

Objective Structured Practical Examination (OSPE) As a Formative Assessment Technique in Radiological Anatomy

Jyoti Narkhede¹, Suchitkumar Kamkhedkar^{2*}, Shilpa Kolhe³, Sundaram Kartikeyan⁴, Aniruddha Malgaonkar⁵, Sandhya Khadse⁶

¹Assistant Professor, Department of Anatomy, Rajiv Gandhi Medical College, Kalwa, Thane-400605, Maharashtra, India

²Professor and Head, Department of Anatomy, Rajiv Gandhi Medical College, Kalwa, Thane-400605, Maharashtra, India

³Associate Professor, Department of Anatomy, Rajiv Gandhi Medical College, Kalwa, Thane-400605, Maharashtra, India

⁴Professor and Head, Department of Community Medicine, Rajiv Gandhi Medical College, Kalwa, Thane-400605, Maharashtra, India

⁵Assistant Professor, Department of Community Medicine, Rajiv Gandhi Medical College, Kalwa, Thane-400605, Maharashtra, India

⁶Dean, Rajiv Gandhi Medical College, Kalwa, Thane-400605, Maharashtra, India

DOI: 10.36348/SIJAP.2019.v02i10.001

| Received: 01.10.2019 | Accepted: 09.10.2019 | Published: 15.10.2019

*Corresponding author: Dr. Suchitkumar Kamkhedkar

Abstract

This complete enumeration, cross-sectional comparative study was conducted at Rajiv Gandhi Medical College in Kalwa, Thane, Maharashtra state, India. After obtaining permissions from the Institutional Ethics Committee and institutional authorities for conducting the study, the purpose of the study and the procedure for objective structured practical examination (including check-list based marking system) was explained to first-year MBBS students and written informed consent was obtained from those willing to participate in the study. Traditional practical examination was first conducted and overall marks (out of 5) were allotted by the examiners. In the objective structured practical examination, the examiners were provided with a pre-validated checklist and the maximum score obtainable was 5 marks. A total of 54 first-year MBBS students (27 females and 27 males) participated in the study. The students obtained significantly higher scores in traditional practical examination but the gender differences in scores were not significant.

Keywords: Objective structured practical examination, Radiological anatomy.

Copyright @ 2019: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

INTRODUCTION

The limitations in the traditional practical examination (TPE) include examiner subjectivity influencing students' scores and inability to assess the students' competencies, communication skills, or attitudes [1].

The Objective Structured Practical Examination (OSPE) involves assessment of the student by direct observation of the student's performance in a flexible examination setting that consists of laboratory stations [2, 3]. The OSPE was first described from the University of Dundee, Scotland in 1975 [4] and improved in 1979 [2, 3]. In 1990, George Miller, a psychologist, put forward a four-level framework for assessing levels of clinical competence – "knows", "knows how", "shows how", and "does" [5]. Student performance has to be assessed across an assortment of situations to ascertain a reliable skill-based evaluation [2].

Typically, introduction of an idea, such as, OSPE, in a conventional framework, is greeted with scepticism [6]. Each method of student evaluation has its own importance, based on the situation, relevance and the available resources [7] and currently, there is no "gold standard" [8] or single pattern of examination that can assess students on the basis of their knowledge, comprehension, psychomotor skills, communication skills and attitudes [9]. The mode of assessment influences the learning style of student [10] and has a crucial role the learning process [11]. The method of assessment largely determines the learning methods of the students [12] and these learning behaviours and methods can be transformed by altering the student evaluation method [13].

The OSPE evaluates an assortment of competencies [5, 14], measures practical psychomotor skills, facilitates uniformity in student assessment, diminishes stress levels among students [15], eliminates subjectivity [5], removes examiner bias [16], reduces total time for practical examination, has a broader

discrimination index with high reliability [17], and helps students to appreciate multiple elements of competencies and also to take feedback [9].

Though limitations of OSPE include its labour-intensive nature, difficulties in retaining identical difficulty levels, and observer fatigue, OSPE brings about an improvement in student assessment [18]. A Hyderabad-based study [19] 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 [19] reported that the entire batch of 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 in small batches and identical difficulty levels was maintained for the entire batch of students. A modification of OSPE, termed “SOSPE” (Semi-Objective Structured Practical Examination) has also been described [20].

OSPE was first introduced in India as a teaching and evaluation tool and standardized in 1986 to assess the practical skills of students in Physiology [21, 22]. OSPE is currently conducted as a formative examination in select Indian medical colleges [18] and has been introduced as summative assessment in a small number of Indian universities [15]. Till date, OSPE has not yet been used as a routine evaluation tool during MBBS practical examinations in Maharashtra State since it is not yet authorized by the Maharashtra University of Health Sciences.

