


## RESEARCH ARTICLE

# Efficacy of simulated video on test anxiety in objective structured clinical examination among nursing and midwifery students: A quasi-experimental study

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## Abstract

**Aim:** This research investigated the effectiveness of simulated video on test anxiety in the Objective Structured Clinical Examination (OSCE) among nursing and midwifery students.

**Design:** A quasi-experimental study with a two-group pre-test and post-test design.

**Methods:** This study was conducted on 118 nursing and midwifery students in Shahroud northeast of Iran in 2019 using the census sampling method. The intervention group received a 15-minute OSCE simulation video half an hour before the test. Data were collected using the Sarason test anxiety questionnaire in two stages: one week before the test and after the simulation film was screened. Data were analysed using descriptive and inferential statistics (Independent *t*-test, Chi-square, Exact fisher and Paired *t*-test).

**Results:** At baseline, no significant difference was observed between groups in the total mean score of test anxiety. The mean score of test anxiety significantly decreased in the OSCE simulation video group after the intervention.

## KEYWORDS

medical education, simulation training, student, test anxiety

## 1 | INTRODUCTION

Clinical education for nursing and midwifery students is more important than theoretical knowledge in developing their clinical competencies. They will soon provide care to people struggling with many different issues (Zamanzadeh et al., 2021). The common method for developing clinical competencies is a clinical simulation where students engage in an artificial situation related to a clinical

environment. Some advantages of this method include creating an atmosphere similar to real-life conditions and providing a controlled and safe process for students to learn and practice crucial skills. This method is useful for student learning and teachers' evaluation of that learning. Objective Structured Clinical Assessment (OSCE) is one such simulation method. OSCE consists of different stations where students can practice skills with simulated patients (Sánchez-Conde & Clemente-Suárez, 2021). In this method, students demonstrate

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their skills at several stations in a specified time (Zamanzadeh et al., 2021). This method has been shown to increase students' clinical competencies (Kolivand et al., 2020).

Most medical students believe OSCE is a valuable assessment method because through the method, they learn which skills are important and which need to be improved (Kolivand et al., 2020; Labaf et al., 2014). This method can give an accurate picture of student performance and the effectiveness of the training course. The method helps clinical instructors standardize their teaching. Students must prove acceptable performance to graduate, start a new course and progress to the next stage in such medical science exams (Gwynne & Morgan, 2014). They, therefore, strengthen students' motivation to study and practice necessary skills and procedures (Müller et al., 2019).

Despite the benefits of this method, many students find this form of assessment more stressful than other methods due to its complexity and the importance of time management. A review of nursing and midwifery literature showed that nursing educators and students report performance-based competency examinations as potentially stressful experiences (Al-Ghareeb et al., 2017; Lejonqvist et al., 2016). Some researchers reported a high level of test anxiety among nursing and midwifery students (Duty et al., 2016; Moradi et al., 2021). Various factors are associated with students' test anxiety, including chronic stress, the burden on students while studying, rigorous progression standards, excessive course loads, fear of failure during examinations and studying all night before exams (Al-Sahman et al., 2019; Quinn & Peters, 2017).

High levels of OSCE-related anxiety may be due to students being individually assessed by assessors (Kerkstra et al., 2018). de Souza Teixeira et al. (2014) showed that nursing students' had significantly higher levels of anxiety performing clinical evaluations with an in-person evaluator than when they were filmed and evaluated remotely (de Souza Teixeira et al., 2014). Furthermore, the test is performed only once at each station and is irreversible, so there is no opportunity to correct mistakes (Mojarrab et al., 2020). Also, some research showed that students experience more stress at the beginning of OSCE due to unfamiliarity with the examination process (Acharya et al., 2018; Labaf et al., 2014; Mojarrab et al., 2020).

