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"Effectiveness of Objective Structured Clinical Examination (OSCE) versus Traditional Clinical Examination (TCE) on Clinical Knowledge and Clinical Skill Competence Regarding Tracheostomy Care among Undergraduate Nursing Students"

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ABSTRACT

Background

Clinical competence is an essential component of nursing education, as undergraduate nursing students must acquire adequate knowledge and psychomotor skills to provide safe and effective patient care. Accurate and objective assessment of clinical competence is therefore important. Traditional Clinical Examination (TCE) may be influenced by examiner subjectivity and variation in clinical exposure. Objective Structured Clinical Examination (OSCE) provides a standardized and structured approach for assessing clinical performance.

Aim

To compare the effectiveness of Objective Structured Clinical Examination (OSCE) and Traditional Clinical Examination (TCE) in assessing clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students.

Methods

A quantitative evaluative comparative study was conducted using a true experimental post-test-only control group design. The study included **220 third- and fourth-year B.Sc. Nursing students** from selected nursing institutions in Bhopal, Madhya Pradesh. Participants were equally divided into an OSCE group (n=110) and a TCE group (n=110). Clinical knowledge was assessed using a structured knowledge questionnaire, while clinical skill competence in tracheostomy care was evaluated using a structured observational checklist. Students in the OSCE group also provided their opinions regarding the assessment method. Descriptive and inferential statistics were used for data analysis.

Results

The OSCE group demonstrated significantly higher clinical knowledge than the TCE group, with overall scores of **91.10% and 65.18%**, respectively (**$p < 0.001$**). Clinical skill performance was also substantially higher in the OSCE group (**94.80%**) than in the TCE group (**51.56%**), with the difference being statistically highly significant (**$p < 0.001$**). A moderate positive correlation was observed between clinical knowledge and clinical skill competence in the OSCE group, while a poor positive correlation was found in the TCE group. Most students (**79.09%**) reported a high level of satisfaction with OSCE and perceived it as a fair, objective, and effective method of clinical assessment.

Conclusion

OSCE was significantly more effective than TCE in assessing clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students. Its standardized structure and objective assessment criteria can minimize examiner-related variation and provide a more consistent evaluation of clinical performance. Integration of OSCE into undergraduate nursing education may strengthen competency-based clinical assessment and improve students' preparedness for safe clinical practice.

KEYWORDS: *Objective Structured Clinical Examination; Traditional Clinical Examination; Clinical Competence; Clinical Knowledge; Clinical Skill; Tracheostomy Care; Nursing Students; Nursing Education.*

INTRODUCTION

Nursing is a practice-oriented profession in which the quality and safety of patient care depend greatly on the knowledge, clinical judgment, technical skills, and competence of nurses. Undergraduate nursing education therefore has an important responsibility to prepare students to perform clinical procedures accurately, safely, and confidently before entering professional practice. Clinical education provides nursing students with opportunities to integrate theoretical knowledge with psychomotor and interpersonal skills; however, the effectiveness of clinical learning largely depends on the quality and appropriateness of the methods used to assess students' competence.

Clinical evaluation is an essential component of nursing education. It is a systematic process of determining the extent to which students have achieved predetermined learning objectives and acquired the knowledge and skills required for professional practice. Effective clinical assessment should be valid, reliable, objective, fair, standardized, feasible, and acceptable to both students and examiners. It should not merely determine whether a student has completed a procedure but should also assess the accuracy of performance, clinical reasoning, communication, patient safety, infection prevention, and appropriate decision-making.

Assessment of clinical competence is particularly challenging because nursing students may have unequal opportunities to perform procedures during their clinical placements. Differences in patient availability, clinical settings, faculty supervision, case exposure, and examiner expectations may influence students' performance. Traditional Clinical Examination (TCE) is commonly used to assess practical skills; however, it may be affected by examiner subjectivity, variation in clinical situations, inconsistent patient conditions, and differences in the procedures selected for individual students. Such variations may reduce the objectivity and comparability of clinical assessment.

The Objective Structured Clinical Examination (OSCE) was developed as a structured performance-based assessment method to provide a more objective and standardized approach to evaluating clinical competence. In an OSCE, students rotate through a series of predetermined stations, with each station designed to assess specific knowledge, psychomotor skills, communication abilities, clinical judgment, or problem-solving competencies. Standardized instructions, predetermined time limits, structured checklists, and clearly defined assessment criteria allow students to be evaluated under comparable conditions.

