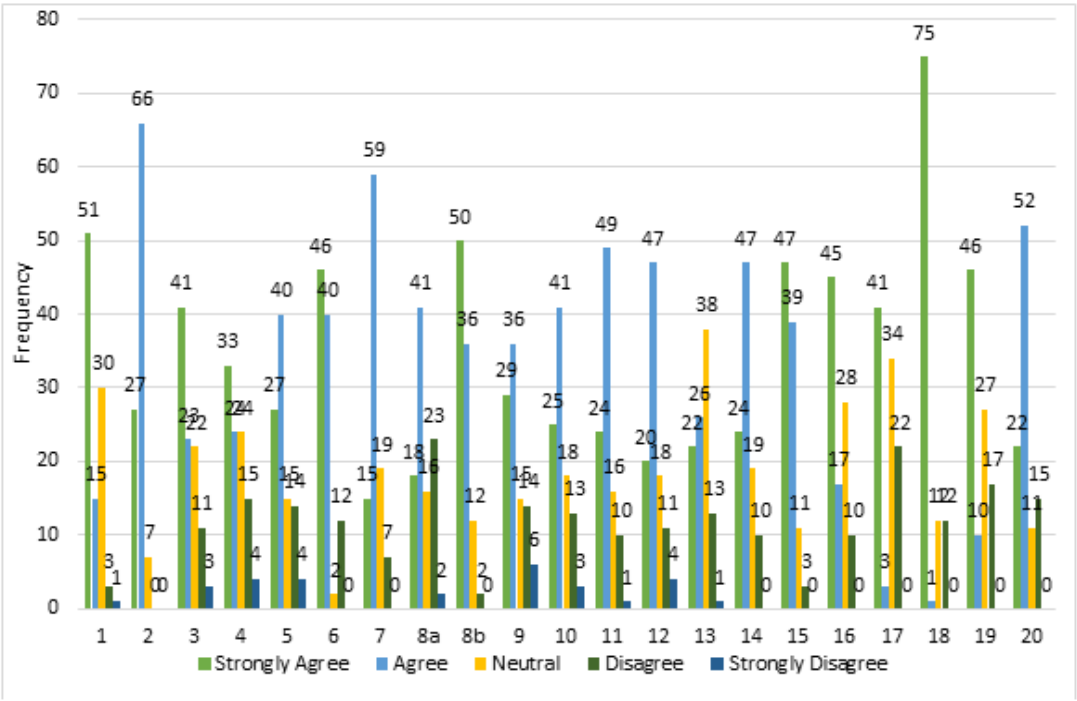
RESULTS

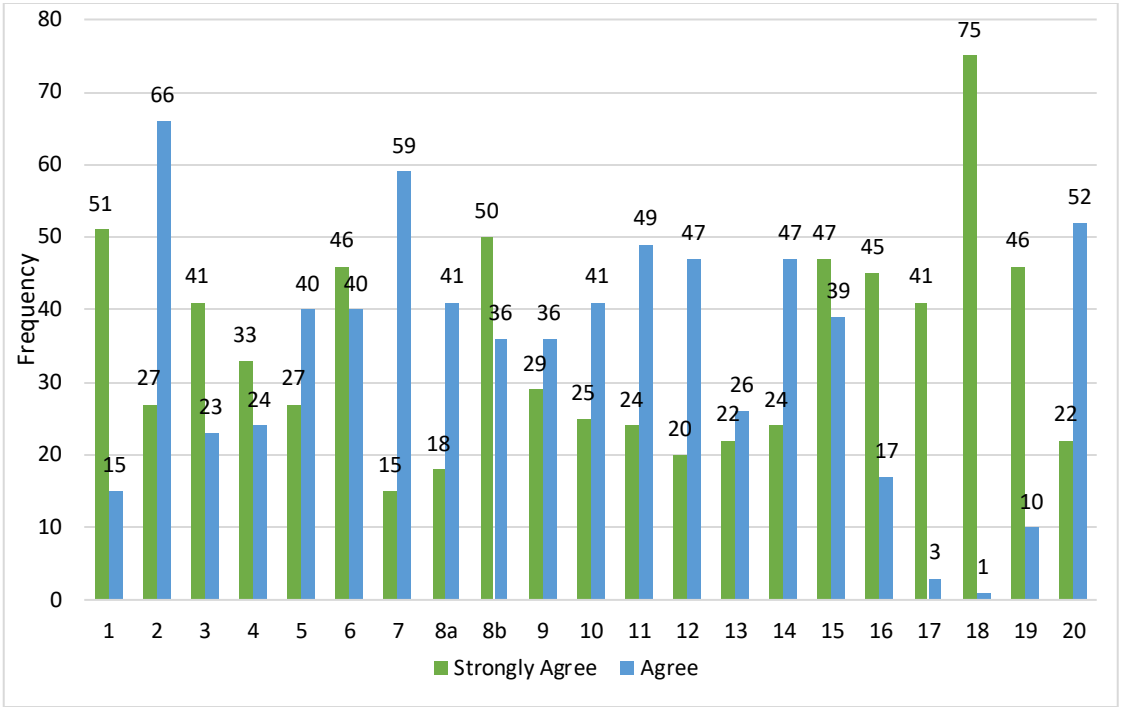
From the following figures & Questionnaire tables, we found that 64% of our First year Undergraduate Students found that Didactic lectures were not interactive,67% found the topics difficult to understand.48% found the lectures monotonous, whereas 57% had low attention span during the Lectures.

