ASSESSMENT OF PERCEPTIONS AND CHALLENGES OF OBJECTIVE STRUCTURED CLINICAL EXAMINATION AMONG MEDICAL STUDENTS AND EXAMINERS: A CROSS-SECTIONAL STUDY AT COLLEGE OF HEALTH SCIENCE, ADDIS ABABA UNIVERSITY

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A thesis submitted to the College of Health Sciences, Addis Ababa University, in partial fulfillment of the Master of Science degree in Health Sciences Education.

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Addis Ababa, Ethiopia

DECLARATION

I, **Natnael Assefa**, hereby declare that the work entitled "***Assessment of Perceptions and Challenges of Objective Structured Clinical Examination among Medical Students and Examiners: College of Health Science, Addis Ababa University*** "is the result of my own work, and all sources or materials used for this thesis have been appropriately acknowledged. This thesis is submitted in partial fulfillment of the requirements for the award of a **Master's Degree in Health Science Education**. It is an original work and this thesis has not been summited to any other institutions anywhere for the award of any academic degree, diploma or certificate

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This is to certify the thesis prepared by Natnael Assefa Mekonen entitled "Assessment of Perceptions and Challenges of Objective Structured Clinical Examination among Medical Students and Examiners: A Cross Sectional Study at College Of Health Science, Addis Ababa University" and submitted in partial fulfillment of requirements for the degree of Masters of Science in Health Sciences education complies with the regulations of the University and meets the accepted standards to originality and quality.

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Abstract

Background: In the modern context, OSCE is one of the competency-based skill assessment tools in which fairly sampled clinical tasks or skills across learned outcomes are represented in several stations where all examinees are observed against standardized scoring rubrics in a simulated environment. OSCEs have gained acceptance globally due to their emphasis on objectivity and their ability to assess cognitive skills, practical abilities, and professional conduct. OSCE is a resource-demanding, time-intensive, and complex assessment method. Therefore, assessing the perceptions and challenges associated with OSCEs from both the students and examiners in our setup will help to improve the gap in the assessment of clinical competence by OSCE since this method of assessment is relatively new in the College of Health Sciences, Addis Ababa University, as well as in Ethiopia.

Objective: The study aims to assess the Perceptions and challenges of OSCE in the undergraduate medicine program among medical students and examiners at the School of Medicine, AAU.

Method: A cross-sectional study was conducted to assess the perceptions and challenges of OSCE among both medical interns and examiners at CHS, AAU from May 1, 2024 – August 31, 2024. Data was collected using a questionnaire adopted and points were in a Likert scale—descriptive statistics such as percentages, means, standard deviations (SD), IQR and median. Mann-Whitney U-Test used to compare variables, with $P<0.05$ as significant.

Result: A total of 82 Medical Interns and 45 examiners participated in this study. This study highlights medical interns' and examiners' perceptions of the OSCE revealing strengths and areas for improvement. The OSCE is widely regarded as a fair, structured, and effective tool, achieving its objectives through broad knowledge coverage and compensatory mechanisms. Most participants agreed it reflects clinical skills and professional requirements, with 60% noting comprehensive coverage and 57.8% affirming it's in alignment with medical practice. Examiners with prior OSCE training reported significantly more positive perceptions of the OSCE process than untrained examiners. Time at each station, variability in equipment quality, student stress, inadequate pre-exam orientation, lack of examiners training before OSCE are the common challenges.

Conclusion and Recommendations: Students and examiners generally viewed the OSCE favorably. However, specific challenges requiring enhancement were noted. Mitigating these challenges will improve clinical competencies for medical interns.

Keywords: Objective structured clinical Examination (OSCE), OSCE experience, OSCE perception, OSCE challenge, Examiners, Medical Students, and Assessment Methods.

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Acronyms

AAU- Addis Ababa University

CHS- College of Health Science

IQR- Inter Quartile Range

IRB-Institutional Review Board

KSA-Kingdom of Saudi Arabia

MCQ- Multiple choice questions

OSCE- Objective structured clinical Examination

SAQ- short Answer Questions

SP-standardized patient

1. Introduction

1.1. Background

The undergraduate doctor of medicine program has recently changed in response to the requirements of the newly developed competency-based undergraduate medicine curriculum. The duration of study for the degree of Bachelor of Medicine is 6 years, which include pre-medicine, pre-clerkship I & II, clerkship I & II, and internship.

Competency-based education is now the popular approach to undergraduate clinical teaching (1). As Miller's pyramid shows, clinical competence is a psychological concept that includes cognitive, psychomotor, and affective domains. Examples of clinical competence are critical thinking, problem-solving, and clinical reasoning.(2) Appropriate assessment of the clinical skills and competence of medical students is crucial(3).

High-stakes formative and summative assessments, which include a clinical examination component, are particularly important for final-year medical students (interns) to ensure that only competent students graduate and enter the workforce. (4)

Several methods are used to assess medical students' clinical skills. Many of these assessment methods lack objectivity and structure, which are essential during examinations (5). To minimize these limitations, Harden et al. introduced the objective structured clinical examination (OSCE) in 1975, which has now become a standard assessment tool in undergraduate and postgraduate medical school training (6).

In the modern context, OSCE can be defined as one of the competency-based skill assessment tools in which fairly sampled clinical tasks or skills across learned outcomes are represented in several stations where all examinees are observed against standardized scoring rubrics in a simulated environment (7).

The Objective Structured Clinical Examination (OSCE) is a standard way to test clinical skills like knowledge, communication, decision-making, and technical skills. It is done through timed, structured stations with standard patients and task-specific checklists. It offers enhanced reliability

and validity over traditional assessments while ensuring objectivity. However, it requires significant logistical support, including proper training for examiners and standardized patients, a well-designed blueprint, and careful standard-setting practices. The OSCE serves as a dynamic tool for formative and summative assessments, providing valuable feedback to trainees and providing public trust in healthcare (6)(8)

Objective Structured Clinical Examination (OSCE) is now a widely accepted clinical skills assessment tool used globally for evaluating and teaching learners' competencies in health care disciplines.(9) It's based on the principles of objectivity and standardization and focuses on cognitive, psychomotor, and affective skills (10).

The Objective Structured Clinical Examination (OSCE) is relatively new in Ethiopia and gaining attraction in Ethiopian medical schools**;** however, its use in Ethiopian medical schools appears to be limited (11).

In the Department of Pediatrics at Jimma University, OSCE has been used for about 16 years, making it the only clinical program in Ethiopia with a relatively long experience with this assessment format. A study conducted on students' perception of the validity, comprehensiveness, and acceptability of the test showed that the majority of the students found the test to be a good learning opportunity that highlighted their areas of weakness (12).

Another study conducted at St. Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia, showed that both students and examiners had a positive response regarding the attributes, structure, organization, and validity of OSCE. However, certain challenges were reported by students, including the stress of the exam, inadequate time, and unsatisfactory orientation (11).

Despite its advantages and various promotion efforts, the progress of OSCE implementation in Ethiopian public universities has not been satisfactory (9). Therefore, continuing evaluation and refinement of OSCE by departments is needed (11)(9). It is also recommended to conduct a further wide-scale national evaluation of the OSCE examination system of medical students (11).

1.2. Statement of the problem

Traditional assessment methods used in medical education include written and oral examinations, which have their value in testing theoretical knowledge but fail to assess important competencies that will prepare the future clinician for real-world clinical practice. For these most critical skills of communication, techniques of clinical examination, and making decisions under pressure, which are vitally important in providing quality patient care (6), consistent scoring has been lacking due to examiner bias; this often tests rote memorization rather than the application of knowledge in a clinical setting (13).These gaps reflect the need for alternative method of evaluation that are more suitable with the requirements of clinical practice.

The Objective Structured Clinical Examination (OSCE) is a critical component of medical education, providing a robust and practical assessment of clinical competence, addressing many shortcomings of traditional methods. OSCE is structured, objective, and scenario-based, enabling a more practical and fair evaluation of a student's ability to perform clinical tasks. To date, no study has been conducted on the application of the OSCE on undergraduate medical students at the College of Health Sciences (CHS), Addis Ababa University. This lack of data is concerning, as the perceptions of both students and examiners are critical for identifying and addressing challenges that may hinder the examination's success. Without this understanding, it becomes tough to shape OSCE to the requirements and constraints of the local setting.

This study, therefore, aims to fill this gap through an investigation of the perceptions and challenges of both the medical interns and examiners about the OSCE at CHS, Addis Ababa University. Specifically, it is going to answer the following research questions:

- **Students' perceptions**: How do medical students experience the OSCE? Their perceptions in respect of effectiveness in assessing clinical skills and fairness and relevance to their learning and future practice; what challenges did they encounter in preparing for the OSCE and at the time of the examination?
- **Examiner perceptions**: What are the perceptions and experiences of examiners involved in the actual administration of the OSCE to medical students? Is the process effective and reliable for the assessment of clinical competence? What are the challenges faced by them: logistical problems, time constraints, or difficulties in objectivity and consistency during

evaluation? Assessing the perceptions and challenges associated with OSCEs from both the student and examiner perspectives in our setup will help to improve the assessment of clinical competence by OSCE.

1.3. Significance of the study

This study will provide a comprehensive understanding of the perceptions and challenges associated with OSCEs among both the student and examiner. This understanding of student and examiner can reveal areas for improvement in the OSCE's design and implementation. This can lead to reduced test anxiety and promote a deeper understanding of the assessed clinical skills and a more effective and fairer assessment of medical students' skills, ensuring graduates are well-prepared for real-world clinical practice.

