

Impact of Formative Objective Structured Clinical Examination (OSCE) on Clinical Performance of Undergraduate Medical Students in Summative OSCE

تأثير الفحص السريري التكويني الموضوعي المنظم على الأداء الاكلينيكي لطلاب
كلية الطب في التقييم النهائي

Monica Wassim¹; Faten Ghazal²; Nayera S. Mostafa³; Randa Reda⁴

¹ M.B.B. Ch, Ain Shams University

² Professor of Pathology, Pathology Department, Ain Shams University

³ Professor of Community, Environmental and Occupational Medicine, Community,
Environmental and Occupational Medicine Department, Ain Shams University

⁴ Professor of Clinical Pathology, Clinical Pathology Department, Ain Shams University

Abstract

Objectives: The purpose of this study was to investigate the impact of having a formative OSCE on clinical performance in the final main summative OSCE, as measured by grades, comparing students who attended the formative OSCE to those who did not. **Methods:** A retrospective observational study was carried out at New Giza University's School of Medicine in Egypt. A total of 228 Year 1 students participated in the study, and their data was collected, including formative attendance records, formative grades, and final OSCE grades. The data was subjected to both quantitative and qualitative analysis. **Results:** Attendance in formative OSCEs resulted in significantly higher percentage scores in both the module final OSCE and the total final OSCE than those who did not attend the formative. The number of formatives attended was connected with higher percentage scores on the OSCE grades in general. Formative OSCEs exhibited an 84.5%-91.3% positive predictive value for passing the summative OSCE. The final IM (Introductory module) OSCE grade and the total final OSCE grade had a substantial positive weak association. **Conclusion:** Formative OSCEs were linked to greater summative OSCE performance. Several formative OSCEs should be included throughout the year to improve medical students' performance in their first year.

Keywords: assessment, attendance, clinical performance, formative, OSCE, summative.

المستخلص:

التعليم الطبي هو مجال ديناميكي مستمر ، مزدحم بالصراعات، مع تزايد المساءلة بسبب قربه من القطاع الصحي. والتقييم هو حجر الزاوية لأي برنامج تعليمي كإجراء لإصدار الشهادات وتقييم البرنامج وعجلة قيادة للعملية التعليمية. على الرغم من أن اجتياز الاختبار التكويني ليس شرطاً للتقدم ، إلا أنه يساعد في توجيه الطلاب لتحسين وتسهيل التعلم الموجه ذاتياً. يجب دمج التقييم التكويني وتنسيقه في العملية التعليمية حتى يكون له تأثير إيجابي على الأداء والتعلم. في هذه الدراسة، تم تقسيم الطلاب وفقاً لحضورهم خلال فترة الامتحانات السريرية المنظمة الموضوعية. تم جمع الدرجات وسجلات الحضور بعد الحصول على الموافقة الإدارية. وقدم جميع الطلاب البالغ عددهم 228 طالباً الامتحان الختامي في نهاية العام، والذي يتألف من 12 محطة في يومين متتاليين تغطي جميع الوحدات المختلفة. كانت نسبة النجاح 50% ، وكان أعلى معدل حضور الامتحانات السريرية المنظمة الموضوعية التكوينية في الوحدة التمهيديّة (IM) تليها، وحدة العدوى و الجهاز المناعي (IaD) مع أقلها وحدة الدورة الدموية والتنفسية (CB) .

حصل الطلاب الذين حضروا الامتحان التكويني على درجات مئوية أعلى في الامتحان اخر العام مقارنة بأولئك الذين لم يحضروا الامتحان التكويني. أسفر حضور جميع الامتحانات التكوينية الثلاثة عن أعلى الدرجات تليها حضور اثنين من امتحانات تكوينية للدرجات. الطلاب الذين لم يحضروا أي امتحانات تكوينية حصلوا على أدنى الدرجات.

الكلمات المفتاحية: التقييم - الحضور - الاداء السريري - الفحص التكويني - الفحص السريري الموضوعي المنظم - التقييم النهائي.

INTRODUCTION

Medical education is an area that is constantly changing, full of discussions, disputes, and dialectic arguments, and it is becoming more accountable due to its connection to the health sector. In 2018, Egypt's medical education system transitioned from discipline-based curricula to integrated competency-based curricula ^(1,2). The new approach prioritizes the use of basic sciences in clinical medicine and employs a variety of teaching methods, including simulation, early clinical exposure, and community-based education ⁽³⁾.

