DISSERTATION

In

NATIONAL BOARD OF EXAMINATIONS

Analysis of the candidates performance & their perception towards OSCE-Objective Structured Clinical Examination in the discipline of Anesthesiology

By

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PG/14/24

Under the guidance of

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Post Graduate Diploma in Hospital and Health Management
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International Institute of Health Management Research

New Delhi

Completion of Dissertation from NBE

The certificate is awarded to

Jyoti Bhatia

In recognition of having successfully completed her Internship in the department of

CPD, NBE

and has successfully completed her Project on

Analysis of the candidates performance and their perception towards OSCE-Objective Structured Clinical Examination in the discipline of Anesthesiology.

She comes across as a committed, sincere & diligent person, who has a strong drive & zeal for learning

We wish her all the best for future endeavors

Zonal Head - Human Resources

3

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Jyoti Bhatia** student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at National Board of Examinations from 01/02/2016 to 30/05/2016.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

Dr. A.K. Khokhar

Director

IIHMR,New Delhi

Dr. A.K Agarwal

Dean, Academics and student Affairs

IIHMR, New Delhi

Certificate of Approval

The following dissertation titled **"Analysis of the candidates performance & their perception towards OSCE-Objective Structured Clinical Examination in the discipline of Anesthesiology"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Jyoti Bhatia

Name	Signature
DR. BRIJENDER SINGH DHILLON	19/5/16
DR. A.K. KHOKHAR	
DR. PANKAJ TALREJA	

Certificate from Dissertation Advisory Committee

This is to certify that **Jyoti Bhatia,** a graduate student of the **Post- Graduate Diploma in Health and Hospital Management** has worked under our guidance and supervision. She is submitting this dissertation titled **"Analysis of the candidates performance & their perception towards OSCE-Objective Structured Clinical Examination in the discipline of Anesthesiology"** in partial fulfillment of the requirements for the award of the Post-Graduate Diploma in Health and Hospital Management.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Dr A.K Khokhar
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Certificate by Scholar

This is to certify that the dissertation titled **Analysis of the Candidates performance & their perception towards OSCE-Objective Structured Clinical Examination in the discipline of Anesthesiology**, and submitted by **Jyoti Bhatia, Enrollment No. PG/14/24** under the supervision of **Dr A.K Khokhar** for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from **01.02.2016 to 30.04.2016** embodies my original work and has not formed the basis for the award of any degree, diploma associate-ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Jyoti

Signature

Feedback Form

Name of the Student: Jyoti Bhatia

Dissertation Organization: National Board of Examinations

Area of Dissertation: CPD Department

Attendance: Punctual at all times

Objectives achieved: Statistical analysis of scores of 6 centres of OSCE.
- Measure the correlation of OSCE stations (observed stations)
- Assess the perception & opinion of candidates regarding OSCE through feedback.

Deliverables:
Dissertation Report submitted.

Strengths:
- Good learning capacity.
- Hardworking & diligent.
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Suggestions for Improvement:
- You need to become a dynamic speaker.

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Date: 27 may 2016

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ABSTRACT

Introduction: Objective structured clinical examination (OSCE) is one of the most preferable means of evaluating cognitive, emotional and psychomotor aspects of clinical students. It has been used as a tool for both formative and summative evaluation of medical graduate and postgraduate students across the globe. Focus over OSCE in India has risen due to the fact that as of now, the Indian experiences with OSCE are limited and there is a need to sensitize the Indian faculty and students. A cautious approach is desired before it is considered as a supplementary tool to other methods of assessment for the summative examinations in Indian settings. To foster actual learning, assessment should be educative and formative.

To obviate the drawbacks of conventional clinical evaluation, objective structured clinical examination (OSCE) was started by NBE in various specialties like Pediatrics and Anesthesiology etc.

Objectives: The objectives of this study were:

1. To do statistical analysis of the 6 centres of OSCE examination.
2. To measure the correlation of OSCE stations by calculating the coefficient of correlation across observed stations.
3. To analyze the performance & perception of the candidates of anesthesiology through feedback taken after the OSCE-Objective Structured Clinical Examination.

Materials & Methods: Sample size- 524 candidates with DNB anesthesiology background participated. A detailed, structured questionnaire comprising of 12 questions was given to the each candidate.

Results: Delhi had the highest number while west Bengal had the least number of candidates who participated in the OSCE.The mean, median value is highest for **West Bengal** and the mode value is highest for **Pune.**There is strong correlation across the observed stations.

Conclusion: Study result suggests that large proportion of the candidates feels that the OSCE-Objective Structured Clinical Examination is more beneficial than the conventional clinical examination and is satisfied after giving this examination. And they also feel that the time given at each station was appropriate.

ACKNOWLEDGEMENT

I owe my sincere gratitude to many people who helped and supported me during the course of this project.

I would like to express my heartfelt gratitude and deep appreciation to my esteemed mentor Dr. BIPIN BATRA, Executive Director, NBE for his excellent guidance, constant support and encouragement without which the successful completion of this project would have been a distant reality. His critical approach, guidance, unflinching support and constant encouragement have helped me to bring this project to a successful completion.

It is with immense pleasure and deep appreciation to my esteemed professor and guide Dr. A.K Khokhar, for guiding and correcting various documents of mine with attention and care. I really appreciate all the pain he took to go through the project and suggesting necessary corrections as and when needed. His tireless pursuit for perfection and professional insight were a source of constant inspiration to me.

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Table Of Contents

LIST OF SYMBOLS & ABBREVIATIONS

NBE- National Board of Examinations

DNB-Diplomate of National Board

CET- Centralized Entrance Test

CME- Continuing Medical Education

OSCE- Objective Structured Clinical Examination

AIPGMEE- All India Post Graduate Medical Entrance Examination

DNB CET- Diplomate of National Board

FMGE- Foreign Medical Group of Examination

CRISIS- Convenience Relevance Individualization Self-Assessment And Specialization

EPC- Evidence-Based practice Center

AHRQ- Agency of Health Care Research& Quality

LIST OF FIGURES

LIST OF TABLES

1. ORGANIZATION PROFILE

National Board of Examinations is a premiere organization imparting post graduate education in various disciplines of modern medicine. It continues to modify the evaluation quality and standards of examination by constant interaction with experts in various disciplines of modern medicine & allied specialties.

NBE conducts examinations in 72 disciplines and subspecialties of modern medicine which include DNB programmes in 30 broad and 22 super specialties.

NBE has accredited 467 institutes/hospitals in public and private sector all over country.

The Board conducts following activities.

1. **Examinations:** The National Board of Examinations conducts examinations in a planned and scientific manner in regard to evaluation and assessment.
   The following exams are conducted by NBE

a. Centralized Entrance Test (CET)

b. Centralized Entrance Test (Super Specialty)

c. Centralized Entrance Test (Post Diploma)

d. Fellowship Entrance Exam

e. DNB Final Examination

f. Fellowship Exit Examination

g. Screening Test For Foreign Medical Graduates

h. AIPGMEE

NBE conducts most of the examinations using Computer based Test (CBT) which has made its examination system more secure , consistent and convenient for candidates.

2. **Thesis Submission and Assessment:**

Each Candidates pursuing DNB courses under National Board of Examination has to submit thesis on specific research topic of their respective broad or super specialty. Thesis is a document submitted in support of candidature for an academic degree or professional qualification presenting the author's research and findings. Thesis should clearly suggests an essay's direction, emphasis, and scope and usually argues a point of view. It should be concise, specific and strong.

Thesis which are submitted by the candidates are assessed by Assessors appointed by Board. Thesis assessment is a confidential activity where assessors and candidates are not known to each other.

3. **Accreditation:**

Board is the prime national level organization that has set a mechanism for imparting post graduate teaching and training in the sphere of higher medical education. Leading centres of excellence in public, private and defence institutes all over the country that have been accredited by NBE are imparting training based on the defined accreditation criteria.

4. **Continuing Medical Education Programme/Workshops:**

National Board of Examination in its continuing endeavour to undertake capacity building and strengthen the Post graduate medical education in the country conducts Continuing Medical Education Programme / workshops for benefits of post graduate trainee, faculty and specialists/consultants. NBE conducts the CME programmes as follows:

- NBE has set up a repository of electronic content in medical education covering all board and super specialties through titles available in DVD volumes. These titles cover wide range of issues as a part of the post

graduate curriculum in modern medicine from common topics to esoteric areas of knowledge which otherwise are not easily available as learning resource.

- Workshops in research methodology:NBE in its continuing endeavour to strengthen research and facilitate capacity building in research methodology periodically conducts workshops for benefits of Post graduate candidates and faculty members.

5. **Specialty Advisory Boards**:

   NBE has constituted specialty advisory boards for various disciplines in which examinations are conducted. The experts from all over the country drawn from various institutes in various disciplines are member of these boards.

6. **Diplomate of National Board (DNB)** is the title awarded by the National Board of Examinations (NBE), an autonomous academic body under the Ministry of Health and Family Welfare, Government of India to candidates who successfully complete their postgraduate or postdoctoral medical education under it.

Research Area

Working as Research Associate in Continuing Professional Development at National Board of Examinations, New Delhi.

Departments Worked

1. Registration and Counseling
2. Continuing Professional Development

Areas of Engagement

1. Conducting feedback sessions for Formative Assessment Examinations for candidates.
2. Conducting of CME/Workshops.
3. Conducting of counseling sessions for admissions to various types of DNB post graduate courses.
4. Collection of data of all the specialties and the super specialties for candidates registered since 1982 to 2015. To find out the number of pass candidates in each specialty in a particular session.
5. Drafting of letters pertaining to maternity leave, resignation and medical leave of the candidates.
6. Verification of the documents of the candidates during admission counseling sessions.

Reflective Learning

1. Preparing official documents.
2. Assessment of official documents.
3. Organizing feedback sessions for candidates.
4. Conducting of counseling sessions for admissions to various courses.
5. Knowledge of the various subjects of the DNB.
6. Verification of the documents of the candidates for admission to DNB.

2. INTRODUCTION

Objective structured clinical examination (OSCE) is one of the most preferable means of evaluating cognitive, emotional and psychomotor aspects of clinical students. The present study was designed to determine the reliability of OSCE in evaluating clinical skills of students.

There [1] is new shift in the pattern of the examination as the medical students are increasing, which has made the traditional long/short style of examination difficult to conduct. The OSCE aims to enhance the validity of clinical assessment by simulating realistic clinical scenarios to reflect real-life professional tasks. Typically, an OSCE consists of multiple stations at which students are required to perform a range of tasks to demonstrate competency in relevant skills. During OSCE students rotate through the various stations spending a predetermined time. At each station the students are instructed to complete specified tasks in the time allocated. Stations can involve actual patients or surrogate volunteers as stimulated patients who are normally trained to present a standardized portrayal of the clinical problem. Each station is scored separately using either detailed checklists or global rating scales.

