

Gaps in the Clinical Competency of Medical School Graduates: A Cross-Sectional Study Based on the Objective Structured Clinical Examination

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Background: Clinical education is the heart of medical education. It is one of the most important manifestations of teaching and learning in professions relating to medical sciences, leading to learners' clinical competency. This study was done to investigate general physician graduates' knowledge, performance, and clinical competency before entering the field of clinical activities.

Methods: In this descriptive cross-sectional study, the scores of different stations of the Objective Structured Clinical Examination (OSCE), held at the end of the general medicine course in Iran, were collected at Mashhad University of Medical Sciences. Totally, 266 students who participated in six periodicities of clinical competency examinations were included in the study by the census method. The clinical competency of general physician graduates assessed in the scopes were determined by the General Medical Education Council, including problem-solving, communication skills, practical action, taking the history, and performing physical examinations by the OSCE. The data were analyzed by SPSS software using descriptive and inferential statistics.

Results: The effect of different scopes of the OSCE ($F_{(3,5652)} = 7.022$ and $P = 0.001$) and participants' performance based on their critical and non-critical indicators ($T = 1.976$ and $P = 0.04$) are significant with 95% confidence interval. This suggests that participants' performance varies in different scopes of the clinical examination, including problem-solving, communication skills, practical action, taking the history, and performing physical examinations.

Conclusions: The differences in the clinical competencies of general physician graduates in mentioned scopes were significant. This emphasizes the need to examine their essential skills to achieve the minimum competencies expected of a future physician before entering the field of clinical activity.

Keywords: Objective Structured Clinical Examination (OSCE), Clinical Competency, Medical Education, Medical Student

شکاف در صلاحیت بالینی فارغ التحصیلان دانشکده پزشکی: یک مطالعه مقطعی بر اساس آزمون بالینی ساختارمند عینی

زمینه و هدف: آموزش بالینی قلب آموزش پزشکی است و در واقع یکی از مهم‌ترین مظاهر آموزش و یادگیری در مشاغل مرتبط با علوم پزشکی است که منجر به صلاحیت بالینی فراگیران می‌شود. این مطالعه با هدف بررسی دانش، عملکرد و صلاحیت بالینی فارغ‌التحصیلان پزشکی عمومی قبل از ورود به حوزه فعالیت‌های بالینی انجام شده است. **روش:** در این مطالعه مقطعی توصیفی، نمرات ایستگاه‌های مختلف آزمون بالینی ساختارمند عینی (OSCE) که به صورت ملی و در پایان دوره پزشکی عمومی در ایران برگزار می‌شود، در دانشگاه علوم پزشکی مشهد جمع‌آوری گردید. به طور کلی، در این پژوهش 266 دانشجوی فارغ‌التحصیل که در شش دوره آزمون صلاحیت بالینی پایان مقطع پزشکی عمومی شرکت کردند به روش سرشماری وارد مطالعه شدند. صلاحیت بالینی فارغ‌التحصیلان پزشکی عمومی در حیطه‌هایی که توسط شورای آموزش پزشکی عمومی تعیین شده است شامل حل مسئله، مهارت‌های ارتباطی، اقدام عملی، گرفتن شرح حال و انجام معاینات فیزیکی توسط آزمون OSCE مورد ارزیابی قرار گرفت. داده‌ها با استفاده از نرم‌افزار SPSS و از طریق آمار توصیفی و استنباطی تجزیه و تحلیل شد.

یافته‌ها: تأثیر حیطه‌های مختلف آزمون بالینی ساختارمند عینی ($F_{(3,5652)} = 7.022$) و $P = 0.001$ و عملکرد شرکت‌کنندگان بر اساس شاخص‌های حیاتی و غیرحیاتی آزمون ($T = 1.976$, $P = 0.04$) با 95٪ فاصله اعتماد معنادار بود. این موضوع حاکی از آن است که عملکرد شرکت‌کنندگان در حیطه‌های مختلف آزمون شامل حل مسئله، مهارت‌های ارتباطی، اقدام عملی، گرفتن شرح حال، و انجام معاینات فیزیکی متفاوت است. **نتیجه‌گیری:** تفاوت در صلاحیت‌های بالینی فارغ‌التحصیلان پزشکی عمومی در حیطه‌های ذکر شده قابل توجه است و این بر لزوم بررسی مهارت‌های اساسی آن‌ها جهت دستیابی به حداقل صلاحیت‌ها و شایستگی‌های مورد انتظار از یک پزشک عمومی قبل از ورود به عرصه فعالیت بالینی تأکید دارد.