The learning environment is complex, with interactions involving the learner, patients, employees, colleagues, resources, and other health care workers. It is necessary to create a safe, supportive atmosphere for learning. Andragogy is an adult learning theory that emphasizes on the learner's goals and autonomy in order for the learner to retain and apply knowledge in the appropriate settings ⁽⁴⁾.

The intended objectives, content to be delivered, expected outcomes, eligibility requirements, program time period, assessment methodology, teaching techniques, and feedback policies are all part of the curriculum design principles ⁽⁵⁾. The medical National Academic Reference Standards (NARS) are an experiment to narrow the gap between coexisting curriculum types, requiring curriculum designers to focus on the intended outcome, with contextualization appropriate to local demands and global standards, ensuring not only health context understanding but also communication skills and decision making ⁽¹⁾.

Assessment is the foundation of any educational program, serving as a certification mechanism, program evaluation, and a powerful steering wheel of the educational process. It is a critical criterion for medical assessments to be as precise and dependable as feasible ^(3,6).

The primary goals of assessment are to monitor the program, address community

requirements, provide feedback to students, and provide an objective basis for certification. Blueprinting is an important part of the evaluation process. It assures the examination's content validity and employs the appropriate assessment tool for each component of the curriculum ⁽⁷⁾.

Objective Structured Clinical Examinations (OSCEs) are high-stakes exams that evaluate students' performance in a safe, controlled environment using a standardized scoring system. Developed in 1975 by Harden et al to assess students' clinical skills competency while overcoming the restrictions of lengthy and short cases, and to allow students to interview patients in a simulated safe and controlled environment. The OSCE evaluates performance at the 'shows how' level of Miller's assessment pyramid ^(8,9).

Performance evaluation is an important component of undergraduate medical school evaluation. OSCEs are commonly used for formative and summative assessments of clinical skill, and are built as a framework of many time-bound stations examining specific tasks ⁽¹⁰⁾.

Because of its intrinsic flexibility, practicality, reliability, and the scope of many learning assessment chances in the same setting in an objective manner, OSCE has acquired recognition and appeal ⁽¹⁰⁾.

Although passing the formative exam is not required for advancement, it does assist students in improving, encouraging, and facilitating self-directed learning ⁽¹¹⁾. It is also an important learning tool, capable of recognizing problematic students and providing them with the extra help they require. Participation in formative exams was found to be more beneficial than passing the formative assessment itself, not only in terms of becoming familiar with the OSCE logistics and being exposed to a variety of different tasks and stations, but also in utilizing the informative corrective feedback provided by the assessor ⁽¹²⁾. Small frequent formative OSCEs were also reported to be more effective ^(9,11).

To have a beneficial impact on performance and learning, formative assessment must be incorporated and coordinated within the educational process. It is critical for medical educators to have a vision of effective formative assessment methods⁽¹⁴⁾.

Research Aim

The study sought to determine the impact of formative OSCE on clinical performance in the summative final OSCE in year 1 students because this is the students' first major encounter with clinical assessment and the concept of time bound different stations requiring a variety of tasks in various disciplines of medical sciences. The primary result was to determine the influence of attending formative OSCEs and the number of formatives attended on final summative OSCE grades.

Subject and Methods

This retrospective observational cohort study was conducted on students enrolled in year 1 of the 2020/2021 academic year at New Giza University in Egypt. It was conducted on a total of 228 students after 27 students were excluded for being repeaters of the year based on our exclusion criteria.

The study protocol was approved by the ethical committees of Ain Shams University and New Giza University. The data was kept confidential, and only the investigator had access to it after receiving consent from the School of Medicine at New Giza University (NGU).

Data Collection

The study began with the student affairs office acquiring students' names, ID numbers, and secondary education data. Following consent from NGU, details about student attendance in general, formative OSCE attendance, formative grades, and final summative grades were obtained from the control office. The first-year modules were altered to determine which included a formative OSCE. The first year begins with the Introductory Module (IM), which lasts 8 weeks, followed by the

Infection and Defense Module (IaD), Behavioral Science Module (BS), Circulation and Breathing Module (CB), and lastly the Fluid, Nutrition & Metabolism Module (FNM).