2.1 Characteristics [2] of a good assessment instrument:

To judge the utility of any particular assessment instrument, it is necessary to apply the following criteria:

- **Objectivity:** It must be remembered, however, that objectivity in not simply the reduction or abolition of examiner subjectivity. When the chance is given to examiners to rephrase the questions, answers, responses, performance and judgment are minimized, there is decrease in variability and increase in the standardization and the chances of objectivity are greatest.

- **Reliability:** this is also called repeatability, reproducibility or consistency. It is the extent to which a test or the instrument if repeated for the same or similar group of examinees will produce the same or similar results. A reliable instrument should be both accurate and precise.

So reliability refers to the precision of measurement or the reproducibility of the scores obtained with the examination.

- **Educational Impact**: Examinations drive learning; this hypothesis describes one of the strongest relationships in education. Trainees wish academic success, and academic success is defined by examinations, therefore students will do everything to maximize their chances of success. The way the exam is conducted also affects the way students learn. An instrument that drives students to learn more in depth is said to have high educational impact.

3. BACKGROUND

It consists of a circuit of stations connected in series with each station devoted to assessment of a particular competency using predetermined guidelines or checklists. OSCE has been used as a tool for both formative and summative evaluation of medical graduate and postgraduate students across the globe.

- Stations [3] may assess various attitudes and behaviors, something the older assessments often failed to address. Each student within a given circuit is assessed on the same task by the same examiner. For more objectivity, the observer is provided with a detailed, itemized checklist on which to mark the candidate's performance. More recently, global rating scales have been advocated and used.

- The use of OSCE for formative assessment has great potential as the learners can gain insights into the elements making up clinical competencies as well as feedback on personal strengths and weaknesses. However, the success of OSCE is dependent on adequacy of resources, including the number of stations, construction of stations, and method of scoring (checklists and/or global scoring), the number of students assessed and adequate time and money.

- **OSCE setup**-The [4] number of stations can vary from 12 to 30 though usually 20 stations are sufficient. The usual time allotted is 5 minutes for each station; ACGME however recommends station duration of 10-15 minutes. Giving more time per station allows more competencies to be tested in relation to the given task. All students begin simultaneously. The number of students appearing in the exam should not exceed the number of stations.

4. REVIEW OF LITERATURE

The Objective [5] Structured Clinical Examination (OSCE) is becoming more prevalent within healthcare education programmes, because it is regarded as a useful method for assessing skills and underpinning knowledge required for practice.OSCE is an assessment technique in which students demonstrates their competence under a variety of simulated conditions. Thus, providing evidence that students are competent in those specific skills tested within the exam context. However, OSCE is a very different experience for students, in comparison to more established methods of assessment, for example: written assignments and continuous assessment in practice.

A review of the literature [6] on OSCE details that this assessment method originated from medical education, where it was initially developed during the 1970's to replace more subjective assessments such as 'long and short-cases'(Harden et al. 1975). Therefore, it has become embedded within medical training and has been subjected to further work on assessment reliability and validity.

Important Components [7] of OSCE are :

First identify the skills which need to be assessed.

Convert them into specific questions or task that can be answered in 4 to 5 minutes.

Types of Stations:

- Observed Stations
- Unobserved Stations
- Rest Stations

Observed Stations: These stations are designed to assess the candidate's history taking, communication skills, professionalism and ability to adopt a patient centric approach to history taking. An actor will play a simulated patient in consultations stations. They will have received a copy of the 'script' and advice regarding the standardized manner in which the patient is to be portrayed. These stations are designed to also assess the candidate's communication skills,

professionalism and ability to adopt a patient centric approach to the examination. The examination may be performed on a simulated patient portrayed by an actor (standardized), a university student, lay person or a manikin will be used. This is also used to assess the candidate's procedural skills, communication skills, professionalism and ability to adopt a patient centric approach. An actor, university student or manikin may simulate a patient in procedure stations. If appropriate they will have received a copy of the 'script' and advice regarding the standardized manner in which the patient is to be portrayed.

Unobserved Stations: is usually a question station .Here student is expected to give answers to some specific and structured question to make the concepts and understanding of the subject clear for e.g. report the microscopic findings of a focused smear.

Third type of station is a **Rest Station** where student is given time to relax and refresh himself.

Checklist: is [8] the most important component of OSCE. This contains the vital steps which assessors want the students to follow to accomplish the identified procedure to fulfill the set objective.

Each step in the checklist is given some marks depending upon the significance of that step.

Advantages[9] of OSCE:

- Tests the student's ability to integrate knowledge, clinical skills, and communication with the patient.
- Provides the faculty with an assessment tool that is custom-fit to the goals of a specific education program.
- Provides unique programmatic evaluation.
- Objectivity and validity are highly ensured in OSCE.
- Tests in condition akin to professional practice.
- A wide range and variety of facts can be tested at a time.
- Contains detailed feedback for students and teachers.

Disadvantages [10] of OSCE:

- OSCE is expensive and time consuming.
- Takes long time to construct a case and a scoring checklist.
- There are technical limitations associated with OSCE.
- Long time planning is required.
- Examiner training is required.
- It is very resource intensive.

Van Den Berk A, et al [11] has stated that OSCE has been successfully implemented in specialties like ophthalmology, paediatrics, radiology and Anesthesiology. Compared with written tests, OSCE's are more susceptible to reliability and validity. And there is need for initiation of OSCE in the field of radiology as it will help in improving the communication in reporting findings of the imaging studies. In this present study, ninety-three Students were examined in the radiology station. Cronbach's alpha coefficient for the radiology station was 0.92. The average score for the radiology station was 3.8 (0.87). The average score for the test without radiology was 3.9 (0.32). The range of the average scores for the six different cases was 0.5 (3.6–4.1). The range of the average scores for the five examiners was 1.0 (3.3–4.3). It has been observed that the range of the scores between the different cases was relatively small. The range of the scores between the different examiners was clearly larger.

Yamini I et al [12] has stated that an OSCE study was conducted for a total of 207 examinees in three groups. It consisted of 18 stations and contained 80 multiple choice questions. The cronbach's alpha for each group was 0.7,0.8 and 0.9. Correlations for all stations ranged from 0.7 to 0.8, which indicated good stability and internal consistency with minor differences in the progression of the indexes. The reliability of the written exam was 0.79, and the validity of the OSCE was 0.63,

as assessed using Pearson's correlation. At least two to three indexes should be used to ensure the reliability of OSCE.

Blood AD,Park YS, Brorson JR [13]study has examined the factors affecting reliability, or consistency of assessment scores, from an objective structured clinical examination (OSCE) in neurology through generalizability theory (G theory).Data include assessments from a multistation .OSCE taken by 194 medical students at the completion of a neurology clerkship. Domains refer to areas of skill (or constructs) that the OSCE measures. G theory is used to estimate variance components associated with each facet, derive reliability, and project the number of cases required to obtain a reliable (consistent, precise) score. Reliability using G theory is moderate (Φ coefficient = 0.61, G coefficient = 0.64). Performance similar across cases but differs by the particular domain, such that the majority of variance is attributed to the domain. From the study it has been observed that projections in reliability estimates reveal that students need to participate in 3 OSCE cases in order to increase reliability beyond the 0.70 threshold.

Alaki SM, Shinawi LA, [14] has stated about the validity evidence of noncognitive skills of incoming students in the Faculty of Dentistry at King Abdulaziz University using multiple mini-interviews (MMI). Validity evidence in response process, internal structure and relationship to other variables was investigated. Total of 146 students were interviewed by faculty members over a two-day period. which consisted of six objective structure clinical examination (OSCE) stations with two faculty interviewers per station. Each student rotated through the six stations and were asked 4-5 structured questions per station. Each student was rated on a three-point rating scale. The inter-rater reliability was 0.91 which was significantly high (range: 0.87-0.94). The total MMI score for all stations was 73.47 (SD = 8.49) with female students scoring significantly higher than males did ($p < 0.001$).Generalizability results indicated good reliability (Φ-coefficient = 0.73; G-coefficient = 0.75).

Jindal P, Khurana G [15] study was to evaluate the effectiveness of OSCE and compare it to conventional examinations as formative assessment tools in anesthesiology. A cross sectional comparative study was done to evaluate the effectiveness of OSCE as compared to conventional examination as formative assessment tool in anesthesiology in defined population of anesthesiology**.** Thirty-five students appeared for the conventional examination on the 1(st) day and viva voce on the 2(nd) day and OSCE on the last day. At the conclusion of the assessment, all the students were asked to respond to the perception evaluation questionnaire. Then analysis of the perception of OSCE among the students was done. Results showed a positive perception of the objective structured physical examination (OSCE) as well as structured 9 (25.7%), fair 19 (54.2%) and unbiased 13 (37.1%) with more standardised scoring 9 (25.7%). The students perceived OSCE to be less stressful than other examination. Thirty-one (88.5%) students agreed that OSCE is easier to pass than conventional method and 29 (82.5%) commented that the degree of emotional stress is less in OSCE than traditional methods.

Comert M, et al. [16] study aimed at providing an overview of existing rating scales, describing their underlying definition of communication skills, determining the methodological quality of psychometric studies and the quality of psychometric properties of the identified rating scales. The search strategy comprised three databases (EMBASE, PsycINFO, and Pub Med), reference tracking and consultation of experts. The methodological quality of included studies was assessed using the Consensus based Standards for the selection of health status Measurement Instruments (COSMIN) checklist. Data of twelve studies reporting on eight rating scales on communication skills assessment in OSCEs were included.5 of 8 rating scales were explicitly developed based on a specific definition of communication skills. The results reveal that future psychometric evaluation studies focusing on improving the methodological quality are needed in order to yield psychometrically sound results of the OSCEs assessing communication skills.

Denison A et al [17] stated that the Objective Structured Clinical Examination (OSCE) is a cornerstone in healthcare assessment. Examiner-recorded comments were collated from successive first year formative and summative OSCE examinations, with paper-based checklists used in 2012 and iPad-based checklists used in 2013. A total of 558 and 498 examiner-candidate interactions took place in the January. Examiner comments were analyzed for quantity and quality. A tool was developed and validated to assess the quality of the comments left by examiners for use as feedback (Kappa = 0.625).A direct comparison of paper-based checklists and iPad-recorded examinations showed an increase in the quantity of comments left from 41 to 51 % (+ 10 %). Furthermore, there was an increase in the number of comments left for students deemed 'borderline': + 22 %. In terms of the quality of the comments for feedback, there was a significant improvement ($p < 0.001$) between comments left in written-recorded and iPad-recorded examinations. IPad-marked examinations resulted in a greater quantity and quality of examiner comment for use as feedback, particularly for students performing less well, enabling tutors to direct further learning for these students.

