Traditional Versus Objective Structured Clinical Examination on Pediatric Nursing Students' Performance

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ABSTRACT

***Context*:** The Objective Structured Clinical Examination (OSCE) method is an effective tool for evaluating the clinical nursing skills of nursing students. OSCE is an assessment technique in which the student demonstrates their competence under a variety of simulated conditions

Aim: This study aimed to compare objective structured clinical examinations versus traditional clinical examination on pediatric nursing students' performance.

Methods: A quasi-experimental research design (study and control group) was used to conduct this study. The study was conducted in the laboratory of pediatric nursing skills at the faculty of nursing, Benha University. All male and female pediatric nursing students in the 3rd year (n. =228), who were studying in the academic year 2018-2019, first semester, faculty of nursing, Benha University, was recruited. A simple random sample chose to achieve the aim of this study. The odd number was for the OSCE group and the even number for the traditional clinical examination (TCE) group. Four tools were utilized to collect data for the current study. A Structured Questionnaire Sheet, A modified Self-administered Questionnaire, Pediatric Nursing Students' Practice Observational Checklists, and Clinical Scenarios were designed to assess the pediatric nursing student OSCE exam and compare between the traditional method and OSCE method of exams.

Results: The current study discovered statistically significant differences were found with a high percentage of agreement responses among pediatric nursing students for related items of OSCE method compared to those in TCE. Additionally, the results clarify a highly statistically significant difference between the studied pediatric nursing students' in TCE and OSCE total performance scores.

Conclusion: Objective Structured Clinical Examination (OSCE) was opinioned as a tool for clinical evaluation. This finding appeared in pediatric nursing students' responses, which confirmed their acceptance of OSCE. The OSCE subsequently remains a more objective method of assessment than the traditional clinical forms of the exam that was previously used. OSCE can be used most effectively in undergraduate nursing curricula to assess fair practice. This type of exam provided an accurate measure of clinical skill competencies. Therefore, OSCE should be adopted as a strategy for examining clinical skills for students in all academic years. The current study recommended that Objective Structured Clinical Examination can be used as effective and meaningful assistance to fitness for practice, and OSCE should be adopted as a strategy for examining clinical skills for students in all academic years.

***Keywords*:** Traditional, Objective Structured Clinical Examination, and Pediatric Nursing Students.

1. Introduction

Objective Structured Clinical Examination (OSCE) is a new type of examination method used in health sciences. It is prepared to test clinical skills, performance, and competence in various skills such as communication, clinical examination, medical/nursing procedures, exercise prescription, joint mobilization and manipulation techniques, positioning techniques, and interpretation of results. It is a hands-on, real-world approach to learning that keeps examiners engaged *(Smrekar et al., 2017).*

Additionally, it allows them to understand the key elements that drive the decision-making process, and challenges the nursing to be innovative and reveals their malpractice in case-handling and gives open space for modified decision-making, based on evidence-based practice for responsibilities of the real-world *(Sola et al., 2017).*

In the OSCE, the students' competence in clinical skills is assessed at a series of stations. OSCEs use scenarios that imitate real-life situations. OSCE is a systematic, comprehensive, and objective method of evaluation that involves the student rotating through several practical and written stations where they are assessed using a set criteria *Gormley, (2011).* In OSCE, each student is required to demonstrate specific clinical skills in a simulated training area on standardized patients *(Mitchell et al., 2015)*

Harden et al. (1975) suggested the use of the OSCE in medical schools as a means of overcoming problems of traditional clinical methods of evaluation and enhancing the quality of clinical performance of the students. They described the OSCE as a timed examination in which medical students interact with a series of simulated patients in stations that may involve history taking, physical examination, counseling, or patient management. The OSCE with scoring rubrics and multiple standardized cases is now widely used as a competent standard and universal format to assess the clinical competency of medical and

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nursing students. Although OSCE lent from medical education, it has been used extensively in nursing worldwide *(Fidment, 2012; Kim & Kim, 2013).*

The Objective Structured Clinical Examination (OSCE) used for evaluating students' clinical competencies where examiners plan the areas carefully for examination. The students rotate some of the responses and written stations, and they spend a specified time at each station. Through the bell sound, the students move on to the next station. The time allowed is the same for all the stations. The number of OSCE stations varies from 12-15 or even 20 stations. Each station requires about 5 minutes. A further 30 seconds should be allowed for students to move from one station to another or to complete any final comments. Since the stations are independent of each other, the student can start at any of the stations and complete the cycle *(Samir et al., 2012).*

A traditional clinical examination (TCE) includes performing a particular clinical procedure followed by the assessment-based on inclusive performance rather than students' clinical competency. It focuses mainly on the "knows" and "knows how" aspects of Miller's pyramid of competence *(Miller, 1990).* The TCE can often be biased, subjective, boring, and inadequate for the evaluation of the overall students' performance at all levels of knowledge, skills, and attitude. Often attitude, interpersonal skills, communication skills, professional judgments, and ethical issues are not assessed in TCE, and the final feedback made by the students is questioned rather than emphasizing the procedures and clinical evaluation. Besides, the traditional assessment tools evaluate facts and recall knowledge but unsuccessfully assess the understanding of the main topic and the problem-solving skills of the students *(Gupta et al., 2010; Wani, 2015)*

2. Significance of the study

In Egypt, OSCE was first introduced during the academic year 2007-2008 into the Mansoura Faculty of Nursing in the Maternity and Gynecological Nursing Department. The successful outcomes of this practice encouraged other nursing faculties to use the OSCE in evaluating their students *(El-Nemer & Kandeel, 2009).*

Nursing faculties as Mansoura Faculty of Nursing, Critical Care Nursing Department, echoed the experience on first-year students during the academic year 2008-2009. Also, OSCE was first introduced into the faculty of nursing at the British university by the Medical-Surgical Nursing Department during the academic year 2008-2009 *(Abd Allah et al., 2012).* Additionally, Benha Faculty of Nursing, Medical-Surgical Nursing Department started on second-year students, the second semester in the academic year 2016-2017, for evaluating students *(Mahmoud et al., 2019).*

For an extended period, in Egypt, all Nursing Faculties adopted the traditional practical exams for evaluating students' clinical performance. Within this approach, the students would be assigned to an examiner who would evaluate their performance for the entire examination when providing nursing care in specific clinical areas or performing procedures in the skills laboratory. This approach has many restrictions, such as; bias, subjectivity in evaluation, limited standardization, time-consuming, and testing a limited number of intended learning outcomes. Dealing with these restrictions demonstrates a challenge for faculty staff members who search for standardization, objectivity, more effective assessment tools used for evaluation of students' clinical performance.

