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Using TOSCE (Team Objective Structured Clinical Examination) in the second national medical sciences olympiad in Iran

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Introduction: Second National Medical Sciences Olympiad was done in Shiraz in August 2010 with aim of indentifying scientifically talented individuals, motivating students and orienting extracurricular activities. This Olympiad was done in 3 areas, basic sciences, clinical sciences and management. In clinical sciences, we used TOSCE (Team Objective Structured Clinical Examination). In this article we report the details of this exam and participants' satisfaction. **Materials and Methods:** This Olympiad in Clinical Medical Sciences was held in 2 levels: Individual and team. In the team stage, 9 teams from 9 universities participated. We used TOSCE for measuring clinical competency of teams. Each team consisted of 3 students. We designed 12 stations based on emergency medicine in medical and surgical fields. The time considered for each station was 15 min, after doing this exam the view of students was measured using a valid and reliable questionnaire. **Results:** Most of the students believed that TOSCE was a useful examination for measuring competency. More than 50% of students reported that success in this exam needs clinical competency, team work and problem solving ability. Nearly, half (48.1%) of students believed that 15 min is not enough for each station and they need more time. **Conclusion:** The results of this study showed that this kind of exam is useful for measuring clinical competency from students' viewpoint.

Keywords: Medical students, olympiad, TOSCE

INTRODUCTION

Background

The objective structured clinical examination (OSCE) was developed in 1975 by harden *et al.*^[1] In OSCE, students move through stations in which they had to demonstrate multiple clinical skills. The OSCE is now regarded as the pioneer of competence assessment in medicine.^[2] Many articles reported OSCE and discussed about its validity and reliability.^[3-6] The team structured

objective clinical examination (TOSCE) was planned as a variation of OSCE. The purpose of designing TOSCE was to measure students' performance in a team.^[7] It was also used to evaluate shared education between midwifery and medical students in one study.^[8] In another study, the modified type of TOSCE named team objective structured bedside assessment (TOSBA) was described.^[9]

This paper describes the process and structure of a 12 station TOSCE exam in a competitive examination for medical students known as the National Medical Science Olympiad in Iran. The evaluation of TOSCE from participants' viewpoint, its advantages and disadvantages will be discussed.

MATERIALS AND METHODS

As we mentioned in our previous articles,^[10,11] the aim of medical science Olympiad in Iran is to indentify

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scientifically talented individuals, to motivate students, orient extracurricular activities, and to foster their creativity. The first Olympiad was held in Isfahan in 2009 and the second in Shiraz 2010 in three areas: Health system management, basic science, and clinical science. In each area, Olympiad examination was held at two stages: Individual and group. In this article, we discuss about TOSCE as a part of group stage of clinical area of the second Olympiad.

Participants

One hundred and thirty five top ranked students as examinees came from 45 medical universities (3 examinees from each university), who were tested in individual stage of clinical science area. After individual stage the mean grade of each university team was calculated and the nine best university teams with higher scores were invited for the team exam. Only undergraduate students were allowed to participate in the Olympiad.

Structure of the TOSCE

An expert panel from all the medical universities in Iran participated in designing TOSCE questions. To ensure content validity of the exam, these experts designed an OSCE blueprint for each station based on the defined objectives in emergency medicine in medical and surgical fields. Each station comprised of three different elements and all the three members of a team should answer each element first and then decided on the whole station based on the group consensus. For example, at one station the first student should take history, the second should do the physical examination and the third should see laboratory data and then they should discuss about diagnosis based on the group consensus. The main aim for stations was to develop a team work toward management of an emergency medicine problem. Expert panel discussed about the time for each station and finally decided to consider 15 min for each station and 12 stations were designed to ensure exam reliability.^[2] One facilitator was assigned to each TOSCE station. These facilitators were internist, general surgeons or emergency medicine specialists. The content validity of the stations was determined by content experts and using a blueprint based on important domains (such as cardiology, nephrology and etc). Reliability of each station's checklist was measured after the exam by Cronbach's alpha as a measure of internal consistency.

The performance of each group was evaluated by pre mentioned criteria agreed by expert committee.

Students' viewpoints

Students completed a questionnaire at the end of the TOSCE. This questionnaire consisted of 11 items on the students' opinion about this exam in a 5 point Likert scale and some open questions. Validity of the questionnaire was determined by medical education experts in the scientific Olympiad

committee and the reliability was determined after a pilot study ($r=8$).

Analysis

We used descriptive statistics (mean and standard deviation) for analysis of questionnaire data. The participants' answers to open-ended questions were categorized by grouping similar comments for each question.