Park SE et al [18] study aimed to evaluate whether the objective structured clinical examination (OSCE) and case presentation (CP) as forms of active assessment were effective measures of overall didactic knowledge and clinical performance in a predoctoral dental curriculum. This evaluation was conducted by statistical analysis of quality points (QP) awarded for didactic and clinical performance, CP grades, and OSCE scores for 185 students at Harvard School of Dental Medicine who graduated during the period 2010-14. As part of the requirements for graduation, each student takes three OSCEs and presents two patient cases. Data for the study were obtained from the Office of the Registrar. However, there was a correlation between OSCE scores and QP. Students with honors-level scores on any of the three OSCEs received significantly more QP than students who did not receive honors. Innovative formats of active assessment such as OSCEs and CPs can promote a student-centered learning environment. These data indicated that, within this study population, there was a positive association between OSCE scores and

clinical and didactic performance, supporting the value of OSCEs as a means of assessment.

Humphrey-Murto, et al [19] stated that for feedback to be effective, it should include direct observation, assessment of performance, provision of feedback, decision making. Specifically, the purpose of this study was to (a) determine the amount and the accuracy of feedback that trainees remember immediately after an OSCE, as well as 1 month later, and (b) assess whether prompting immediate recall improved delayed recall. Internal medicine residents received 2 minutes of verbal feedback from physician examiners in the context of an OSCE. Residents were randomly allocated to the immediate recall group (immediate-RG; n = 10) or the delayed recall group (delayed-RG; n = 8). The immediate-RG completed a questionnaire prompting recall of feedback received immediately after the OSCE, and then again 1 month later. The total number and accuracy of feedback points provided by examiners were compared to the points recalled by residents. Results comparing recall at 1 month between the immediate-RG and the delayed-RG were also studied. Physician examiners provided considerably more feedback points (M = 16.3) than the residents recalled immediately after the OSCE (M = 2.61, $p < .001$). There was no significant difference between the number of feedback points recalled upon completion of the OSCE compared to 1 month later (M = 1.96, p = .06, Cohen's d = .70). The feedback points that are recalled are neither very accurate nor representative of the feedback actually provided.

Brennan PA et al [20] stated that despite standardizing the procedures, the variation including examiner scoring, can occur which may affect reliability. In study of a high-stakes UK postgraduate surgical OSCE,& investigated whether examiners changing stations once during a long examining day affected marking, reliability, and overall candidates scores compared with examiners who examined the same scenario all day. An observational study of 18,262 examiner-candidate interactions from the UK Membership of the Royal College of Surgeons examination was carried at 3 Surgical Colleges across the United Kingdom. Scores between examiners were compared using analysis of variance. Examination reliability was

assessed with Cronbach's alpha. A significant difference was found in absolute scores differences awarded in the morning and afternoon sessions between examiners who changed stations at lunchtime and those who did not ($p < 0.001$). No significant differences were found for the main effects of either broad content area ($p = 0.290$) or station content area ($p = 0.450$). The reliability of each day was not affected by examiner switching ($p = 0.280$). Overall, no difference was found in z-score distribution of total candidate scores and categories of examiner switching. This large study has found that although the range of marks awarded varied when examiners change OSCE stations, examination reliability and the likely candidate outcome were not affected.

5. Objectives

- To do statistical analysis of the scores of the 6 centers of OSCE examination.
- To compare the results of the various examination centers.
- To measure the correlation of OSCE stations by calculating the Coefficient of correlation across observed stations.
- To assess the performance and perception of the candidates of anesthesiology through feedback taken after the OSCE (Objective Structured Clinical Examination).

6. Research Questions

- What correlation should we expect on average when we develop an OSCE?
- What is the likely range of such values?
- What factors appear to influence the expected correlation?

7. Methodology

a. Study Area: 6 Centers of OSCE examination

b. **Study Design:** Cross sectional study

c. **Sample size:** Total 524 candidates who participated in the OSCE in anesthesiology.

d. **Source of Data:** Database of marks scored by candidates in OSCE & the feedback forms administered to candidates after examination.

e. **Tools & Techniques:** Feedback forms administered to candidates after examination.

Microsoft excels & SPSS 16 for analysis of data.

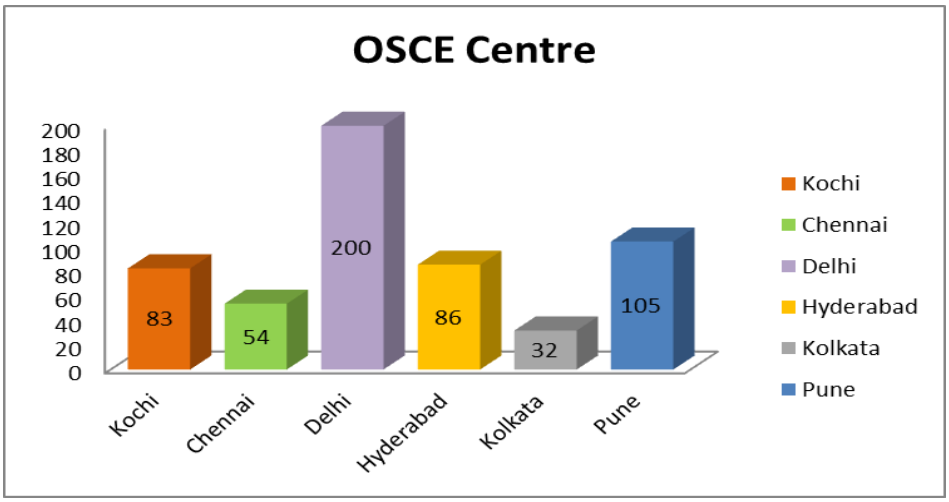
8. MATERIALS AND METHODS

For this descriptive evaluative study, 20 different skills relevant to practice of Anesthesiology were selected. Then, 524 students performed these skills at 28 different OSCE stations, during which experienced assessors evaluated their performance. The instruments used for data collection were learning behavior checklists in question stations and multiple choice tests in question stations. Finally, the correlation between OSCE scores and the mean theoretical and clinical performance scores of students was calculated. Meanwhile, the correlation between the total OSCE scores with OSCE score of each station was determined. Assessor's reliability (correlation between scores reported by assessors at each station) was also calculated.

A detailed, structured questionnaire consisting of 12 questions was given to the each candidate at the end of the examination. The questionnaires were collected immediately after being filled up. Suggestions were also sought regarding the improvement of the OSCE and its implementation in their discipline.

9. Study Findings:

Figure 9.1 Distribution of candidates across all centres



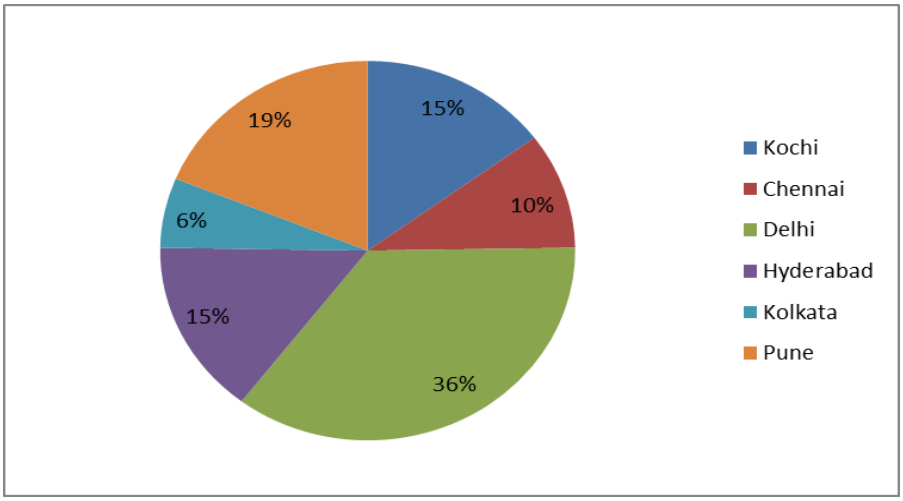


Table 9.1: Table showing distribution of candidates across all centres

Kochi	**83**	**15%**
Chennai	**54**	**10%**
Delhi	**200**	**36%**
Hyderabad	**86**	**15%**
Kolkata	**32**	**6%**
Pune	**105**	**19%**