Other research found that high levels of stress and anxiety before the test can negatively affect student performance (Ferreira et al., 2020; Mojarrab et al., 2020). These factors can be explained through Zeidner and Matthews' (2005) theory that test anxiety is a multi-causal phenomenon influenced by many factors such as meta-cognition, coping strategies, motivation, self-belief, severity and degree of competency, and related beliefs (Zeidner & Matthews, 2005).

## 1.1 | Background

Researchers have used various interventions to alleviate test anxiety in nursing students, including progressive muscle relaxation, guided reflection, cognitive restructuring, thought stopping, earplugs and

aromatherapy methods (Hashemi et al., 2021; Poorman et al., 2019; Sharif et al., 2013; Zargarzadeh & Shirazi, 2014).

Some studies have been conducted to reduce OSCE-related distress in students. Dunne et al. (2018) showed that conducting an OSCE familiarization workshop for nursing students reduced test-related anxiety. Young et al. (2014) similarly showed that pre-test OSCE simulation reduced student anxiety (Dunne et al., 2018; Young et al., 2014).

Integration of new technologies in higher education, such as simulation online learning, and blended learning, can facilitate student-centred learning (Brown, 2016; Karoglu et al., 2014). Furthermore, providing educational materials in a wide range of models provides even more collaborative and individual learning opportunities (Karoglu et al., 2014). Video simulation training is one method of e-learning. It can be used to provide examples of subjects for students. It seems to facilitate active learning and a better understanding of clinical skills. If the OSCE examples are presented to the students in the video, students might develop a positive attitude and familiarity with the clinical skills assessment environment (Massey et al., 2017).

Simulation videos can also help develop nursing knowledge and proficiencies (Lynch et al., 2012). Using such videos in a blended learning context enables students to observe best practices and provides a suitable linkage between theory and practice (Coyne et al., 2018). The simulation is defined as "an educational strategy in which a particular set of conditions are created or replicated to resemble authentic situations that are possible in real life" ("INACSL Standards of Best Practice: Simulation SM Simulation Glossary," 2016).

In this regard, Massey et al. (2017) showed the effectiveness of providing pre-OSCE video presentations in improving understanding of OSCE expectations in nursing students. The researchers found a decrease in anxiety and stress levels (Massey et al., 2017). Simulated videos are also easier and more inexpensive to prepare than other interventions (e.g. aromatherapy, Cognitive behaviour therapy [CBT]). Considering the importance of test anxiety in students, its adverse effects on students' clinical and academic performance, and the limited number of studies conducted in this field, in this study, we aimed to evaluate the effectiveness of simulated video on test anxiety in objective structured clinical examinations among nursing and midwifery students. This study was possible to be conducted in terms of ease of intervention and content preparation and no need for the presence of experts.

Our research question was: What is the effect of simulated video on test anxiety in Objective Structured Clinical Examination (OSCE) among nursing and midwifery students?

## 2 | THE STUDY

### 2.1 | Design

This study is quasi-experimental, with a two-group pre-test-post-test design.

## 2.2 | Participants

Participants included 118 first-semester nursing and midwifery students of Shahroud School of Nursing and Midwifery in North-Eastern of Iran in 2019. Inclusion criteria included studying in the first semester. The students' clinical skills were assessed using the OSCE method at the end of the semester. Exclusion criteria were (1) suffering from psychological disorders or experiencing grief within 8 weeks of the test, and (2) past participation in any test with a structure similar to OSCE (previous experience of participating in an OSCE can be a factor in reducing the psychological distress caused by the test). Four participants were excluded due to their previous history of evaluation under an OSCE. Of all 122 nursing and midwifery students, 118 eligible students were included. One hundred and eighteen nursing and midwifery students in their first university entrance (nursing = 40, midwifery = 19) and second university entrance (nursing = 38, midwifery = 21) in 2019 were selected by census method.