During the first year, students take three formative OSCE exams: Introductory Module (IM), Infection and Defense (IaD), and Circulation and breathing (CB). Although formative tests were not required, students were strongly encouraged to take them.

Overall grades were produced and quantitatively analyzed (mean and standard deviation), after which scores were categorized into two primary groups based on the summative exam cut-off point (Pass: 50% or more and Fail: less than 50%) and qualitatively analyzed. Following the modules included in the study, a formative OSCE of 1-4 stations was conducted, with 4 stations used during the initial formative test in the IM module and reducing in number as the year continued to 1 station in the CB near the conclusion of the year. Students were given 5 minutes for each station, and they were graded based on previously announced checklists. The examiners provided personalized feedback to the students immediately following the station, informing them of their faults and correct responses.

All students took the summative end-of-year OSCE exam at the end of the academic year. The exam consisted of 12 stations spread over two days, covering all of the numerous modules presented over the year, with two stations on IM, two stations on IaD, two stations on BS, three stations on CB, and three stations on FNM. This equates to 7 stations for modules that include a formative OSCE exam and 5 stations for modules that do not. The percentage of marks gained was used to assess performance. The pass percentage was 50% out of a possible score of 240, with each station worth 20 points. It was further subdivided into grades for formative tests with a maximum score of 140 (7 stations) and scores for modules without formative exams with a maximum score of 100 (5 stations). To examine the effect on summative OSCE

performance, summative examination scores were compared to formative exam attendance and grades and analyzed using SPSS-27.

Statistical Analysis

SPSS version 27 was used for data cleaning and input. Descriptive statistics were computed and reported as a number and percentage for qualitative variables, as well as a mean and standard deviation for quantitative data.

For quantitative variables, the independent sample t-test and One-Way ANOVA were used for analysis. Pearson's correlation was used to determine the relationship between quantitative variables. To assess the effect of different independent factors on overall end-of-year summative OSCE grades, a linear regression model was used. If the p-value was less than 0.05, it was considered statistically significant.

Results

Table (1) General characteristics of the participants

	Variable	Number (%)
Gender	Male	122 (53.5)
	Female	106 (46.5)
Secondary education	IGCSE*	80 (35.1)
	National Egyptian	74 (32.5)
	American diploma	68 (29.7)
	Others**	6 (2.7)
Formative exam attendance/ module	IM	177 (77.6)
	IaD	165 (72.4)
	CB	121 (53.1)
Number of formatives attended	1	44 (19.3)
	2	76 (33.3)
	3	89 (39.1)
	None	19 (8.3)

*IGCSE: International General Certificate of secondary education

**Others: The French baccalaureate, the German Abitur, the International baccalaureate

IM: introductory module, IaD: Infection and Defense, CB: Circulation and Breathing, BS: Behavior Sciences, FNM: Fluid, Nutrition and Metabolism, OSCE: Objective Structured Clinical Examination,

Of the 255 students enrolled in the first year of medical school at New Giza University, 27 were repeating the academic year and were thus eliminated from the study. In addition, 228 students were selected for the study.

There was no statistically significant relationship between gender and final OSCE grades. This was also discovered among the three major secondary school systems (IGCSE, National Egyptian diploma, and American diploma).

The majority of students (177 students) were eager to attend the IM formative OSCE because it was the first formative held in year 1 and was their first experience with the OSCE

examination. The IaD formative OSCE and the CB formative OSCE have 165 and 121 pupils, respectively, as the year progresses.

Although formative examinations are not required and failing them has no effect on the final OSCE grade, students are advised to attend all formative exams, not only to become comfortable with the OSCE logistics but also to become acquainted with different question modalities. 89 students (39.1%) attended all three formative OSCEs held throughout the year, 76 (33.3%) attended two, and 44 (19.3%) attended only one. There were also 19 (8.3%) students who did not attend any of the formatives offered throughout the year.

Table (2): Comparison between attendance of formative OSCE exam and final OSCE grades for each module and total final OSCE grade.