Figure 9.2 Statistical analysis of Chennai OSCE centre

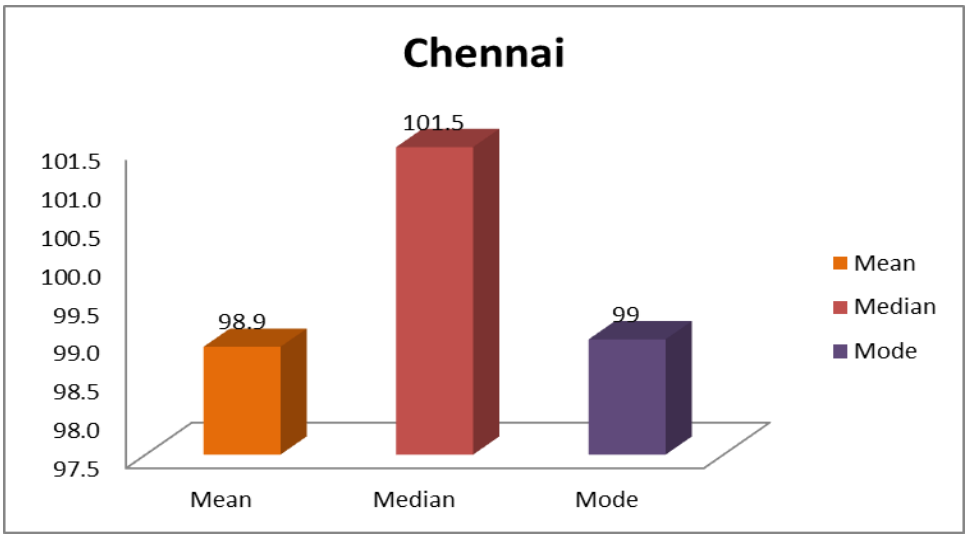


Table 9.2.1 Table showing results of analysis of Chennai OSCE centre

Chennai	
Mean	**98.9**
Median	**101.5**
Mode	**99**

Figure 9.3 Statistical Analysis of Delhi OSCE centre

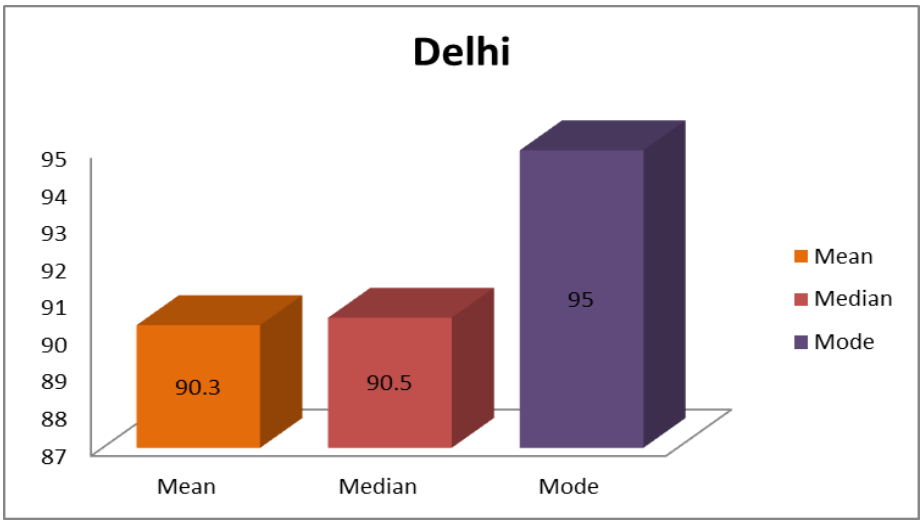


Table 9.3.1 Table showing results of analysis of Delhi OSCE centre

Delhi	
Mean	**90.3**
Median	**90.5**
Mode	**95**

Figure9.4: Statistical analysis of Hyderabad OSCE centre

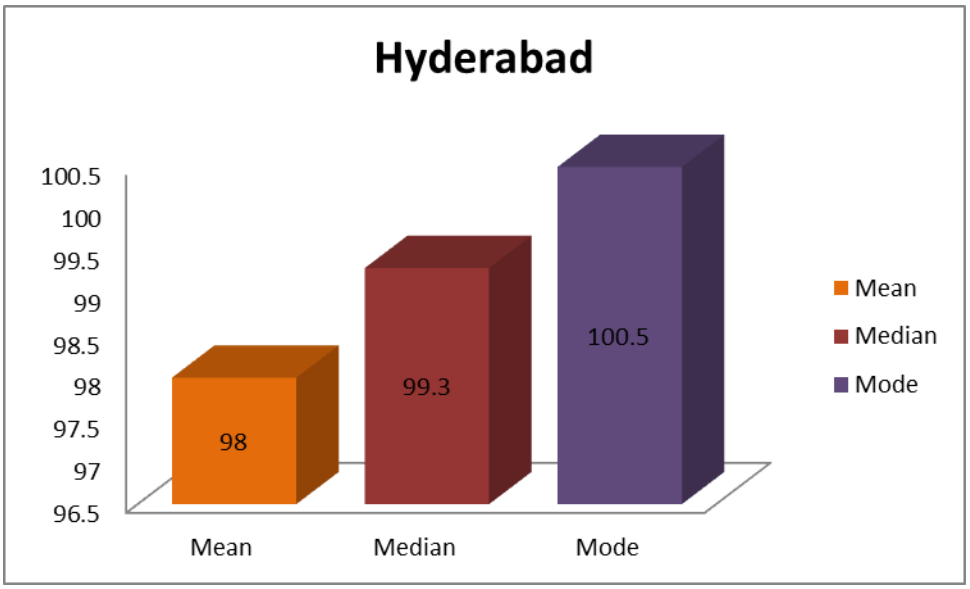


Table 9.4.1: Table showing results of analysis of Hyderabad OSCE centre

Hyderabad	
Mean	**98**
Median	**99.3**
Mode	**100.5**

Table 9.5: Statistical analysis of Kochi OSCE centre

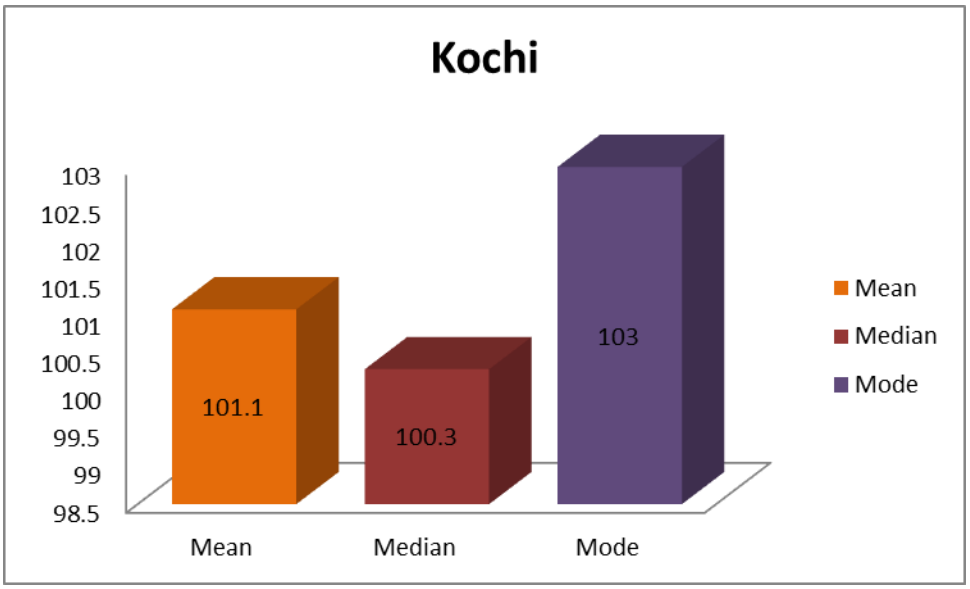


Figure 9.5.1 Table showing results of analysis of Kochi OSCE centre

Kochi	
Mean	**101.1**
Median	**100.3**
Mode	**103**

Figure 9.6 : Statistical analysis of Pune OSCE centre

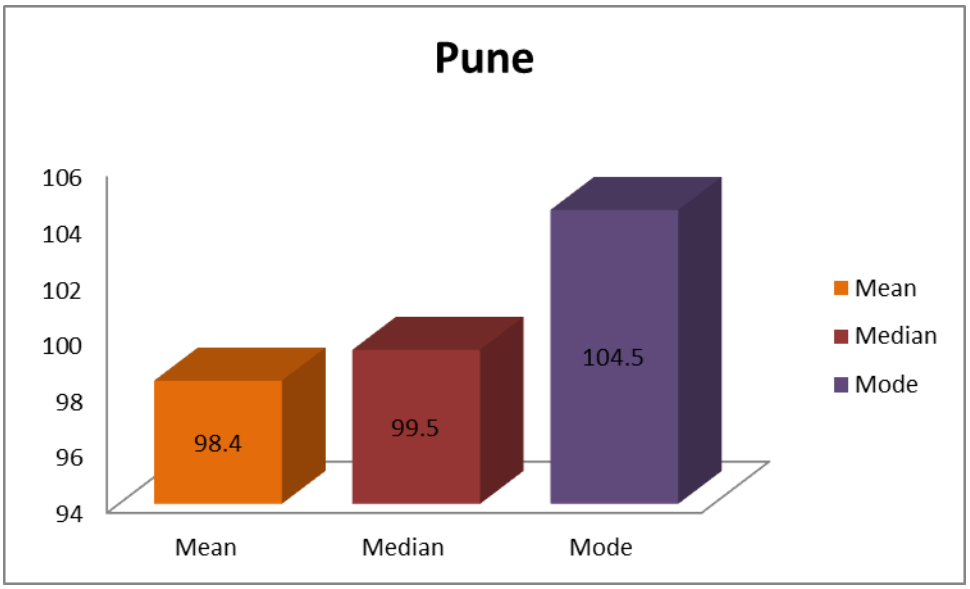


Figure 9.6.1: Table showing results of analysis of Pune OSCE centre

Pune	
Mean	**98.4**
Median	**99.5**
Mode	**104.5**

Figure 9.7: Statistical analysis of West Bengal OSCE centre

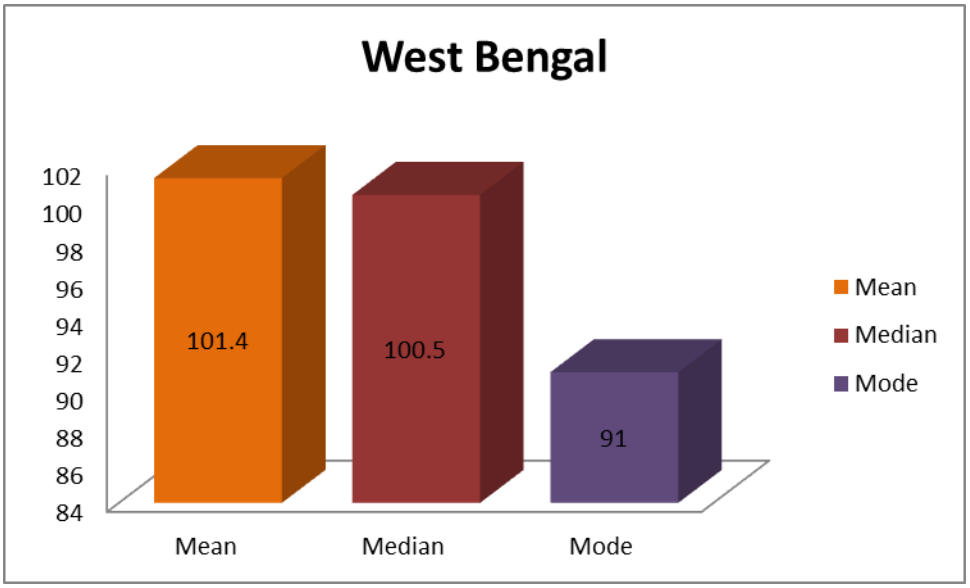
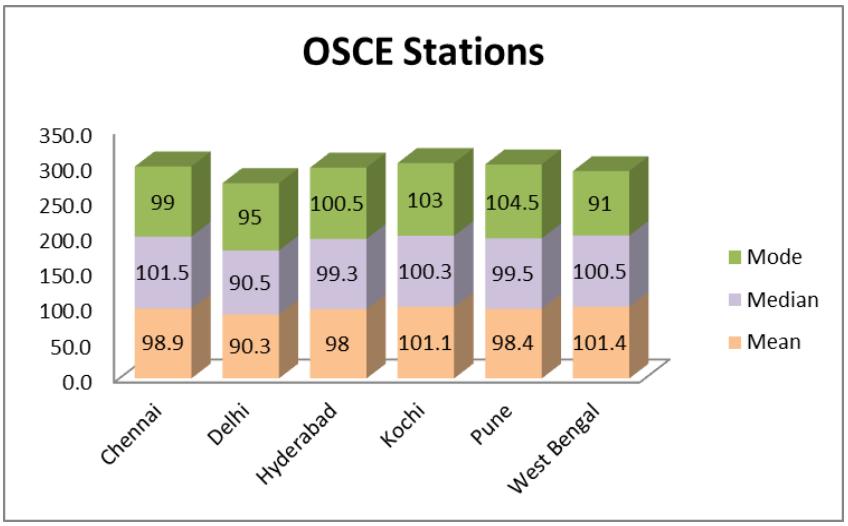
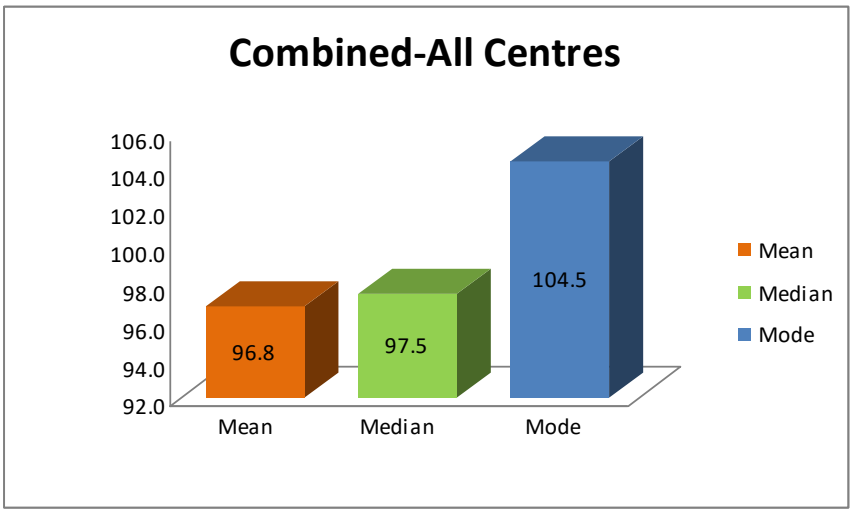