It will also assess examiners perceptions and identify challenges in the administration and scoring of the OSCE. It can then be used to guide training session preparation to the examiners for effective and consistent assessment.

Generally, this study can contribute much to the improvement of the quality and effectiveness of the OSCE assessment at CHS, Addis Ababa University, ultimately benefiting both students, the medical education system, and the healthcare system in Ethiopia.

2. Literature Review

A large body of research has repeatedly confirmed that accurate, robust assessment is essential for effective feedback, coaching, self-regulated learning, and professional growth. Miller's assessment pyramid (Miller 1990) remains a helpful framework to guide programs in building assessment systems (14), which includes basic knowledge (know), know-how (competence), show-how (performance, e.g., OSCE), and does (action).

Assessment in medical education includes a wide range of methods to assess medical students and residents. They are: written exam (multiple-choice questions, short-answer questions, and structured essays), supervising clinicians' assessment, direct observation or video review, clinical simulations (OSCE, SP) multisource assessments (360 feedback), self-assessment, portfolios, longitudinal assessment(15).

OSCE is a method of assessing a student's clinical competence that is objective rather than subjective, in which the areas tested are carefully planned by the examiners (16) and the student is observed for performance of different tasks at specified stations.

The challenges of the Objective Structured Clinical Examination (OSCE) encompass logistical and resource constraints, including the need for extensive planning, examiner training, and standardized patient preparation. Reliability and fairness in assessment is crucial but is threatened by inconsistency of examiner scoring and variability in standardized patient performance. In addition, need financial and time in conducting an OSCE, together with stress in both students and faculty, also act to hinder successful implementation. (17)(18)

Research done by Obizoba in the united states of America on mitigating the challenges of objective structured clinical examination (OSCE) in nursing education found five themes related to the strategies nursing faculty used to mitigate their identified OSCE challenges of high resource human and material intensiveness: administrative and technical supports, use of clinical instructors during evaluation, faculty OSCE education, limitation of validation to the required skills essential for professional practice, and collaboration among all course faculty members (19).

The 2016 study on Taking OSCE Examiner Training on the Road, which was done in Melbourne, Australia, describes how the "OSCE Roadshow" training program was put into action and how it was evaluated. The goal of the program was to make examiner behavior more consistent in objective structured clinical examinations (OSCEs). The training, conducted at many teaching hospitals during Grand Rounds, aims to engage clinicians with OSCE procedures, evaluation criteria, and anticipated examiner behavior. Regardless of their clinical expertise, the results show that participants' marking scores closely experienced ideal benchmarks, indicating the training's efficacy in reducing variability. (20)

Studies on medical students show that female students, despite performing equally or better, are perceived as less confident than males ([$F(1,133) = 4.45$, $p < 0.05$]), influenced by nonverbal cues like fidgeting ([$r = -0.16$, $p < 0.10$]) and speech fluency ([$r = 0.35$, $p < 0.01$]). However, they excel in communication skills across empathy, structure, verbal, and non-verbal expression ([$p < 0.0001$]), while males often overestimate their abilities. These findings highlight the need for gender-sensitive training to address biases and foster equitable skill development.(21)(22)

Research done by Ravikirti (2018) on Objective Structured Clinical Examinations (OSCEs) as an Assessment Tool in Undergraduate Medical Education in Nigeria reveals that, among these, 31 (89%) agreed that this format was easy to prepare for and perform. 29 (83%) found the format useful for learning clinical examination, and 28 (80%) agreed that it helped them identify their weak areas. 28 (80%) also agreed that it encouraged them to think logically in clinical scenarios. 33 (94%) found the feedback session useful in identifying the areas for improvement (23).
The Objective Structured Clinical Examination (OSCE) has emerged as a valuable assessment tool in medical education, demonstrably improving clinical competency by evaluating practical skills and fostering a deeper knowledge base through practical application. Studies have shown a positive correlation between OSCE performance and clinical proficiency (24).

In the current study, perception of medical students about the OSCE examination was done, which shall give room for positive criticism and further improvement of the system wherever required. It shall also encourage teachers to change assessment tools where required. This assessment tool not only helps to assess the clinical skills of students but also provides an opportunity to observe the behavior of the student (25).

The study done by M.Joshi et al. (2016) in India, the faculty was satisfied with the conduction of OSCE. All involved faculty members agreed that the questions sampled a wider area of the subject as compared to the conventional examination. They were also happy as the examination of 70 students could be completed in a short time (25).

A mixed-method study conducted by A. Sallam et al. (2022) on medical students' perception of a newly implemented objective structured clinical examination (OSCE) in orthopedic surgery and trauma showed that more than half of the students (55.5%) believed that the exam was fair and covered a wide range of knowledge (63.8%) and clinical skills (72.4%). Considerable percentages of students were doubtful regarding the standardization of OSCE scores (62.6%) and whether those scores provided a true measurement of their clinical skills (65%), and more than half of them were not sure whether gender, personality, or ethnicity affected their exam scores (55.5%) and whether OSCE provides them practical and useful experience (53.5%) (2).

Another study done by Rees CE et al. (2019) in Australia found perceived problems with documents related to not knowing what could be written on or not, reading and interpreting charts, and locating information amongst bundled paperwork. Candidates' unfamiliarity with the OSCE materials was suggested to contribute to their cognitive overload (e.g., thinking interrupted, misinterpreting information), increased anxiety (e.g., becoming flustered, stressed, panicked, overwhelmed), loss of confidence, and, ultimately, poor execution of the station skill and, consequentially, feeling disadvantaged (26).

The study conducted by Skrzypek et al. (2017) focused on the evaluation of the Objective Structured Clinical Examination (OSCE) from the perspective of third-year medical students at the Jagiellonian University Medical College in Kraków, Poland, revealing that a total of 221 questionnaires were analyzed, with 93.7% of students considering the OSCE as well-organized, 87.8% claiming it to be fair, and 95.5% stating that it was clear. Additionally, 86.4% of students were pleased with the introduction information given before the examination (27).

A qualitative study by N. Alkhateeb in 2022 at Hawler Medical University, Iraq, called Objective Structured Clinical Examination: Challenges and Opportunities from Students' Perspective, showed that the people who took part in the study were generally satisfied with the OSCE and saw

many positive things about it. They emphasized the role of the OSCE in increasing confidence, engagement, and motivating learning, and they performed quickly. The study participants identified several positive aspects of the OSCE, such as improving their study of practical sessions, fostering a sense of responsibility for their learning, exposing them to real-world examples of their future lives, and fostering the ability to work under pressure, all of which will equip them to overcome future challenges (28).

Research conducted by T. Ansari in 2021, on the acceptability of OSCE as being an effective assessment tool for undergraduate medical students at Majmaah University, KSA, indicated the fact that medical students have mixed feeling toward OSCE as an evaluation tool. Despite appreciating the clarity and fairness of the exam structure, they are generally dissatisfied with the current OSCE processes. There's a lack of understanding about the objectives and academic role of OSCE. Most students (64%) believe that more time should be allocated for each OSCE station and feedback should be given post-exam. The participation of faculty as simulated patients in OSCE causes stress among students, ultimately affecting their performance negatively (29).

52.7% of students in Dammam, Saudi Arabia, studying in 2022, agreed that the tasks reflected what they had learned. Just 50% found the settings and context at the stations authentic.60.8% of students thought the instructions were clear and unambiguous, and 54.1% considered the tasks fair. Also, 52.7% regarded the stations sequence as logical and appropriate and 74.3% agreed with the statement the exam has given you good chances to learn. Despite these positive elements, 62.3% of the students found the exam stressful and 58.4% regarded the exam as threatening. Only 28.6% of students perceived themselves as adequately prepared, which primarily contributed to this perception. Furthermore, 48.7% of students believed that the OSCE was a legitimate evaluation tool for acquiring clinical skills, while only 30.5% indicated having a general understanding of the exam prior to its administration.(30)

Another study conducted on the Objective Structured Clinical Examination (OSCE) in nursing education in the UAE (2019) found it to be a valuable and effective tool for assessing students' physical assessment skills. Students and examiners appreciated its objectivity, structure, and ability to highlight clinical strengths and weaknesses. Despite these strengths, students reported high stress levels (93.6%), citing limited time at stations (87.7%) and insufficient preparation

(63.6%). Examiners also highlighted the need for better organization (90%) and the use of trained standardized patients. Recommendations included implementing trial exams, adopting blended learning models, and enhancing exam settings to improve the OSCE experience and outcomes.(31)

The study conducted in the Kurdistan region of Iraq in 2023 assessed the perceptions of medical students and examiners regarding the Objective Structured Clinical Examination (OSCE). Findings indicated that 42.7% of students agreed that the OSCE was well-designed, 51.4% believed it assessed a wide range of skills, and 33% felt it reduced the chance of failure. However, 65.8% reported experiencing significant stress; 45% expressed dissatisfaction with the provided instructions; and only 33–39% indicated satisfaction with the performance criteria. In regards to organization, 42-58% of students expressed positive perceptions; however, many suggestions for improvement were made, including the need for clearer instructions, increased time at stations, and the availability of simulators.(32)