3. Aim of the study

This study aimed to compare objective structured clinical examinations (OSCE) versus traditional clinical examination (TCE) on pediatric nursing students' performance at the Faculty of Nursing, Benha University through:

- Assessing pediatric nursing students' performance regarding objective structured clinical examinations (OSCE).
- Designing and implementing scheduled orientation and training sessions for pediatric nursing students about OSCE.
- Evaluation of students' performance regarding a selected group of skills using both OSCE and traditional methods.
- Assessment of pediatric nursing students' opinion regarding the OSCE attributes.

3.1. Research Hypothesis

The pediatric nursing students who are evaluated by OSCE will have improved performance compared to those evaluated by traditional clinical examination.

3.2. Operational definitions

Objective Structured Clinical Examination (OSCE)

It is a tool for evaluating the clinical nursing skills of nursing students with more objectivity and no bias.

Traditional Clinical Examination

Traditional clinical examination is an evaluation method widely used in the nursing field. It based on inclusive performance rather than students' clinical competency.

4. Subjects & Methods

4.1. Research design

A quasi-experimental (study/control) research design was utilized to conduct this study for the establishment of the causality, the effect of an independent variable on the dependent variable *(Dutra & Dos Reis, 2016),* in which the pediatric nursing students were assigned to the traditional group and OSCE group.

4.2. Research Setting

The study was conducted in the laboratory of pediatric nursing skills because of the unsuitable design of the OSCE lab. At the faculty of nursing, Benha University. This laboratory was divided into three parts and located on the second floor. The lab capacity is 6-9 students approximately. The lab is equipped with pediatric manikins

(Sim Baby, simulators, and supplies for cardiopulmonary resuscitation, oxygen therapy, and suctioning).

4.3. Subjects

All male and female pediatric nursing students in the 3rd year in the first semester (n. =228), who were studying in the academic year 2018-2019, Faculty of Nursing, Benha University, were recruited. They were chosen by a simple random sample (the odd number for the OSCE group and the even number for the TCE group (114 students in each group).

4.4. Tools of the study

Four tools were utilized to collect data on the current study. These tools consisted of the following:

4.4.1. A structured Interview Questionnaire

It developed by the researchers after reviewing the literature to collect data related to the students' characteristics and to record their overall suggestion regarding the OSCE exam. It included two parts as the following;

Part 1: personal characteristics of studied pediatric nursing students as; age and gender.

Part 2: overall suggestions for studied pediatric nursing students to improve the method of OSCE exam.

4.4.2. A Modified Self-administered Questionnaire

It adopted from *Pierre et al. (2004)* to assess pediatric nursing students' opinions regarding TCE and OSCE exam for both groups. The OSCE feedback questionnaire included 23 items and categorized under four major dimensions with a 3-point Likert scale, which ranged from agreeing, neutral, and disagree. The first dimension included six items. They were evaluating pediatric nursing students' opinions and feedback related to the quality of instructions and organization of the exam.

The second dimension included eight items and looks at pediatric nursing students' opinions and feedback related to the quality of the exam performance. The third dimension had 5 items to investigate pediatric nursing students' opinions and feedback related to the exam scoring objectivity and validity, and the fourth dimension, which has 4 items to identify comments of pediatric nursing students on the examination set-up.

The scoring system

A three-point Likert-type scale that indicated degrees of the agreement were used to assess most of the dimensions in the questionnaire. The students were asked to rate their responses, agree, neutral, and disagree. The students' responses were displayed as frequencies and percentages.

4.4.3. Pediatric Nursing Students' Practice Observational Checklists

It adopted and modified by the researchers. It used to assess the actual pediatric nursing students' practices for both groups regarding a selected group of skills, including oxygen administration, neonatal, infant, and child cardiopulmonary resuscitation (CPR) and suctioning. It composed of four main parts which are:

Part 1: Pediatric Nursing Students' Practice Observational Checklist regarding oxygen administration. It adopted from *Hockenberry & Wilson (2015)*. It consisted of 30 items, including; nasal prong (10 items), face mask (8 items), and headbox (12 items).

Part 2: Pediatric Nursing Students' Practice Observational Checklist regarding cardiopulmonary resuscitation. It is adopted from *the American Heart Association* (*2015).* It consisted of 42 items, including; neonatal cardiopulmonary resuscitation (12 items), infant cardiopulmonary resuscitation (14 items), and child cardiopulmonary resuscitation (16 items).

Part 3: Pediatric Nursing Students' Practice Observational Checklist regarding suctioning. It adopted from *American Heart Association (2015)*. It consisted of 22 items, including oral/nasal suction (10 items), endotracheal tube suction (12 items). All students are passing, with variations, through all these checklists in both groups.

Scoring system

Give a score of (1) for correctly done step, a score of (0) for incorrectly done or not done. The total score was ranged from 0-94. (0-30 for oxygen administration, 0-42 for cardiopulmonary resuscitation, and 0-22 for suctioning). Total scores converted into percent scores, where the score of ≥ 80% considered competent practice and a score < 80% considered incompetent practice.

4.4.4. Clinical Scenarios

They were constructed by the researchers after reviewing related literature, articles, and periodicals. It was applied only for the OSCE group, while the traditional group was evaluated by traditional clinical exam procedural checklists. In the clinical scenarios, the pediatric nursing students rotated through several five minutes stations. The pediatric nursing students read carefully the instructions and questions presented in the scenario inside each station and answered the needed questions according to the type of each station as follows:

Type (1): Procedure Station. In this type of station, pediatric nursing students are given specific tasks to perform. In this station, there was a clinical scenario including the station number, title, allowed time, as well as instructions given for students regarding the current station situation. The student read the instructions carefully and applied the required task to be performed as there was an observer inside the station to observe the performance of each pediatric nursing student through a pre-set checklist.