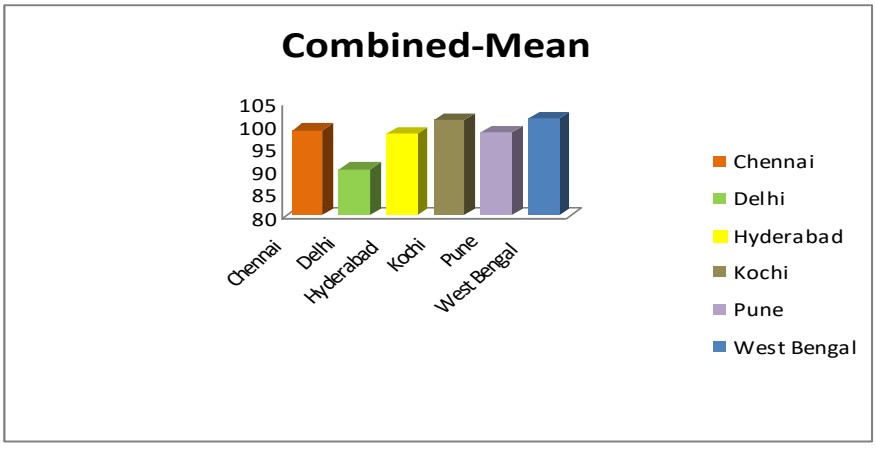
Table 9.7: Table showing results of analysis of West Bengal OSCE centre

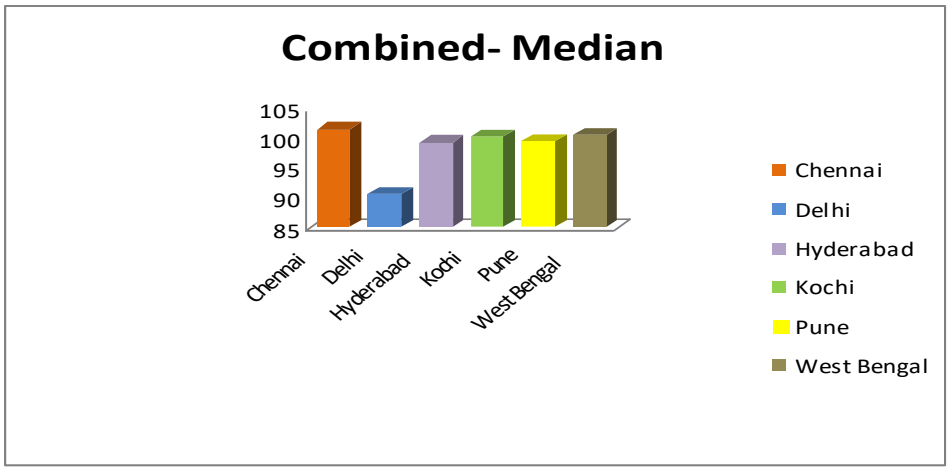
West Bengal	
Mean	**101.4**
Median	**100.5**
Mode	**91**

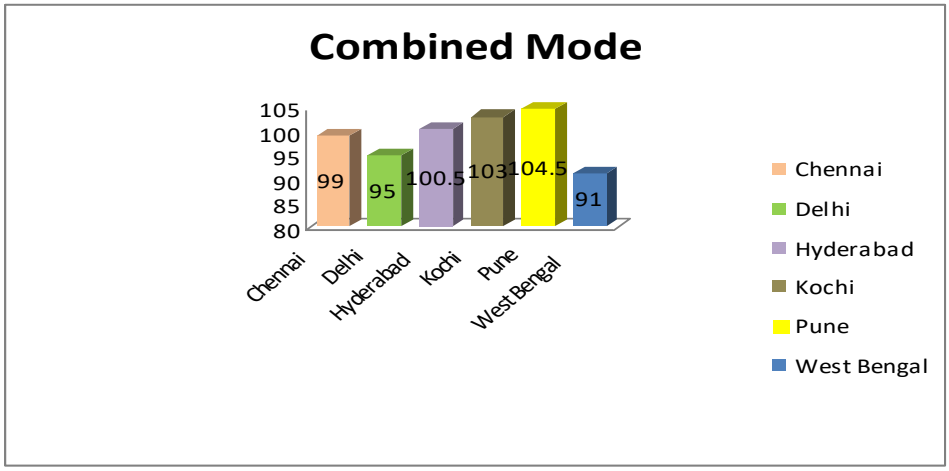
Figure 9.8: Statistical analysis of all centres of OSCE Examination









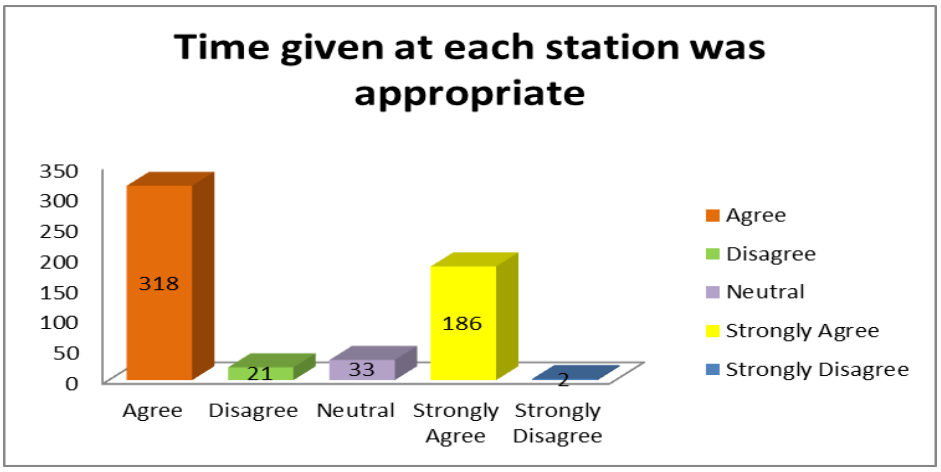


<u>Table 9.8.1</u>: Table showing results of analysis of all centres of OSCE Examination

	Chennai	Delhi	Hyderabad	Kochi	Pune	West Bengal
Mean	**98.9**	**90.3**	**98**	**101.1**	**98.4**	**101.4**
Median	**101.5**	**90.5**	**99.3**	**100.3**	**99.5**	**100.5**
Mode	**99**	**95**	**100.5**	**103**	**104.5**	**91**

Data Interpretation of Feedback Responses:

Figure 9.9: Responses of candidates regarding time given at each station



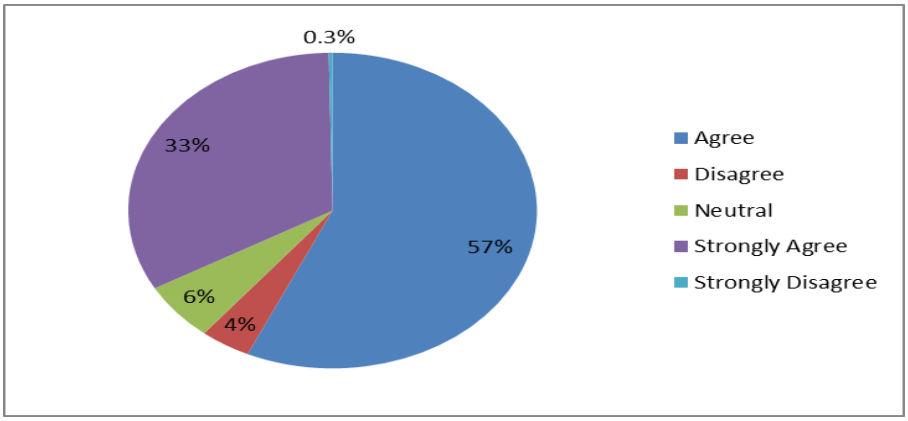
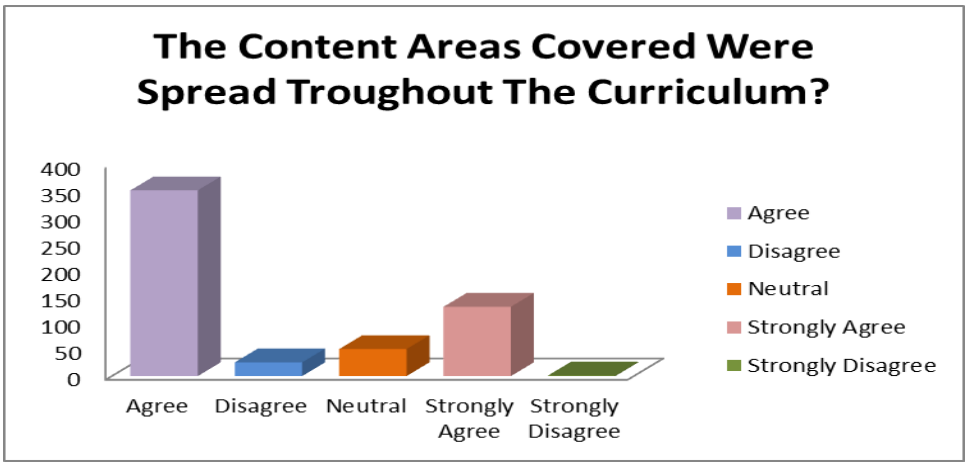


Table 9.9.1: Percentage Distribution of responses of candidates

Agree	**318**	**57%**
Disagree	**21**	**4%**
Neutral	**33**	**6%**
Strongly Agree	**186**	**33%**
Strongly Disagree	**2**	**0.3%**

Figure 9.10: Responses of candidates regarding whether the content areas were spread throughout curriculum



