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PERIODICAL ASSESSMENT OF OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE) AT FAMILY MEDICINE PROGRAM, NORTHERN BORDERS (ARAR), SAUDI ARABIA - A METHOD FOR ACADEMIC IMPROVEMENT

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ABSTRACT

Background: In post-graduation education, multiple evaluation methods were incorporated to the all four levels of residents to gain the modern assessment techniques orientation and to create good academic teaching and learning atmosphere at Family Medicine programs, Northern border region Program (Arar) as per the directions from the Saudi Commission for Health Specialities. Periodically Objective structured clinical examinations (OSCE) will be conducted for the promotion to the residents to next level entry at the end of year examination. The objective of the present study to find the mean score of different levels of Residents and some demographic variables association with mean OSCE score of different levels (R1 to R4) residents. **Methodology:** An institutional based cross sectional study was conducted in the month of July 2021. A total of 48 residents participated in the study. Data entered in Statistical package for Social Sciences (SPSS) and required statistical tests were applied. **Results:** In the current study, about two thirds (66.7%) were females. Mean age in the study population was 28.95± 1.35. About 91.7% of residents were in the age group of 25-30 years. In the current study about 95.7% were passed in the OSCE examination. Mean OSCE score in the study population was 70.98 ± 5.51 (M:F OSCE mean scores 73.11 ± 3.57: 69.98 ± 6.00). There was statistically significant association was observed between mean OSCE stations of epilepsy and mean OSCE station of antenatal care with male gender (P-0.001, P-

0.001). **Conclusions:** Based on study results, there will be some difference of mean OSCE scores among the different resident levels as well as gender difference. In addition to above, OSCE become popular method for evaluation of all three domains (Knowledge, Attitude and Skill) and it resembles real life scenarios and it contains structured events in the examination for the maintenance of uniformity.

KEYWORDS: OSCE, Mean scores, Family Medicine Residents, Saudi Arabia.

INTRODUCTION

For the last two decades there was tremendous development about Medical education technology, different teaching techniques and assessment methods were developed to maintain transparency of assessment to students as well as teachers. Major shift taken place in most of the world from traditional way of teaching and assessment methods to most competent, knowledge, attitude, skill and communication based teaching to undergraduate medical students as well as post graduate medical residents teaching in many teaching institutions from developed world to developing countries to maintain the appropriate medical standards.[1,2]

Objective structured clinical examination (OSCE) was first introduced in the year 1979 by Harden and Gleeson, almost close to four decades back and has been used to improve the clinical performance of the residents in variety of clinical real time situations and domains.[3,4] OSCE can be conducted for certain real time situation scenarios and regular clinical practice areas with as low as 4 stations to as high as 12 stations and it all depends upon faculty availability and preparedness to conduct the OSCE exam.

Post graduate residency program, there were several methods to be adopted to improve academic performance of the residents. Some of the different methods were commonly used was case based discussions, mini clinical exercise evaluation, directly observed performance skill, group discussions, seminars, weekly academic day activities, assignments, self directed learning and other research skill developments, multiple choice questions and well known established objective structured clinical examination. Harden et al was the founder to describe the OSCE structure and organization. Later, many Medical schools trying to incorporate in their regular assessment of three main domains (cognitive, attitude and psychomotor) plus communication domain in many developed as well as developing countries keeping as a representation of a major tool of assessment and evaluation.[5,6]

In view of the above circumstances, we made an attempt to see the OSCE evaluation for four different levels of family medicine residents and to see some associations with age, gender and other factors. The ultimate aim to improve further in our Family Medicine academic clinical conduction of OSCE, identification of some associations, problems and improve the scores of the residents as best as possible with our existing resources.

Objectives

1. To find the demographic factors, mean OSCE scores in the study population and explore the training problems in program.
2. To determine the demographic factors association with the different levels of residents in the study population.