Type (2): Response Station: This type of station included different types of questions as multiple choice questions, true or false questions, the arrangement of steps for certain clinical procedures, pictures, or indications of use of some instruments. Students answered on an answer sheet presented inside the station. These answers are marked later by the examiner at the end of the exam. Additionally, this type of station can be done in the

classroom.

Type (3): Rest Station: this type of station is interspersed in the round to allow students to prepare themselves for the next stations and complete any required items.

4.5. Procedures

Preparatory phase: Validity and reliability testing was performed to phrase the content validity of the data collection tools. The researchers assure that items of the tools were adequately represented what is supposed to be measured by three experts, including; one Medical-Surgical Nursing professor and two assistant professors of the Pediatric Nursing field from the Faculty of Nursing Benha University and Ain Shams University, to test the content validity.

Modifications were done according to the experts' judgment on the sequence of items, clarity of sentences, and appropriateness of contents. The experts' agreed on the content but recommended minor language changes that would make the information clearer and more precise. The suggested changes were made. The internal consistency reliability of all items of the data collection tools was assessed using coefficient alpha. It was 0.83 for the modified self-administered questionnaire and was 0.89 for pediatric nursing students' practices observational checklists.

Official permission for data collection was obtained from the dean of Benha Faculty of Nursing, Vice - Dean of Education and Students ' Affairs and head of Pediatric Nursing Department to carry out the current study in pediatric nursing skill laboratory and collect data from pediatric nursing students. The title, aim, and the expected outcomes of the study were illustrated as well as the main data items to be covered, and the study was carried out after gaining the necessary permission.

Ethical Considerations and Human Rights: Official permissions to conduct the study were obtained from the dean of the Benha Faculty of Nursing. Participation in the study was voluntary. Each pediatric nursing student was informed about the aim of the study, the purpose, procedures, benefits, and all information that was taken was protected. Each student had the right to withdraw from the study at any time without any rationale, and then oral consent was obtained from them, and they were assured about the confidentialities of data collected. Each student was reassured that the evaluation would not affect their academic grades.

A pilot study was carried out for 10% of studied subjects (11 pediatric nursing students) during October 2018 to assess the feasibility of the research process, clarity, objectivity, applicability, and time needed for the data collection. Accordingly, the necessary modifications were made in the form of adding or omission of some questions. The pilot study subjects were excluded from the actual study sample.

The actual fieldwork was performed for both groups from the beginning of October 2018 to the end of December 2018 to collect data. The orientation sessions for students was done during the first and second week of October 2018. The actual fieldwork was done during periodic exams.

The traditional clinical examination method: The assessment of pediatric nursing students' practice through the traditional method was done during the first semester in the academic year 2018-2019 from the beginning of October 2018 to the end of December 2018 by pediatric nursing staff in pediatric skill lab during periodic exams.

The OSCE method: The assessment of the pediatric nursing students' practice through the OSCE method was done at the end of the first semester in the academic year 2018-2019. This method performed through eight steps during the planning and implementation phases as following: identification of pediatric nursing procedures to be assessed according to the pediatric course specification, which drawn from the clinical procedures in the curriculum as oxygen administration, neonatal cardiopulmonary resuscitation, infant cardiopulmonary resuscitation and child cardiopulmonary resuscitation, oral/nasal suction and endotracheal tube suction based on the available resources "simulators, Sim Baby, manikins, supplies."

Development of case scenarios based on identified procedures (procedure stations and response stations), identification/modification/development of evaluation tools (checklist, rating scales), identification of the site of assessment for conducting OSCE exam as pediatric skill laboratory which was more suitable to accommodate a large number of students than OSCE lab. Then series of orientation and training sessions for students and staff.

Implementation phase: OSCE was implemented as follows; after determining the number and types of stations based on the assessed techniques and available facilities. OSCE included 12 stations (two rest stations, five written stations, one station for O_2 administration, three stations for CPR, and one station for suction), each of five minutes duration.

The practical stations involved oxygen administration, neonatal, infant and child cardiopulmonary resuscitation (CPR), and suctioning. Scenarios required pediatric nursing students to demonstrate practical skills in performing required clinical procedures. The OSCE exam registration started at 9:00 am till 9:15 am in the pediatric nursing laboratory. Then the exam conducted only one day, and stations were conducted from 9:30 am till 3:30 pm. While The five written stations were performed in the classroom.

The instructions of each station and checklists were introduced firstly. Each student has a code number to be recorded on their answers' sheet in the written stations and to be given to the examiner in the practical stations. All the students started equally at the same time, and then they assessed by the examiners by using the checklist.

Evaluation phase: After examination, staff and students' perspectives tool (A structured questionnaire and modified self-administered questionnaire) were distributed in the pediatric skills laboratory to be fulfilled, and written feedback was obtained and signed out.

4.6. Data analysis

The data collected were revised, organized, tabulated, and analyzed using SPSS (Statistical Package for the Social Science Software) statistical package version 22 on IBM compatible computer. Numerical data (Quantitative data) was presented in tables by using mean and standard deviation (X ± SD) and analyzed by applying t-test for normally distributed variables, while qualitative data were expressed as frequency and percentage. Chi-square was used to compare the results for both groups. P-value at 0.05 was used to determine significance as:

- P-value > 0.05 to be statistically insignificant.
- P-value ≤ 0.05 to be statistically significant.
- P-value ≤ 0.001 to be highly statistically significant.

5. Results

Table 1 describes the personal characteristics of the studied pediatric nursing students in the traditional group; the majority of their age was more than 20 years (77.2%), with the mean age 21.36 ± 1.42 years. Two-thirds of them were females (66.7%). In the OSCE group, more than three quarters more than 20 years (78.9%), with the mean age 21.42 ± 1.34 years, and 71.9% of them were females, with a non-statistical significance difference between the two groups.