RESULTS

Nine teams from nine universities acquired the highest grades and participated in the TOSCE. Therefore, a total of 27 students participated in this one day exam. The results of reliability of stations are shown in [Table 1].

Most students either agreed or strongly agreed that TOSCE was a useful examination for measuring competency. More than 50% of them reported this exam reinforces team work and problem solving ability. 48.1% of them believed that 15 min was not enough for each station and they needed more time for reaching team consensus and answering the questions. The results are shown in Table 2.

In open questions, the students mentioned that this kind of exam was new and exciting for them. Some of the students' ideas are mentioned below:

- The most significant aspect of this TOSCE format was promoting a team activity toward emergency medicine problem management;
- Everyone was trying to do best in the team which was an important activity;
- The best thing about this sharing activity was the fact that we learned to decide who does what and how to have a consensus in our team.

DISCUSSION

The results of validity, reliability and participants' satisfaction of the TOSCE described in this paper as a part of second

Table 1: The reliability of each station in TOSCE

station	Cronbach's alpha
1	0.742
2	0.735
3	0.742
4	0.755
5	0.753
6	0.789
7	0.744
8	0.777
9	0.766
10	0.739
11	0.744
12	0.746

Table 2: Participants' views of the TOSCE exam

Impacts of the program	Strongly agree and agree (%)	Not agree, not disagree (%)	Strongly disagree and disagree (%)
Objectives of the exam were clearly explained	20 (74)	0 (0)	7 (26)
Objectives stated for group exam in Olympiad were met	21 (77.7)	2 (7.5)	4 (14.8)
The examination was a good learning experience for me	18 (66.6)	0 (0)	9 (33.4)
The examination content was related to a general practitioner's needs	20 (74)	6 (22.3)	1 (3.7)
The exam was a good method for measuring clinical competency	24 (88.8)	1 (3.7)	2 (7.5)
The exam reinforced team communication skills	17 (62.9)	1 (3.7)	9 (33.4)
Useful cases and scenarios were selected in this exam	14 (51.8)	2 (7.5)	11 (40.7)
The exam reinforced problem solving	18 (66.6)	3 (11.1)	6 (22.3)
The exam strengthened my confidence	19 (70.3)	3 (11.1)	5 (18.6)
The exam time was adequate	8 (29.6)	6 (22.3)	13 (48.1)
Overall I am satisfied with this exam	20(74)	1 (3.7)	6 (22.3)

national medical science Olympiad represented that this kind of exam was useful for measuring clinical competency and also team activity from students' viewpoints.

Similar results reported in pervious articles. Brian reported a group OSCE (GOSCE) in 1991 that was performed for postgraduate assessment of general practitioners in United Kingdom and concluded that GOSCE is a good method for formative and self assessment.^[12] Singleton and colleagues reported a TOSCE in St. George Hospital Medical School in London and concluded that this kind of exam is feasible, although, some students are unfamiliar with it.^[7] Also, Elliot and colleagues stated a GOSCE for assessment of clinical and interpersonal skills in United States of America and reported that GOSCE influence curriculum, students and faculties well.^[13]

In the present study, the students were generally agreed that TOSCE gave them an opportunity to work with their peers well. Most students had not a classroom experience for working in teams. In some classes, the high rank students think that working in groups may lead to do more than their usual duties, otherwise, they should accept the risk of getting bad grades in group works due to difficult and lazy group members that do not want to do anything as a group member.^[14] It seems necessary to empower our students in team activities and TOSCE exam seems to be useful for achieving this goal.

In our study near half of the participants believed that they needed more time in stations, especially for getting group consensus. The 5 min station is most frequently used in OSCEs,^[15] but some articles reported that students may need more time.^[16] In our TOSCE, the expert panel decided to consider 15 min for each three part station, although it seems that more time was needed as reported by half of the students.

The most important strength of this study was that participants were from nine different universities in Iran, besides an expert panel of teachers from different medical

universities were selected based on their expertize. To our knowledge, this is the first report of a TOSCE in a norm reference competitive exam such as Olympiad. This TOSCE was used for the first time in the second national medical science Olympiad in Shiraz, while in the first Olympiad in Isfahan other kinds of exams were used to assess group dynamic and clinical competence.^[17]

The main limitation of this study was that examinees were the top ranked students and were not a good representative of all medical students, especially in team work. Future studies should be done on representative sample of medical students.

CONCLUSION

Good teamwork is an essential component of clinical performance. Although, further evidence is required on TOSCE effectiveness as a method for group clinical problem solving, we believe that the TOSCE is a useful tool. Most importantly it encourages a positive feeling to team work in our students.

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