OPEN ACCESS
Scholars International Journal of Anatomy and Physiology
Abbreviated Key Title: Sch Int J Anat Physiol
ISSN 2616-8618 (Print) |ISSN 2617-345X (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://scholarsmepub.com/sijap/

Original Research Article

Comparison of Two Practical Examination Techniques in Osteology for First-Year MBBS

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DOI: 10.36348/SIJAP.2019.v02i10.007 | **Received:** 07.08.2019 | **Accepted:** 21.08.2019 | **Published:** 27.10.2019

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Abstract

This complete enumeration, cross-sectional comparative study was conducted to compare the scores obtained by students in traditional practical examination with that obtained in objective structured practical examination in Osteology, which is a "must know" component of the first-year MBBS curriculum in Anatomy. After obtaining permissions from the Institutional Ethics Committee and institutional authorities for conducting the study, first-year MBBS students were oriented about the purpose of the study, the objective structured practical examination procedure, the check-list based marking system and their written informed consent was obtained. The maximum marks obtainable in both traditional practical examination and objective structured practical examination were 10 marks each. A total of 55 (27 females; 49.09% and 28 males; 51.91%) first-year MBBS students participated in the study. The students obtained higher scores in objective structured practical examination, as compared that in traditional practical examination. The male students had a higher maximum score in traditional practical examination but the gender difference in scores was not significant either for traditional practical examination (p=0.054) or for objective structured practical examination (p=0.934). Students obtaining relatively lower scores would require remedial training. A larger study would be necessary in order to generalize the results.

Keywords: Anatomy, Objective structured practical examination, Osteology.

INTRODUCTION

Student performance has to be evaluated across a range of situations to ensure a reliable skill-based evaluation. [1] The Objective Structured Practical Examination (OSPE) was first described from the University of Dundee, Scotland in 1975 [2] and further developed in 1979. [3] In OSPE, the student is assessed by direct observation of the student's performance in a adaptable examination setting that comprises several laboratory stations that should be completed within the same time duration (about 4-5 minutes each) [1,3]. The students move to the next station when a signal is given and should rotate through all stations in a pre-arranged sequence. Often, the stations are independent and the students can start at any of the stations and complete the cycle. Each station is designed to test a component of competence. Each procedure station is assigned an observer with a pre-validated check list for scoring the student's performance in the task to be performed at that station. At question stations, students answer questions or record their findings of the previous procedure station [4]. OSPE was first introduced in India as a teaching and evaluation tool and standardized in 1986 to assess the practical skills of students in the subject of Physiology [5]. The OSPE involves appraisal of the student by direct observation of the student's performance in a flexible examination setting comprising laboratory stations [6].

The OSPE evaluates a range of competencies [7, 8], measures practical psychomotor skills, eliminates subjectivity [7, 9] and examiner bias [8, 10], reduces total time for practical examination, enables uniformity in student assessment, decreases stress levels among students [11], has a wider discrimination index and high reliability [12] and helps students to grasp various components of competencies and also obtain feedback [11, 13]. A Hyderabad-based study [14] has reported

use of Computer-assisted OSPE (COSPE) in the subject of Anatomy, wherein, the OSPE questions were formulated using well-labelled specimens, animated and projected as a PowerPoint presentation on an LCD screen. This study [14] reported that all the students can take the COSPE at the same time and did not have to physically move between stations. Besides, COSPE saved staff time and effort in arranging the examination and identical difficulty levels was maintained for the entire batch of students.

A framework for assessing levels of clinical competence and described four levels – "knows", "knows how", "shows how", and "does" was proposed in 1990 [9]. The traditional practical examination (TPE) is subjective and principally examines the cognitive (knowledge) component viz. "knows" and "knows how" aspects while the OSPE also evaluates the psychomotor (competence) component - the "shows how" level. Student performance has to be assessed across a range of situations to ensure a reliable skill-based evaluation [6]. Each method of student evaluation has its own importance, based on the situation, relevance and the available resources [15]. The mode of assessment influences the learning style of student [16], has a crucial role the learning process [17] and chiefly determines what students learn [18], while an alteration in the method of student evaluation can transform learning behaviour [19]. The hurdles in using OSPE include its labour-intensive nature, difficulties in retaining identical difficulty levels, and observer fatigue [20]. Despite these constraints, OSPE brings about an improvement in student assessment [7]. Currently, OSPE has been introduced in select Indian universities [7, 11]. But, OSPE has not yet been used as an evaluation tool during MBBS practical examinations in Maharashtra State since it is not yet recommended as an evaluation tool by the Maharashtra University of Health Sciences. Osteology was selected for OSPE in the present study because this is classified in the "must know" segment of the first-year MBBS curriculum in Anatomy. The objective of the present study was to compare the scores obtained by students in TPE with that obtained in OSPE.