## 2.3 | Intervention: Simulation video

The intervention consisted of presenting a 15-minute OSCE-simulated video to students half an hour before the start of OSCE in the entrance quarantine. In this video, actors simulate a student and examiner during an OSCE test. The clinical procedures shown in the simulated video did not overlap with the original test material because the participants were not aware of the content of the real OSCE. A checklist was provided to assess the qualitative content validity of the simulated video to the panel of experts consisting of 10 faculty members in nursing and medical education to evaluate the necessary items for the preparation of the simulated video. (Such as video duration, video quality and resolution, standard video recording environment, simulated test stations, OSCE evaluation checklists, and a number of evaluators and students). For the comparison group, routine educational actions of the faculty were performed.

The first entrance students in 2019 were considered as a control group (January 6–13, 2019), and students of the second entrance were considered as an intervention group (July 14–21, 2019) based on the type of intervention and to prevent information leakage between the two groups. Due to the type of intervention, blinding between the two groups was not possible. The students completed the test anxiety scale in two stages: the first one week before their OSCE, and the second after watching the simulated video in the pre-OSCE quarantine.

## 2.4 | Data collection tools

Data collection tools included a demographic profile form and a Sarason test anxiety questionnaire. Demographic characteristics collected included gender, age, marital status, the field of study, job status, residence status, interest in the field, number of pre-OSCE

practice sessions and the final OSCE scores (the lowest and highest scores obtained from OSCE were 0 and 20, respectively).

## 2.5 | Sarason's test anxiety scale

Sarason developed the test anxiety scale in 1957. The test includes 37 items to which participants respond "yes" or "no." A higher score indicates levels of test anxiety. A score of 12 or lower indicates mild test anxiety, a score of 13 to 20 indicates moderate test anxiety, and a score of 21 or higher indicates severe test anxiety (Sarason, 1978). The reliability of a Persian version of this questionnaire was measured by Farnia et al. (2017), which is acceptable based on internal consistency using Cronbach's alpha coefficient equal to 0.84 (Farnia et al., 2017).

## 2.6 | Analysis

Data were analysed using descriptive statistics (absolute and relative frequency, mean and standard deviation) and inferential statistics (independent *t*-test and paired *t*-test) in both control and intervention groups. The significance level was considered  $p < .05$  for all statistical tests.

## 2.7 | Ethics

This study was approved by the ethics council of Shahroud University of Medical Sciences with the code of ethics IR.SHMU.REC.1399.105. Before beginning data collection, the method was explained to all participants, and they were assured that their information would be kept confidential. Informed consent was obtained from all participants.

## 3 | RESULTS

The mean age in the intervention and control groups was  $19.92 \pm 3.02$  and  $20.08 \pm 2.86$ , respectively. The two groups were not significantly different in terms of demographic variables such as the number of pre-OSCE training, interest in the field of study and other variables. The mean scores in the two groups were homogenous in these respects (see Table 1).

The independent *t*-test showed that the control and simulated video groups did not differ significantly in test anxiety mean scores before ( $p = .23$ ) and after the intervention ( $p = .07$ ). (Table 2).

These findings showed that the mean OSCE score was not significantly different between the two groups ( $p = .54$ ; see Table 3) after the intervention. However, in the intragroup comparisons, paired *t*-test results showed that the test anxiety score in the simulated group significantly decreased compared to pre-intervention ( $p = .04$ ), whereas the control group did not have a significant decrease or change ( $p = .43$ ).

## 4 | DISCUSSION

Objective Structured Clinical Examination is a great opportunity for students to improve their clinical skills, and also it can cause anxiety (Harden, 2016). In this study, before the real OSCE experience,