This study (Iraq, 2023) also showed that examiners had increased satisfaction levels. The majority of respondents (82.8%) agreed that the OSCE demonstrated fairness, 79.7% suggested that it properly assessed a wide range of clinical skills, and 79.7% believed it reduced examiner variability. But 60.9% reported that the process was exhausting. The student success rate was 85.86%. Students identified stress, inadequate preparation, and organizational issues as key areas needing improvement. Meanwhile, examiners suggested implementing workshops, optimizing resource allocation, and enhancing examiner engagement to improve future assessments. Findings from the study showed a clear difference between how students felt and how satisfied examiners were.(32)

The study by T.T. Sholadoye et al. (2019) at Ahmadu Bello University, Zaria, Nigeria, looked at the strengths and weaknesses of the Objective Structured Clinical Examination (OSCE) and the Conventional Examination. After being asked how they felt about the OSCE, 51.5%, 53.0%, and 54.9% strongly agreed that it dealt with bias in the physical exam, tested a wide range of clinical skills, and pointed out specific areas of weakness. Most of the candidates also agreed that the conventional clinical examination causes more stress (90.4%) and exam fatigue (80.5%) than the OSCE (61.9%) vs. 61.4%, respectively. (33)

A study conducted in Pakistan in 2020 showed that female students better than male students in both written assessments (mean scores: females 61.8 ± 8.35, males 59.2 ± 6.35) and OSCE (females 73.6 ± 8.34, males 70.1 ± 9.84). Additionally, 60% of the students expressed a preference for OSCE as their assessment method. A majority of female students employed a deep learning approach (65%) and participated in group discussions, while male students showed a significant variation in scores between written assessments and OSCE, suggesting a tendency toward shallow learning. Students showed better performance in OSCE overall; however, they indicated limitation in key clinical competencies, including clinical examination techniques and procedural skills. Based on the feedback given, 90% of students agreed that the content was covered adequately in the written exams, and 80% agreed with the content was covered adequately by OSCE. All students knew how the tests would be set up, and 90% thought the time allotted was enough. OSCE motivated 82% of students, whereas 70% felt that reviewing previous MCQ papers was adequate for preparing for the written exam. Half of the students found the problem-based scenarios in the written assessments to be challenging (34)

An evaluative study of objective structured clinical examination (OSCE): students and examiners perspectives, conducted by Mujumdar MAA, 2018, at the University of the West Indies (Cave Hill), indicates that the students were asked to compare the assessment instruments; the majority of the students identified the OSCE as the most difficult and MCQ as the fairest assessment format. Students also felt that they learned most from the essay/SAQ format and recommended using clerkship rating more in the clinical years (5)**.**

The research conducted in Lahore, Pakistan (2021) reveals that 67.6% of students perceived the OSCE as fair, while 64.9% considered its wide coverage of clinical skills; however, only 27% believed the time provided at each station was adequate. In terms of Stress, since 64.9% of students felt that the exam was stressful, whereas only 32.4% considered this less stressful than other formats. 67.6% felt that the exam adequately covered the taught knowledge, and 60% found unbiased regarding gender as well as ethnicity. In addition, respondents thought that multiple-choice questions helped them learn more (68.9%) than objective structured clinical examinations. Furthermore, 73% considered the OSCE to be the most equitable assessment format; however, only 58.1% expressed satisfaction with the exam's structure and sequencing, while 50% indicated dissatisfaction with the performance of stations.(35)

A study done by S. Musa et al. (2019) on perceptions of conducting the objective structured clinical examination (OSCE) as a formative tool at the end of pediatrics posting in a new medical school in Nigeria showed that the OSCE was resource-intensive, with much time spent on selecting competencies, recruiting standardized patients, standardizing checklists, briefing assessors, and preparing stations (36).

A qualitative study led by Maragheh University of Medical Sciences, Azerbaijan, in 2024, on OSCE as a tool for assessment of nursing students' professional competencies was focused on OSCE benefits and OSCE limitations; because the time at stations is usually insufficient, it routinely resulted in stress and negatively impacting performance, some were unable to complete their tasks or demonstrate full capability. Students reported confidence, stress management, and peer support all contributed to success while evaluator bias and variable feedback influences assessment fairness. The research concludes that with better preparation, offering better resources, examiner training, and improvement of exam conditions, OSCE can be far more reliable and valid, and therefore has the potential to enhance nursing education.(37)

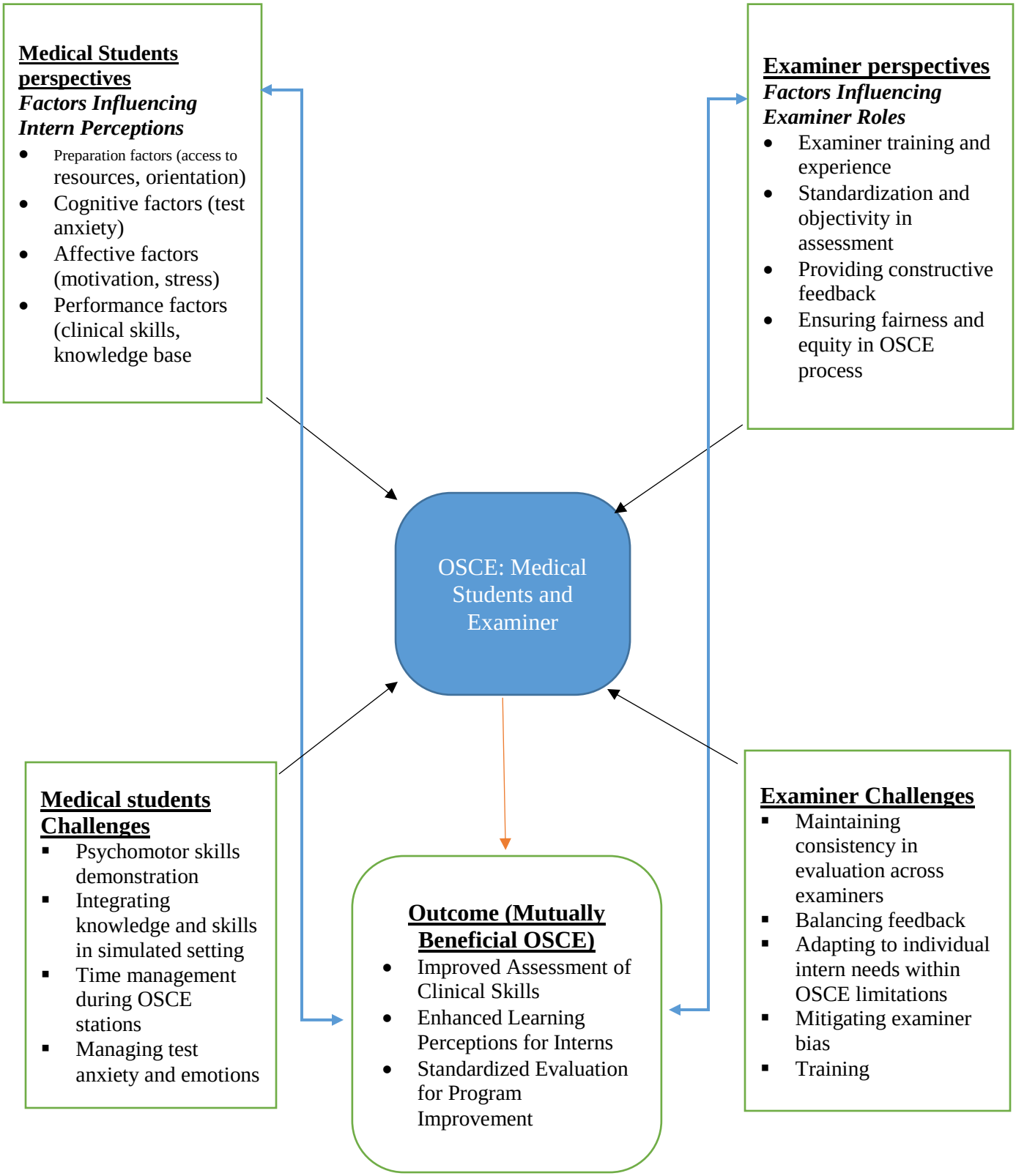
In study conducted by B.eze et al (2022) on Objective Structured Clinical Examination as a reliable tool in the summative evaluation of final year medical students at Enugu State University College of Medicine, Nigeria showed that an examination of 120 students, 112 sat for both Internal Medicine and Surgery. Significant positive correlations were found between students' scores in Surgery clinical OSCE and Internal Medicine clinical OSCE ($r = 0.617$, $p = 0.000$), Surgery picture OSCE and Internal Medicine Picture OSCE ($r = 0.647$, $p = 0.000$), and Surgery clinical examinations and Internal Medicine clinical examinations ($r = 0.750$, $p = 0.000$). The reliability of Surgery clinical examinations was 0.851 and for Internal Medicine clinical examinations was 0.816. OSCE proved to be a more reliable tool than the traditional method for the summative assessment of final year medical students, providing a higher correlation coefficient and Cronbach alpha(38).

A qualitative study by G. Ataro (2020) on the experience and problems of the Objective Structured Clinical Examination (OSCE): Perspective of Students and Examiners in a Clinical Department of Ethiopian University found that the OSCE exam wasn't well planned and was hard to organize. During the planning phase, the OSCE team should arrange meetings and training sessions before

the exam day to prepare the exam blueprint, design stations, write scenarios, orient examiners, and prepare the rooms (9).