واژه‌های کلیدی: آزمون بالینی ساختارمند عینی، صلاحیت بالینی، آموزش پزشکی، دانشجوی پزشکی

الثغرات في الكفاءة السريرية لخريجي كلية الطب: دراسة مقطعية تستند إلى الفحص السريري الموضوعي المنظم

مقدمة: التعليم السريري هو قلب التعليم الطبي. في الواقع، هو أحد أهم مظاهر التدريس والتعلم في المهن المتعلقة بالعلوم الطبية مما يؤدي إلى الكفاءة السريرية للمتعلمين. لذلك، تم إجراء هذه الدراسة للتحقق من المعرفة والأداء والكفاءة السريرية لخريجي الأطباء العام قبل الدخول في مجال الأنشطة السريرية.

الطرق: في هذه الدراسة المقطعية الوصفية، تم جمع عشرات المحطات المختلفة للفحص السريري الموضوعي الوطني (OSCE)، الذي عقد في نهاية دورة الطب العام في إيران، في جامعة مشهد للعلوم الطبية. إجمالاً، تم تضمين 266 طالباً شاركوا في ست فترات من اختبارات الكفاءة السريرية في الدراسة بطريقة التعداد. تم تحديد الكفاءة السريرية لخريجي الأطباء العامين الذين تم تقييمهم في النطاقات من قبل مجلس التعليم الطبي العام بما في ذلك حل المشكلات ومهارات الاتصال والإجراءات العملية وأخذ التاريخ وإجراء الفحوصات البدنية من قبل OSCE. تم تحليل البيانات بواسطة برنامج SPSS باستخدام الإحصاء الوصفي والاستنتاجي.

النتائج: أظهرت النتائج أن تأثير النطاقات المختلفة لـ OSCE ($F_{(3,5652)} = 7.022$) و $P = 0.001$ ، وأداء المشاركين بناء على مؤشراتهم الحرجة وغير الحرجة ($T = 1.976$ و $P = 0.04$) ذات أهمية بفاصل ثقة 95٪. يشير هذا إلى أن أداء المشاركين يختلف في نطاقات مختلفة من الفحص السريري بما في ذلك حل المشكلات، مهارات الاتصال، الإجراءات العملية، أخذ التاريخ وإجراء الفحوصات البدنية.

الخلاصة: أشارت النتائج إلى أن الفروق في الكفاءات السريرية للخريجين من الأطباء العامين في المجالات المذكورة كانت كبيرة، وهذا يؤكد على ضرورة فحص مهاراتهم الأساسية لتحقيق الحد الأدنى من الكفاءات المتوقعة من طبيب المستقبل قبل دخول مجال النشاط السريري.

الكلمات المفتاحية: الفحص السريري الموضوعي المنظم (OSCE)، الكفاءة السريرية، التعليم الطبي، طالب الطب

میڈیکل اسکول کے فارغ التحصیل افراد کی طبی قابلیت میں فرق: معروضی ساختہ کلینیکل ٹرائل پر مبنی ایک کراس سیکشنل مطالعہ