MATERIALS AND METHODS

This complete enumeration, cross-sectional comparative study was conducted in 2018 at Rajiv Gandhi Medical College, a municipal medical college located at Kalwa, Thane, about 30 kms from Mumbai in Maharashtra state, India. Permissions from the Institutional Ethics Committee and institutional authorities were obtained for conducting the study. TPE was first conducted and overall marks (out of 10) were allotted by the examiners. Before conducting OSPE, the participating students were oriented regarding OSPE and the marking system based on a checklist and their written informed consent was obtained. During the OSPE, the examiners were provided with a pre-validated checklist. The maximum score obtainable in OSPE was 10 marks.

The data were statistically analyzed using EpiInfo Version 7.0 (public domain software package from the Centers for Disease Control and Prevention, Atlanta, GA, USA). Continuous data were presented as Mean and Standard Deviation (SD). 95% Confidence interval (CI) was stated as: [Mean-(1.96)*Standard Error)] - [Mean+(1.96)*Standard Error)]. Paired t-test value and standard error of difference between two means were calculated. Statistical significance was determined at $p<0.05$.

RESULTS AND DISCUSSION

A total of 55 (27 females; 49.09% and 28 males; 51.91%) first-year MBBS students participated in the study.

Table-1: Differences in scores: TPE versus OSPE

Parameter	Females (n=27)		Males (n=28)	
	TPE (out of 10)	OSPE (out of 10)	TPE (out of 10)	OSPE (out of 10)
Mean	5.41	6.74	6.29	6.79
SD	1.42	2.55	1.94	1.94
95% CI	4.87 – 5.94	5.78 – 7.70	5.77 – 7.00	6.07 – 7.50
Paired t-value	2.367		0.964	
'p' value	0.021 *		0.339	

CI = Confidence interval; * Significant

TPE = Traditional practical examination; OSPE = Objective structured practical examination

In this study, the students obtained higher scores in OSPE, as compared to TPE. Similar results have been reported by other researchers [21]. In the present study, the difference in scores was significant (p=0.021) for female students (Table-1).

Table-2: Gender differences in scores

Parameter	TPE (marks out of 10)		OSPE (marks out of 10)	
	Females (n=27)	Males (n=28)	Females (n=27)	Males (n=28)
Mean	5.41	6.29	6.74	6.79
SD	1.42	1.94	2.55	1.94
95% CI	4.87 -5.94	5.77 – 7.00	5.78 – 7.70	6.07 – 7.50
Z value	1.924		0.081	
'p' value	0.054		0.934	

CI = Confidence interval; Z = Standard error of difference between two means
TPE = Traditional practical examination; OSPE = Objective structured practical examination

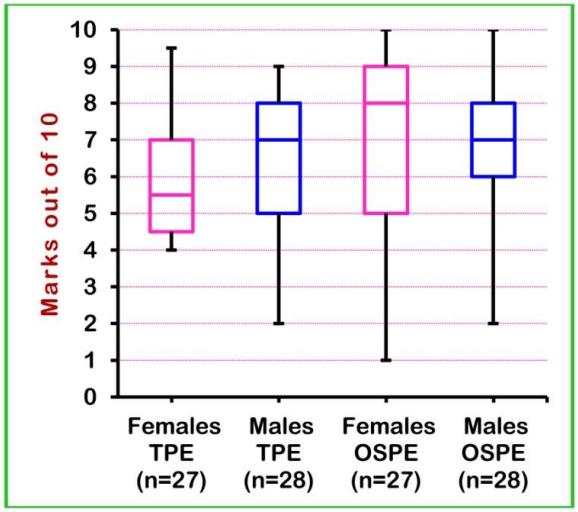

Fig-1: Boxplot of gender differences in scores
TPE = Traditional practical examination; OSPE = Objective structured practical examination

The male students had a higher maximum score in TPE but there was no gender difference in maximum scores in OSPE (Fig-1). The third quartile and median scores were higher among females in OSPE. In the present study, the gender difference in scores (Table-2) was not significant either for TPE (p=0.054) or for OSPE (p=0.934). Another study [22] has also reported that there was no significant (p=0.115) gender difference in OSPE scores. However, some other researchers [21, 23] have reported that female students performed significantly better, as compared to their male counterparts.

CONCLUSION

In the present study, the difference in the overall mean TPE and OSPE scores was significant only in the case of female students. The gender differences in mean TPE and OSPE scores were not significant. Students obtaining relatively lower scores would require remedial training. A larger study would be necessary in order to generalize the results.

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