TABLE 1 Demographic characteristics of study participants

Variables	Control (N = 59)	Intervention (N = 59)	p
	N (%)	N (%)	
Gender			
Male	21 (35.6)	18 (30.5)	.56
Female	38 (64.4)	41 (69.5)	
Residence status			
With family	21 (35.6)	20 (33.9)	1.00
Dormitory	38 (64.4)	38 (64.4)	
Rented house	0 (0.0)	1 (1.7)	
Field of study			
Nursing	40 (67.8)	38 (64.4)	.70
Midwifery	19 (32.2)	21 (35.6)	
Marital status			
Single	53 (89.9)	53 (89.9)	1.00
Married	6 (10.1)	6 (10.1)	
Job status			
Unemployed	54 (91.5)	53 (89.8)	.83
Student work	2 (3.4)	1 (1.7)	
Practical nurse	3 (5.1)	3 (5.1)	
Other	0 (0.0)	2 (3.4)	
	Mean (SD)	Mean (SD)	
Age	20.08 (2.86)	19.92 (3.02)	.76
Pre-OSCE practice sessions	4.61 (2.25)	4.46 (1.77)	.69
Interest in the field	7.61 (1.86)	7.54 (2.23)	.84

Abbreviations: %, percent; N, frequency; OSCE, Objective Structured Clinical Examination; p, p-Value; SD, Standard deviation.

participants were introduced to the OSCE process through the display of simulated videos. Interventions to prepare students for OSCE can reduce pre-test levels of test anxiety (Yusefzadeh et al., 2019). In this regard, Dunne et al. (2018) stated that pre-OSCE anxiety management programmes can effectively control anxiety levels among nursing students (Dunne et al., 2018).

As mentioned above, lack of familiarity with OSCE can be one of the reasons for test anxiety in students. In this regard, Al-Zeftawy and Khaton (2016) showed that students' previous experience of participating in the OSCE test was associated with lower levels of stress (Al-Zeftawy & Khaton, 2016). Therefore, preparing and familiarizing students before the test can effectively reduce the anxiety caused by the test (Massey et al., 2017). For this reason, increasing familiarity with the test through a simulated OSCE was suggested as an effective way to reduce anxiety on the actual test (Emery & Rose-Innes, 2017).

This study showed that test anxiety was significantly reduced in the intervention group after receiving the simulated video. However, no significant difference was observed between the two groups in terms of test anxiety scores in the intergroup comparison. Other studies have shown that simulated interventions can effectively reduce students' stress and anxiety in their first experiences in clinical practice (Khalaila, 2014; Szpak & Kameg, 2013). Khadivzadeh and Erfanian (2012) showed that simulated obstetrics and gynaecological models effectively reduced students' anxiety levels while practicing (Khadivzadeh & Erfanian, 2012). The

TABLE 3 Mean (SD) of OSCE scores in two groups of simulated video after intervention

Variable	Intervention	Control	Intergroup test results
	Mean (SD)	Mean (SD)	
OSCE score	11.96 (2.82)	11.67 (2.36)	T = 0.622 df = 116 p = 0.54 <sup>a</sup>

Abbreviations: OSCE, Objective Structured Clinical Examination; p, p-Value; SD, Standard deviation.

<sup>a</sup>Independent sample t-test.

TABLE 2 Mean (SD) of test anxiety scores in two groups of simulated video and control before and after intervention

Variable		Intervention	Control	Intergroup test results
		Mean (SD)	Mean (SD)	
Test anxiety	Before intervention	16.74 (6.27)	18.18 (6.69)	T = -1.20 df = 116 p = 0.23 <sup>a</sup>
	After intervention	15.77 (6.28)	17.91 (6.33)	T = -1.83 df = 116 p = 0.07 <sup>a</sup>
	Intragroup test results	T = -0.96 df = 58 p = 0.04 <sup>b</sup>	T = -0.27 df = 58 p = 0.43 <sup>b</sup>	

Abbreviations: p, p-Value; SD, Standard deviation.

<sup>a</sup>Independent sample t-test.

<sup>b</sup>Pair sample t-test.

clinical skills of medical students can also be enhanced by using simulations including videos depicting real clinical situations (Choi et al., 2015).