Consequently, OSCE can reduce examiner bias and improve the consistency and transparency of clinical assessment.

Tracheostomy care is an important nursing procedure that requires adequate theoretical knowledge, technical competence, adherence to infection-prevention principles, and careful observation of the patient's condition. Nurses caring for patients with a tracheostomy must be competent in maintaining airway patency, assessing the tracheostomy site, performing suctioning, cleaning and replacing the inner cannula, changing sterile dressings and tracheostomy ties, maintaining aseptic technique, recognizing complications, and accurately documenting care. Inadequate performance of these procedures can compromise airway safety and may lead to serious complications. Therefore, assessment of nursing students' competency in tracheostomy care requires an evaluation method capable of assessing both knowledge and actual procedural performance.

OSCE provides an opportunity to assess different components of tracheostomy care systematically through standardized clinical stations. Each student can be evaluated using the same instructions and objective criteria, allowing specific components of the procedure to be assessed individually. This approach may provide a more comprehensive picture of students' clinical competence than conventional practical examinations. Furthermore, students' perceptions and satisfaction with OSCE are important because acceptance of an assessment method can influence their engagement, preparation, confidence, and learning experience.

Competency-based nursing education emphasizes the development and assessment of measurable knowledge, skills, attitudes, clinical judgment, and safe professional practice. Therefore, nursing educators require assessment strategies that accurately demonstrate whether students are prepared to provide safe and effective patient care. Integrating structured clinical assessment methods such as OSCE into undergraduate nursing education may strengthen the evaluation of psychomotor skills and support a more consistent and objective assessment process.

In view of the importance of accurate clinical assessment and the critical nature of tracheostomy care, the present study was undertaken to compare the effectiveness of Objective Structured Clinical Examination with Traditional Clinical Examination in assessing clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students. The study also assessed students' opinions regarding OSCE as a method of clinical evaluation. The findings may provide useful evidence for nursing educators and institutions in selecting appropriate, standardized, and competency-based methods for evaluating clinical performance.

REVIEW OF LITERATURE

Studies Related to Knowledge Regarding Tracheostomy Care Among Staff Nurses

Dhaliwal, Choudhary and Sharma (2018)

Dhaliwal, Choudhary and Sharma conducted a descriptive study entitled **"A Descriptive Study to Assess the Knowledge and Skills on Tracheostomy Care among Staff Nurses Working in Selected Hospitals of District Mohali, Punjab."** The study included **100 staff nurses** selected through convenient sampling. A structured knowledge questionnaire and an observational checklist were used to assess knowledge and skills related to tracheostomy care.

The study revealed that **57% of staff nurses had average knowledge and 43% had good knowledge** regarding tracheostomy care. Regarding skills, **44% demonstrated fair skills and 56% demonstrated good skills**. A weak positive correlation was found between knowledge and skills (r = 0.198). Knowledge was significantly associated with age, total work experience, present area of work and previous educational programmes related to tracheostomy care. The authors concluded that regular educational programmes are important for improving nurses' knowledge and skills.

4. El-Sadig Eltaher Abdulrahman et al. (2021) [1]

Abdulrahman and colleagues conducted a quasi-experimental study entitled **"Effect of an Educational Training Program in Tracheostomy Care on Nurses' Knowledge and Skills."** The study was conducted at Sinnar Teaching Hospital and aimed to evaluate nurses' knowledge and skills regarding tracheostomy care and determine the effectiveness of an educational training programme.

The study used a **one-group quasi-experimental design**. Nurses' knowledge and practical skills were assessed before and after the educational programme. The intervention focused on important aspects of tracheostomy care. The study demonstrated improvement in nurses' knowledge and skills following the training programme, supporting the effectiveness of structured educational interventions in improving the quality of tracheostomy care.

5. Nsabimana et al. (2021)[4]

Nsabimana and colleagues conducted a descriptive cross-sectional study entitled **"Nurses' Knowledge and Practices Regarding Tracheostomy Care at a Selected Referral Hospital in Rwanda."** The study included **80 nurses** working in internal medicine, surgical wards and intensive care units. A structured questionnaire was used to assess nurses' knowledge and practices related to tracheostomy care.