SUBJECTS AND METHODS

Study Design and Sampling

Arar city is the capital city of Northern borders region in north part of Saudi Arabia.This was a cross sectional study carried out among the all residents of Family Medicine program of Northern borders of Saudi Arabia in the month of July 2021 as a part of curriculum guidelines implementation. No specific method was used for the sample calculation purpose. But, included all the residents from R1 level to R4 level, considered as a census like method. No sampling was applied. Altogether 48 residents were included in the study. All the eligible residents were included in the study. The study preparation, conduction and preparation of the manuscript of the article about 6 months period from July 2021 to December 2021. All Saudi Family Medicine residents belongs to Northern borders and both the gender was included.

Data collecting tool

A Questionnaire was prepared based on the availability of variables in the present OSCE examination. Then, a record review study was conducted after completion of the Objective structured clinical examination (OSCE). Based on the available information in the records of OSCE exam, questionnaire was designed. The questionnaire of first part consisted of socio-demographic characteristics like age of the resident, gender and level of resident. Second part of the questionnaire included as the residents score in all six stations, mean score and final result status.

The study procedure

A questionnaire was designed and collected the required information from the OSCE examination master sheet. In addition to that age and gender status taken from the office of the Family Medicine program, northern borders (Arar) province. About 48 residents data was collected and there is no refusal of the participants as this study was record review study.In our institution level, there were 6 functioning OSCE stations and 2 rest stations. All together 8 stations maintained for the conduction of exam. Each station 10 minutes time will be allotted to the resident and 2 minutes will be allotted to the resident to transfer from one station to another station as a preparatory time.

In our Arar Training centre we conducted OSCE 6 functional stations at different domains namely first station was Standard oral examination (SOE), 3rd station was Dermatology (slide), 4th station was Electro cardiogram (ECG), 5th station was Epilepsy (active simulation), 7th station was antenatal care (active simulation) and 8th station was X ray (slide) (2nd and 4th stations were considered as rest stations).

As per OSCE guidelines instructions given to residents as well as faculty members and other supporting staff involved for time management and transit period from one station to other station well maintained. Pass marks were different according to different level of Residency in the program. R1 Residents pass marks was 50%, R2 level as 55%, R3 level as 60% and lastly R4 Residents the pass mark was 65%. According to their cut of pass marks in OSCE exam, outcome of exam considered as pass and fail based on above criteria.

Ethical considerations

Individual resident score and examiner name was kept confidential and will not be revealed to any other agencies to for any purpose. The completed questionnaires were checked on a daily basis for the completeness of the results and also faculty used specific codes for each trainee task.

Inclusion criteria

Saudi Family Medicine residents of all four levels in northern borders program will be included.

Statistical analysis

Data entered in Statistical package for social Sciences (SPSS) 21.0 version and data was verified and cleaned. quantitative variables like mean scores were presented as means ±

standard deviations (SDs). A Chi-square test was applied to two or more categories of two different variables. For the comparison of mean OSCE scores with different levels of residents, Analysis of variance (ANOVA) test was applied. Probability (P) value for statistical significance was taken as P less than or equal to 0.05.

RESULTS

In the present study there were 48 residents were included. Of which 33.3% were males and two thirds were females. About 43.8% were R4 residents and R1 residents only 8.3%. Almost 95.7% (out of 47 residents) were passed in the OSCE examination. Only 2 residents (4.3%) failed and another resident was not appeared (Table-1). Mean OSCE score in R1 resident level was 64.61% and mean OSCE score in R2 resident level was 67.85%. Similarly, mean OSCE score in R3 resident level was 70% and mean OSCE score in R4 resident level was 73.94%. There was steady increase of mean score level in OSCE stations according to the increasing level of residency from R1 to R4.

Table 1: Demographic characteristics among the study participants.

Demographic factors	Number of participants	Percentage
Age ± SD	28.95 ± 1.35	
Age: 25-30 years	44	91.7
31-35 yrs	4	8.3
Male	16	33.3
Female	32	66.7
R1 Residents	4	8.3
R2 Residents	7	14.6
R3 Residents	16	33.3
R4 Residents	21	43.8
Pass	45	95.7
Fail	2	4.3
Not appeared	1 (1/48)	2.1
Total	48	100

Table 2: Status of OSCE Scores at different stations in the study population.