پس منظر اور مقصد: طبی تعلیم علمی علم کا مرکز ہے اور حقیقتاً طبی علوم سے متعلق امور کو سیکھنے کا ایک اہم ترین مظہر ہے، جو سیکھنے والوں کی طبی قابلیت کا باعث بنتا ہے۔ لہذا، اس مطالعہ کا مقصد طبی سرگرمیوں کے میدان میں داخل ہونے سے پہلے جنرل میڈیسن کے فارغ التحصیل افراد کے علم، مشق اور طبی قابلیت کا جائزہ لینا ہے **طریقہ:** اس وضاحتی مطالعہ میں، سرکچرڈ لیبیکٹیو کلینیکل ٹیسٹ (OSCE) کے مختلف سیشنوں کے اسکور، جو کہ قومی سطح پر اور ایران میں جنرل میڈیسن کورس کے اختتام پر منعقد کیا جاتا ہے، مشہد یونیورسٹی آف میڈیکل سائنسز میں کیا گیا۔ مجموعی طور پر، اس مطالعہ میں، 266 گریجویٹ طلباء جنہوں نے جنرل میڈیسن کے اختتام پر طبی قابلیت کے چھ کورسز میں حصہ لیا تھا، مردم شماری کے طریقہ کار کے ذریعے مطالعہ میں شامل کیے گئے تھے۔ OSCE ٹیسٹ کے ذریعے جنرل میڈیکل ایجوکیشن کونسل کے نامزد کردہ شعبوں میں جنرل میڈیکل گریجویٹس کی طبی قابلیت کا اندازہ لگایا گیا، بشمول مسئلہ حل کرنا، مواصلات کی مہارتیں، عملی کارروائی، تاریخ لینا اور جسمانی امتحانات کرنا۔ ٹینا کا تجزیہ SPSS سافٹ ویئر اور وضاحتی اور تخمینے والے اعدادوشمار کا استعمال کرتے ہوئے کیا گیا۔

نتائج: نتائج نے ظاہر کیا کہ معروضی ڈھانچہ والے کلینیکل ٹرائل کے مختلف شعبوں کا اثر ($F_{(3,5652)} = 7.022$, $P = 0.001$) اور اہم اور غیر اہم ٹیسٹ انڈیکس ($T = 1.976$, $P = 0.04$) پر مبنی شرکاء کی کارکردگی 95٪ فاصلے کے ساتھ قابل اعتماد معنی خیز ہے۔ اس سے پتہ چلتا ہے کہ ٹیسٹ کے مختلف شعبوں میں شرکاء کی کارکردگی مختلف ہوتی ہے، بشمول مسئلہ حل کرنا، مواصلات کی مہارتیں، عملی کارروائی، تاریخ لینا، اور جسمانی امتحانات کرنا۔

نتیجہ: نتائج بتاتے ہیں کہ مذکورہ علاقوں میں جنرل میڈیسن کے فارغ التحصیل افراد کی طبی قابلیت میں فرق نمایاں ہے، اور اس کے لیے سرگرمی کے میدان میں داخل ہونے سے پہلے ایک عام پریکٹیشنر سے متوقع کم از کم قابلیت اور قابلیت کو حاصل کرنے کے لیے ان کی بنیادی مہارتوں کی تلاش اور کوشش کی ضرورت ہے۔

مطلوبہ الفاظ: معروضی طور پر تشکیل شدہ کلینیکل ٹرائل، طبی قابلیت، طبی تعلیم، طبی طالب علم

INTRODUCTION

Today professional competencies become one of the hot issues in the educational systems, especially higher education. In the sense of "judging the learners' knowledge and performance" education assessment has a history of about five centuries (1). Educational assessment and evaluation of the learners were always one of the most important issues in educational systems. According to the previous studies and experiences, improvement of education quality strongly depends on the learners' educational assessment and evaluation mechanisms, which require an efficient and appropriate evaluating mechanism to achieve the goals (2). In experts' opinion, one of the notable bases of medical education is clinical practice and education. From past to present, many studies have been indicated the significant role of clinical education on medical students' clinical competencies. Despite many approaches being designed to improve medical students' clinical competencies up to now, today the planned clinical experience approach, which is looking for applying designed clinical learning activities for definite purposes, is highly welcomed. (3).