The findings showed that **71% of nurses had moderate knowledge, 26.5% had low knowledge and only 2.5% had high knowledge** regarding tracheostomy care. The study also reported that **97.5% of nurses demonstrated low levels of practice**, while only 2.5% demonstrated high practice levels. No significant demographic factors were associated with knowledge and practice. The researchers recommended continuous professional development and in-service education for nurses caring for patients with tracheostomies.

6. Assessment of Healthcare Professionals' Knowledge Regarding Tracheostomy Care (2022)

A cross-sectional observational study published in the **Brazilian Journal of Otorhinolaryngology (2022)[6]** assessed knowledge regarding tracheostomy care and management of early complications among **254 doctors and nurses** from four tertiary-care hospitals.

The study assessed knowledge regarding suctioning, cuff care, cuff management, tube blockage and feeding of patients with tracheostomy. Approximately **52% of healthcare professionals demonstrated satisfactory knowledge**. Important knowledge gaps were identified, particularly concerning **cuff pressure, suction pressure and the first response to tube blockage**. The study emphasized that healthcare professionals caring for tracheostomy patients should receive adequate training in routine care and emergency management.

7. Jamaldeen et al. (2023)[5]

Jamaldeen, Nalamate, Kurien, Basheer and Rose conducted an interventional study in India entitled **"Otolaryngologists' Initiative for Collaborative Tracheostomy Care: Knowledge, Attitude and Skill in Tracheostomy Care Among Nurses."** The study evaluated nurses working in intensive care units and wards and assessed their knowledge, attitude and skills regarding tracheostomy care.

A structured workshop was conducted using **didactic lectures, videos and simulation-based hands-on training**. Knowledge and skills were assessed before and after the intervention, including follow-up assessment. The study demonstrated the value of collaborative and structured training in improving nurses' knowledge, skills and preparedness for tracheostomy care. The authors emphasized that coordinated tracheostomy care involving nurses and other healthcare professionals is important for improving patient safety and reducing adverse events.

8. Critical Care Nurses' Knowledge of Tracheostomy Care (2023)

A cross-sectional descriptive study published in the **Iranian Journal of Nursing and Midwifery Research (2023)[7]** assessed the knowledge of **260 critical care nurses** working in four government hospitals in Jordan. Data were collected using a structured questionnaire covering general information about the trachea, tracheostomy tubes, tracheostomy care, suctioning and nursing responsibilities.

The overall knowledge level was **moderate**, with a mean score of 26.05 out of 38. Moderate knowledge was observed in most dimensions, including knowledge of the tracheostomy tube, suctioning and nursing responsibilities. Significant differences in knowledge were associated with **age, educational level and work experience**. The authors concluded that nurses' knowledge was suboptimal and recommended further educational programmes regarding tracheostomy care.

9. Thomas et al. (2024)[8]

Thomas, Rao, Mahmood, Bhat and Dsouza conducted a study entitled **"The Role of a Tracheostomy Care Training Module in Improving the Knowledge, Attitude and Practices Among Nurses in High Dependency Units."** The study was conducted at Father Muller Medical College Hospital, Mangalore, Karnataka, and included **65 nurses** working in high-dependency areas.

A pre-validated questionnaire was used to assess knowledge, attitude and practices. The nurses subsequently received a structured tracheostomy care training module that included teaching, demonstration, hands-on simulation and an Objective Structured Clinical Examination (OSCE).

The mean knowledge score increased from **7.74 in the pre-test to 10.66 in the post-test**, with the improvement being statistically significant. The nurses' comfort and confidence also increased, and the average OSCE score was 73%. The authors concluded that a structured training module can significantly improve nurses' knowledge, confidence and quality of tracheostomy care.

10. Bilung, D'Souza and Maddani (2024)[2]

Bilung, D'Souza and Maddani conducted a study entitled **"Effectiveness of a Need-based Interventional Tracheostomy Care Protocol on Knowledge and Practice of Tracheostomy Care among Nurses."** The study was conducted in India using a **quasi-experimental design** involving **98 intensive care nurses**, with 49 nurses allocated to the experimental group and 49 to the control group.

The intervention involved a need-based tracheostomy care protocol, and nurses' knowledge and practice were assessed using pre-test and post-test measures. The study investigated whether a structured protocol could improve nurses' knowledge and practice while also contributing to the reduction of complications among patients with tracheostomies. The findings supported the usefulness of an evidence-based, structured tracheostomy care protocol for improving nursing care.