Radiological Anatomy was selected for this comparative study since it is a “must know” topic in the subject of Anatomy in the curriculum for the first-year MBBS course. The objective of the present study was

to compare the scores obtained by students in Objective Structured Practical Examination (OSPE) with that obtained in Traditional Practical Examination (TPE) in Radiological Anatomy.

MATERIALS AND METHODS

This complete enumeration, cross-sectional comparative study was conducted in the year 2018 at Rajiv Gandhi Medical College in Kalwa, Thane, Maharashtra state, India. After obtaining permissions from the Institutional Ethics Committee (IEC) and institutional authorities for conducting the study, the purpose of the study and the OSPE procedure (including check-list based marking system) was explained to first-year MBBS students and written informed consent was obtained from those willing to participate in the study. TPE was first conducted and overall marks (out of 5) were allotted by the examiners. During the OSPE, the examiners were provided with a pre-validated checklist. The maximum score obtainable in OSPE was 5 marks.

The data were entered in Microsoft Excel and 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]. The paired t-test value and the standard error of difference between two means (Z) were calculated. Statistical significance was determined at p<0.05.

RESULTS AND DISCUSSION

A total of 54 first-year MBBS students (27 females; 50.0% and 27 males; 50.0%) participated in the study.

Table-1: Differences in scores: TPE versus OSPE (marks out of 5)

Parameter	Females (n=27)		Males (n=27)	
	TPE	OSPE	TPE	OSPE
Mean	2.56	0.94	2.30	1.46
SD	0.51	0.86	0.52	1.46
95% CI	2.36 - 2.75	0.62 - 1.27	2.10 - 2.49	0.91 - 2.01
Paired t-value	8.419		2.816	
'p' value	<0.0001*		<0.0068*	

CI = Confidence interval; * Significant

TPE=Traditional Practical Examination; OSPE=Objective Structured Practical Examination

Table-2: Gender differences in scores (marks out of 5)

Parameter	TPE		OSPE	
	Females (n=27)	Males (n=27)	Females (n=27)	Males (n=27)
Mean	2.56	2.30	0.94	1.46
SD	0.51	0.52	0.86	1.46
95% CI	2.36 - 2.75	2.10 - 2.49	0.62 - 1.27	0.91 - 2.01
Z value	1.854		1.594	
'p' value	0.0063		0.110	

CI = Confidence interval; Z = Standard error of difference between two means

The differences between scores in TPE and OSPE were significant both for female and male students (Table-1), but irrespective of gender, the students had higher scores in TPE. However, other studies [23, 24] have reported significantly higher scores in OSPE as compared to that in TPE.

The gender differences in TPE and OSPE scores were not significant in the present study (Table-2). However, other studies have reported higher scores among female students, as compared to their male counterparts [25, 26].

CONCLUSION

In the present study, the difference in the overall mean TPE and OSPE scores was significant for both female and male students but the gender differences in mean TPE and OSPE scores were not significant. This study was limited to one batch of first-year MBBS students. A larger study would be necessary in order to generalize the results.