Clinical competencies in realist-circle scenarios are defined as achievements at a pre-determined level of efficacy; therefore, it seems that students' evaluation before entering the clinical wards can be an authentic criterion to determine students' quality of clinical performance assessment (4); Meanwhile, the Objective Structured Clinical Examination (OSCE) is considered as an approved scientific model for clinical competency assessment (5, 6). A glance at the Miller's Pyramid indicates that clinical competency includes the following four levels: "Knows, knows How, Shows How and Does"; and "Shows How" is defined as performance competency which can be evaluated by skill tests (7). Due to the previous interesting studies based on Miller's pyramid, a complex of assessment methods, including clinical skills and competency assessment methods, can significantly predict medical students' performance after graduation (8). Moreover, evaluation and assessment style may play a remarkable role in learners' learning approaches improvement. This theory is based on the fact that data retrieving can activate cognitive learning pathways, which in terms of medical education would improve learners' understanding, and make them able to apply what they learned in both basic and clinical sciences at the patients' bedside (9). In search of a pillar for clinical education and learning, Continuous formative assessment (CFA) with appropriate feedback is one of the notable tools; In this way, OSCE not only provide clinical skills for medical learners but also improve their performance and help them overcome their weaknesses (10).

Applying a valid and reliable method for assessing young physicians' clinical competency and their readiness for entering the clinical field is a major issue for medical universities and faculties all over the world; Nevertheless, any method has its own limitations, OSCE is known as a valid and reliable method for clinical competency assessment, by the way, behavioral evaluation is too difficult (11). In detail, OSCE is an international clinical competency assessment

method organized objectively in the form of different stations, and students are assessed under standard fair conditions (12-15).

Mainly, the OSCE stations evaluate clinical skills including history taking, physical examination performance, the ability of para-clinical test interpretation, and performing clinical procedures. (16, 17). Through the OSCE process, the specific supervisor of each station evaluates each individual's skill by a standard checklist (18). On the other hand, an actor-patient evokes a definite clinical scenario for the students through behavioral and verbal responses (19). This approach can basically provide performance appraisal and assurance of minimum professional standards for future physicians and test the learners' ability by interacting with standard supervisors and patients in clinical skills centers (20). Iranian medical students are assessed for clinical skills in terms of communication skills, taking the history, practical action (procedures and critical skills), performing physical examinations, and problem-solving. The Iranian national OSCE, like the international exam, is designed in form of different stations, and in each station, an expert assessor evaluates the participant's performance during a "complex clinical task". (21, 22).

Due to the fact that the clinical competency examinations at the end of the medical course have been considered and emphasized by Iran's Ministry of Health and Medical Education since 2015, as well as since they are held nationally, and registration in the residency course and graduation of general medical students is subject to obtaining the quorum of acceptance in these exams; so, the promotion of training and intra-departmental evaluations can have a significant impact on the success of general medical students. Therefore, since the most important aim of evaluation and assessment is to make educational programs' quality improved, one of the valid and reliable assessment methods in medical education is the OSCE. The present study has been conducted to evaluate the clinical competency, knowledge, and performance of the general physician graduates before entering the clinical field activities in the medical faculty of Mashhad University of Medical Sciences (MUMS), Mashhad, Iran in 2018 and 2019. In this study, we are looking for evaluating essential skills to achieve the competencies envisaged of a future physician, according to the General Medical Education Council document of the minimum competency expected from general physicians (GPs) and the required abilities of general medical graduates in Iran, in the scopes of communication skills, taking the history, practical action, performing physical examinations, and problem-solving.

METHODS

The present descriptive cross-sectional study included 266 general medical students in the six periodicities of the OSCE, which was conducted in 2018 (May, July, August, and November) and 2019 (February, and May) were collected by census sampling method at MUMS. Since the data were extracted by analyzing the scores of different stations of the exams from recorded checklists of the assessors, the confidentiality of information was ensured. It should be

noted that the clinical competency examination is conducted nationally, simultaneously, and centrally in qualified centers in the health areas of Iran. These centers are accredited according to the standards approved by the Secretariat of the General Medical Education Council and by the General Medical Board.