NEED FOR THE STUDY

Clinical competence is a fundamental requirement in nursing practice because nurses are directly responsible for performing procedures that can significantly influence patient safety and outcomes. Undergraduate nursing students must therefore demonstrate adequate knowledge and psychomotor skills before assuming professional responsibilities. Accurate assessment of clinical competence is essential to determine whether students can translate theoretical knowledge into safe and effective clinical practice.

Traditional Clinical Examination (TCE) remains a commonly used method for evaluating nursing students' practical skills. However, conventional clinical examinations may be influenced by examiner subjectivity, differences in patient conditions, variation in clinical exposure, and inconsistent opportunities for students to perform specific procedures. These limitations may affect the reliability, validity, fairness, and objectivity of clinical assessment. A standardized assessment method is therefore needed to provide equal opportunities for students to demonstrate their clinical competencies.

The Objective Structured Clinical Examination (OSCE) offers a structured and standardized approach to clinical assessment. Through predefined stations, standardized instructions, fixed time limits, and objective checklists, OSCE allows specific clinical competencies to be assessed systematically. It can evaluate psychomotor skills, clinical knowledge, communication, clinical judgment, patient safety practices, and procedural accuracy while reducing examiner-related variation and bias.

Tracheostomy care is a specialized nursing procedure that requires precise knowledge and competent psychomotor performance. Nurses must be able to assess the patient, maintain airway patency, perform tracheal suctioning, clean and replace the inner cannula, maintain the tracheostomy site, change sterile dressings and tracheostomy ties, follow infection-prevention measures, recognize complications, and document care appropriately. Errors during these procedures may compromise airway safety and place the patient at risk. Hence, reliable assessment of students' competency in tracheostomy care is particularly important.

Despite the importance of clinical competency assessment, there remains a need to identify assessment approaches that are objective, standardized, reliable, and capable of evaluating individual components of a complex nursing procedure. Comparing OSCE with TCE can

provide evidence regarding whether a structured examination method offers advantages over conventional clinical assessment in measuring students' knowledge and practical competence.

Therefore, the present study was undertaken to compare the effectiveness of OSCE and TCE in assessing clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students in selected nursing institutions at Bhopal. The study also explored students' opinions regarding OSCE. The findings may assist nursing educators and institutions in strengthening competency-based clinical assessment and promoting standardized, fair, and patient-safety-oriented evaluation practices.

PROBLEM STATEMENT

"A comparative study to evaluate the effectiveness of Objective Structured Clinical Examination (OSCE) versus Traditional Clinical Examination (TCE) on clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students in selected nursing institutions at Bhopal, Madhya Pradesh."

OBJECTIVES OF THE STUDY

The objectives of the study were:

1. To assess the post-test level of clinical knowledge regarding tracheostomy care among undergraduate nursing students in the OSCE and TCE groups.
2. To assess the post-test level of clinical skill competence regarding tracheostomy care among undergraduate nursing students in the OSCE and TCE groups.
3. To compare the effectiveness of OSCE and TCE in terms of clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students.
4. To determine the association between post-test clinical knowledge and clinical skill competence regarding tracheostomy care and selected demographic variables among undergraduate nursing students in the OSCE and TCE groups.
5. To determine the relationship between clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students in the OSCE and TCE groups.
6. To assess the level of satisfaction and opinions of undergraduate nursing students regarding OSCE for the assessment of tracheostomy care.

HYPOTHESES

All hypotheses were tested at the **0.05 level of significance**.

H1: There is a significant difference in the post-test clinical knowledge scores regarding tracheostomy care between undergraduate nursing students assessed through OSCE and those assessed through TCE.

H2: There is a significant difference in the post-test clinical skill competence scores regarding tracheostomy care between undergraduate nursing students assessed through OSCE and those assessed through TCE.

H3: There is a significant association between post-test clinical knowledge and clinical skill competence regarding tracheostomy care and selected demographic variables among undergraduate nursing students in the OSCE and TCE groups.

H4: There is a significant relationship between clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students in the OSCE and TCE groups.