OSCE Stations	Mean ± Standard deviation
Standard Oral Examination OSCE station 1	83.92 ± 8.75
Dermatology OSCE station 3	56.17 ± 12.77
ECG-OSCE station 4	70.53 ± 10.06
Epilepsy OSCE station 5	72.34 ± 12.95
ANC OSCE station 7	84.12 ± 6.77
X ray OSCE station 8	58.82 ± 12.56
Overall Score in all stations	70.98 ± 5.51

Table 2 depicted that mean highest score (84.12 ± 6.77) was noticed in ANC OSCE station and low mean score (56.17 ± 12.77) was observed in Dermatology OSCE station. Overall OSCE score was observed in all 6 stations was 70.98 ± 5.51.

Table 3: Mean scores of OSCE stations in relation to gender in study population.

Mean scores of OSCE stations	Male	Female	P Value & Confidence interval
Standard Oral Examination OSCE station 1	81.21 ± 8.54	85.32 ± 8.67	P-0.102, CI (-9.90 to 13.59)
Dermatology OSCE station 3	60 ± 12.24	54.37 ± 12.81	P-0.162, CI (-2.34 to 13.59)
ECG OSCE station 4	72.33 ± 3.19	69.68 ± 11.97	P - 0.407, CI (-3.71 to 9.01)
Epilepsy OSCE station 5	83.40 ± 6.25	67.15 ± 12.02	P - 0.001, CI (9.58 to 22.90)
ANC OSCE station 7	78.46 ± 7.28	86.78 ± 4.61	P-0.001, CI (-11.83 to -4.79)
X ray OSCE station 8	63.66 ± 10.76	56.56 ± 12.85	P -0.070, CI (-0.61 to 14.8)
Overall OSCE score	73.11 ± 3.57	69.98 ± 6.00	P- 0.069, CI (-0.24 to 6.52)

Table 3 revealed that there was statistically significant association was observed between mean OSCE score station of epilepsy and antenatal care [ANC] OSCE station with gender (mean male:female scores 83.40 ± 6.25 vs 67.15 ± 12.02; 78.46 ± 7.28 vs 86.78 ± 4.61 respectively). Overall mean score among all the six OSCE stations among the males was 73.11 ± 3.57 and among the females was 69.98 ± 6.00.

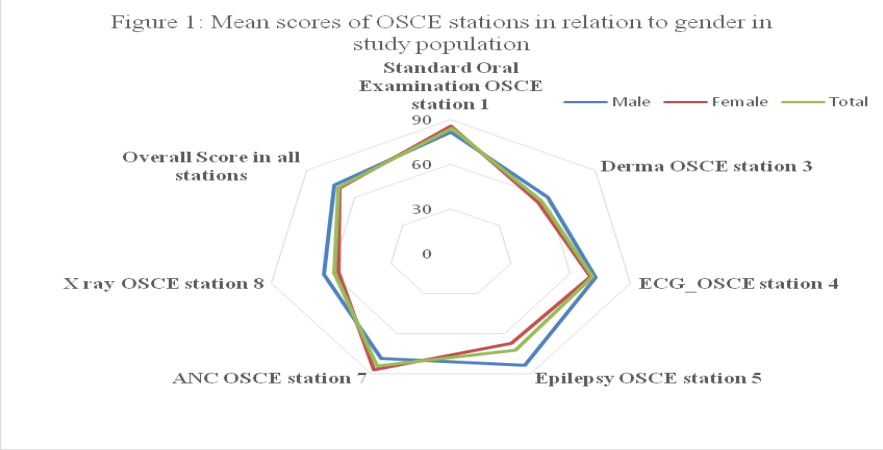

Figure 1: Radar chart stated that mean OSCE score among the females of ANC OSCE station was 85.32 ± 8.67 comparatively mean male score in same ANC station was 81.21

± 8.54. Less mean scores were noticed among Derma, ECG and X ray OSCE stations in both the gender.

Table 4: Mean scores of different OSCE stations in relation to Resident level in study group.