The present researchers evaluated, assessed, and compared the clinical competency, performance, and knowledge of the general medical students before entering the field of clinical activities in terms of communication skills, taking the history, practical action (procedures and critical skills), performing physical examinations, and problem-solving, in addition to critical and non-critical indicators. The competencies which are indexed as "critical" are the essential skills that a general practitioner needs to master. In OSCE, one of the admission criteria is to examine the participants regarding the number of critical and non-critical stations in which they have not received a passing score. The data were analyzed through SPSS software by using descriptive statistics (frequency, mean, and standard deviation) and inferential statistics, including independent t-test and one-way and two-way analysis of variance.

RESULTS

In this study 266 participants were studied and their demographic characteristics are presented in Table 1.

Table 2 indicates the descriptive statistics and results of the independent t-test to determine the differences between critical and non-critical indicators. Also, it shows the one-way

analysis of variance to investigate the differences in terms of problem-solving, communication skills, practical action, taking the history, and performing physical examinations in the OSCE.

The findings indicated that the impact of the scopes, including history and physical examination, communication skills, practical action, and problem-solving ($P = 0.001$ and $F_{(3,5652)} = 7.022$), as well as critical and Non-critical indicators ($P = 0.04$ and $T = 1.976$) were significant with 95% confidence in OSCE.

Based on the Post-hoc test, the difference between the means was investigated using the Bonferroni test. According to the results of the tests, there is a significant difference between the following scopes: problem-solving and history and physical examination ($p=0.024$), communication skills and history and physical examination ($p=0.028$), and procedure and history and physical examination ($p=0.001$) (table 3).

Furthermore, the two-way analysis of variance was used to investigate the interaction between critical and non-critical indicators of the OSCE. The first factor is the scope of the OSCE, which consists of 4 levels, including problem-solving, communication skills, practical action, and history and physical examination. The second factor of the OSCE includes two levels (critical and non-critical indicators). The results showed that the interaction and the combined effect of the factors mentioned above were not significant ($F_{(3,5648)} = 1.961$ and $P = 0.118$).

DISCUSSION

The findings indicated that the participants performed better in communication skills, and the average score in this scope is higher than others. On the other hand, taking the history and performing physical examinations had the lowest average score in the OSCE. Furthermore, this examination's competencies evaluated as critical competencies had lower mean scores than non-critical skills. However, according to the national document of general practitioner competencies, all the mentioned fields are equally important, and general medical graduates are expected to have sufficient qualifications in expected abilities. Therefore, considering the competencies expected from a general practitioner, the observed gap in other areas needs attention and constructive intervention.

Table 1. Demographic characteristics of participants

Variables		N (%)
Gender	Female	140 (52.63)
	Male	126 (47.37)
Residential Status	Native	156 (58.65)
	Non-native	110 (41.35)
Marital Status	Single	203 (76.32)
	Married	63 (23.68)
Nationality	Iranian	258 (96.99)
	Not Iranian	8 (3.01)

Table 2. The results of independent t-test to evaluate the difference between critical and non-critical indicators and ANOVA test to investigate the OSCE scopes

Scope	Frequency (N)	Mean(SD)	Min. Score	Max. Score	T	F	P-value
Problem-solving	1143	15.89 (3.64)	0	20	-	7.022	0.001
Communication skills	377	16.07 (3.01)	2	20			
Practical action	2367	15.97 (3.41)	0	20			
History and physical examination	1769	15.52 (3.33)	3	20	1.976	-	0.04
Critical indicators	3767	15.76 (3.48)	0	20			
Non-critical indicators	1889	15.94 (3.28)	0	20			
Total	5656	15.82	0	20			

Table 3. The Bonferroni post hoc test results to investigate the relationship between the OSCE scopes