OPERATIONAL DEFINITIONS

1. Effectiveness

In this study, **effectiveness** refers to the extent to which OSCE produces better outcomes than Traditional Clinical Examination in terms of students' post-test clinical knowledge and clinical skill competence regarding tracheostomy care, as measured by the structured knowledge questionnaire and clinical skill assessment checklist.

2. Objective Structured Clinical Examination (OSCE)

In this study, **OSCE** refers to a structured, standardized, station-based method of clinical assessment in which undergraduate nursing students perform specified components of tracheostomy care within a predetermined time and are evaluated using standardized criteria and checklists.

3. Traditional Clinical Examination (TCE)

In this study, **Traditional Clinical Examination** refers to the conventional method of practical clinical assessment in which undergraduate nursing students demonstrate tracheostomy care and are evaluated by the examiner using the existing traditional clinical assessment method.

4. Clinical Knowledge

In this study, **clinical knowledge** refers to the understanding of principles, indications, equipment, procedures, precautions, complications, infection-prevention measures, and documentation related to tracheostomy care, assessed using a structured knowledge questionnaire.

5. Clinical Skill Competence

In this study, **clinical skill competence** refers to the ability of undergraduate nursing students to correctly and safely perform the steps of tracheostomy care, including preparation, patient assessment, equipment collection, tracheal suctioning, cleaning and replacement of the inner cannula, stoma care, sterile dressing, changing tracheostomy ties, and documentation, as assessed using a structured observational checklist.

6. Tracheostomy Care

In this study, **tracheostomy care** refers to the systematic nursing care provided to a patient with a tracheostomy to maintain airway patency, prevent infection and complications, and

promote patient safety. It includes assessment, equipment preparation, suctioning, inner-cannula care, stoma cleaning, sterile dressing, changing tracheostomy ties, and documentation.

7. Undergraduate Nursing Students

In this study, **undergraduate nursing students** refer to third- and fourth-year B.Sc. Nursing students enrolled in selected nursing institutions in Bhopal who met the specified inclusion criteria and participated in the study.

8. Satisfaction/Opinion

In this study, **satisfaction/opinion** refers to the students' reported perceptions regarding the fairness, objectivity, usefulness, effectiveness, acceptability, and learning benefits of OSCE for assessing tracheostomy care, measured using a structured opinion/satisfaction scale.

LIMITATIONS OF THE STUDY

The study had the following limitations:

1. The study was conducted among undergraduate B.Sc. Nursing students from selected nursing institutions in Bhopal; therefore, the findings may not be generalizable to all nursing students.
2. The sample was limited to 220 third- and fourth-year B.Sc. Nursing students, which may restrict the generalizability of the findings to larger populations.
3. The assessment was conducted at a single point in time; therefore, the long-term retention of knowledge and clinical skills could not be assessed.
4. Implementation of OSCE requires trained examiners, standardized stations, equipment, adequate time, and financial resources, which may limit its routine implementation in some nursing institutions.
5. Differences in students' individual learning experiences and previous clinical exposure could not be completely controlled.
6. The study focused specifically on tracheostomy care; therefore, the findings may not directly apply to other nursing procedures or clinical competencies.

DELIMITATIONS OF THE STUDY

The study was delimited to:

1. Third- and fourth-year B.Sc. Nursing students studying in selected nursing institutions in Bhopal.
2. Students who had received classroom teaching regarding tracheostomy care.
3. The assessment of clinical knowledge and clinical skill competence related specifically to tracheostomy care.
4. Comparison of Objective Structured Clinical Examination (OSCE) with Traditional Clinical Examination (TCE).

5. A total sample of 220 undergraduate nursing students, with 110 students in the OSCE group and 110 students in the TCE group.
6. Students who were available and willing to participate during the period of data collection.

RESEARCH METHODOLOGY

Research Approach

A **quantitative evaluative comparative research approach** was adopted to compare Objective Structured Clinical Examination (OSCE) with Traditional Clinical Examination (TCE) in assessing clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students.

Research Design

A **true experimental post-test-only control group design** was used. The participants were divided into two groups: an experimental group assessed through OSCE and a control group assessed through TCE.

Group	Intervention/Assessment	Post-test
Experimental Group (n=110)	OSCE for tracheostomy care	Clinical knowledge and clinical skill competence
Control Group (n=110)	Traditional Clinical Examination	Clinical knowledge and clinical skill competence

The total sample consisted of **220 undergraduate B.Sc. Nursing students**.