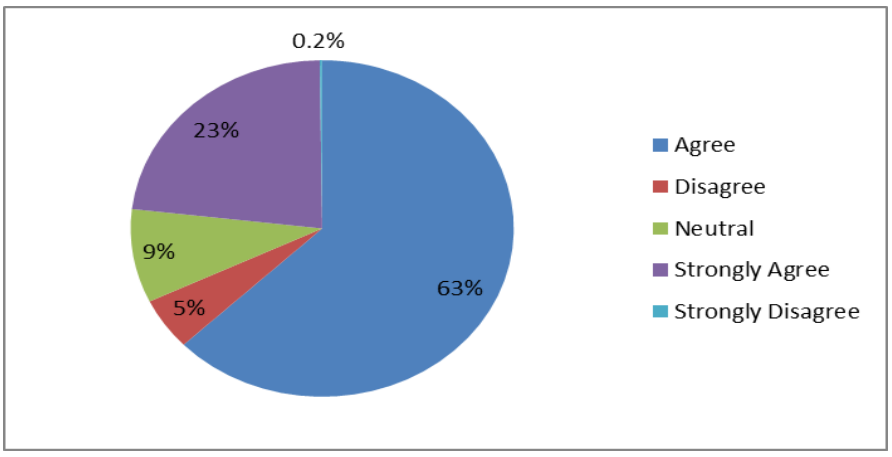
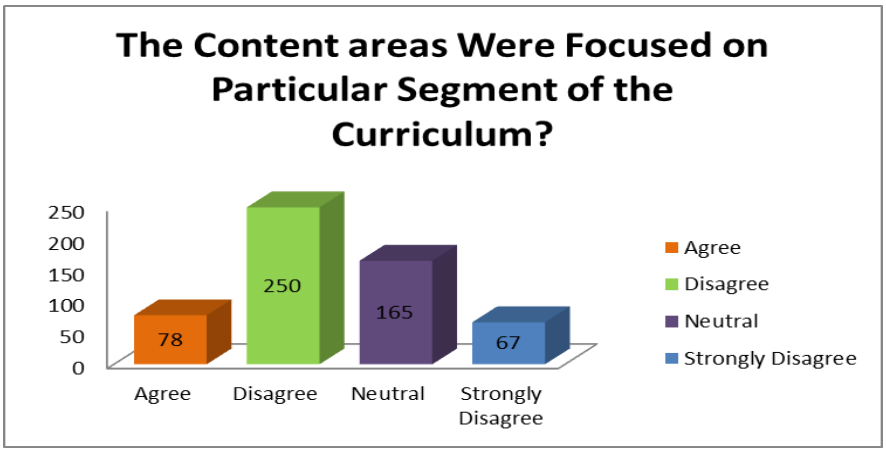


Table 9.10.1: Percentage Distribution of responses of candidates

Agree	**351**	**63%**
Disagree	**26**	**5%**
Neutral	**51**	**9%**
Strongly Agree	**131**	**23%**
Strongly Disagree	**1**	**0.2%**

Figure 9.11 Perception of candidates whether content areas were focused on particular segment of the curriculum.



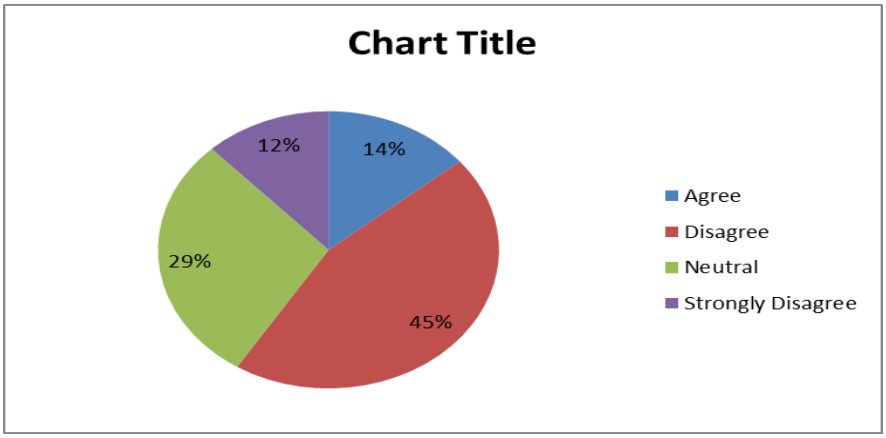
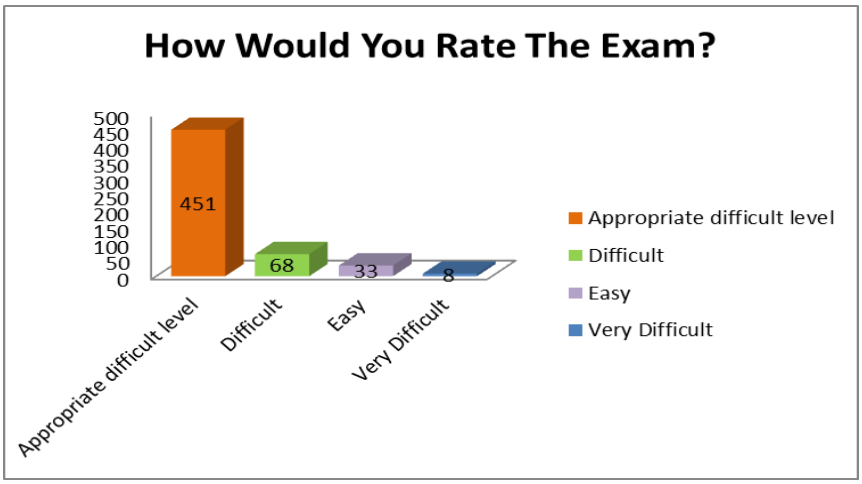


Table 9.11.1 Percentage Distribution of responses of candidates

Agree	**78**	**14%**
Disagree	**250**	**45%**
Neutral	**165**	**29%**
Strongly Disagree	**67**	**12%**

Figure 9.12: Responses of candidates on how would they rate the exam



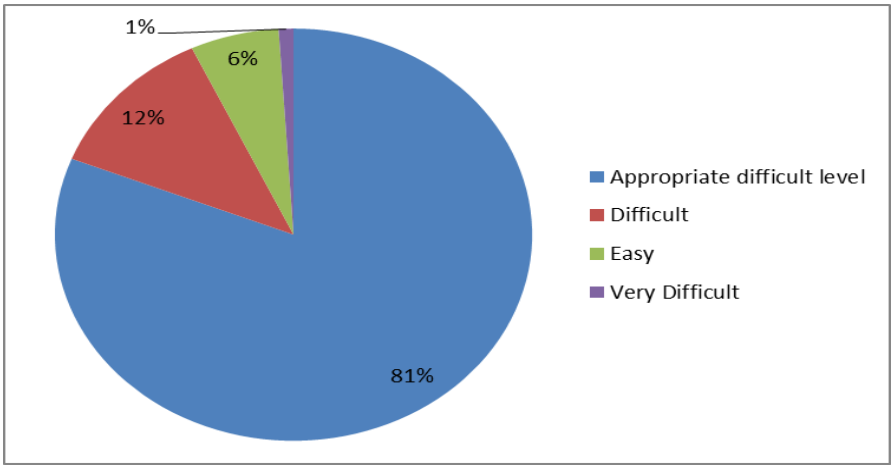
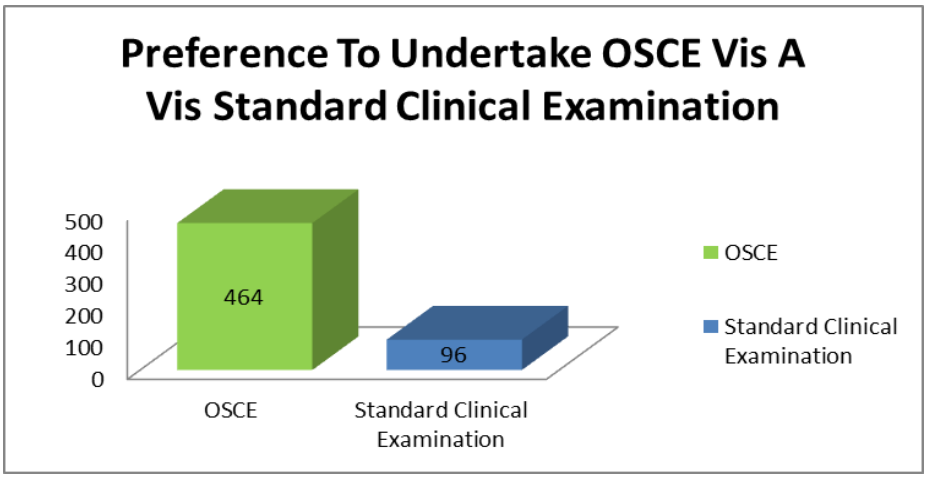


Table 9.12.1:Percentage Distribution of responses of candidates

Appropriate difficult level	**451**	**81%**
Difficult	**68**	**12%**
Easy	**33**	**6%**
Very Difficult	**8**	**1%**

Figure 9.13: Responses regarding preference of OSCE Vis a Vis Standard Clinical Examination



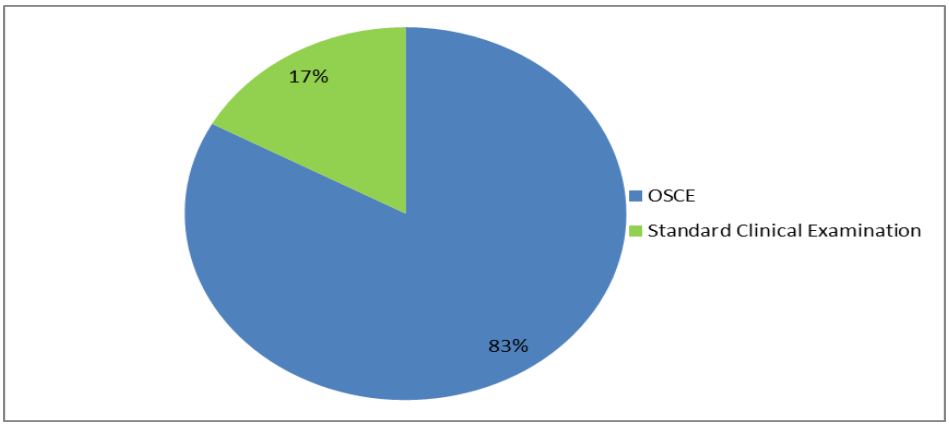
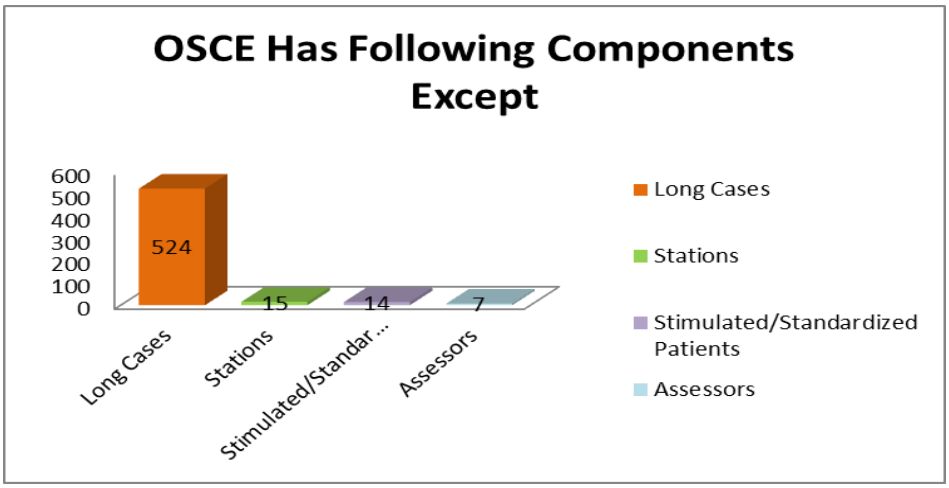