Scope	Other Scopes	Mean Difference	Standard Error	P-value
Problem-solving	Communication skills	-0.17500	0.20247	1.000
	Procedure	-0.08129	0.12279	1.000
	History and physical examination	0.37302*	0.12938	0.024
Communication skills	Problem-solving	0.17500	0.20247	1.000
	Procedure	0.09372	0.18904	1.000
	History and physical examination	0.54803*	0.19338	0.028
Practical action	Problem-solving	0.08129	0.12279	1.000
	Communication skills	-0.09372	0.18904	1.000
	History and physical examination	0.45431*	0.10714	0.001
History and physical examination	Problem-solving	-0.37302*	0.12938	0.024
	Communication skills	-0.54803*	0.19338	0.028
	Procedure	-0.45431*	0.10714	0.001

One of the major challenges in medical education is the lack of clarity about the expectations, skills, and competencies that graduates should develop upon completion at the end of general medicine. Nowadays, researchers and experts are faced with various educational approaches, which can settle the medical competencies by pointing out professional medical graduates through the Outcome-Based Education (OBE) approach. In detail, OBE focus on the final output of the educational program and learners' clinical capability, by considering their basic skills. Exit-Outcome capability is a performance that is defined as the level of mastery of learners within the program. Capabilities and competencies commonly include all three components of attitudes, knowledge, and skills; furthermore, it should be noted that knowledge is not simply considered as a competency. It is important to note that these capabilities and competencies can be measured by specific tools and methods. Previous studies have been determined some advantages for the OBE approach, including defining the goals and mission of the university in general practitioner training, the relevance of the educational program to future job tasks, making learners responsible for learning, providing appropriate guidance for evaluation, a suitable tool for evaluation, group participation in planning, the possibility of program continuity and its relationship with higher-level programs, flexibility, being acceptable, clarity and comprehensibility, and the relevance of the educational program to future job tasks (21). Obviously, every country has specific rules for administering medical licenses. Also, it is unavoidable that practitioners have to prove their competence to acquire a license. Looking back to the OSCE's history, it was limited to the United States, the United Kingdom, Canada, and Australia at the beginning. Nevertheless, after it becomes routine in developed countries, other countries such as Korea, Japan, and Taiwan, instructed medical graduates to take medical licensing exams (20).

As described, OSCE is known as a convenient method for medical students' assessment that can overcome the

limitations of the traditional assessment methods (23). The study by Sulaiman et al in 2018 on 232 pre-clerkship students at the University of Sharjah who were participated in the Group OSCE (GOSCE) indicated the value of this exam. In the participated students' opinion, the GOSCE not only can place medical students' educational gaps but also is a suitable bridge to share skills and knowledge with peers. (10). A study in 2000 by Marshall and Harris indicated that OSCE is an effective assessment method for the students' radiographers (medical imaging students) clinical competency (24). Also, Nazzawi (2018) through his study in the Kingdom of Saudi Arabia suggested the OSCE as an equitable tool for clinical skills assessment (25). Another interesting study by Saunders et al. at the University of Tasmania, Australia in 2019 determined that more than 80% of the studied undergraduate nursing students believed OSCE as a road to the clinical skills competency (26). Hsieh et al. (Tiwan, 2012) found out that OSCE as a tool for measuring clinical skills supplies students to understand more effectively and make their clinical outcomes significantly improved. In their study participants' opinion, OSCE was the way to face real clinical problems in the not-real condition (27). In addition, the OSCE offers a great opportunity to enhance the curriculum and evaluate students' skills in the critical areas (28). Furthermore, studies have been presented the OSCE as an effective tool for assessing essential scopes in the health professionals' performance, such as making communication, the ability to receive information from the patient, data interpretation, and problem-solving (29).