Study Variables

Independent variable:
Objective Structured Clinical Examination (OSCE) for tracheostomy care.

Dependent variables:

1. Clinical knowledge regarding tracheostomy care.
2. Clinical skill competence in performing tracheostomy care.
3. Students' satisfaction/opinion regarding OSCE.

Setting of the Study

The study was conducted among undergraduate B.Sc. Nursing students studying in **selected nursing institutions in Bhopal, Madhya Pradesh**.

Population

The target population comprised undergraduate nursing students enrolled in the B.Sc. Nursing programme.

The accessible population consisted of **third- and fourth-year B.Sc. Nursing students** studying in selected nursing institutions in Bhopal during the study period.

Sample and Sample Size

The sample consisted of **220 third- and fourth-year B.Sc. Nursing students** who fulfilled the eligibility criteria.

The students were divided equally into:

- **Experimental/OSCE group:** 110 students
- **Control/TCE group:** 110 students

Thus, the total sample size was **220 students**.

Sampling Technique

Students who fulfilled the inclusion criteria were selected for the study. The participants were allocated equally into the experimental and control groups to facilitate comparison between OSCE and TCE.

Eligibility Criteria

Inclusion Criteria

Students who:

- were studying in the third or fourth year of the B.Sc. Nursing programme;
- had received classroom teaching regarding tracheostomy care;
- were willing to participate in the study; and
- were available during the period of data collection.

Exclusion Criteria

Students who:

- were absent during the period of data collection;
- had previous formal experience with OSCE for tracheostomy care; or
- had previously participated in a similar OSCE-based assessment.

Description of the Intervention/Assessment

Objective Structured Clinical Examination (OSCE)

Students in the experimental group were assessed through a structured OSCE consisting of predetermined clinical stations related to tracheostomy care. Standardized instructions, predetermined assessment criteria, and structured observational checklists were used to evaluate students' performance.

The assessment covered important components of tracheostomy care, including:

1. Quiz/knowledge assessment regarding tracheostomy care.
2. Collection and preparation of required equipment.
3. Preliminary assessment of the patient.
4. Tracheal suctioning.

5. Cleaning and replacement of the inner cannula.
6. Cleaning of the tracheostomy stoma.
7. Changing of sterile dressing.
8. Changing of tracheostomy ties.
9. Documentation of relevant information.

Each student was evaluated using predetermined criteria to promote objectivity and consistency in assessment.

Traditional Clinical Examination (TCE)

Students in the control group were assessed using the traditional clinical examination method. Their performance in tracheostomy care was evaluated using the conventional clinical assessment procedure followed by the institution/examiners.

Data Collection Tools

The following tools were used for data collection:

Tool I: Structured Knowledge Questionnaire

A structured questionnaire was used to assess students' clinical knowledge regarding tracheostomy care. The questionnaire covered areas such as indications, equipment, principles of care, suctioning, inner-cannula care, stoma care, infection prevention, complications, precautions, and documentation.

Tool II: Clinical Skill Assessment Checklist

A structured observational checklist was used to assess students' clinical skill competence in performing tracheostomy care. The checklist included the major procedural steps and safety measures required for competent performance.

Tool III: Opinion/Satisfaction Scale

A structured opinion/satisfaction scale was administered to students in the OSCE group to assess their perceptions regarding the fairness, objectivity, usefulness, acceptability, and effectiveness of OSCE in assessing tracheostomy care.

Validity and Reliability

The research tools were subjected to appropriate procedures for establishing **content validity** through consultation with experts in nursing education, medical-surgical nursing, clinical practice, and research methodology. Reliability of the tools was established using an appropriate reliability-testing procedure before their use in the main study.

Data Collection Procedure

After obtaining the necessary administrative and ethical permissions, eligible students were identified and enrolled in the study. The purpose of the study was explained to the participants and informed consent was obtained.

The participants were divided into the OSCE and TCE groups. Students in the experimental group underwent assessment through standardized OSCE stations, while students in the control group underwent Traditional Clinical Examination. Following the respective

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examination methods, clinical knowledge and clinical skill competence were assessed using the predetermined tools. Students in the OSCE group were subsequently asked to provide their opinions regarding the OSCE.