REFERENCES

- Ananthkrishnan, N. (1993). Objective structured clinical/practical examination (OSCE/OSPE). *Journal of Postgraduate Medicine*, 39(2), 82-84.
- Harden, R. M. (1979). How to assess clinical competence: An overview. *Medical Teacher*, 1(8), 289-296.
- Harden, R. M., & Gleeson, F. A. (1979). ASME Medical Education Booklet No. 8: Assessment of clinical competence using an objective structured clinical examination. *Medical Education*, 13, 41-54.
- Harden, R. M., Stevenson, M., Downie, W. W., and Wilson, G. M. (1975). Assessment of clinical competencies using objective structured clinical examination. *British Medical Journal*, 1(5955), 447-451.
- Miller, G. E. (1990). The assessment of clinical skills/competence/performance. *Academic Medicine*, 65(9 Suppl), S63-S67.
- Kowlowitz, V., Hoole, A. J., & Sloane, P. D. (1991). Implementing the Objective structured clinical examination in a traditional medical school. *Academic Medicine*, 66(6): 345-347.
- McLeod, P. J., Cuello, C., Capek, R., & Collier, B. (1996). A multidimensional evaluation system in a basic science course in medicine. *Medical Teacher*, 19-22.
- Collins, J.P., & Gamble, G.D. (1996). A multifomat interdisciplinary final examination. *Medical Education*, 30, 259-265.
- Abraham, R. R., Rao, R., Kamath, S., & Kamath, A. (2009). A trial of the objective structured practical examination in physiology at Melaka Manipal Medical College, India. *Advances in Physiology Education*, 33, 21-23.
- Pierre, R. B., Wierenga, A., Barton, M., Branday, J. M., & Christie, C. (2004). Student evaluation of an OSCE in pediatric at the University of the West Indies, Jamaica. *BMC Medical Education*, 4(22), 1-7.
- Newble, D. I., & Jagger, K. (1983). Effect of assessment examination and learning of medical students. *Medical Education*, 17, 165-171.
- A-Latif, A. (1992). An examination of the examinations: the reliability of the objective structured clinical examination and clinical examination. *Medical Teacher*, 14(2-3), 179-183.
- Hilliard, R. I., & Tallett, S. E. (1998). The use of an objective structured clinical examination with postgraduate residents in Pediatrics. *Archives of Pediatrics and Adolescent Medicine*, 152(1), 74-78.
- Charles, J., Janagond, A., Thilagavathy, Rajendran, Ramesh, & Vidhya. (2016). Evaluation by OSPE (Objective Structured Practical Examination) – A good tool for assessment of medical undergraduates – A study report from Velammal Medical College, Madurai, Tamilnadu, India. *IOSR-JRME*, 6(3), 1-6.
- Kundu, D., Das, H. N., Sen, G., Osta, M., Mandal, T., & Gautam, D. (2013). Objective structured practical examination in Biochemistry: An experience in Medical College, Kolkata. *Journal of Natural Science, Biology and Medicine*, 4(1), 103-107.
- Reznick, R. K., Smee, S., Baumber, J. S., Cohen, R., Rothman, A., Blackmore, D., & Berard, M. (1993). Guidelines for estimating the real cost of an objective structured clinical examination. *Academic medicine: journal of the Association of American Medical Colleges*, 68(7), 513-517.
- Byrne, E., & Smyth, S. (2008). Lecturers' experiences and perspectives of using an objective structured clinical examination. *Nurse Education in Practice*, 8(4), 283-289.
- Gupta, P., Dewan, P., & Singh, T. (2010). Objective Structured Clinical Examination (OSCE) Revisited. *Medical Education*, 47(11), 911-920.
- Cherian, S. B., (2017). COSPE in Anatomy: An innovative method of evaluation. *International Journal of Advanced Research*, 5(5), 325-327.
- Hasan, S., Malik, S., Hamad, A., Khan, H., & Bilal, M. (2009). Conventional/Traditional Practical Examination (CPE/TDPE) Versus Objective Structured Practical Evaluation (OSPE)/Semi Objective Structured Practical Evaluation (SOSPE). *Pakistan Journal of Physiology*, 5(1), 58-64.

21. Nayar, U. (1983). Objective structured practical examination. In: Bijlani, R. L., & Nayar, U. (Eds.) Teaching Physiology, Trends and Tools (pp. 151-159). New Delhi: All India Institute of Medical Sciences.
22. Nayar, U., Malik, S. L., & Bijlani, R. L. (1986). Objective structured practical examination: A new concept in assessment of laboratory exercises in preclinical sciences. *Medical Education*, 20, 204-209.
23. Rao, R. D., Babu, P. U., Chakravarthy, K. C. V., & Ramya, N. (2018). Objective structured practical examination (OSPE) as a tool in formative assessment of II MBBS students, in pathology. *International Journal of Research in Medical Sciences*, 6(1), 221-224.
24. Mokkalapati, A., Pavani, G., Dass, S. M., & Rao, M. S. (2016). Objective structured practical examination as a formative assessment tool for IInd MBBS microbiology students. *International Journal of Research in Medical Sciences*. 4, 4535-4540.
25. Hosseini, S., Vartanoosian, J., Hosseini, F., & Faridi J. (2018). A comparison of the Objective Structured Clinical/ Practical Examination (OSCE/ OSPE) Scores of the Biochemistry Laboratory Obtained by Male and Female Nursing Students of Shahid Beheshti University of Medical Sciences: 2011-15. *Advances in Nursing and Midwifery*, 27(3), 20-25.
26. Bhattacharya, S., Wagh, R., Malgaonkar, A., & Kartikeyan, S. (2017). Gender differences in student scores in objective structured practical examination (OSPE) on measurement of blood pressure in clinical physiology. *International Journal of Physiology, Nutrition and Physical Education*, 2(2), 1-4.