In South Korea, the National Health Personnel Licensing Examination Board (NHPLB), resemblant to the National Board of Medical Examiners (NBME) in the United States of America, is responsible for issuing medical permissions and licensing through attitude, knowledge, skill, and competency exams. After studies and evaluations for years, The Korean Society of Medical Education has been verified the OSCE as a medical licensing exam, by this logic that a written exam is not adequate, appropriate, and fair to analyze medical

knowledge, skills, and competencies of general medicine graduates. There is a center in Seoul, South Korea, in which two clusters of parallel stations are offered for the OSCE that includes 12 stations. Medical procedures like simple sutures, measuring blood pressure, blood sampling, etc are tested in six brief stations. To measure clinical skills including clinical reasoning and communication skills, participants encounter standardized patients in six extended stations. Furthermore, each station consists of 2-3 experts including whether a trained physician or a Science Committee member and a staff member who are assess the participants based on the standard structured checklist. Also, other skills and competencies such as history-taking, brief physical examination, ordering paraclinical tests, interviewing skills, and communication skills are going to evaluate in various stations (11).

Like South Korea, the OSCE committee of Taiwan is a reference for graduated medical students' clinical competencies approval (12). In the study by Yang et al., the qualifications of the residents in the six main cores were assessed in the form of OSCE. A study by Yang et al was conducted between 2007 to 2010 in Taiwan to qualify the six main cores of the medical residency education by OSCE. Interestingly, their study indicated a significant difference in medical residents' performance referring to the clinical competencies cores ($F = 49.8$ and $P < 0.05$). This study showed that interpersonal and communication skills have the highest acceptance rate (81%) among medical residents, while the professionalism aspect is at the end of the list (53%) (20). The alignment of Spanish medical school curricula with the European Higher Education Area (EHEA) caused the curriculum design to focus on eligibility. As qualifying involves achieving a predetermined efficiency level in real-world scenarios, students need to gain more realistic healthcare experiences. Until recently, medical education in most medical schools only assessed learners' knowledge, while the medical education program had to be based on defined competencies. The main goals of the Spanish program included acquiring basic skills in taking the history, performing the physical examination, making reports, and amplifying clinical reasoning (4). Kamarudin et al. (2012) determined the high value of the face and construct validity of the OSCE among Malaysian students and trainers. Based on their view, the OSCE as an excellent assessment tool is going to be replaced globally instead of the long case assessment method over 30 years (30).

Furthermore, according to the Deane et al opinion, it is important to provide feedback during clinical pedagogic processes, this behavior can significantly improve physical examination and procedural skills, interview and communication skills, team building, problem-based learning, and professional behaviors (31). In addition, applying simulated patients is a way to increase the students' empathy during clinical practice (32). According to what was stated by Schauer and Wimmers (2017), OSCE is a group of brief standard clinical meetings, as part of the California Consortium of the Assessment Clinical

Competence (CCACC), that four major skills of clinical practice including patient-provider interaction, history taking, physical examination, and information sharing are being assessed through them (33). Another advantage of the OSCE is the interaction and discussion among assessors and examiners which seems necessary to improve participants' performance (34); therefore, it is desired that the OSCE improves ideals of physicians' qualifications and makes valuable modifications in clinical education at medical faculties.

As the most critical limitation of this study was its time interval, further studies in long duration can be more accurate in investigating the medical schools' educational gaps about training graduate students in clinical competencies. However, our study covered six periodicities of the OSCE test at MUMS, which can be considered as a light to improve educational planning.

Medical students are probably encountering examinations that are unable to evaluate the expected capabilities of a physician in most cases. Expert physicians' training is one of the most notable purposes of medical schools and universities; therefore, evaluating young physicians' clinical competency is a difficult complicated procedure that leads to professional physicians and GPs. Evaluating the performance of medical students, especially their clinical competencies, is very important. Clinical competency assessment is known as a difficult and complex process that consists of a combination of different evaluation stages in which students' skillful performance and their implementation of treatment and care programs are evaluated. As a result-oriented education paradigm, competency-based education significantly changes the students' education pathway. However, according to the background of the studies and experiences of other countries, OSCE is a valid method for assessing clinical competency. In addition, further studies are needed to determine the clinical competencies of the medical students in different universities to cover the educational gaps in future educational strategies.

Ethical considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors. The ethics committee of Mashhad University of Medical Sciences approved this research, ethics code IR.MUMS.REC.1398.152. All methods were carried out following relevant guidelines and regulations.

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