Contrary to the results obtained in this study, in evaluating the effect of simulated video puncture and heparinization of Totally Implantable Access Ports (TIAP) on cognitive and technical competencies of nursing students, Cardoso et al. (2012) did not find simulated videos to have a significant effect on reducing related anxiety. Possible causes of these discrepancies in findings could be differences in sample size, anxiety-induced situations and intervention implementation processes.

Massey et al. (2017) found that utilizing video exemplars increased students' confidence, engagement and understanding of performance expectations. These researchers also found that the exemplars reduced students' anxiety when preparing for OSCE, but the exemplars did not affect overall OSCE performance. The results of our current study are in line with Massey et al. (2017), showing significantly reduced anxiety for the intervention group and no significant differences in performance between groups on the OSCE (Massey et al., 2017).

This study showed that while students' performance in the experimental group was slightly better than in the control group, this difference was not statistically significant. This finding is consistent with the results of a previous study in Taiwan (Lee et al., 2019).

Overall, one difference between this study and previous studies is that in previous studies, simulations were used continuously during the semester, but this study only used the simulation minutes before the test. Given that in this study, student test performance was measured only by the score obtained from the OSCE, the score scale alone is not sufficient to measure student performance. It can provide a better picture to have continuous evaluation. Using simulated video during the learning period can affect students' test performance; however, we showed the simulated video minutes before the test in our study. We think the short time between the simulation and the real test can create a significant difference in the experimental group based on the pre-test and post-test. However, the short time frame may also explain the statistical insignificance between the experimental and control group.

#### 4.1 | Limitations

Since students taking the OSCE often communicate with senior students before taking the test themselves, to prevent information leakage between the intervention and control groups, first-entrance nursing and midwifery students were selected as the control group and second-entrance students as the intervention group. This allocation was non-random and purpose-based. The quantitative measurements were not utilized for examine the validity of intervention in the present study. Another limitation was the short time between the OSCE simulation video and the real test.

#### 4.2 | Implications

This work has implications for researchers, educators, mental health providers and administrators. Future researchers can use simulation videos a few times rather than one time and measure the effect change based on number of simulations. Future researchers can also use a new, comprehensive and collaborative method called Online Photovoice (Tanhan, 2020; Tanhan & Strack, 2020) to understand the facilitators and barriers of simulation and their real OSCE processes. This method can help to improve future OSCE simulations and increase understanding of students' biopsychosocial, spiritual and economic contexts. Educators in nursing and midwifery can integrate simulations into their weekly work and provide opportunities to their students to watch the videos many times at their convenience.

Mental health providers can collaborate with nursing and midwifery educators and their students to address barriers and advance facilitators that affect the students' OSCE performance. Administrators should pay close attention to OSCE. They can act from a Community-Based Participatory Research (Dari et al., 2019) perspective to collaborate with educators, simulation makers and students to provide more effective tools, environments and opportunities to enhance the overall quality of student education.

#### 5 | CONCLUSIONS

Rigorous and challenging health care training programmes expose students to high levels of anxiety and stress that can undermine their ability to learn and perform well on tests. Nursing and midwifery students experience test anxiety due to the high importance of the OSCE in determining their educational outcomes. The results suggest that simulated video decreased OSCE-related test anxiety in nursing and midwifery students.

#### AUTHOR CONTRIBUTIONS

A. A contributed to the conceptualization, methodology, investigation and writing – original draft preparation. M. B substantially contributed to the conceptualization, investigation and writing – original draft preparation. N. F contributed to the investigation, data collection and writing – original draft preparation. M. H. B substantially contributed to the formal analysis, interpreted the data and writing – original draft preparation. A. T contributed to the investigation and writing – review and editing. R. M contributed to the investigation, data collection and writing – original draft preparation. S. M substantially contributed to the conceptualization, methodology, writing – review and editing, supervision and project administration.

All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE (<http://www.icmje.org/recommendations/>)]:

- substantial contributions to conception and design, acquisition of data or analysis and interpretation of data;

- drafting the article or revising it critically for important intellectual content.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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