Table 2 describes overall suggestions to improve the OSCE exam of the studied pediatric nursing students. More than three-quarters of the OSCE group (77.2%) suggested increasing the time required for each procedure compared with 15.8% in the TCE group. In comparison, 1.8% of the OSCE group suggests allowing knowing achievement grades immediately after the exam. 66.7% of the OSCE group suggested increasing the time for reading instructions compared with 1.8% of the TCE group, and no one of the TCE group suggested an increase in the number of stations compared with 36.8% of the OSCE group.

Table 3 shows a comparison between pediatric nursing students' opinions related to the quality of TCE and OSCE instructions and organization. There is a statistically significant difference with a higher proportion of agreement responses for OSCE exam-related items as; the exam was well-organized, well-structured, students fully aware of the nature of the exam, and adequate time allocated for each procedure. Regarding clarity and unambiguous of the exam instructions and well administrated of the exam, 85.9% and 82.5% of students agreed in TEC compared with 71.9% and 81.6% of OSCE group, respectively.

Table 4 clarifies the comparison of the studied pediatric nursing students according to their opinions related to the quality of TCE and OSCE exam performance. It was observed that 94.7%, 82.5%, 85.9%, 80.7%, 93.9%, 87.7% and 70.2% of them were agreed that the OSCE exam cover wide range of clinical skills, allowed students to compensate in different areas, focus on areas of weaknesses, students were aware of the level of information asked, tasks were clinically relevant, the exam provided opportunities for learning and required tasks were consistent with teaching objectives respectively compared to students in the TCE (92.1%, 76.3%, 77.2%, 81.6%, 85.9%, 85.9% & 87.7% respectively). The majority of pediatric nursing students in the OSCE group (81.6%) describe that the OSCE exam was less stressful compared with 47.4% in the TCE group. This table also shows a statistically significant difference between both groups' responses.

Table 5 clarifies a comparison of the studied pediatric nursing students according to their opinions related to the quality of TCE and OSCE exam scoring objectivity and validity. The response of these students was significantly higher in the OSCE group than students in the TEC group regarding all objectivity and validity parameters.

Table 6 reveals a comparison of the studied pediatric nursing students according to their opinions related to the quality of TCE and OSCE set-up. There is A statistically significantly higher proportion of students were agreed in the OSCE group compared with students in the TEC group regarding the environment was free from noise, adequate light, and the exam was well-structured. On the contrast, 93.9% of studied students were agreed regarding the adequate space provided in the TCE group compared to 89.5% in the OSCE group.

Table 7 reveals the comparison of pediatric nursing students' traditional method versus objective structured clinical examination score regarding O_2 administration, CPR, and suction procedures. It clarifies a highly statistically significant difference between the studied pediatric nursing students' traditional and OSCE total performance scores (P-value < 0.001).

Table (1): Frequency and percentage distribution of the studied pediatric nursing students according to their characteristics (n=228).

Personal characteristics	TCE (n.= 114)		OSCE (n.= 114)		X^2	P-value
	No	%	No	%		
Age in years						
< 20	26	22.8	24	21.1		
≥ 20	88	77.2	90	78.9	21.42	>0.05
X ±SD	21.36 ± 1.42		21.42 ± 1.34			
Gender						
Male	38	33.3	32	28.1	5.82	>0.05
Female	76	66.7	82	71.9		

Table (2): Frequency and percentage distribution of the studied pediatric nursing students according to their overall suggestions to improve the exam method (n=228).

Suggestions	TCE (n.= 114)		OSCE (n.= 114)	
	No	%	No	%
Increase the number of examiners	10	8.8	26	22.8
Increase the time required for each procedure	18	15.8	88	77.2
Availability of more supplies and equipment	34	29.8	38	33.3
Increase the time for reading instructions	2	1.8	76	66.7
Increase the number of stations	0	0.0	42	36.8
Allow knowing achievement grades immediately after the exam	4	3.6	2	1.8
Allow giving immediate feedback after each procedure	14	12.3	17	14.9

A statistically significant at P value ≤0.05, highly statistically significant at P value >0.001.

Table (3): Comparison of the studied pediatric nursing students according to their opinions related to the quality of TCE and OSCE instructions and organization (n=228).

Students' opinion	TCE (n.= 114)						OSCE (n.= 114)						X^2	P-value
	Agree		Neutral		Disagree		Agree		Neutral		Disagree			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
The exam was well organized	87	76.3	15	13.2	12	10.5	92	80.7	22	19.3	0	0.0	11.64	0.001
The exam was well structured.	92	80.7	12	10.5	10	8.8	100	87.7	14	12.3	0	0.0	13.8	0.001
Instructions were adequate, clear, and unambiguous.	98	85.9	14	12.3	2	1.8	82	71.9	32	28.1	0	0.0	18.23	0.001
The student was fully aware of the nature of the exam	87	76.3	14	12.3	13	11.4	92	80.7	22	19.3	0	0.0	11.18	0.001
The time allocated for each procedure was adequate.	76	66.7	12	10.5	26	22.8	80	70.2	34	29.8	0	0.0	10.23	0.001
Generally, the exam was well administered.	94	82.5	16	14.0	4	3.5	93	81.6	21	18.4	0	0.0	19.27	0.001

A statistically significant at P value ≤0.05, highly statistically significant at P value >0.001.

Table (4): Comparison of the studied pediatric nursing students according to their opinions related to the quality of TCE and OSCE exam performance (n=228).