Module	Attendance of Formative	Final OSCE grade per module		Total final OSCE Grade	
		Mean ± SD	P value	Mean ± SD	P value
IM	Yes	73.3±18.8	<0.001*	63.3±17.4	0.002*
	No	61.1±16.4		54.7±16.0	
IaD	Yes	69.4±20.7	<0.001*	64.8±17.0	<0.001*
	No	55.5±19.1		52.5±15.5	
CB	Yes	65.8±15.0	<0.001*	68.4±13.2	<0.001*
	No	52.7±19.4		53.4±18.3	

Test of Significance: Independent Sample t Test

*: P Value is significant (less than 0.05)

Students who took the formative OSCE tests scored 63.3±17.4 in the IM, 64.8±17.0 in the IaD, and 68.4±13.2 in the CB in their overall final OSCE, with a significant p value of less than 0.005. Those who did not take the formative OSCE scored 54.7±16.0 on the IM, 52.5±15.5 on the IaD, and 53.8±18.3 on the CB. The final OSCE grade per module for those who attended the formative OSCEs was

similarly statistically significant, with 73.3±18.8 in the IM, 69.4±20.7 in IaD, and 65.8±15.0 in the CB module.

The total percentage score for modules with formatives was 70.6±18.9 in the IM, 65.6±21.1 and 59.7±18.4 in the IaD and CB, respectively, with a total of 64.5±16.6, higher than the modules without formatives with 59.8±19.7 and 55.3±24.2 in the BS and FNM, respectively, with a total of 57.1±20.7.

Table (3) Comparison between number of attended formative OSCE exams and final OSCE grades for modules with and without formatives and total OSCE grades.

Number of attended formative exams	Grades of modules with formative exams			Grades of modules without formative exams			Total OSCE grade		
	Mean \pm SD	P value	Rank	Mean \pm SD	P value	Rank	Mean \pm SD	P value	Rank
1	58.6 \pm 15.4	<0.001*	A	45.9 \pm 17.8	<0.001*	A	53.3 \pm 15.4	<0.001*	A
2	59.5 \pm 17.5		A	51.1 \pm 20.1		A	56.0 \pm 17.7		A
3	74.2 \pm 10.2		B	67.0 \pm 15.3		B	72.4 \pm 11.3		B
None	52.7 \pm 18.0		A	47.0 \pm 20.8		A	50.3 \pm 18.4		A

Test of significance: Oneway ANOVA

* p value is significant (<0.05)

The number of formative OSCEs attended had a statistically significant beneficial effect on the mean percentage score of the total OSCE grade, as indicated in table (3) and figure (1).

Three formative OSCEs were held during the year, with the mean percentage score higher in those who attended all three formatives (72.4 \pm 11.3) and lower in those who attended

only one formative OSCE (53.3 \pm 15.4). The mean percentage score in the total final OSCE for students who did not take any of the formative tests was 50.3 \pm 18.4. The majority of students who attended all three formatives passed the final OSCE exam, with only 2.2% failing the final OSCE. Students who did not attend any of the formatives had nearly identical probability of passing or failing the final OSCE, with 47.4% passing and 52.6% failing.

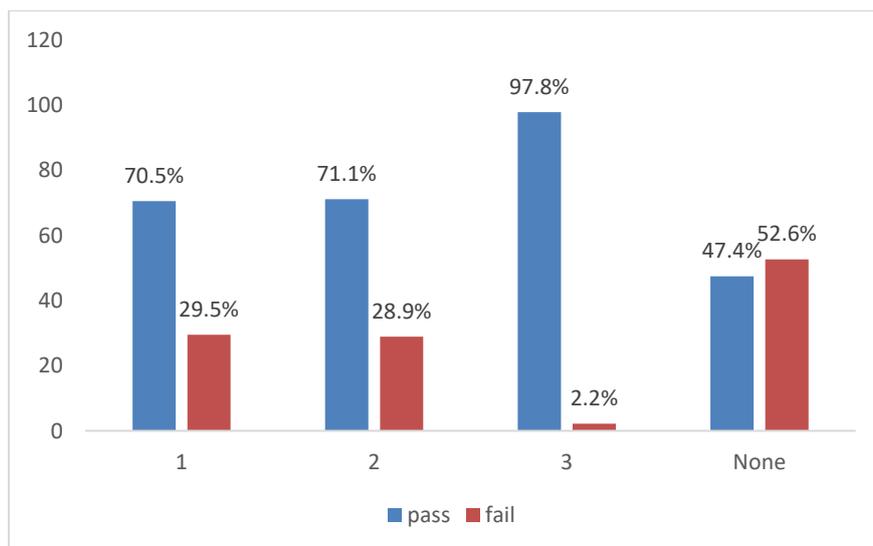


Figure (1): Number of attended formative OSCEs and total final OSCE grade.