Another study done by H. Fisseha and H. Desalegn (2021) on the perception of students and examiners about objective structured clinical examination at St. Paul's Hospital Millennium Medical College (SPHMMC), 2021, indicates that participants had variable perception on the validity of OSCE. While 82.3% agreed with OSCE as a good measure of competency, only around half agreed that it truly measures clinical skills (11).

3. Conceptual framework



4. Research questions

1. What are the perceptions of undergraduate medical students and examiners regarding the attributes, organization, quality and validity/reliability of OSCE in assessing clinical competence in School of Medicine, AAU?
2. What are the challenges faced by undergraduate medical students and examiners during the preparation, implementation, and evaluation of OSCE in School of Medicine, AAU?

5. Objectives

5.1. General objective

- Assess the perceptions and challenges of OSCE among Undergraduate medical students and examiners at School of Medicine, AAU.

5.2. Specific objectives

- To assess students' perceptions of the OSCE assessment
- To assess examiners' perceptions of the OSCE assessment
- To identify challenges faced by Medical students and examiners during OSCE preparation and Examinations.

6. Methods and Materials

6.1. Study area and period

The study was conducted at Tikur Anbessa Hospital, School of Medicine, CHS, and AAU. OSCE has been incorporated into the assessment methods for undergraduate medical students' curriculum. Addis Ababa University (AAU), established in 1950 as the University College of Addis Ababa (UCAA), is the oldest and the largest higher learning and research institution in Ethiopia. Since its inception, the university has been the leading center in teaching-learning, research, and community services. The College of Health Sciences (CHS), Addis Ababa University (AAU), is a professional health sciences college, established in 2009/10 by the reorganization of previously separate institutions of health under one umbrella.

The study period (data collection) was from May1, 2024 up to August 30, 2024.

6.2. Study design

A **cross-sectional study design** was conducted. Questionnaires were administered electronically (via Google Form) to all medical interns and examiners enrolled in the study.

6.3. Population

6.3.1. Source population

All undergraduate medical students and instructors at CHS, AAU during the study period

6.3.2. Study population

All medical interns and examiners who passed through the Assessment of OSCE and who meet the inclusion criteria.

6.3.3. Study unit

Individual interns and examiners in different clinical departments at CHS, AAU Eligibility Criteria

6.4. Eligibility Criteria

6.4.1. Inclusion criteria

- Currently enrolled as medical interns
- Took at least one OSCE during their evaluations
- Faculty members involved in OSCE assessment.

6.4.2. Exclusion criteria

- Medical students who didn't pass the qualification exam
- Medical interns who refuse to participate in the study
- Faculty members who do not participate in OSCE evaluation
- Examiners who refuse to participate in the study

6.5. Sample size Determination and Sampling techniques

6.5.1. Simple size determination

G*Power was applied to determine the sample sizes for the study in order to ensure sufficient statistical power and accuracy.(39)(40)(41) According to the initial calculations, in order to detect an effect with 80% power, a medium effect size (Cohen's d) of 0.5, and a 5% alpha significance level, a sample size of 77 participants for students and 55 participants for examiners was obtained from 188 medical interns and 134 examiners. Considering a 5% non-response rate, the final sample size required 86 medical interns and 61 examiners.

6.5.2. Sampling techniques

To study the perceptions of medical interns (one population group) and examiners (from two departments- pediatrics and child health and obstetrics & gynecology), a combination of systematic random sampling for medical interns and stratified random sampling for examiners was used.

Study participants from medical interns were chosen systematically from the list obtained by using the systematic random sampling procedure. 32 examiners from Pediatrics and Child Health and 29

examiners from Obstetrics and Gynecology were selected by proportion ratio, ensuring balanced representation of the examiners, and the participants were randomly selected from each department.

6.6. Variables

6.6.1. **Dependent variable**

- Perception of students for OSCE
- Challenges of students encountered during OSCE process
- Perception of examiners for OSCE
- Challenges of examiners encountered during OSCE process

6.6.2. Independent variable

Intern related

- Age
- Gender
- Preparation Factors: Access to resources, time, place, environment
- Cognitive Factors: Test anxiety
- Affective Factors: Motivation, stress
- Performance Factors: Clinical skills, knowledge base

Examiner related

- Age
- Gender
- Preparation
- Training
- Experience
- Standardization and Objectivity in Assessment
- Providing Constructive Feedback

6.7. Operational definition

Perception of OSCE (Objective Structured Clinical Examination): refers to the Subjective opinions ,attitudes , feelings and beliefs of students (medical interns) and examiners regarding the design, fairness, relevance ,effectiveness ,structure and quality of objective structured clinical Examination(6)(7)(8)

Challenges of OSCE (Objective Structured Clinical Examination): refers to factors that impede the effective planning, execution, assessment, or outcome of the examination process include (e.g., organizing stations, ensuring standardized patients), resource constraints (e.g., cost and time), examiner-related issues (e.g., subjectivity or variability in scoring, training), and stress experienced by students during high-stakes evaluations.(17)(18)

6.8. Data collection tool and procedures

This study utilized a structured questionnaire for data collection, adopted and adapted from previously validated instruments to ensure reliability and validity (5)(11)(35).The questionnaire aimed at obtaining a wider range of perceptions of interns and examiners concerning the characteristics, structure, quality, validity, and reliability of the Objective Structured Clinical Examination (OSCE). The adopted questionnaire was slightly modified to fit the specific research objectives of this study. These were changes made by rephrasing certain elements in order to make the tool clearer and more pertinent. The core structure was maintained so that comparisons to previous studies could be made. A final tool was created with Likert scale items that were intended to measure specific perceptions by both interns and examiners. This tool was used to measure students' perceptions regarding the attributes, organization, quality, validity, and reliability of the OSCE, exploring examiners' general perceptions of the OSCE in assessing general concepts and specific skill areas. The developed questionnaire was pretested with 5% of the total sample size on its clarity, appropriateness, and usability.

Data collectors were trained to ensure accuracy and consistency in the data collection. The training gave them insights about the study objectives, how to go about administering the questionnaire, and answering participant queries. The training also focused on ethical issues like keeping

confidentiality, getting informed consent, and ensuring that participants were comfortable throughout the process.

Data collection occurred voluntarily during the specified timeframe of May to August 2024. The study used both electronic and hard-copy formats to accommodate participant preferences, facilitating participants' accessibility while ensuring anonymity protection.

6.9. Data quality assurance

A pretest of the Likert scale questionnaire was carried out on 5% of the sample population to ensure data quality and help identify any potential problems concerning clarity or format. During data collection, the principal investigator checked the returned questionnaires for completeness, legibility, and adherence to instructions daily. All the responses were further checked for inconsistencies and duplicate entries in order to ensure that the dataset was accurate and complete.

6.10. Data analysis

Data were analyzed using SPSS version 25, with descriptive statistics such as percentages, means, standard deviations (SD), IQR, and median. Cronbach's alpha is used to assess internal reliability on questionnaires for medical interns and examiners. Chi-square tests for goodness of fit were used to indicate whether the responses of Likert scales are randomly or not randomly distributed in relation to expected frequencies. A Mann-Whitney U-test was used for the comparison of variables, with $P < 0.05$ as significant. Mean and SD for interns' ages and percentage of male and female interns, and examiners and for prior trained and untrained examiners. We presented the data in words and tables.

6.11. Ethical consideration

The study was commenced after receiving ethical approval from IRB, CHS, and AAU. Then, data collection began after getting an official letter from the college confirming the request and a support letter; the study was conducted at CHS, AAU. The supervisor saw to any form of ethical violation throughout the data collection period. Written consent that was obtained before the

commencement of the data collection. Confidentiality was assured by avoiding mention of personal identifiers. The collected data were stored in a file and won't be revealed to a third party.

6.12. Dissemination of results

Copies of the research will be disseminated to college of health science, Health science education program, AAU student research office. Finally, it will be send to journals for publication

7. Result

Among 86 medical interns who were expected to participate in the study, 82 medical students participated and accounts the response rate of 95.3%. The mean age of medical interns is approximately 24.99 with the standard deviation (SD ±0.839) and ranges from 23 to 27years. Male are 44 (53.7%) and female are 38 (46.3%). Majority of interns responded OSCE assessment was given in Pediatrics and child health and Gynecology and obstetrics departments.

Of the 61 examiners who were expected to participate in the study, 45 (73.8%) answered the questionnaire. However, the collected data of 73.8% of examiners were constrained by practical limitations. The practical limitation on examiners' response rate could be due to time constraints arising from their various professional commitments, compounded by survey fatigue associated with the high-research area of CHS. Among 45 examiners, 23 (51.1%) are male and 22 (48.9%) are female. All examiners (45) have experience as OSCE examiners, but only 17 (37.8%) have taken training on OSCE before the exam.

The Cronbach's alpha value of 0.801 showed that the student questionnaire maintained a high level of overall internal reliability. The examiner questionnaire had an acceptable value of 0.803. There is no omitting question that has been done since the internal reliability is in the normal range.

Table 1: Gender distribution of medical interns and examiners' of OSCE.