Students' opinion	TCE (n.= 114)						OSCE (n.= 114)						X^2	P-value
	Agree		Neutral		Disagree		Agree		Neutral		Disagree			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Cover wide ranges of clinical skills.	105	92.1	6	5.3	3	2.6	108	94.7	6	5.3	0	0.0	38.04	0.001
The exam was less stressful.	54	47.4	26	22.8	34	29.8	93	81.6	5	4.4	16	14.0	38.19	0.0
It allowed students to compensate in different areas.	87	76.3	14	12.3	13	11.4	94	82.5	16	14.0	4	3.5	36.08	0.001
The exam was focus on areas of weaknesses.	88	77.2	12	10.5	14	12.3	98	85.9	14	12.3	2	1.8	32.74	0.001
Students were aware of the level of information asked.	93	81.6	18	15.8	3	2.6	92	80.7	22	19.3	0	0.0	42.16	0.00
Tasks were clinically relevant.	98	85.9	14	12.3	2	1.8	107	93.9	7	6.1	0	0.0	31.55	0.001
The exam provided opportunities for learning.	98	85.9	10	8.8	6	5.3	100	87.7	12	10.5	2	1.8	38.04	0.001
Required tasks were consistent with teaching objectives.	100	87.7	12	10.5	2	1.8	80	70.2	34	29.8	0	0.0	40.11	0.001

A statistically significant at P value ≤0.05, highly statistically significant at P value >0.001.

Table (5): Comparison of the studied pediatric nursing students according to their opinions related to the quality of TCE and OSCE scoring objectivity and validity (n=228).

Students' opinion	TCE (n.= 114)						OSCE (n.= 114)						X^2	P-value
	Agree		Neutral		Disagree		Agree		Neutral		Disagree			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
The exam was fair for testing knowledge and skills.	90	78.9	18	15.8	6	5.3	92	80.7	22	19.3	0	0.0	13.41	0.001
The exam was minimizing the chance of failure as compared to other tests.	92	80.7	18	15.8	4	3.5	102	89.5	9	7.9	3	2.6	19.11	0.001
The scores of the exam reflect student performance during the exam.	94	82.4	10	8.8	10	8.8	99	86.8	13	11.4	2	1.8	18.84	0.001
The scores provide an accurate measure of necessary clinical skills.	82	71.9	18	15.8	14	12.3	90	78.9	18	15.8	6	5.3	18.79	0.000
Personality and students' social relations do not affect exam scores.	99	86.8	13	11.4	2	1.8	100	87.7	8	7.0	6	5.3	16.48	0.001

A statistically significant at P value ≤0.05, highly statistically significant at P value >0.001.

Table (6): Comparison of the studied pediatric nursing students according to their opinions related to the quality of TCE and OSCE set-up (n=228).

Students' opinion	TCE (n.= 114)						OSCE (n.= 114)						X^2	P-value
	Agree		Neutral		Disagree		Agree		Neutral		Disagree			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Adequate space was provided.	107	93.9	7	6.1	0	0.0	102	89.5	9	7.9	3	2.6	16.31	0.001
The environment was free from noise.	94	82.4	10	8.8	10	8.8	107	93.9	7	6.1	0	0.0	14.71	0.001
Adequate light.	102	89.5	9	7.9	3	2.6	108	94.7	6	5.3	0	0.0	18.89	0.000
The exam was well-structured.	99	86.8	13	11.4	2	1.8	110	96.5	4	3.5	0	0.0	12.87	0.001

A statistically significant at P value ≤0.05, highly statistically significant at P value >0.00

Table (7): Comparison of pediatric nursing students' traditional method versus objective structured clinical examination total score regarding nursing procedures (n. =228)

Nursing procedures	TCE (n.= 114)				OSCE (n.= 114)				X^2	P-value
	Correctly done		Incorrectly done / not done		Correctly done		Incorrectly done / not done			
	No.	%	No.	%	No.	%	No.	%		
Oxygen administration										
- Nasal prong	54	47.4	60	52.6	100	87.7	14	12.3	132.82	0.000
- Face mask	42	36.8	72	63.2	94	82.5	20	17.5		
- Headbox	48	42.1	66	57.9	88	77.2	26	22.8		
Cardiopulmonary resuscitation										
- Neonatal CPR	38	33.3	76	66.7	94	82.5	20	17.5	98.43	0.000
- Infant CPR	45	39.5	69	60.5	95	83.3	19	16.7		
- Child CPR	54	47.4	60	52.6	88	77.2	26	22.8		
Suction										
- Oral/nasal suction	38	33.3	76	66.7	90	78.9	24	21.1	118.23	0.000
- Endo tracheal tube suction	42	36.8	72	63.2	95	83.3	19	16.7		

A statistically significant at P value ≤0.05, highly statistically significant at P value >0.001.

6. Discussion

Traditional clinical exams can assess only clinical knowledge while the OSCE assesses knowledge and skills *Bhatnagar et al., (2011).* It is expected that the application Objective Structured Clinical Examination (OSCE) will ensure the development of a competent nurse who will be able to deliver safe and high-quality nursing care and minimize nursing errors *Abd Allah et al., (2012).* So, the present study was conducted to compare objective structured clinical examinations (OSCE) versus traditional clinical examination on pediatric nursing students' performance.

Regarding personal characteristics of studied pediatric nursing students, the study results indicated that the higher percentage of them were aged more than 20 years, with the mean age 21.36 ± 1.42 and 21.42 ± 1.34 years for TCE and OSCE group respectively. This finding supported by *Abd Allah et al., (2016)* in a study entitled "the effect of an educational program for cardiopulmonary resuscitation using Sim Man versus traditional manikin on 2nd year nursing students' performance," who reported that the majority of the studied samples were at the age range between 19-20 years. This finding is also following *Salah (2013)* in a study entitled "the effect of using simulation-based learning versus traditional learning on nursing

students' clinical performance of the respiratory system," who founded that the majority of the age of the studied samples ranged between 19-20 years. In addition to *Marie (2011)*, in a study about "the effect of simulation on knowledge, self-confidence and skill performance," which showed that more than half of the studied sample was less than twenty-one years old.

As regards the gender of the studied students, the study results indicated that the majority of the studied pediatric nursing students were females in both groups. This due to the Egyptian culture: females were commonly working in the nursing field than males. This finding was in agreement with *Abd Allah et al. (2016),* who reported that the majority of the studied sample were females. This finding also supported by *Kipsang and Bruce (2013)*, who conducted a study about "Study comparison of cardiopulmonary resuscitation competence between two groups of advanced practice student nurses at a medical training college in Kenya," who reported that the majority of the studied sample were females.