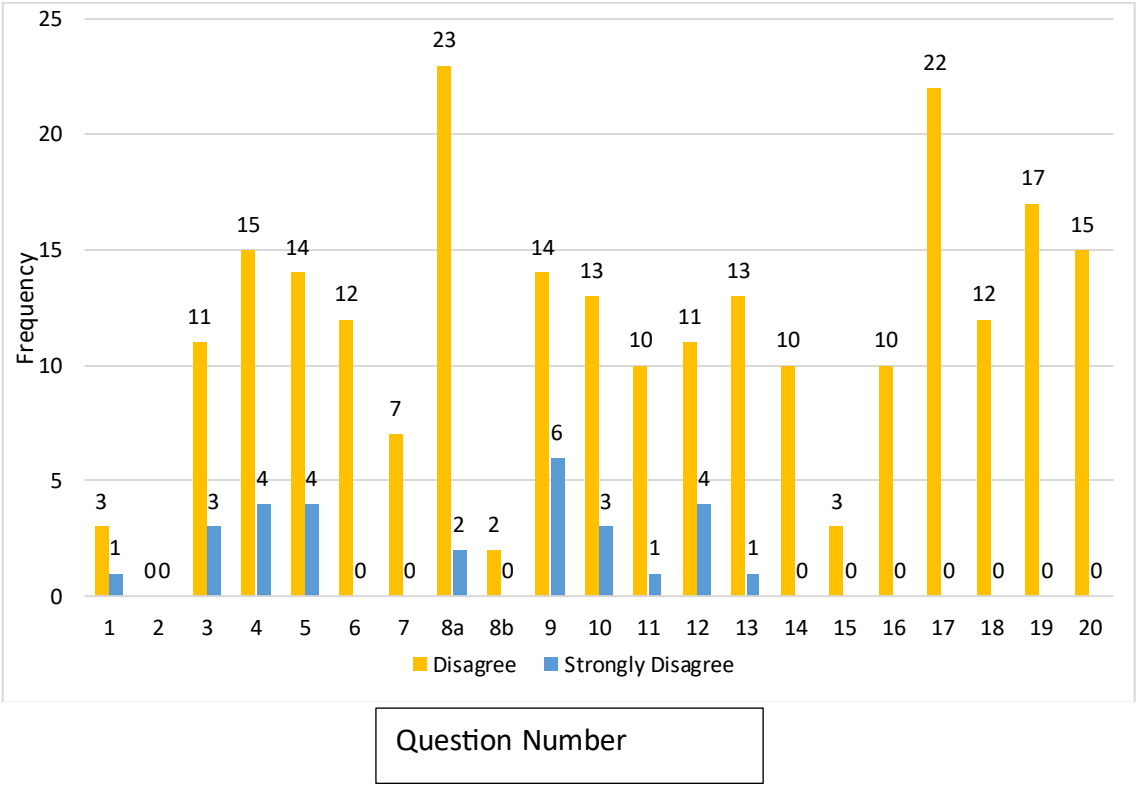
For 71% of students OSPE helped them in clarity on practical aspects,65% in enhancing their skills,69% found Clinical Application helpful,75% found them more easy in scoring marks, Around 76%students preferred OSPE over Didactic Lectures for better understanding & clarity.