Medical Interns	
Gender	Numbers (%)
Male	44 (53.7%)
Female	38 (46.3%)
Examiners	
Gender	Numbers (%)
Male	23 (51.1%)
Female	22(48.9)

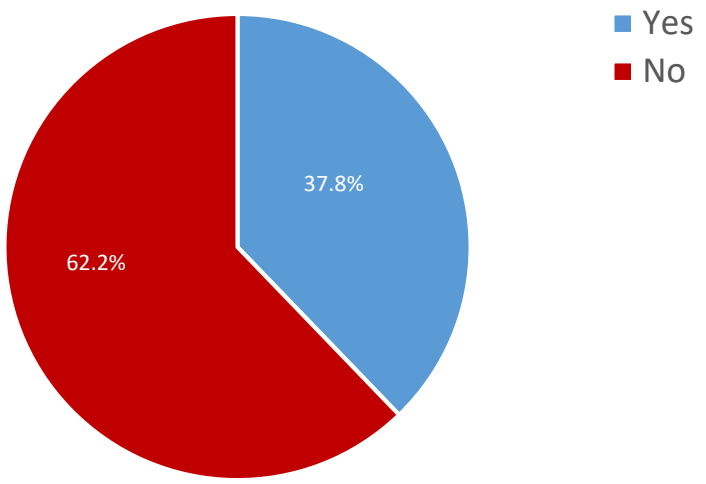


Figure 1: Distribution of Examiners' training on OSCE before the Exam

7.1. Students' Perception of attributes of OSCE

According to the result listed below on the students perception of attributes of OSCE, it indicates that the majority of medical interns generally agree across most attributes, particularly regarding the fairness of the OSCE exam (47.6% agree and 12.2% strongly agree), knowledge coverage (40.2% agree and 14.6% strongly agree), and the ability to compensate in certain areas during assessments (48.8% agree and 13.4% strongly agree). A significant majority of medical interns agree the examination was well-structured and sequenced (41.5% agree and 9.8% strongly agree) and well administered (45.1% agree and 4.9% strongly agree). The majority of medical interns are neutral (31.5%), followed by those who agree (26.5%) on examination stressfulness and minimizing the chance of failing (41.4% agree, followed by neutral 30.5%).A significant percentage of medical interns felt that they needed more time at stations (46.3% agreed and 11% strongly agreed).

There is a difference between male and female participants in the perceptions of attributes of OSCE on needs of more time at each station (mean rank of male = 36.05, mean rank of female = 47.82, z = -2.077 and p = 0.017) and intimidated by OSCE (mean rank of male = 36.35 and mean rank of female = 47.47, Z = -2.199 and p = 0.028). It indicates that female respondents felt the need for more time compared to males on the examination, and also females found that the examination was more intimidating than males.

Table 2: Responses of Students perception of attributes of OSCE (N=82)

Attributes of OSCE	Strongly Disagree	Disagree	Neutral	Agree	strongly Agee	IQR	median	Chi-square	Mann-Whitney U (Z)	Mann-Whitney U (p-value)
Examination was fair	4(4.9%)	10(12.2%)	19(23.2%)	39(47.6%)	10(12.2%)	1	4	45.93*	777 (-0.616)	0.538
Wide knowledge area covered	4(4.9%)	11(13.4%)	22(26.8%)	33((40.2%)	12(14.6%)	1	4	31.05*	795.5(-0.395)	0.693
Needed more time at stations	1(1.2%)	18(22%)	16(19.5%)	38(46.3%)	9(11%)	1	4	46.41*	596(-2.38)*	**0.017**
Examination well administered	4(4.9%)	9(11%)	28(34.1%)	37(45.1%)	4(4.9%)	1	3.5	56.17*	731.5(-1.044)	0.297
Examination very stressful	1(1.2%)	18(22%)	26(31.7%)	22(26.8%)	15(18.3%)	1	3	22.27*	685.5(-1.449)	0.147
Examination well-structured and sequenced	3(3.7%)	11(13.4%)	26(31.7%)	34(41.5%)	8(9.8%)	1	4	41.54*	802(-0.334)	0.738
Examination minimized chance of failing	4(4.9%)	16(19.5%)	25(30.5%)	34(41.5%)	3(3.7%)	1	3	43.73*	707(-1.269)	0.204
OSCE less stressful than other examinations	8(9.8%)	20(24.4%)	14(17.1%)	32(39%)	8(9.8%)	2	3	24.58*	791(-0.436)	0.663
Allowed student to compensate in some areas	5(6.1%)	7(8.5%)	19(23.2%)	40(48.8%)	11(13.4%)	1	4	49.46*	821.5(-0.145)	0.885
Highlighted areas of weaknesses	4(4.9%)	12(14.6%)	30(36.6%)	31(37.8%)	5(6.1%)	1	3	42.76*	835.5(-0.005)	0.996
Examination intimidating/ frightening	3(3.7%)	29(35.4%)	22(26.8%)	20(24.4%)	8(9.8%)	2	3	27.63*	609(-2.199)*	**0.28**
Student aware of level of information needed	7(8.5%)	18(22%)	27(32.9%)	29(35.4%)	1(1.2%)	2	3	36.54*	732.5(-1.009)	0.303
Wide range of clinical skills covered	5(6.1%)	9(11%)	24(29.3)	35(42.7)	9(11%)	1	4	39.22*	824.5(-0.113)	0.910

Note: D_f =4, * value is statistically significant at P<0.05

7.2. Student perception on organization of OSCE

The majority of OSCE's organizational features received average ratings. For instance: orientation of OSCE before examination (43.9%), announcement of venue and known to student (41.5%), and staff answered inquiries related to OSCE (37.8%) etc. Otherwise announcement of venue and timetables availability which are known to students rates are good features of OSCE Organization which rates more than average.

There is a difference between male and female participants on the perceptions of organization of OSCE on orientation of OSCE before exam (mean rank of male = 35.68, mean rank of female = 48.24, z = -2.527 and p = 0.011) and Staff answered queries related to OSCE (mean rank of male = 47.24 and mean rank of female = 34.86, Z = -2.466 and p = 0.014). It indicates that female respondents perceive positively on orientation of OSCE before exam compared to males. On the other hand result shows a significant difference in how male and female students perceive the Staff answered queries related to OSCE, with male reporting a more favorable perception compared to females.

Table 3: Responses of Student perception of Organization of OSCE (N=82)

Organization of OSCE	Excellent	Above average	Average	Below average	Very poor	IQR	median	Chi-square	Mann-Whitney U (Z)	Mann-Whitney (p-value)
Orientation of OSCE before examination	4(4.9%)	11(13.4%)	36(43.9%)	24(29.3%)	7(8.5%)	1	3	43.49*	580 (-2.527)	**0.011***
Announcement of venue and known to student	17(20.7%)	20(24.4%)	34(41.5%)	11(13.4%)	-	1	3	13.90*	758(-0.763)	0.445
Timetables were available and known to student	17(20.7%)	21(25.6%)	19(23.2%)	18(22%)	7(8.5%)	2	3	7.26	699(-1.307)	0.191
Revision of clinical procedures before OSCE	7(8.5%)	11(13.4%)	30(36.6%)	26(31.7%)	8(9.8%)	1	3	28.36*	811(-0.238)	0.812
Staff answered queries related to OSCE	5(6.1%)	11(13.4%)	31(37.8%)	27(32.9%)	8(9.8%)	1	3	33.84*	583.5(-2.466	**0.014***
Quality of OSCE rooms i.e. setup, lightening etc.	10(12.2%)	16(19.5%)	32(39%)	20(24.4%)	4(4.9%)	2	3	27.51*	741(-0.923)	0.356
Availability good equipment including simulators	7(8.5%)	17(20.7%)	33(40.2%)	17(20.7%)	8(9.8%)	2	3	26.53*	617.5(-2.123)	**0.034***

Note: D_f =4 for all except (announcement of venue and known to student, D_f =3), * Value is statistically significant at P<0

7.3. Student perception of quality of OSCE performance

A majority of medical interns (69.5%) perceived somewhat awareness about the OSCE, while 24.4% reported a greater extent of awareness, and only 6.1% indicated minimal awareness. A majority (58.5%) noticed that the tasks somewhat reflected with what was taught, whereas 20.7% thought to a greater extent. over half (54.9%) of the interns experienced the setting and context as somewhat authentic, whereas 19.5% experienced a higher degree of authenticity, and 20.7% reported minimal authenticity. most (52.4%) of interns weighed the tasks as somewhat fair. Fifty percent of medical interns perceived the sequence of stations as somewhat logical, while 29.3% expressed a stronger agreement. Furthermore, 47.6% of interns perceived the examination as somewhat beneficial for learning opportunities, while 32.9% agreed to a greater extent. Regarding the instructions, 42.7% felt as somewhat clear and unambiguous, while 28% considered them to be clear to a greater extent.

Regarding the quality of OSCE performance, male medical interns' perception that tasks reflected those taught significantly more positively than females, as shown by the higher mean rank for males (46.74) compared to females (35.43). The significant p-value (0.016) and the negative Z-value (-2.420) confirm that this difference is statistically significant and that males rate this aspect higher. Males perceive significantly clearer and more unambiguous than females do related to OSCE instructions, as indicated by the higher mean rank for males (47.86) compared to females (34.13). The significant p-value (0.005) and the negative Z-value (-2778) confirm that this difference is statistically significant and that males rate higher.