In the same line, *Marie (2011)* showed that the majority of the studied samples were females. Also, *Salah (2013)* founded that the majority of the study and control groups were females. *Mahmoud et al. (2019*) supported these results in a study about "Objective structured clinical examination versus traditional clinical examination on the achievement of medical-surgical nursing students," who showed that 72.8% of the studied students were females.

Regarding the studied pediatric nursing students according to their suggestions to improve the OSCE exam, more than three-quarters of them suggested increasing the time required for each procedure. This result was in agreement with *Ameh et al. (2014)* in a study about "Objective structured clinical examination versus clinical examination evaluation of students' perception and preference in a Nigerian Medical School," who clarified that the short time at OSCE station was one of the students' obstacles during OSCE implementation. These results supported by *Nafee et al. (2019)* in a study about "Objective structured clinical examination versus traditional clinical examination among nursing students: A comparative approach," who showed that the procedures need more time to be applied.

Regarding the comparison between pediatric nursing students' opinions related to the quality of TCE and OSCE instructions and organization, the result of the current study showed that there was a statistically significant difference with a higher proportion of agreement responses for OSCE exam-related items compare to TCE group. This result was supported by *Selim et al. (2012)* in a study about "Using objective structured clinical examination (OSCE) in undergraduate psychiatric nursing education: Is it reliable and valid?" They mentioned that the majority of the studied students consistently appraised the OSCE and reported that the OSCE was well structured, instructions were unambiguous and clear, adequate time for each station, and generally, the exam was well administered. Additionally, this result also agreed with *Mahmoud et al. (2019)*, who revealed that the majority of the students indicated that they received sufficient information about OSCE and was fully aware of the nature of OSCE before the examination.

The comparison of the studied pediatric nursing students revealed their opinions related to the quality of TCE and OSCE exam performance. It was observed that the majority of them have agreed that the OSCE exam covers a wide range of clinical skills, allowed students to compensate in different areas. They also reported that the exam focused on areas of weaknesses, students were aware of the level of information asked, tasks were clinically relevant, the exam provided opportunities for learning and required tasks were consistent with teaching objectives respectively compared with students in the TCE group.

These results agreed with findings obtained by many authors as *Nafee et al. (2019); Nazzawi (2018)* in a study about "Dental students' perception of objective structured clinical evaluation." *Mitchell et al. (2009),* in a study about "The objective structured clinical examination (OSCE): Optimizing its value in the undergraduate nursing curriculum.", and *Hasan et al. (2012)* in a study about "Association of the pre-internship objective structured clinical examination in final year medical students with a comprehensive written examination." They found that students who exposed to OSCE mentioned that the OSCE exam covers most of the objectives of their clinical rotation.

More than three-quarters of studied pediatric nursing students in the OSCE group stated that the exam is less stressful compared to less than half of them in the TCE group. The result of the present study also was supported by *Chetna et al. (2016)* in a study about "Assess and compare objective structured clinical examination (OSCE) versus traditional clinical examination (TCE) regarding Denver developmental screening test (DDST II) in terms of preference." They found that 51.25% of students exposed to OSCE and 33.75% of them exposed to TCE pointed out that exams were less stressful.

This result disagreed with *Nazzawi (2018); Mater et al. (2014)* in a study about "The impact of the objective structured clinical examination approach for clinical evaluation skills on the student's performance in nursing college" and *Ali et al. (2012)* in a study about "Objective structured clinical examination (OSCE) as an assessment tool for clinical skills in Sohag University. Nursing students' perspective," they pointed out that the majority of the student reported that the OSCE exam was very stressful and can be a source of anxiety-producing for these students. On the other hand, negative student opinions on OSCE have also been reported in a study by *Delavar et al. (2013)*, who reported that around half of students expressed their opinions that the OSCE test was stressful assessment.

Besides, the present study clarified that more than three-quarters of studied students in both groups agreed that they aware of the level of asked information and tasks required to be performed consistent with the course's teaching objectives. This finding concordant with *El Nemer and Kandeel (2009)* in a study about "Using OSCE as an assessment tool for clinical skills: Nursing students' feedback, " who found that studied students in OSCE group can recompense in some areas and minimized their chances

of failure. As well as the present study found that most of the studied pediatric nursing students in the OSCE group, compared with more than three-quarters of them in the TCE group, agreed that the exam was focus on areas of weaknesses.

The quality of TCE and OSCE exam scoring objectivity and validity revealed that a higher proportion of students in the OSCE group compared to those in the TCE group pointed that the exam was fair for testing knowledge and skills, minimizing the chance of failure. It also reflects each student performance during the exam, provides an accurate measure of basic clinical skills and personality and students' social relations of students does not affect the exam scores, these results supported by *Goud et al. (2014)* in a study about "Perceptions and performance of undergraduate medical students in objective structured practical examinations OSPE in Biochemistry at RAK Medical and Health Services University."

Mukwato et al. (2013) in a study about "Implementation of objective structured clinical examination for assessing nursing students' clinical competencies: Lessons and implications" and *Eldarir and Abd Hamid (2013)* in a study about "Objective structured clinical evaluation versus traditional clinical achievement at maternity nursing." They found that most of the students agreed that the exam was fair, minimizing the chance of failure, reflect each student's performance, provide an accurate measure of basic clinical skills, and social relations do not affect the exam scores.

Concerning pediatric nursing students' opinions related to the exam set-up, the current study showed that there is a statistically significant regarding agreement responses of pediatric nursing students in OSCE group related items as; the environment was free from noise, adequate light, and the exam was well-structured than students in TCE.

These findings are in the same line with *Lakshmipathy (2015)* in a study about "student perceptions about physiology subject teaching and objective structured practical examination based formative assessment for improving competencies." The results also supported by *Abraham et al. (2009)* in a study about "A trial of the objective structured practical examination in physiology at Melaka Manipal Medical College," they reported that the relaxed environment considered essential criteria of a proper examination.