Didactic Lectures Questionnaire

Q #	Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Did you read the topic prior to the class	51	15	30	3	1
2	Did you clearly understand the objectives of the lecture	27	66	7	0	0
3	You felt the lecture is not interactive?	41	23	22	11	3
4	Your attention span was very less during the lecture	33	24	24	15	4
5	You found the topic very difficult to understand?	27	40	15	14	4
6	Flowcharts/images shown were informative	46	40	2	12	0
7	You feel the same topic could be taken as OSPE?	15	59	19	7	0
8a	Do you find in this method your skills are assessed?	18	41	16	23	2
8b	Do you find this method will help you to score more marks?	50	36	12	2	0
9	Was the lecture audible to those sitting in the last row?	29	36	15	14	6
10	Didactic lecture helps in better understanding	25	41	18	13	3
11	Didactic Lecture helpful in clinical application?	24	49	16	10	1
12	Did you find Didactic Lecture intimidating?	20	47	18	11	4
13	Didactic lecture is very monotonous	22	26	38	13	1
14	Active participation in Didactic lectures	24	47	19	10	0
15	Topic clearly understood after the lecture	47	39	11	3	0
16	Didactic lecture enhances intellectual curiosity	45	17	28	10	0
17	Prefer Didactic lecture over OSPE	41	3	34	22	0
18	Prefer OSPE over Didactic lecture	75	1	12	12	0
19	Didactic lectures are more effective to understand the subject	46	10	27	17	0
20	Some practical topics should be taken as OSPE	22	52	11	15	0