Table 4: Responses of Students perception of quality of OSCE performance (N=82)

Quality of OSCE performance	To a greater extent	Somewhat	Very little	Not at all	IQR	median	Chi-square	Mann-Whitney U (Z)	Mann-Whitney (p-value)
Aware of the nature of the examination	20(24.4%)	57(69.5%)	5(6.1%)	-	0	2	52.42*	758.5(-0.894)	0.371
Tasks reflected those taught	17(20.7%)	48(58.5%)	15(18.3%)	2(2.4%)	0	2	55.66*	605.5(-2.42)*	**0.016**
Time at each station was adequate	13(15.9%)	36(43.9%)	20(24.4%)	13(15.9%)	1	2	17.22*	827.5(-0.084)	0.933
Setting and context at each station felt authentic	16(19.5%)	45(54.9%)	17(20.7%)	4(4.9%)	1	2	44.15*	827(-0.933)	0.926
Instructions were clear and unambiguous	23(28%)	35(42.7%)	23(28%)	1(1.2%)	2	2	29.42*	556(2.778)*	**0.005**
Tasks asked to perform were fair	31(37.8%)	43(52.4%)	8(9.8%)	-	1	2	23.15*	778(-0.603)	0.547
Sequence of stations logical and appropriate	24(29.3%)	41(50%)	14(17.1%)	3(3.7%)	1	2	38.10*	725(-1.123)	0.262
Examination provided opportunities to learn	27(32.9%)	39(47.6%)	9(11%)	7(8.7%)	1	2	34.10*	736(-1.006)	0.315

Note: D_f =3 for all except (Aware of the nature of the examination and Tasks asked to perform were fair, D_f =2), * Value is statistically significant at $P<0.05$

7.4. Student Perception of Validity and reliability of OSCE performance

The table below shows the validity and reliability of Objective Structured Clinical Examinations (OSCEs) based on medical student perception. The majority of interns (54.9%) found the OSCE somewhat practical and useful, and 37.8% to a great extent. Only 6.1 % reported minimal usefulness. Over half (51.2%) of interns believed OSCE scores somewhat measure essential clinical skills, while 18.3% to a great extent. Half (50%) of interns felt OSCE scores were somewhat standardized, while only 17.1% to a greater extent. A significant proportion (24.4%) found minimal standardization, and 8.5% responded as not at all entirely. While 37.8% felt OSCE scores were somewhat unaffected by personality, ethnicity, and gender, 28% to a great extent.

On the student perception of validity and reliability of OSCE performance, females perceive the OSCE scores as a true measure of essential clinical skills significantly more positively than males (mean rank for males: 35.2, mean rank for females: 48.42, z-value: -2.651, p-value: 0.008), males perceive the OSCE as a practical and useful experience significantly more positively than females (mean rank for males: 44.27, mean rank for females: 38.29, z-value: -2.326, p-value: 0.020).

Table 5: Responses of Students perception of validity and reliability of OSCE performance (N=82)

Validity and reliability of OSCE	To a greater extent	Somewhat	Very little	Not at all	IQR	median	Chi-square	Mann-Whitney U (Z)	Mann-Whitney (p-value)
OSCE scores provide true measure of essential clinical skills	15(18.3%)	42(51.2%)	16(17.1%)	9(11%)	1	2	31.66*	537(-2.651)	**0.008**
OSCE scores are standardized	14(17.1%)	41(50%)	20(24.4%)	7(8.5%)	1	2	31.46*	814(-0.221)	0.825
OSCE is a practical and useful experience	31(37.8%)	45(54.9%)	5(6.1%)	1(1.2%)	1	2	64.93*	615(-2.326)	**0.020**
Personality, ethnicity and gender will not affect OSCE scores	23(28%)	31(37.8%)	17(20.7%)	11(13.4%)	2	2	10.68*	714(-1.187)	0.235

Note: D_f =3, * Value is statistically significant at P<0.05

7.5. Students' Perception of Assessment Method.

Regarding students' perceptions of different assessment methods, medical interns rate the methods as "neutral" in terms of ease of use. This includes MCQ (48.8%), OSCE (56.1%), long case (45.1%), short case (48.8%), and viva voce (52.4%). In the interns' responses, they identified MCQ (35.4%) and OSCE (29.2%) as the easiest formats to use. On the other hand, the majority of them responded that essay/SAQ (46.3%) is difficult among the assessment formats. Almost two-thirds of them felt MCQ (63.4%) is the fairest of all formats, followed by OSCE (53.7%). Medical students learned most from long case examinations (61%), followed by OSCE (57.3%). Medical interns recommended a more frequent use of the short case, long case, OSCE, and viva voce formats (59.8%, 58.5%, 56.1%, and 56.1%, respectively) during the clinical years.

Table 6: Responses of students' perceptions on Assessment method (N=82)

Easiest formats	**Difficult**	**Neutral**	**Easy**	IQR	median	Chi-square	Mann-Whitney U(Z)	Mann-Whitney (p-value)
MCQ	13(15.9%)	40(48.8%)	29(35.4%)	1	2	13.49*	760.5(-0.768)	0.443
Essay/SAQ	38(46.3%)	34(41.5%)	10(12%)	1	2	16.78*	808(-0.286)	0.775
OSCE	12(14.6%)	46(56.1%)	24(29.2%)	1	2	21.76*	778(-0.605)	0.545
Long case	33(40.2%)	37(45.1%)	12(14.6%)	1	2	13.20*	804.5(-0.320)	0.749
Short case	31(37.8%)	40(48.8%)	11(13.4%)	1	2	16.12*	790(-0.470)	0.638
Viva voce	28(34.1%)	43(52.4%)	11(13.4%)	1	2	18.76*	706(-1.340)	0.180
Fairest formats	**Unfair**	**Neutral**	**Fair**					
MCQ	8(9.8%)	22(26%)	52(63.4%)	1	3	36.98*	792(-0.481)	0.631
Essay/SAQ	23(28%)	38(46.3%)	21(25.6%)	2	2	6.32*	835.5(-0.005)	0.996
OSCE	4(4.9%)	34(41.5%)	44(53.7%)	1	3	31.70*	718(-1.247)	0.212
Long case	39(47.6%)	24(29.3%)	19(23.2%)	1	2	7.93*	755(-0.815)	0.415
Short case	33(40.2%)	33(40.2%)	16(19.5%)	1	2	7.05*	828(-0.080)	0.936
Viva voce	28(34.1%)	30(36.6%)	24(29.3)	2	2	0.68	643(-1.906)	0.057
formats learn most	**Learn very little**	**Neutral**	**Learn a lot**					
MCQ	20(24.4%)	36(43.9%)	26(31.7%)	1	2	4.78	752(-0.838)	0.402
Essay/SAQ	20(24.4%)	39(47.6%)	23(28%)	1	2	7.63*	819(-0.171)	0.864
OSCE	7(8.5%)	28(34.4%)	47(57.3%)	1	3	29.29*	823.5(-0.132)	0.895
Long case	9(11%)	23(28%)	50(61%)	1	3	31.78*	714(-1.310)	0.190
Short case	8(9.8%)	37(45.1%)	37(45.1%)	1	2	20.51*	825.5(-0.108)	0.914
Viva voce	9(11%)	33(40.2%)	40(48.8)	1	2	19.34*	794.7(-0.427)	0.670

Formats should be used more often in the clinical years	**Used much less**	**Neutral**	**Used much more**					
MCQ	12(14.6%)	27(32.9%)	43(52.4%)	1	3	17.59*	822.5(-0.139)	0.538
Essay/SAQ	28(34.4%)	34(41.5%)	20(24.4%)	1	2	3.61	793(-0.4280	0.669
OSCE	5(6.1%)	31(37.8%)	46(56.1%)	1	3	31.49*	652.5(-1.945)	0.052
Long case	10(12.2%)	24(29.3%)	48(58.5%)	1	3	27.02*	709(-1.344)	0.179
Short case	9(11%)	24(29.3%)	49(59.8%)	1	3	29.88*	627(-2.229)	0.026
Viva voce	12(14.6%)	24(29.3%)	46(56.1%)	1	3	21.76*	732(-1.084)	0.278

Note: D_f =2, ***** Value is statistically significant at $P < 0.05$

7.6. Examiners perception of OSCE

On the examiners perception on OSCE, the majority of responses indicate that instructions at each satiation were clear and unambiguous (64.5%), Personality, ethnicity and gender will not affect OSCE scores (62.3%), OSCE covers clinical skill and knowledge (60%), OSCE reflects requirements of medical profession (57.8%).A total of 51.1% of examiners (40% agree and 11.1% strongly agree) suggested that the examination was well organized and administered. On the other hand significant number of the examiners felt neutral with the logic and appropriateness of OSCE sequence and disagree with the time allocated at each station.

Examiners with prior training on OSCE generally reported more positive perceptions of the OSCE process compared to those without prior training, particularly in areas like: Coverage of clinical skills and knowledge (mean rank trained = 29.09, mean rank untrained= 19.30, Z = -2.574, p = 0.010), Exam organization and administration(mean rank trained = 27.76, mean rank untrained= 20.11, Z = -1.985, p = 0.047), OSCE scores as a true reflection of essential clinical skills(mean rank trained = 26.68, mean rank untrained= 19.55, Z = -2.346, p = 0.019), Positive impact on student learning(mean rank trained = 28.47, mean rank untrained= 19.68, Z = -2.264, p = 0.024), Reflection of medical profession requirements(mean rank trained = 28.76, mean rank untrained= 19.50, Z = -2.509, p = 0.012), availability and of good quality Equipment including simulators, medical instruments, and imaging studies(mean rank trained = 26.05, mean rank untrained= 17.97, Z = -2.095, p = 0.036)and Use of similar questions and scenarios for competency measurement (mean rank trained = 29.41, mean rank untrained= 19.11, Z = -2.725, p = 0.006).