Data Analysis

The collected data were coded, tabulated, and analyzed using descriptive and inferential statistics.

Descriptive statistics included:

- Frequency
- Percentage
- Mean
- Standard deviation

Inferential statistics included appropriate tests such as:

- Independent *t*-test for comparison between groups.
- Correlation analysis to determine the relationship between clinical knowledge and clinical skill competence.
- Chi-square test/Fisher's exact test, as appropriate, to determine associations between selected demographic variables and study outcomes.

The level of statistical significance was set at **$p < 0.05$**.

Ethical Considerations

Ethical principles were maintained throughout the study. Necessary permission was obtained from the concerned nursing institutions/authorities before data collection. Participants were informed about the purpose and procedure of the study, and their participation was voluntary. Informed consent was obtained from all participants. Confidentiality and anonymity of the participants and their collected information were maintained.

RESULTS

A total of **220 undergraduate B.Sc. Nursing students** participated in the study, comprising **110 students in the OSCE group and 110 students in the TCE group**. The majority of students in both groups were aged 21–23 years, and females constituted the majority of the participants. The groups had comparable representation of third- and fourth-year students.

The findings showed a marked difference in clinical knowledge and clinical skill competence between the two assessment methods. The overall clinical knowledge score was **91.10% in the OSCE group**, compared with **65.18% in the TCE group**. The difference in knowledge scores between the groups was statistically highly significant (**$p < 0.001$**), indicating better performance among students assessed through OSCE.

Clinical skill competence was also substantially higher among students assessed through OSCE. The overall clinical skill performance score was **94.80% in the OSCE group**, compared with **51.56% in the TCE group**. The difference was statistically highly significant (**$p < 0.001$**). All students in the OSCE group demonstrated an adequate level of clinical skill

competence, whereas the TCE group included students with inadequate, moderate, and adequate levels of performance.

In the OSCE group, students demonstrated particularly strong performance in cleaning and replacing the inner cannula, cleaning the stoma, changing sterile dressings, changing tracheostomy ties, and documentation. In comparison, students assessed through TCE demonstrated lower performance across several procedural domains, particularly tracheal suctioning, inner-cannula care, stoma care, sterile dressing, tracheostomy-tie changing, and documentation.

A **moderate positive correlation** was found between clinical knowledge and clinical skill competence in the OSCE group, whereas a **poor positive correlation** was observed in the TCE group. This indicates that better clinical knowledge was associated with better clinical skill performance, particularly among students assessed through OSCE.

Regarding demographic variables, no significant association was found between clinical competence and selected demographic variables in the OSCE group. In the TCE group, clinical competence and knowledge were significantly associated with the year of study, with fourth-year students demonstrating higher scores than third-year students.

Students' opinions regarding OSCE were highly favorable. **79.09% of students** reported a high level of satisfaction with OSCE. The highest-rated statement was that OSCE helped students gain more knowledge regarding tracheostomy care, while students also reported that OSCE provided a fair and objective method of assessing their clinical skills. Fourth-year students demonstrated a higher level of satisfaction than third-year students.

Overall, the findings demonstrated that OSCE was significantly more effective than TCE in assessing both clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate nursing students.

CONCLUSION

The present study demonstrated that **Objective Structured Clinical Examination (OSCE) was significantly more effective than Traditional Clinical Examination (TCE)** in assessing clinical knowledge and clinical skill competence regarding tracheostomy care among undergraduate B.Sc. Nursing students.

Students assessed through OSCE achieved substantially higher scores in both clinical knowledge (**91.10%**) and clinical skill performance (**94.80%**) compared with students assessed through TCE (**65.18%** and **51.56%**, respectively). The differences were statistically highly significant (**$p < 0.001$**).

The findings suggest that OSCE provides a **structured, standardized, objective, and comprehensive approach** to clinical assessment. By using predetermined stations and standardized assessment criteria, OSCE can reduce examiner variability and provide students with equitable opportunities to demonstrate their clinical competencies.

The high level of student satisfaction further supports the acceptability of OSCE as an assessment strategy. Therefore, OSCE may be incorporated into undergraduate nursing education, particularly for assessing important and technically demanding procedures such as tracheostomy care. Its integration into competency-based nursing education may improve the

accuracy of clinical evaluation, strengthen students' clinical preparedness, and ultimately contribute to safer and higher-quality patient care.

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