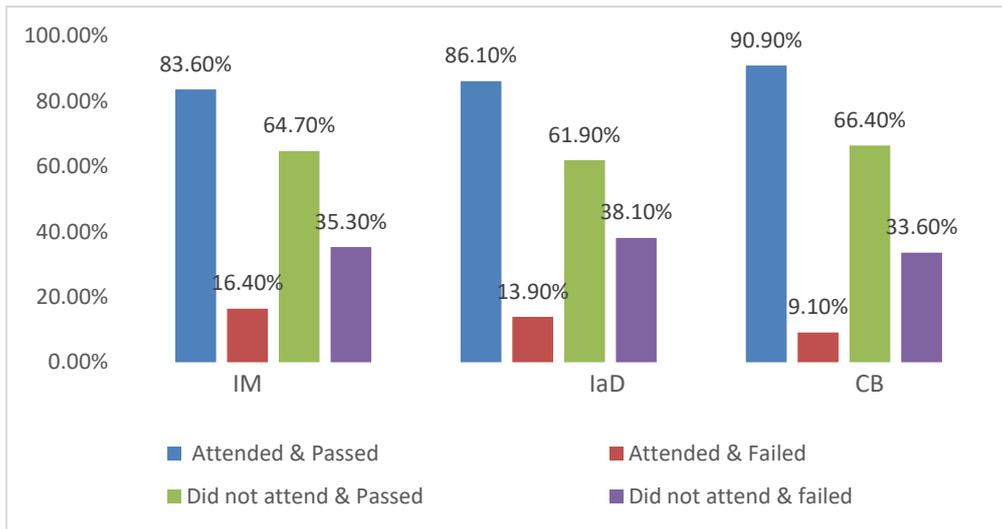


Figure (2): Relation between final OSCE exam and attendance of each formative OSCE exam

Figure (2) depicts the percent distribution of passing and failing in the total OSCE grade vs attendance at each formative assessment. Those who took the formative and failed the final OSCE were far fewer than those who did

not take the formative and failed the final OSCE. Students who attended the formatives were far more likely to pass the final OSCE than those who did not. This was true for all three formative OSCEs held.

Table (4) Comparison between formative grades and total final OSCE grade

Module Formative OSCE grade		Total final OSCE grade		Total
		Pass	Fail	
IM *	Pass	98(84.5)	18(15.5)	116 (100.0)
	Fail	50(82.0)	11(18.0)	61 (100.0)
IaD**	Pass	130(85.5)	22(14.5)	152 (100.0)
	Fail	12 (92.3)	1(7.7)	13(100.0)
CB***	Pass	95(91.3)	9(8.7)	104 (100.0)
	Fail	15(88.2)	2(11.8)	17(100.0)

*Sensitivity: 66%, PPV: 84.5%

**Sensitivity: 91.5%, PPV: 85.5%

***Sensitivity: 86.4%, PPV: 91.3%

As indicated in table (4), passing the formative OSCE had a positive predictive value of 84.5% in the IM formative OSCE, 85.5% in the IaD formative OSCE, and 91.3% in the CB

formative OSCE. The IaD formative OSCE was passed by 91.5% of individuals who passed the final OSCE.

Table (5) Linear regression model for the effect of attendance of formative OSCE exams on total final OSCE percentage grades

Variable	B	SE	Beta	Sig	CI	
					Lower bound	Upper bound
Constant	46.072	2.512		<0.001	41.122	51.023
Attended IM formative OSCE	5.053	2.549	0.121	0.049	0.029	10.076
Attended IaD formative OSCE	6.474	2.496	0.166	0.010	1.556	11.392
Attended CB formative OSCE	12.676	2.159	0.363	<0.001	8.422	16.931

The predictive impact of attending the three formative tests on the end-of-year OSCE grade is shown in Table (5). Attendance at the CB formative exam had the greatest impact on the end-of-year OSCE grade (12.676%), followed by the IaD (6.474%) and, finally, the IM (5.053%).