Table 9.13.1: Percentage distribution of responses of candidates

OSCE	**464**	**83%**
Standard Clinical Examination	**96**	**17%**

Figure 9.14: Responses of candidates for OSCE has following components except:



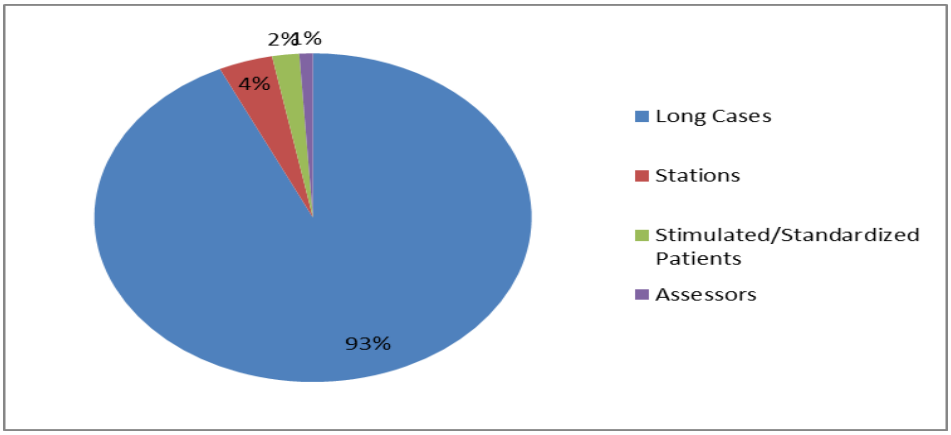
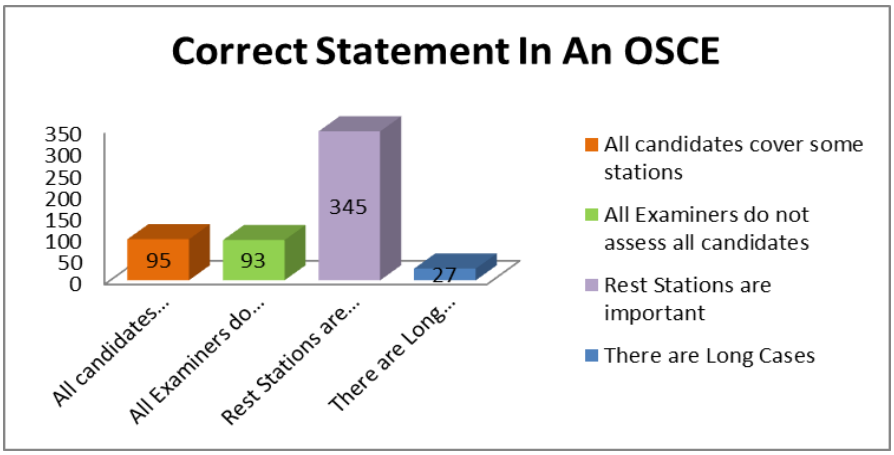


Table 9.14.1: Percentage distribution of responses of candidates

Long Cases	**524**	**93%**
Stations	**15**	**4%**
Stimulated/Standardized Patients	**14**	**2%**
Assessors	**7**	**1%**

Figure 9.15: Responses of candidates regarding correct statement in an OSCE



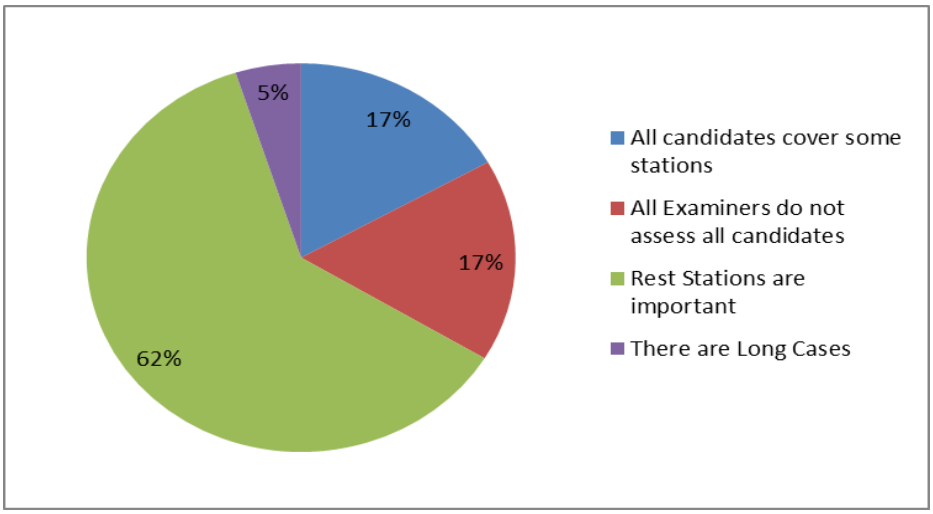


Table 9.15.1:Percentage distribution of responses of candidates

All candidates cover some stations	**95**	**17%**
All Examiners do not assess all candidates	**93**	**17%**
Rest Stations are important	**345**	**62%**
There are Long Cases	**27**	**5%**

Data Interpretation For Correlation:

Figure 9.16: Graph of Correlation between Station-4 & Total Score

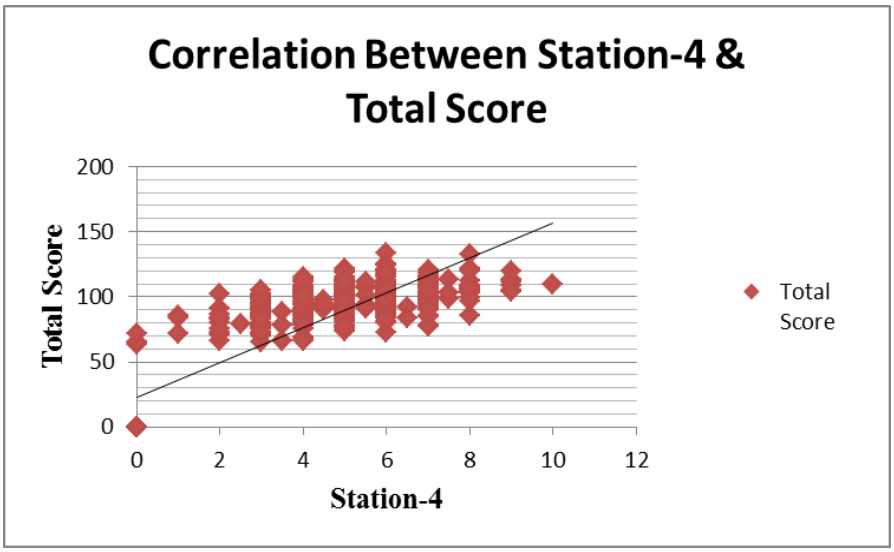


Table 9.16.1: Table showing value of coefficient of correlation between Station-4 & Total Score

	S 4	*Total Score*
S 4	**1**	**0.85187**
Total Score	**0.85187**	**1**

Figure 9.17: Graph of correlation between Station- 9 & Total score

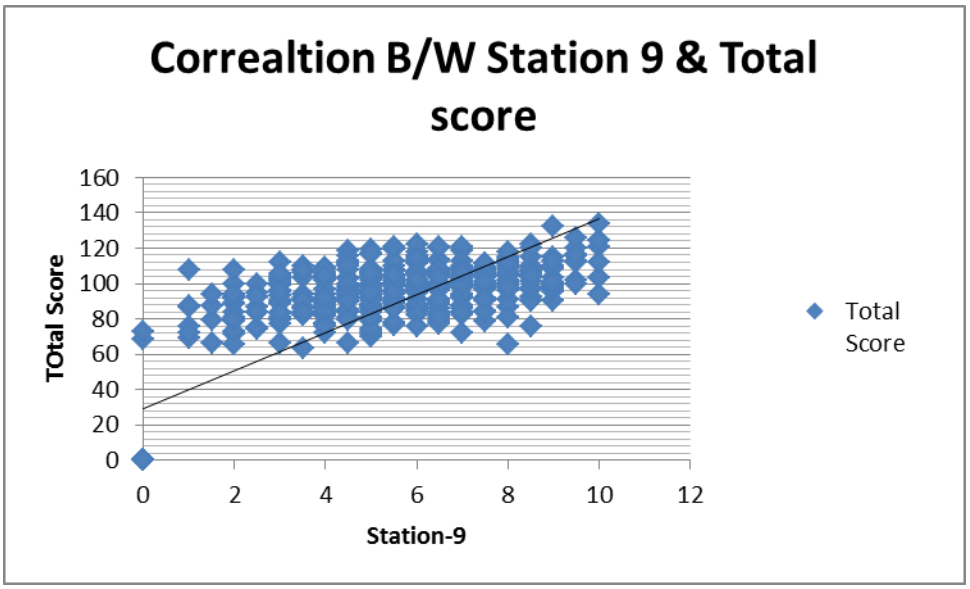


Figure 9.17.1: Table showing value of coefficient of correlation between Station-9 & Total Score

	S 9	*Total Score*
S 9	**1**	**0.80973**
Total Score	**0.80973**	**1**

Figure 9.18: Graph of correlation between Station-16 & Total score

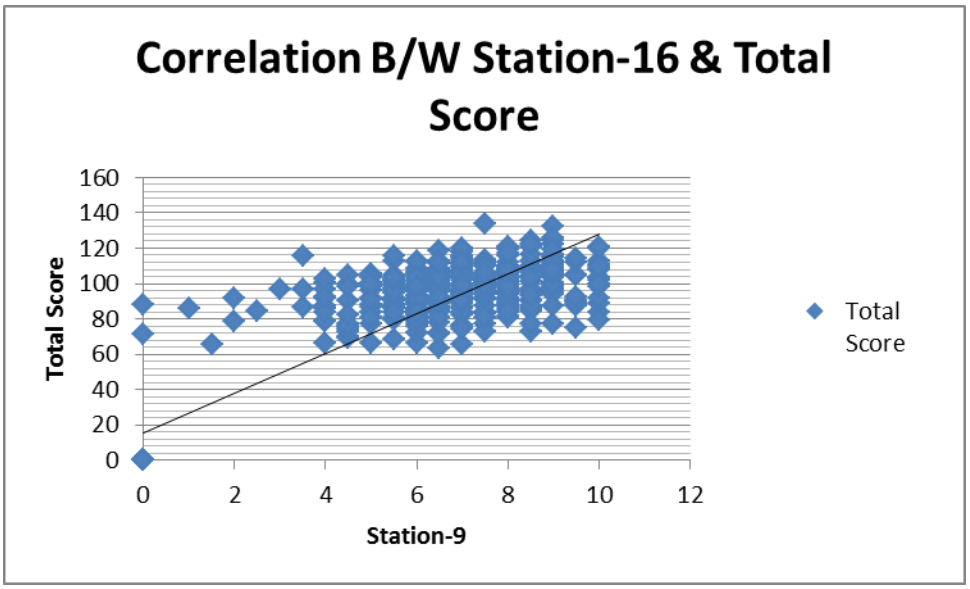


Table 9.18: Table showing value of coefficient of correlation between Station-16 & Total Score