Table 7: Responses of examiners' Perception of OSCE (N=45)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	IQR	median	Chi-square	Mann-Whitney U (Z)	Mann-Whitney (p-value)
Wide range of clinical skills and knowledge are covered	3(6.7%)	6(13.3%)	9(20%)	21(46.7%)	6(13.3%)	1	4	22.00*	134.5(-2.574)	**0.010**
Examination was well-organized and well-administered	2(4.4%)	9(20%)	11(24.4%)	18(40.0%)	5(11.1%)	2	4	16.67*	157(-1.985)	**0.047**
Instructions for students at each station were clear and unambiguous	1(2.2%)	7(15.6%)	8(17.8%)	25(55.6%)	4(8.9%)	1	4	38.89*	171.5(-1.720)	0.085
Stations and settings reflected authentic clinical scenario	3(6.7%)	6(13.3%	15(33.3%)	19(42.2%)	2(4.4%)	1	3	25.55*	178.5(-1.480)	0.139
Sequence of stations was logical and appropriate	3(6.7%)	6(13.3%	15(33.3%)	18(40.0%)	3(6.7%)	1	3	22.00*	200.5(-0.927)	0.354
Time at each station was adequate	3(6.7%)	15(33.3%)	10(22.2%)	15(33.3%)	2(4.4%)	2	3	17.56*	213.5(-0.600)	0.549
The number of stations was adequate	4(8.9%)	8(17.8%)	11(24.4%)	19(42.2%)	3(6.7%)	2	3	18.44*	232(-0.148)	0.883
OSCE scores provided true measure of essential clinical skills	4(8.9%)	7(15.6%)	14(31.1%)	15(33.3%)	5(11.1%)	2	3	11.78*	141.5(-2.346)	**0.019**
Examination was stressful for the students	4(8.9%)	10(22.2%)	9(20%)	15(33.3%)	7(15.6%)	2	3	7.33	177.5(-1.461)	0.144
OSCE minimizes chances of failing	8(17.8%)	4(8.9%)	17(37.8%)	14(31.1%)	2(4.4%)	2	3	18.22*	207.5(-0.748)	0.454
OSCE has a positive impact on student learning	3(6.7%)	7(15.6%)	13(28.9%)	16(35.6%)	6(13.3%)	1	3	12.67*	145(-2.264)	**0.024**
OSCE is a standardized examination for all students	4(8.9%)	9(20%)	12(26.7%)	17(37.8%)	3(6.7%)	2	3	14.89*	226.5(-0.281)	0.779
OSCE is preferable compared to other forms of clinical examination	5(11.1%)	3(6.7%)	18(40%)	15(33.3%)	4(8.9%)	1	3	21.56*	213(-0.618)	0.537
The OSCE grading format was appropriate to evaluate the students on the particular stations	3(6.7%)	7(15.6%)	15(33.3%)	14(31.1%)	6(13.3%)	1	3	12.22*	210.5(-0.669)	0.504
It gives feedback on performance that can be used for self-improvement	4(8.9%)	9(20%)	10(22.2)	19(42.2%)	3(6.7%)	2	3	18.00*	226.5(-0.283)	0.777
It reflects requirements of medical profession	2(4.4%)	3(6.7%)	14(31.1%)	23(51.1%)	3(6.7%)	1	4	38.00*	140(-2.509)	**0.012**
Equipment including simulators, medical instruments and imaging studies were available and had good quality	3(6.7%)	17(37.8%)	12(26.7%)	11(24.4%)	2(4.4%)	2	3	18.00*	152.5(-2.095)	**0.036**
Personality, ethnicity and gender will not affect OSCE scores	6(13.3%)	3(6.7%)	8(17.8%)	21(46.7%)	7(15.6%)	1	4	21.56*	209(-0.721)	0.471
Having similar questions and case scenario for all students is a good measure of competency	4(8.9%)	16(35.6%)	19(42.2%)	6(13.3%)	0	1	4	14.47*	129(-2.725)	**0.006**

7.7. Challenges of OSCE

Students and examiners faced common challenges on time allocation at each station was not adequate. Stress is the challenges for students during OSCE examination. Majority of interns seek orientation before OSCE examination significant challenge for examiners is the impact of training.

8. Discussion

In this study the medical interns response rate was 95.3 % of medical students, and it was higher compared to the previous studies related to the response rate of 63%,70.5% and 78.3% respectively (3)(11) (28). Examiners response rate was 73.8%. it is higher when it was compared to the study conducted in the University of the West Indies, Barbados (55%) and Ethiopia (65%)(5)(11). The mean age of medical interns was about 24.99 with the standard deviation (SD ±0.839), Male are 44 (53.7%) and female are 38 (46.3%) . approximately similar to the previous study that mean age of 24.4 (SD ±1.6) years, male(54.5%) and 45.5% of female. (5)

Low percentage of examiners (37.8%) have taken training on OSCE before the exam on our study. A study of the implementation of an "OSCE Roadshow," which aimed to deliver training to a large number of current and potential OSCE examiners (20) and another study demonstrated that brief, accessible training sessions could effectively improve examiners' consistency and understanding of the OSCE processes.(37) Both have given emphasis for pre OSCE training of examiner improve the Examination Processes than our study. This is may be due to low emphasis is given to the impact of pre -OSCE training on the quality of OSCE and its outcome in our study.

The major of the medical interns has positive perception of attributes of OSCE that OSCE was fair(59.8% agreement) and adequately covered the knowledge(54.8% agreement) and about half of medical interns has agreement(52.2%) on the ability to compensate in certain areas during assessments .This result in line with the findings from the previous study done in Egypt, Nigeria and Ethiopia (2)(5) (11). About Half of medical interns perceived the examination was well-structured and sequenced (41.5% agree and 9.8% strongly agree) and well administered (45.1% agree and 4.9% strongly agree). Previous study in this area(63-91%), are similar to this one, although with a slightly lower level of agreement in our study (5).

Despite the positive feedback, there were concerns from medical interns that they needed more time at stations (46.3% agreed and 11% strongly agreed), which is in the same direction as previous studies (29)(31)(37) The majority of medical interns are neutral (31.5%), followed by those who agree (26.5%) on examination stressfulness. But previous study consistently stated that OSCE was stressful(5)(30). This is mainly due to the recall bias since this study was not conducted immediately after the OSCE exam.

There is a difference between male and female participants on the perceptions of attributes of OSCE on needs of more time at each station (mean rank of male = 36.05, mean rank of female = 47.82, z = -2.077 and p = 0.017) and intimidated by OSECE (mean rank of male = 36.35 and mean rank of female = 47.47, Z = -2.199, and p = 0.028). It indicates that female respondents felt the need for more time at each station compared to males on the examination, and also females found that the examination was more intimidating than males. A previous study expressed that that female medical students were viewed as significantly less confident than male medical students ($F(1,133) = 4.45$, $p < 0.05$), especially at the beginning of the interaction and increased Anxiety ,support the current study since demanding time and being intimidating prone to less confident and increased Anxiety(21)

Regarding to the OSCE organization, all OSCE's organizational features received average ratings For instance: orientation of OSCE before examination (43.9%), announcement of venue and known to student (41.5%), and staff answered inquiries related to OSCE (37.8%) received average rating by the majority. Otherwise announcement of venue and timetables availability which are known to students are good features of OSCE Organization which rates more than average. However the overall origination of OSCE was thought positive in previous studies (5) (32) but many participants in study(32) suggested improvements in availability of equipment including simulators in line with the current study. This result could be due to the absence of an assigned OSCE exam coordinator within the institution.as stated by(32)

Regarding the quality of OSCE performance the majority of medical interns perceived tasks were satisfactory and above on tasks were fair , educative, and gave opportunity to lean; station setting were logical and clear and students' awareness. Other studies are in line with this study (29)(31)(30).(32) About 40% (24% very little and 15.9% not at all) of participants were

dissatisfied with the time given at each station. Many previous study finding support this result.(5)(29)(31)

Regarding the validity and reliability of OSCE performance, most medical interns rate it as "somewhat" and "to a greater extent" on practicality and usefulness measures of clinical skill, standardization, and the fact that personality, race, and gender don't affect the score. Many different previous studies on the perception of students of OSCE in line with the current study. (11)(29)(30)(31).

Regarding students' perceptions of different assessment methods, medical interns rate the methods as "neutral" in terms of ease of use. This includes MCQ (48.8%), OSCE (56.1%), long case (45.1%), short case (48.8%), and viva voce (52.4%). In the interns' responses, they identified MCQ (35.4%) and OSCE (29.2%) as the easiest formats to use. Similar study done in Jimma, Ethiopia is in line with this study(12). On the other hand, the majority of them responded that essay/SAQ (46.3%) is difficult among the assessment formats. Almost two-thirds of them felt MCQ (63.4%) is the fairest of all formats, followed by OSCE (53.7%).studies done by Sarfraz F. et.al(35) and Article.O et.al.(34), are discussed as similar to this study. Medical students learned most from long case examinations (61%), followed by OSCE (57.3%). (12)(35) Medical interns recommended a more frequent use of the short case, long case, OSCE, and viva voce formats (59.8%, 58.5%, 56.1%, and 56.1%, respectively) during the clinical years. Similar studies done by Shitu. B et.al in Jimma, Ethiopia supports the statement of current study.(12)

Regarding to examiners' perception of OSCE, majority of the examiners who answered about their perception with OSCE said that the instructions at each station were clear and unambiguous (64.5%), OSCE covers clinical skills and knowledge (60%), and the exam was well organized and administered (51.1%). In studies done by Majumder M. et al. in the West Indies, Barbados, and by Rozhan Nabaz M. in Iraq, they are in line with our study(5)(19). Another study done in Ethiopia was also consistent with ours.(11) Most of examiners (57.8%) agree that OSCE reflects the requirements of medical profession. Previous study shows similar perception to our study.(11)

Time allocated to each station, availability of equipment for OSCE, were considered by examiner to be a challenge (37.8% disagree and 26.7 % neutral; and 33.3% dis agree and22.2 % neutral) respectively and OSCE was considered stressful by 33.3% agree and 15.6% strongly agree.