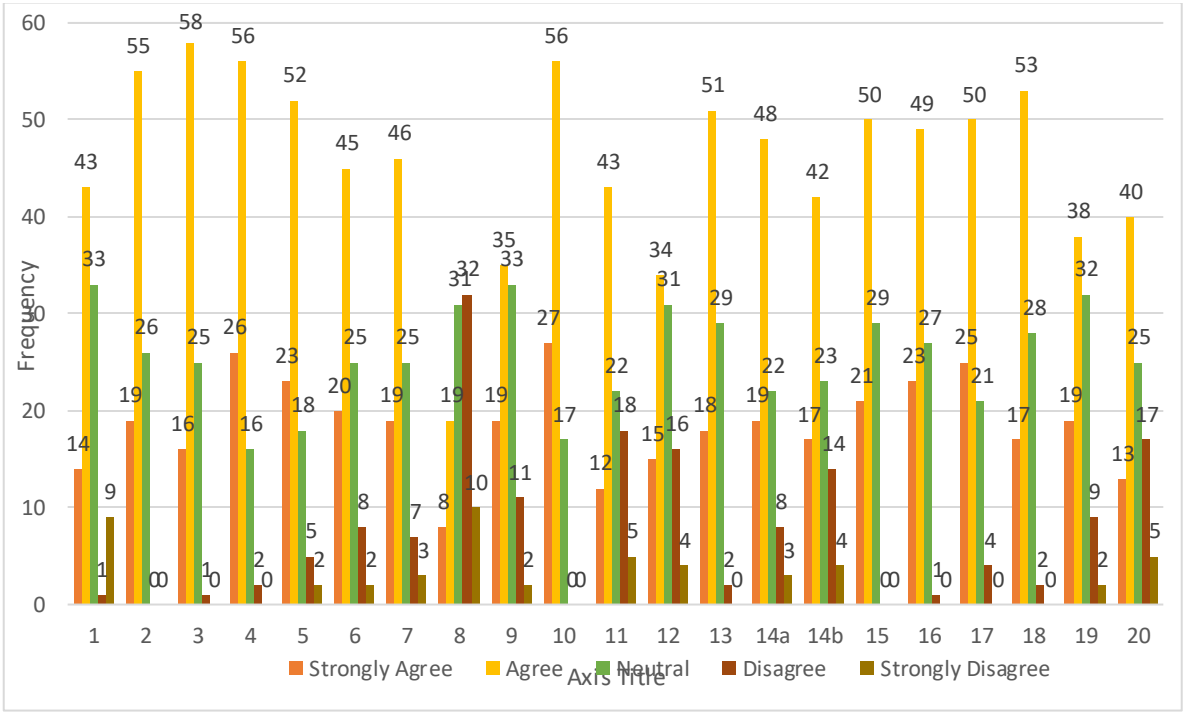


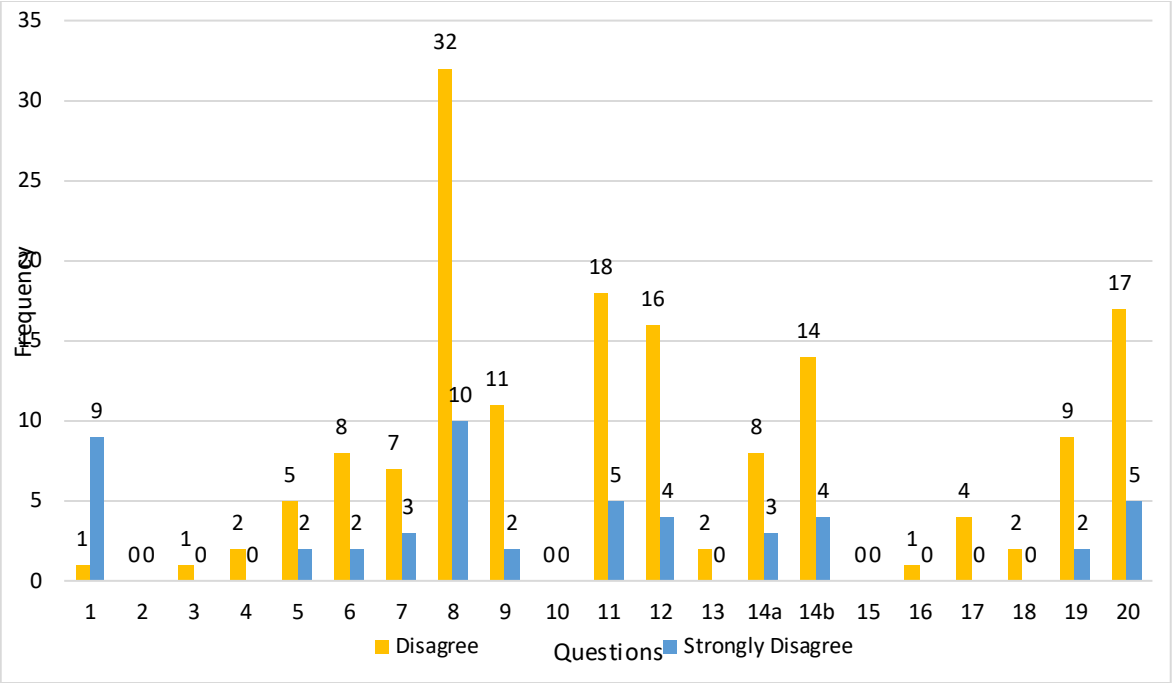


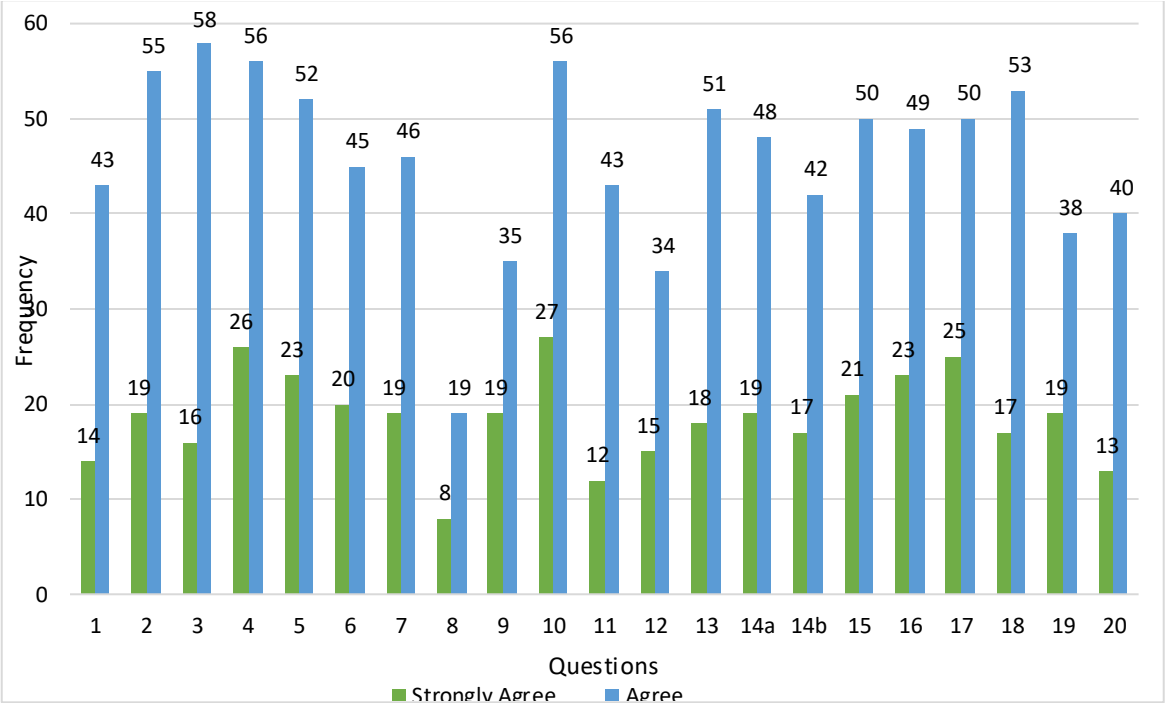
OSPE Questionnaire

Q. No. (N=100)	Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Were you properly sensitized about OSPE?	14	43	33	1	9
2	Did the questions cover the appropriate knowledge area?	19	55	26	0	0
3	Do you find the questions were clear and proper?	16	58	25	1	0
4	Was sufficient time given for each station?	26	56	16	2	0

5	Do you find OSPE beneficial for scoring the marks?	23	52	18	5	2
6	Do you feel OSPE is helpful in enhancing your skills?	20	45	25	8	2
7	Is OSPE a better module of learning for some topics in Biochemistry?	19	46	25	7	3
8	Is OSPE more stressful as compared to traditional methods?	8	19	31	32	10
9	Should the traditional method of assessment of practical skills continue in Biochemistry?	19	35	33	11	2
10	Should OSPE be followed as the method of assessment of practical skills in Biochemistry?	27	56	17	0	0
11	Was the OSPE well structured and organized?	12	43	22	18	5
12	Did you find OSPE intimidating?	15	34	31	16	4
13	Is OSPE helpful in clinical application?	18	51	29	2	0
14a	Do you require OSPE sessions on a regular basis?	19	48	22	8	3
14b	Were you confident to perform the tasks assessed in OSPE?	17	42	23	14	4
15	Do you feel OSPE is helpful in giving clarity about the practical aspects?	21	50	29	0	0
16	Is preparation and writing the OSPE examination stress-free?	23	49	27	1	0
17	Do you find presence of an observer embarrassing?	25	50	21	4	0
18	Do you feel OSPE is enhancing your intellectual curiosity?	17	53	28	2	0
19	Do you prefer OSPE over the traditional practical examination?	19	38	32	9	2
20	Is OSPE more effective than didactic lectures?	13	40	25	17	5







DISCUSSION

It was felt that a conventional method of teaching did not satisfy all the elements of Assessment. Competency based Medical Education involves the attainment of observable abilities by the students in a time independent learner centred manner[9].A new pattern of Objective Structured Practical Examination was developed in 1975 & later modified by Harden & Gleeson in 1979.In OSPE each component of the competence is tested uniformly & objectively for all the students.[10,11]