Regarding the comparison of pediatric nursing students' traditional method versus objective structured clinical examination total score regarding O_2 administration, CPR, and suction procedures, the results of the current study clarified a highly statistically significant difference between the studied pediatric nursing students' TCE and OSCE total performance scores. This result supported by *Mahmoud et al. (2019)*, who revealed that there a high statistical significance between the studied students' traditional and OSCE total performance scores regarding suction, oxygen therapy, and advanced CPR procedures. This finding is supporting the research hypothesis.

7. Conclusions

Based on the results of the current study, it can be concluded that; the research hypotheses are accepted. Objective Structured Clinical Examination (OSCE) was opinioned as an appropriate tool for clinical evaluation. This finding appeared in pediatric nursing students' responses, which confirmed their acceptance of OSCE. The OSCE subsequently remains a more objective method of assessment than the traditional clinical forms of the exam that previously used.

8. Recommendations

In light of the findings of the current study, the following recommendations are suggested:

- Objective Structured Clinical Examination (OSCE) can be used as an effective and meaningful assistance for practice.
- OSCE can be used most effectively in undergraduate nursing curricula to assess fair practice.
- OSCE should be adopted as a strategy for examining clinical skills for students in all academic years
- Checklists of OSCE are strongly suggested as a reliable and valid assessment for the increased number of nursing students.
- Continuous education and training programs should be provided by using OSCE demonstration workshops for nurses' educators.
- Further studies should be implemented to assess obstacles that hinder the application of OSCE.
- Replication of this study on a larger probability sample and in different settings to generalize the results of this study.

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10. References

1. ***Abd Allah, K., Abd El Sapour, M., Mohamed, S. & Abd Alla, E. (2016).*** The effect of an educational program for cardiopulmonary resuscitation using sim-man versus traditional manikin on 2nd year nursing students' performance, Doctorate Thesis, Faculty of Nursing, Benha University, p 61.
2. ***Abd Allah, K., Ahmed, O., & Hamza, M. (2012).*** Effectiveness of using blended learning versus traditional teaching on the nursing students' performance, a Doctorate thesis**,** Faculty of Nursing, Ain Shams University, p 87.
3. ***Abraham, R., Raghavendra, R., Surekha, K., & Asha, K. (2009).*** A trial of the objective structured practical

examination in physiology at Melaka Manipal Medical College, India. *Adv Physiol Educ, 33*(1), 21- 23. PMid:19261756 https://doi.org/10.1152/advan.90108.2008

4. ***Ali, G., Mehdi, A., & Ali, H. (2012).*** Objective structured clinical examination (OSCE) as an assessment tool for clinical skills at Sohag University. *Nursing students' perspective. Journal of Environmental Studies, 8, 59-69.*
5. ***American Heart Association (AHA) (2015).*** Cardiopulmonary resuscitation, *Available at http//circ. aha journals.org accessed on 10/8/2018.*
6. ***Ameh, N., Abdul, M. A., Adesiyun, G. A., & Avidime, S. (2014).*** Objective structured clinical examination versus clinical examination evaluation of students' perception and preference in a Nigerian Medical School. *Niger Med Journal. 55(4): 310-313. PMid: 25114366* https: //doi.org/10.4103/0300-1652.137191
7. ***Bhatnagar, K. R., Saoji, V. A., & Banerjee, A. A. (2011).*** Objective structured clinical examination for undergraduates: is it a feasible approach to standardized assessment in India? *Indian J. Ophthalmic, 59 (*3), 211-14. Available at http://dx.doi.org/ 10.4103/0301-4738.81032.
8. ***Chetna, K., Yogesh, K., & Srinivasan, P. (2016).*** Assess and compare objective structured clinical examination (OSCE) versus traditional clinical examination (TCE) regarding Denver Developmental Screening Test (DDST II) in terms of preference. *International Journal of Health Sciences and Research, 6*(7), 237-242.
9. ***Delavar, M. H., Salmalian, M. Faramarzi, H. Pasha, M., Nikpour, & Ledari, F. (2013).*** Using Objective structured clinical examinations in undergraduate midwifery students. *Journal of Medicine and Life, 6:* 76-79.
10. ***Dutra, H. S., & Dos Reis, V. N. (2016).*** Experimental and quasi-experimental study designs: Definitions and challenges in nursing research. *J Nurs UFPE on line. Recife, 10(6):2230-41. DOI: 10.5205/reuol.9199-80250-1-SM1006201639.*
11. ***El Nemer, A., & Kandeel, N. (2009).*** Using OSCE as an assessment tool for clinical skills: Nursing students' feedback. *Australian Journal of Basic and Applied Sciences, 3*(3), 2465-2472.
12. ***Eldarir S, & Afefi, N. (2013).*** Objective structured clinical evaluation versus traditional clinical achievement at maternity nursing: A Comparative Approach. *IOSR Journal of Dental and Medical Sciences. 4*(3), 63-68. https://doi.org/10.9790/0853-0436368
13. ***Fidment, S. (2012).*** The Objective Structured Clinical Exam (OSCE): A Qualitative Study Exploring the Healthcare Student's Experience. *Student Engagement and Experience Journal, 1* (1), 1-11.2465-72.
14. ***Gormley, G. (2011).*** Summative OSCEs in undergraduate medical education. *Nurse Education in Practice, 80,* 127-132.
15. ***Goud, B. K. M., Begum, S., Zakin, B., & Haridas, S. (2014).*** Perceptions and performance of undergraduate medical students in objective structured practical examinations OSPE in Biochemistry at RAK Medical and Health Services University, UAE. *Journal of Universal College of Medical Science, 2*(4), 54-61.
16. ***Gupta, P., Dewan, P., & Singh, T. (2010).*** Objective structured clinical examination (OSCE) Revisited. *Indian Pediatrics, 47*(11), 911-920. http://dx.doi.org/10.1007/s13312-010-0155-6
17. ***Harden, R. M., Stevenson, M., Downie, W. W., & Wilson, G. M. (1975).*** Assessment of clinical competence using the objective structured examination. *Br Med J. 11*(5955), 447–451. doi:10.1136/bmj.1.5955.447
18. ***Hasan, E., Ali, L., Pasha, A., Arsia, J., & Farshad, S. (2012).*** Association of the pre-internship objective structured clinical examination in final year medical students with a comprehensive written examination. *Med Educ Online, 17,* 1-7. *http://dx.doi.org/10.3402/meo.v17i0.15958.*
19. ***Hockenberry, M., & Wilson, D. (2015).*** *Wong's clinical manual of pediatric nursing. 8th ed., London: Mosby. Pp: 652-658.*
20. ***Kim, J. H., & Kim, H. J. (2013).*** Relationships between the objective structured clinical examination, depression cognitive scale, self-efficacy, and problem-solving strategies of Sophomore nursing students, *International Journal of Bioscience and Biotechnology, 5*(4), 73-80.
21. ***Kipsang, J., & Bruce, J. C. (2013).*** Study comparison of cardiopulmonary resuscitation competence between two groups of advanced practice student nurses at a Medical Training College in Kenya. *Africa Journal of Nursing and Midwifery, 13(2), 103-118.*
22. ***Lakshmipathy, K. (2015).*** MBBS student perceptions about physiology subject teaching and objective structured practical examination based formative assessment for improving competencies. *Adv. Physio. Educ, 39,* 198-204. *PMid:26330038 https://doi.org/10.1152/advan.00073.2014*
23. ***Mahmoud, D. M., Shereif, W. I., Rezk, M. M., & Ghonaem, S. E. (2019).*** Objective structured clinical examination versus traditional clinical examination on the achievement of medical-surgical nursing students. Unpublished Doctorate Thesis in Medical-Surgical Nursing. Faculty of Nursing, Benha University.
24. ***Marie, A. B. (2011).*** The Effect of simulation on knowledge, self-confidence, and skill performance. Doctorate Thesis, Frances Payne Boltan School of Nursing Case Western Reserve University. 59.
25. ***Mater, E. A. M., Ahmed, E. I., El Sayed, A. A., Shaikh, M. A. E., & Farag, M. K. (2014).*** The impact of the objective structured clinical examination approach for clinical evaluation skills on the student's performance in nursing college. *World J MedSci, 11*(4), 609-613.
26. ***Miller, G. (1990).*** The assessment of clinical skills/competence/ performance. *Academic Medicine. 65* (9),563–567