Previous study done by H.Fisseha et.al and a qualitative study done by G. Ataro in Ethiopia is comparable with our study.(11)(9)

Examiners with prior OSCE training reported significantly more positive perceptions of the OSCE process than untrained examiners. Key areas of difference among trained and untrained examiners perception included: coverage of clinical skills and knowledge (mean rank trained = 29.09, untrained = 19.30, $p = 0.010$), exam organization and administration (trained = 27.76, untrained = 20.11, $p = 0.047$), OSCE scores reflecting essential skills (trained = 26.68, untrained = 19.55, $p = 0.019$), positive impact on student learning (trained = 28.47, untrained = 19.68, $p = 0.024$), reflection of profession requirements (trained = 28.76, untrained = 19.50, $p = 0.012$), quality equipment availability (trained = 26.05, untrained = 17.97, $p = 0.036$), and use of standardized questions (trained = 29.41, untrained = 19.11, $p = 0.006$).previous studies indicated that there is some evidence suggesting that examiner training improves consistency of examiners' behavior and reduces examiner variation in scoring (6)(20)(26).

9. Limitation

The study shares the methodological limitations of a cross-sectional study. It also relies on self-reported perceptions from medical interns and examiners, which may be subject to response bias and personal interpretation.

10. Conclusion

This study evaluated medical interns' and examiners' perceptions of the Objective Structured Clinical Examination (OSCE). Both groups agreed that the OSCE effectively assesses a wide range of clinical skills, reflects professional requirements, and is fair and standardized. Interns appreciated the organization but need more station time, while examiners felt the OSCE was well-managed and free from bias by personality, gender and ethnicity. Students ranked OSCE as the second fairest method after MCQs and Interns also recommended more frequent use of short cases, long cases, OSCEs, and viva voce formats during clinical years, will enrich the learning experience and in line assessments with real-world clinical scenarios.

Challenges identified by both Interns and examiners include insufficient station time, lack of availability and variability of equipment. Additionally, students' challenges are pre- OSCE exam orientation, staff responsiveness to inquiries, rated average and below average indicates for room for improvement. A significant challenge for examiners is not received training prior to OSCE and this study shows that there is difference between rained and untrained examiners on the perception of OSCE.

11. Recommendation

To optimize the effectiveness of the OSCE, time given at stations should be considered before exams according to the nature and the types of tasks at each station. The availability and quality of equipment should be improved to the standard. Orientation before the examination should be conducted in detail. Examiners should also receive formal training on OSCE. Staff should be oriented before the exam on how to respond to inquiries by students related to OSCE. These measures can improve student anxiety and stress, leading to better performance on the exam. Examiners' training also ensures consistency and fairness and minimizes variability in assessments.

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Annexes

Annex I: Research consent form

Dear study participant,

My name is **Natnael Assefa**. I have been attending postgraduate program in the field of Health Science Education at Addis Ababa University. I am going to conduct research on "***Assessment of Perceptions and Challenges of Objective Structured Clinical Examination among Medical students and Examiners perspective, College of Health Science, Addis Ababa University: cross sectional Study***, Addis Ababa, Ethiopia, from May1, 2024 up to August 30, 2024.

The collected data will not include any identification nor will it be revealed to any third body. All the information you will provide will be kept confidential and used for the research purpose only. The filling of the questionnaire will take approximately 15 minutes only. Since your information will be very essential for the finding of the study, please fill only genuine information. You have a right to not participate in the study and to discontinue the study at any time you want. If you want to participate in the study, please sign in the space below.

Thank you in advance for your help.

By signing below, you are agreeing that you have read and understood the Participant Information Sheet questions about your participation in this study have been answered satisfactorily and you are taking part in this research study voluntarily (without coercion).

Signature of the participant……

Code…….

Annex-II: Data collection tool

Section I: Socio-demographic characteristics

1. Age in years ……..
2. Gender
    1. Male
    2. Female

3. Department (examiners only)
    1. Internal Medicine
    2. Obstetrics and Gynecology
    3. Surgery
    4. Pediatrics and child Health
    5. Ophthalmology
    6. Psychiatry
    7. Others (specify…….)

4. Examiner job title
    1. Professor
    2. Assistant professor
    3. Associate professor
    4. Resident
    5. General practitioner
    6. Medical Intern
    7. Other (specify….)

5. Which department did you take the OSCE exam?

Select more than one if apply (Medical interns only)

    1. Internal Medicine
    2. Obstetrics and Gynecology
    3. Surgery
    4. Pediatrics and child Health
    5. Ophthalmology
    6. Psychiatry
    7. Others (specify…….)

6. Do you have experience as OSCE examiner? (Examiners only)
    1. Yes
    2. No
7. Do you have previous training on OSCE?(Examiners Only)
    1. Yes
    2. No

Part I. Students

Section I. Student perception of attributes and organization of OSCE

1. Student perception of attributes of OSCE
   Please click if you answer is:

Strongly disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly agree (5)

Attributes of OSCE	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Examination was fair					
Wide knowledge area covered					
Needed more time at stations					
Examination well administered					
Examination very stressful					
Examination well-structured and sequenced					
Examination minimized chance of failing					
OSCE less stressful than other examinations					
Allowed student to compensate in some areas					
Highlighted areas of weaknesses					
Examination intimidating/frightening					
Student aware of level of information needed					
Wide range of clinical skills covered					

2. Student perception of Organization of OSCE
   Please click if you answer is:
   Excellent (1) Above average (2) Average (3) Below average (4) Very poor (5)

Organization of OSCE	Excellent	Above average	Average	Below average	Very poor
Orientation of OSCE before examination					
Announcement of venue and known to student					
Timetables were available and known to student					
Revision of clinical procedures before OSCE					
Staff answered queries related to OSCE					
Quality of OSCE rooms i.e. setup, lightening etc.					
Availability good equipment including simulators					

Section II. Student perception of quality and validity/reliability of OSCE performance

1. Student perception of quality of OSCE performance
   Please click if you answer is:
   To a greater extent (1) Somewhat (2) Very little (3) Not at all (4)

Quality of OSCE performance	To a greater extent	Somewhat	Very little	Not at all
Aware of the nature of the examination				
Tasks reflected those taught				
Time at each station was adequate				
Setting and context at each station felt authentic				
Instructions were clear and unambiguous				
Tasks asked to perform were fair				
Sequence of stations logical and appropriate				
Examination provided opportunities to learn				

2. n of validity/reliability of OSCE performance
   Please click if you answer is:
   To a greater extent (1) Somewhat (2) Very little (3) Not at all (4)

Validity and reliability of OSCE	To a greater extent	Somewhat	Very little	Not at all
OSCE scores provide true measure of essential clinical skills				
OSCE scores are standardized				
OSCE is a practical and useful experience				
Personality, ethnicity and gender will not affect OSCE scores				

Section III. Students' perception of assessment method.

1. Which of the following formats is easiest?	Difficult	Neutral	Easy
MCQ			
Essay/SAQ			
OSCE			
Long case			
Short case			
Viva voce			
2. Which of the following formats is fairest?	Unfair	Neutral	Fair
MCQ			
Essay/SAQ			
OSCE			
Long case			
Short case			
Viva voce			
3. From which of the following formats do you learn most?	Learn very little	Neutral	Learn a lot
MCQ			
Essay/SAQ			
OSCE			
Long case			
Short case			
Viva voce			
4. Which of the following formats should be used more often in the clinical years?	Used much less	Neutral	Used much more
MCQ			
Essay/SAQ			
OSCE			
Long case			
Short case			
Viva voce			

Part II. Examiners

Section I. Examiner's perception of OSCE

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Wide range of clinical skills and knowledge are covered					
Examination was well-organized and well-administered					
Instructions for students at each station were clear and unambiguous					
Stations and settings reflected authentic clinical scenario					
Sequence of stations was logical and appropriate					
Time at each station was adequate					
The number of stations was adequate					
OSCE scores provided true measure of essential clinical skills					
Examination was stressful for the students					
OSCE minimizes chances of failing					
OSCE has a positive impact on student learning					
OSCE is a standardized examination for all students					
OSCE is preferable compared to other forms of clinical– examination					
The OSCE grading format was appropriate to evaluate the students on the particular stations					
It gives feedback on performance that can be used for self-improvement					
It reflects requirements of medical profession					
Equipment including simulators, medical instruments and imaging studies were available and had good quality					
Personality, ethnicity and gender will not affect OSCE scores					
Having similar questions and case scenario for all students is a good measure of competency					