In our study, we took a Didactic lecture and OSPE on urine analysis & compared the feedback of students on both the modalities of teaching. Regarding Didactic Lectures majority of the students found the topic of the lecture difficult to understand, not interactive, monotonous, with less attention span. Some students preferred the topic to be taken as OSPE, while others realized that the clinical application was less.

In our study students found that Questions were clear, sufficient time was given for each station, helpful in scoring marks & enhancing practical skills.

They found OSPE gave them more clarity about practical aspects as compared to Didactic lecture. These observations were also there in studies by Rahman et al[12]& Menezes[13] et al, who found OSPE as a better tool over the traditional

methods for assessing the practical skills of MBBS students. Shiwani Jaswal[14] et al reported that OSPE is very useful tool in Biochemistry. Other studies reported that OSPE helps to assess the performance grade of the students[15,16-21]There were few students who found didactic lecture more informative. **OSPE is helpful is assessing the competency of the students[22].**

CONCLUSION

In conclusion, OSPE is feasible & have good reliability for evaluating practical skills of Undergraduate Medical Students apparent by the Examiners & students. OSPE is significantly more effective than Didactic lectures in understanding a particular topic of Biochemistry. It increases their attention span, their interest in the subject and also helps in retentio n of learned concept better when compared with traditional lectures. Simultaneously, it motivates the students for self-directed learning and improves their communication skills and should be a regular part of the curriculum.

Limitations: Gender comparison was not assessed in the current study.

Source of funding: None

Conflict of Interest: The authors declare no conflict of interest

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