Mean scores of OSCE stations	R1	R2	R3	R4	P value
SOE OSCE station 1	86.93 ± 8.6	79.14 ± 7.6	82.65 ± 8.6	85.85 ± 8.98	F-1.32, P-0.278
Derma OSCE station 3	52.50 ± 11.90	49.28 ± 14.26	55.33 ± 13.68	59.76 ± 11.34	F-1.397, P-0.257
ECG_OSCE station 4	53.75± 14.36	74.28 ± 8.3	71.33 ± 10.08	71.90 ± 6.79	F-5.39, P-0.003
Epilepsy OSCE station 5	67.00± 7.07	59.71± 14.23	69.46± 12.09	79.61± 9.5	F-6.72, P-0.001
ANC OSCE station 7	81.25± 12.57	84.00± 4.5	83.60± 8.1	85.09± 5.13	F-0.399, P-0.755
X ray OSCE station 8	46.25± 10.30	60.71± 16.4	57.66± 11.78	61.42± 11.30	F-1.825, P-0.157

SOE: Standard Oral examination, F- Analysis of Variance (ANOVA) P- Probability

Table 4 depicted that an ANOVA test was applied, there was a statistically significant difference was observed between mean score in ECG OSCE station (F-5.39, P-0.003), mean score in epilepsy OSCE station (F-6.72, P-0.001) with different levels of Residents in the program. A significant difference was observed between the categories of different residency level of R1 (mean OSCE score in ECG station 53.75± 14.36) and other residency level R2 (mean OSCE score in ECG station 74.28 ±8.3). Similarly there was significant difference was observed between different categories of residency level R2 in epilepsy station (mean OSCE score in epilepsy station 59.71± 14.23) and other residency level R4 (mean OSCE score in epilepsy station 79.61± 9.5).

Table 5: Final OSCE result in relation to resident level in study population.

Resident level	Pass	Fail	Total
R1 level	4 (100%)	0 (0%)	4 (100%)
R2 level	7 (100%)	0 (0%)	7 (100%)
R3 level	13 (86.7%	2 (13.3%)	15 (100%)
R4 level	21 (100%)	0 (0%)	21 (100%)
Total	45 (95.7%)	2 (4.3%)	47 (100%)

Table 5 revealed that 100 percent pass was observed in R1, R2 and R4 level residents. Only in R3 level, there was 2 residents failed. One resident got average marks in all stations as

more than 60%. But secured less than 50% marks in two OSCE stations. Hence, considered the same resident as failed. Other resident average score in all OSCE stations was less than 60%.

Table 6: OSCE final result according to gender.

Gender	Pass	Fail	Total
Male	15 (100%)	0 (0%)	15 (100%)
Female	30 (93.7%)	2 (6.3%)	32 (100%)
Total	45 (95.7%)	2 (4.3%)	47 (100%)

X^2-0.979, 1df, P- 0.322.

Table 6 stated that in the study population, about almost all males were passed and females passed status was 95.7%. There was no statistically significant association was observed with gender and OSCE final result.

DISCUSSION

The Institutional based cross sectional study was conducted among the Family Medicine program at northern borders [Arar city] during the period from May to July 2021. During the process of OSCE examination, a total of 8 stations were arranged. Of which, 2 stations (Station 2 and station 6) were rest stations.

During the COVID-19 period, many institutions conducted even in online mode (E-OSCE) in majority places including in Saudi Arabia. A recent study was conducted by Alshammari E in College of pharmacy in Riyadh and stated in his study as 100% of the students agreed E-OSCE saved the time.[7] But mostly online practices mostly limited to the under graduation level as more number of the students to avoid close contact and to follow COVID-19 prevention strategies.

Few studies conducted in United kingdom and Australia, authors revealed that present OSCE examination has become popular method to assess clinical performance of the students and also stated that reliability and validity of the examination is accountable in the OSCE.[8,9] In the united kingdom study highlighted about the Miller pyramid (1990) of assessment included the knowledge, attitude and skill domains in the OSCE examination.[7]

In the present study. mean OSCE scores from 64.61% to 73.94% (R1 and R4). Almost similar study conducted in the year 2017 by Gabbany et al among the Family Medicine residents in Qassim stated that little more score, mean OSCE score was reported among the

R1 was 73% and among the R2 residents mean OSCE score was 72.40% and that time there was no R3 and R4 level residents.[1] A study conducted in University of Toronto among the 24 residents and they mentioned mean OSCE score in their study was 64.9 ± 14.[10]