Discussion

The feedback offered to the student on their clinical performance and how they might develop their skills distinguishes formative OSCE from summative tests. Although failing the formative has no effect on the summative marks and is not required for progression, it allows students to become acquainted with the OSCE experience in a non-judgmental setting.

This one-year retrospective cohort research was done on year one students enrolling in the School of Medicine at New Giza University. Repeaters of the year will be disqualified based on our exclusion criteria. A total of 255 students were enrolled in year 1, but 27 were eliminated because they were academic year repeaters, leaving 228 individuals in the study.

Because of the time, effort, and cost involved, formative OSCE is frequently difficult for staff members. However, it provides several advantages to pupils, such as greater confidence and experience. The study sought to ascertain the impact of formative OSCE on clinical performance in year 1 students' summative final OSCE, with an emphasis on attendance and the number of formatives taken.

In terms of final OSCE marks, pupils received a mean Standard deviation of percentage scores of 61.4 ± 17.5 , with 79.4% passing and 20.6% failing. This was comparable to a study conducted on second-year medical students in the United Kingdom, where the final OSCE marks in 2013 and 2014 were 59.6 ± 8 and 59.8 ± 9.5 , respectively.⁽¹⁵⁾ The highest summative grade was obtained in IM (70.6 ± 18.9) with the lowest grades in FNM (55.3 ± 24.2), which could be attributed to the fact that FNM is the final module of the year, with the lowest overall attendance and no formative OSCE conducted in it. It was also discovered that the percentage grades for modules with formative OSCE (IM, IaD, and CB) were higher (64.5 ± 16.6) than those for modules without formatives (BS and FNM) (57.1 ± 20.7). Although many factors could have contributed to this outcome, including the difficulty of the stations, ineffective instructions given to students, different examiners, different content, and core competencies, no one can deny that formative OSCE provides students with experience, knowledge, and confidence when attending the summative OSCE. Knowing the logistical aspects of the formative OSCE permits students to attend the summative OSCE with greater confidence and familiarity.

Attendance in the formative OSCE exams was highest in the first one: IM (77.6%), dropped to 72.4% in the second formative (IaD), and was lowest in the third formative OSCE of the CB (53.1%). This might be related to students' desire to understand what an OSCE is and

how they will be evaluated, but they got less eager to attend formative tests as the year proceeded as they became acquainted with the concept of OSCE after taking their first formative. Some students believed that a single formative was sufficient to grasp the concept of OSCE, while others believed that a lack of preparation for the formative was a valid reason not to take the exam, despite the fact that students were encouraged to attend the formative OSCE to become familiar with different question modalities.

Before the final summative exam, formative OSCEs are used to familiarize students with the procedure, concept, and logistics of OSCE. ⁽¹⁶⁾ During year one, three formative OSCEs are held in distinct modules (IM, IaD, and CB), with students encouraged but not required to attend all formatives. There were 89 students (39.1%) who attended all three formatives, 33.3% (76 students) who attended two formatives, and 19.3% (44 students) who attended only one formative. In addition, 19 students did not participate in any of the formative OSCEs. In the entire final OSCE grades, those 19 students received a mean percentage score of 50.3184.

Students who took the IM formative had a mean percentage score of 73.3 ± 18.8 in the final IM OSCE and 63.3 ± 17.4 in the whole final OSCE. This was higher than the students who took the IaD formative, who had a mean percentage score of 69.4 ± 20.7 in the final IaD OSCE and 64.8 ± 17 in the whole final OSCE. Finally, those who took the CB formative scored 65.8 ± 15 and 68.4 ± 13.2 , respectively. All of them were significant, with p-values less than 0.05. M.Riaz et al discovered comparable significant results with formative attendance and summative OSCE passing percentage scores. ⁽¹⁷⁾ Townsend et al demonstrated that using formative OSCE enhanced later summative OSCEs significantly. ⁽¹⁸⁾

Attendance at formative examinations and OSCE marks had a substantial link. Students who attended all three formatives received a mean percentage score of 74.2 ± 10.2 in the final OSCE for formative modules, 67 ± 15.3 in the final OSCE for non-formative modules,

and 72.411.3 in the entire final OSCE. This mean percentage score is greater for students who attended two formatives (59.5 ± 17.5 , 51.1 ± 20.1 , and 56 ± 17.3 , respectively) and lower for students who attended only one formative (58.6 ± 15.4 , 45.9 ± 17.8 , and 53.3 ± 15.4). Students who did not take any formative tests had the lowest final OSCE scores for modules with formatives (52.7 ± 18) and total final OSCE grades (50.3 ± 18.4).