27. ***Mitchell, M. L., Henderson, A., Groves, M., Dalton, M., & Nulty, D. (2009).*** The objective structured clinical examination (OSCE): Optimizing its value in the undergraduate nursing curriculum. *Nurse Education Today.* 29(4), 398-404. doi: 10.1016/j.nedt.2008.10.007. Epub 2008 Dec 3.
28. ***Mitchell, M. L., Henderson, A., Jeffrey, C., Nulty, D., Groves, M., Kelly, M., Knight S., & Glover, P. (2015).*** Application of best practice guidelines for OSCEs: An Australian evaluation of their feasibility and value. *Nurse education today, 5*(5), 700-705. https://doi.org/10.1016/j.nedt.2015.01.007
29. ***Mukwato, P. K., Mwape, L., Kabinga-Makukula, K., Mweemba, P. & Maimbolwa, M. C. (2013***). Implementation of objective structured clinical examination for assessing nursing students' clinical competencies: Lessons and implications**.** *Sci Res Journal, 4*(10), 48-53.
30. ***Nafee, H. M., Ahmed, A. E., & Hussien, A. M. (2019).*** Objective structured clinical examination versus traditional clinical examination among nursing students: A comparative approach. *Journal of Nursing Education and Practice, 9(*2), 42-52, available at http://jnep.sciedupress.com.DOI: 10.5430/jnep.v9n2p42 URL: https://doi.org/10.5430/jnep.v9n2p42.
31. ***Nazzawi, A. A. (2018***). Dental students' perception of objective structured clinical evaluation. *Journal of Tiba University Medical Sciences, 3*(1), 64-69. https://doi.org/10.1016/j.jtumed.201 7.09.002
32. ***Pierre, R., Wierenga, A., Batron, M., Branday, J., & Chrietie, C. (2004).*** Students evaluation of an OSCE in pediatrics at the University of West Indies, Jamaica. *BMC Medical Education, 4*(22), 1-7. *http://dx.doi.org/10.1186/1472-6920-4-22*.
33. ***Salah, R. S. (2013).*** The effect of using simulation-based learning versus traditional learning on nursing students' clinical performance of the respiratory system, Doctorate thesis, Faculty of Nursing, Alexandria University, p 80.
34. ***Samir, S., Karam O. H., Ahmed, A. O. & Hamza, M.F. (2012).*** Effectiveness of using blended learning versus traditional teaching on nursing students' performance. An unpublished Doctorate thesis, Faculty of Nursing, Ain Shams University**,** *Egyptian journal of health care, p 87.* Available at: http://research.asu.edu.eg/handle/123456789/168168
35. ***Selim, A., Ramadan, F., El-Gueneidy M., & Gaafer M. (2012).*** Using objective structured clinical examination (OSCE) in undergraduate psychiatric nursing education: Is it reliable and valid? *Nurse Education Today Journal, (32)* 283–288. http://dx.doi.org/10.1016/j.nedt.2011.04.006
36. ***Smrekar, M., Ledinski Fičko, S., Hošnjak, A. M., & Ilić, B. (2017).*** Use of the objective structured clinical examination in undergraduate nursing education. *Croat Nurs J, 1*(1), 91-102. DOI:10.24141/2/1/1/8.
37. ***Sola, M., Pulpon, A. M., Morin, V., Sancho, R., Cleries, X., & Fabrellas, N. (2017).*** Towards the implementation of OSCE in the undergraduate nursing curriculum: A qualitative study**.** *Nurse education today, 49 (1), 163-167.* doi: 10.1016/j.nedt.2016.11.028.
38. ***Wani, P. D. (2015).*** Traditional clinical examination versus objective structured practical examination in human physiology: Examiner's bias. *International Journal of Medical Science and Public Health, 4*(5), 607-611. Website: http://www.ijmsph.com. DOI: 10.5455/ijmsph.2015.17042014122