	S 16	*Total Score*
S 16	**1**	**0.88812**
Total Score	**0.88812**	**1**

Figure 9.19: Graph of correlation between Station-23 & Total score

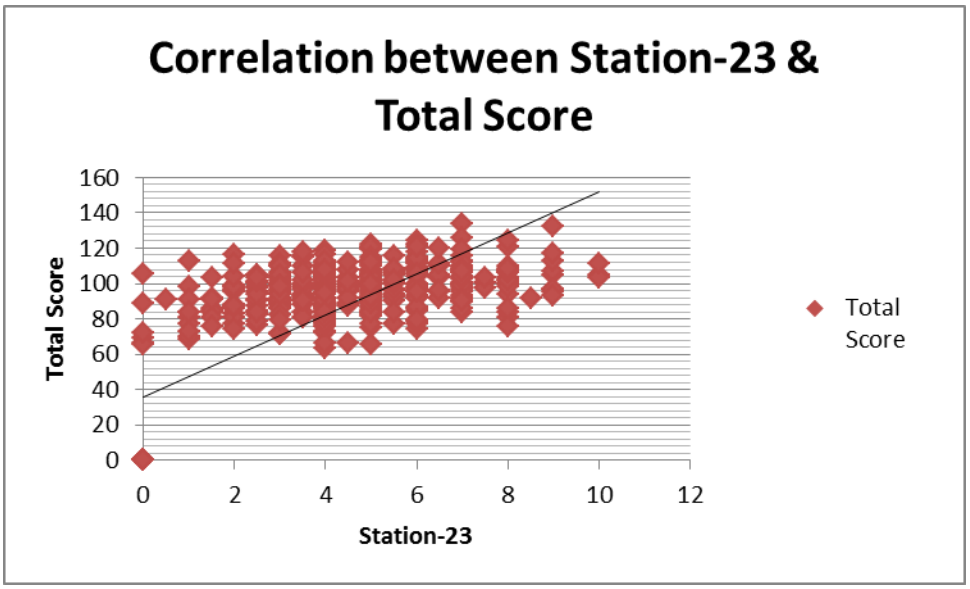


Table 9.19.1: Table showing value of coefficient of correlation between Station-23 & Total Score

	S 23	*Total Score*
S 23	**1**	**0.74773**
Total Score	**0.74773**	**1**

10. Results :

The study results are as follows:

- From Figure 9.1 it was inferred that Delhi had highest i.e 36% candidates while Kolkata had least number of candidates i.e 6% in OSCE.
- From Figure 9.2 it was inferred that at Chennai Centre, the total of 54 candidates participated in the OSCE Examination and the analysis gives mean value of 98.9, the median value of 101.5 and the mode value of 99.
- From Figure 9.3 it was inferred that at Delhi Centre, total 162 candidates participated in the OSCE Examination, and the analysis gives the mean value of 90.3, the median value of 90.5 and the mode value of 95.
- From Figure 9.4 it was inferred that at Hyderabad Centre, total 113 candidates participated in the OSCE Examination, the analysis gives the mean value of 98, the median value of 99.3 while the mode value of 100.5.
- From Figure 9.5 it was inferred that at kochi centre, total 85 candidates participated in the OSCE Examination, the analysis gives the mean value of 101.1, the median value of 100.3 and the mode value of 103.
- From Figure 9.6 it was inferred that at Pune Centre, total 84 candidates participated in the OSCE Examination, the analysis gives the mean value of 98.4, the median value of 99.5 and the mode value of 104.5.
- From Figure 9.7 it was inferred that at West Bengal Centre, total 26 candidates participated in the OSCE examination, the analysis gives the mean value of 101.4, the median value of 100.5 and the mode value of 91.
- From Figure 9.8 it was inferred that the mean value is highest for the West Bengal Centre i.e. 101.4 followed by the Kochi centre, and the median value is also highest for the West Bengal centre i.e 100.5 followed by the Chennai centre, while the mode value is highest for the Pune Centre i.e 104.5 followed by the Kochi centre.

- From Figure 9.9 it was inferred that 90% candidates felt that the time given at each OSCE Station was appropriate, while 6 % candidates felt that average time was given at each station and 4.3% felt that the time given at each station was inappropriate.

- From Figure 9.10 it was inferred that 86 % of the candidates felt that the content areas covered were spread throughout the curriculum, 9% of the candidates felt that the average content areas were spread throughout the curriculum and the 5.2 % candidates disagreed.

- From Figure 9.11 it was inferred that 14% of the candidates felt that the content areas were focused on a particular segment of the curriculum, 29% candidates felt average about it and the 57% of the candidates disagreed that the content areas were focused on a particular segment of the curriculum.

- From Figure 9.12 it was inferred that 81% candidates felt that the exam was of appropriate difficult level,13% candidates felt that the exam was of difficult level while 6% candidates felt that exam was easy.

- From Figure 9.13 it was inferred that 83% candidates felt that they would prefer OSCE and 17 % candidates felt that they would prefer Standard clinical examination.

- From Figure 9.14 it was inferred that 93% candidates felt that there were no long cases in the examination, 4% candidates felt that there were no stations, 2% candidates felt that there were no standardized patients and 1% felt that there were no assessors in the examination.

- From Figure 9.15 it was inferred that 62% candidates felt that rest stations were important, 17% candidates felt that all candidates cover some stations and 5% candidates felt that there were long cases.

- From Figure 9.16 it was inferred that the value of correlation coefficient was 0.85187 which signified that there was strong positive correlation between Station 4 and total score. As variable Station 4 increases, variable Total score increases.

- From Figure 9.17 it was inferred that the value of correlation coefficient was 0.80973 which signified that there wass strong positive correlation between Station 9 and total score. As variable Station 9 increases, variable Total score

increases.

- From Figure 9.18 it was inferred that the value of correlation coefficient was 0.88812 which signified that there was strong positive correlation between Station 16 and total score. As variable Station 16 increases, variable Total score increases.

- From Figure 9.19 it was inferred that the value of correlation coefficient was 0.74773 which signified that there was strong positive correlation between Station 23 and total score. As variable Station 23 increases, variable Total score increases.

11. Discussion:

The primary objectives of this study were to measure the reliability of the OSCE stations by calculating the coefficient of correlation among observed stations and to assess the perception of the students regarding objective structured clinical examination.

Earlier researches [12,16]suggests that OSCE is more effective as compared with the conventional examination and statistics reveals that the candidates have a positive perception towards OSCE. They perceived it less stressful than the other examinations. The correlation value lies between 0.7 to 0.9 which indicated good stability and consistency.

The results revealed that the perception of candidates regarding OSCE is same as perceived by the earlier studies i.e OSCE is more beneficial than the conventional clinical examination and candidates were satisfied after giving this examination. And they also felt that the time given at each station was appropriate. And there is strong correlation across the observed stations as value lies between 0.7 to 0.9.

12. Limitations of Study

- Study was conducted only in the one discipline i.e of anesthesiology.
- There were technical limitations associated with the OSCE.
- Standardized patients are used in the place of real patients.

13. Conclusion

Study result suggests that large proportion of the candidates feels that the OSCE-Objective Structured Clinical Examination is more beneficial than the conventional clinical examination and is satisfied after giving this examination. And they also feel that the time given at each station was appropriate.

Thus there is a necessity to conduct the OSCE so as to assess and evaluate the cognitive, emotional and psychomotor aspects of clinical students. The residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals. It is better to judge on residents communication skills by some specially designed OSCE stations.

It has been analyzed by the research available that the topic of communication skills is still not given sufficient weightage in formal student assessments. That is why residents could easily compensate for low score of their poor communication skills with good scores of their other competencies to successfully pass the exams. It should be considered as a top educational priority, and to focus on its up-coming impacts on health system in medical faculties.

13.1 Recommendations

- An OSCE is considered less stressful to students than previous examination experiences. So it should be conducted in all the disciplines.
- To train SP'S in the issues of encounter and ensure they don't provide any information unless the person being assessed requests it.
- SP encounters or tasks requiring interpretations of clinical information must be provided at separate stations.
- Separate performance scores should be generated for the task at each station based on input from the SP, the person being assessed, and the assessor.
- It can be cost effective only when many individuals are examined at one administration.
- Attention needs to be paid to increasing the feasibility of this high fidelity assessment methodology.

14. Instrumentation

OSCE STUDENT FEEDBACK FORM

Form Description

(i) Name

(ii) Hospital/ Institution Name

(iii) Year

a) 1st Year
b) 2nd Year
c) 3rd Year

(iv) OSCE Centre
a) Delhi
b) Chennai
c) Hyderabad
d) Kolkata
e) Kochi
f) Pune

(v) What is OSCE?
a) Objectively Suited Clinical Environment
b) Objectively Suited Classroom Environment
c) Objective Structured Clinical Examination
d) Objective Structured Classroom Environment

(vi) OSCE has the following components except:
a) Stations
b) Assessors
c) Stimulated/ Standardized patients
d) Long cases

(vii) Which of the following is a correct statement in an OSCE:
a) All examiners do not assess all candidates.
b) All candidates cover some stations.
c) Rest stations are important.
d) There are long cases.

(viii) The time given at each station was appropriate?
a) Strongly Agree
b) Agree

c) Neutral
d) Disagree
e) Strongly disagree

(ix) The content areas covered were spread throughout the curriculum?
a) Strongly Agree
b) Agree
c) Neutral
d) Disagree
e) Strongly Disagree

(x) The content areas were focused on a particular segment of the curriculum?
a) Strongly Disagree
b) Disagree
c) Neutral
d) Agree
e) Strongly Disagree

(xi) How would you rate the exam?
a) Very Easy
b) Easy
c) Appropriate Difficulty level
d) Difficult
e) Very difficult

(xii) Your preference to undertake OSCE vis a vis Standard clinical examination?
a) OSCE
b) Standard Clinical Examination

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