In many studies revealed that the scores in the OSCE stations vary from station to station to and also inter observer and intra observer variations will be there. Still we can be considered best evaluation method for testing student in all the essential domains.[11] A study of systematic review published in the year 2011 in the United States of America stated that Increased number of OSCE stations will increase the reliability of test and in his study stated that OSCE score will be useful for the high stake decisions in Medical college assessments.[12]

In the present study, mean OSCE score among R1 resident level was 64.61% and mean OSCE score among R2 resident level was 67.85%. A study conducted in Family Medicine Program Qassim, in the year 2017, study revealed that mean R1 score in OSCE examination was 73.75% and mean OSCE score among the R2 level was 72.4%. This could be due to selection of the topics for OSCE exam, questions and student side some amount of anxiety and hidden tensions, will be universal in many exam facing residents.[1]

In relation to OSCE scores in the examination, mean highest score (84.12 ± 6.77) was noticed in Antenatal OSCE station and lowest mean score (56.17 ± 12.77) was recorded in Dermatology OSCE station. Overall OSCE score was observed in all 6 stations was 70.98 ± 5.51. There was statistically significant association was observed among the epilepsy station, males were scored more than that of females (M:F; 83.40 ± 6.25 vs 67.15 ± 12.02). Similarly, statistically significant association was observed in the mean score of antenatal station, females were scored good score than that of males (M:F; 78.46 ± 7.28 vs 86.78 ± 4.61). A study conducted in Canada by Bornemann P et al during rotations in the year 2017, assessed the perceptions of point-of-care ultrasound in Family Medicine, the study stated that the average objective structured clinical exam (OSCE) scores improved significantly, from 41 to 85%.[13]

In the context of different residents levels mean scores according to different stations of OSCE, we observed ECG OSCE station, R2 residents were scored better score versus other resident levels (R1,R3 & R4 levels). There was statistically significant study association was observed in ECG OSCE station mean score of R2 between other residents mean scores about

ECG station (R2 mean score 74.28 ±8.3 vs R1 53.75± 14.36). This could be due to R2 residents were seniors comparatively first year and also might have undergone ECG trainings and classes related to ECG. A study done by Bord S, Retezar R et al conducted study in Emergency department and revealed that OSCE scores varies from topic to topic and situation to situation and mentioned the OSCE scores categories into three types; < 50%, 50-80% and > 80%.[14]

Similarly with Epilepsy OSCE station mean score, R4 residents were scored as 79.61± 9.5 comparison with R1 residents mean OSCE score in epilepsy station was 67.00± 7.07. ANOVA test was applied and there was significant association was observed between R4 resident level versus R2 resident score (P-0.001). A study conducted by Joorabchi B et al stated that 3rd year residents scored better score than that of 1st year residents in the paediatric program in relation to epilepsy OSCE station.[15] This could be assumed as R4 residents, obviously seniors and exposed many OSCE exposures, undergone training and by virtue of seniority at the better knowledge and skill domains.

In the OSCE final result about 95.7% were passed. Little more percentage of pass among the males were observed in the current study. There was no statistically significant association was observed with OSCE result examination and gender (P>0.05). Exactly similar stations of six used for the OSCE examination by the authors Yudkowsky R, Downing SM et al among the Internal Medicine and Family Medicine residents and revealed that female gender did better OSCE performance.[16]

One of the limitation of the study was less sample size and generalization of results to whole population/other residency programs is not advisable. But, these findings will be looked into improvement and also gives the direction for the improvement and considered as a good teaching and learning experience.

CONCLUSIONS

Based on the study results, majority of the residents passed OSCE examination and there was no significant gender difference in OSCE examination outcome. Mean OSCE scores among the residents also good. There was significant difference of the mean OSCE scores of R2 residents was better than R1 residents. Similarly Mean OSCE scores about the Epilepsy station, good score achieved by the males in comparison with females. Same time females were scored better OSCE scores than of males in relation to Antenatal care. Needs more

Training efforts are required in Dermatology, X-ray and ECG stations. Based on the above situations, need to focus more for the next OSCE examination to improve further and according to that curriculum development and content will be placed.

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