Attending a number of formative OSCEs allowed the students to encounter a broader range of questions and use the feedback acquired to improve their clinical skills performance. Formative assessment should not be a one-time event, but rather an organized procedure that is disseminated and incorporated throughout the year. ⁽¹⁹⁾ Lien et al discovered a considerable improvement in students' summative OSCE performance after a series of formative OSCEs. ⁽²⁰⁾ Lee et al discovered similar results in a mixed cohort study of emergency medicine residents. ⁽²¹⁾ In a 2019 study conducted in the United States, Sampat et al discovered that students who completed a practice exam performed much higher in their end-of-clinic OSCE. ⁽²²⁾ Another study conducted in 2017 at the Caribbean Medical School found a significant improvement in academic performance following the use of formative assessment in students in the basic science years. ⁽²³⁾ In contrast to our study, a randomized control trial on the effect of formative OSCE on clinical performance conducted in Erbil, Iraq, in 2016 discovered that a single formative OSCE does not necessarily result in better performance in the summative OSCE but it did improve the mean score of students as compared to the formative OSCE mean scores ⁽⁶⁾, which could be explained by the fact that this study included fifth year medical students who had previously experienced formative OSCE. Furthermore, the participants were subjected to four independent summative OSCEs rather than a unified summative OSCE, which could have contributed to variances in exam difficulty.

The CB, the final formative of the year and the least attended, had the greatest impact on the overall final OSCE (12.67%), followed by the IaD (6.47%), and finally the IM (5.05%), according to a linear regression model that demonstrated attendance at all three formative OSCEs was a significant predictor of the total final OSCE. Bhattacharya et al. discovered comparable outcomes with the final formative of the year, with considerable final grade prediction. ⁽²⁴⁾

The first and most popular formative is the IM formative OSCE. This formative was attended by 177 students (77.6%). In the IM formative OSCE, students received a mean percentage grade of 53.6 ± 20.6 . The following IaD assessment saw a minor decline with 165 students (72.4%), but students received the highest percentage grade of 73.7 ± 17.9 . This could be explained by the fact that the IM formative was their first exposure with OSCEs, whereas they were more experienced in the IaD formative OSCE. The CB formative had the lowest attendance of 121 students (53.1%) and the highest absence of 107 students (46.9%), with a mean formative percentage score of 61 ± 17.5 .

104 (89.7%) of the 116 students who passed the IM formative OSCE went on to pass the IM final OSCE, while 98 (84.5%) went on to pass the overall final OSCE. This resulted in a positive predictive value (PPV) of 89.7% for passing the formative OSCE as a predictor of passing the final IM OSCE and 84.5% for passing the entire final OSCE. It was also discovered that 66% of students who passed the overall final OSCE had also taken the IM formative OSCE. Passing the formative as a predictor of passing the final OSCE had a PPV of 85.5% and 91.3% for IaD and CB, respectively. Passing the formative as a predictor of passing the summative OSCE has a PPV of 92.5%, according to Chisnall et al. ⁽¹⁵⁾ Another study conducted in Pakistan in 2021 discovered that attending the formative OSCE was a 100% predictor of passing the summative OSCE. ⁽¹⁷⁾ It was also discovered that 91.5% and 86.4% of students who passed

the total final OSCE, respectively, attended the IaD and CB formative OSCEs.

Limitations of the Study

The current study's limitations were that it did not compare the effect of formative OSCE across years, which should be examined further. A randomized controlled trial with a number of students barred from participating in the formative OSCE could not be conducted due to ethical concerns.

Conclusion

Attendance at the formative OSCE was found to have a beneficial impact on the summative OSCE.

Participants who took all three formative examinations received the highest mean percentage grade in the final OSCE. Passing the formative OSCE examinations had a positive predictive value on the final OSCE grade ranging from 84.5 to 91.3%.

Recommendations

Although it is a time-consuming process, formative OSCEs have been shown to benefit students before they face the final OSCE. Students benefit from having more than one formative assessment implemented throughout the academic year. More research is needed to determine the effect of other factors on formative and final OSCE grades.

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