Validation of Objective Structured Clinical Examination (OSCE) based on the Occupational Therapy Practice Framework (OTPF): A pilot study

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Keywords

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ABSTRACT

Fieldwork education is an integral part of the educational process in occupational therapy and assessing student competency at the end of fieldwork is important. The aim of this study was to design and conduct an Objective Structured Clinical Examination (OSCE) based on the Occupational Therapy Practice Framework (OTPF) for occupational therapy students on Level II fieldwork in Iran. A seven-station OSCE was designed and conducted with 13 students. Face and content validity of the exam scenarios and grading checklists was assessed via faculty review. The correlation between scores from each station and total OSCE scores were obtained to assess construct validity. Inter-rater reliability between two independent examiners at each OSCE station was determined. The participants' (including both students and examiners) reactions to and learning from the exam was assessed using a self-report questionnaire that included participants' attitudes, satisfaction, and emotional response to the OSCE. Finally, a focus group of 12 examiners was conducted to examine the strengths and weaknesses of the exam. It was ascertained that the OSCE had good and acceptable face, content, and construct validity as well as inter-examiner reliability. All students reported that the exam was stressful, and most students (n=8, 61%) and examiners (n=5, 42%) reported there was not enough time for each station. Strength and weaknesses of the exam as related to the exam condition, exam content, students, and examiners were reported. Based on the qualitative and quantitative analysis of the results, in order to use OSCE as a method of evaluating occupational therapy students, some changes should be applied.

Introduction

Clinical education is an integral part of the educational program of medical sciences including occupational therapy (OT; Pashmdarfard & Shafarood, 2018). One important outcome of clinical education is clinical competence, which is a main characteristic of individuals in the process of professionalization and is a combination of theoretical and practical knowledge (Navas-Ferrer et al., 2017). According to Miller's (1990) theoretical framework for clinical competency, there are four levels of learning, including: 1) Knows (assessment of knowledge); 2) Knows How (assessment of competence); 3) Shows How (assessment of performance); and 4) Does (assessment of action/live practice). Each level of learning may be assessed by several methods (Miller, 1990; Navas-Ferrer et al., 2017). Clinical evaluation and using methods to assess the skills, competencies, and abilities of the students, is of particular importance (Farajzadeh et al., 2012).

The Objective Structured Clinical Examination (OSCE; Farajzadeh et al., 2012) is one of the best methods to assess students' clinical competency because it can evaluate the achievement of educational goals in terms of their cognitive, emotional and psychomotor abilities. OSCE was first described by Harden and Gleeson in 1975 as an objective, rather than subjective, method of assessing a student's clinical competence, and in which the areas tested are carefully planned by the examiners (Harden & Gleeson, 1979). In this method, there are several clinical skill assessment stations. At each station, examiners are asked to evaluate students in performing station-specific clinical skills (Farajzadeh et al., 2012). In an OSCE, examiner bias is limited because the scoring procedure is determined in advance by the exam team; a scoring checklist is used for each station; and the conditions are the same for all examinees (Harden & Gleeson, 1979).

Krusen and Rollins (2019) found the OSCE to be valid in assessing clinical skills, and students perceived it as stressful but a valuable learning experience. They found that during the OSCE, learning also takes place while clinical skills are performed at each station, and that OSCE can provide a focus on students' global careers rather than just specific clinical competencies. They suggested the utility of OSCEs as a strategy to assess clinical competence in OT (Krusen & Rollins, 2019). Sakurai et al. (2014) stated it is important to establish the OSCE system for evaluation of students' competency by rehabilitation specialists. Most of the studies about the evaluation of clinical education of students suggested that schools should implement the OSCE as a valid method for evaluation of students (Farajzadeh et al., 2012; Krusen & Rollins, 2019; Sakurai et al., 2014).

To promote quality clinical education, the assessment of the fieldwork should be consistent with the educational content (Farajzadeh et al., 2012). The Occupational Therapy Practice Framework (OTPF) is an official document from the American Occupational Therapy Association (AOTA, 2014). This framework is intended as a guide for OT professionals and students, other health care professionals, educators, researchers, and consumers. The framework provides a summary of the intertwined

structures that describe OT practice (AOTA, 2014) and was useful for designing an OSCE. This study was the first to investigate OT students' Level II fieldwork clinical competency using an OSCE based on the OTPF, 3rd edition (the 4th edition was not released at the time of the study).

Methods

This study used mixed methods. In the quantitative part, the validity and reliability of the OSCE in occupational therapy students were studied and in the qualitative part, the strengths and weaknesses of the OSCE from the viewpoints of students and assessors were studied. This study was conducted during the Covid-19 pandemic, which limited the number of participants. Only the students who passed their fieldwork in Iran University of Medical Sciences fieldwork settings participated in this study. The participants were 13 students (8 males and 5 female) and 12 examiners (9 females and 3 male). All participants had completed an informed consent form. This study was approved by the ethics committee of Iran University of Medical Sciences (code: IR.IUMS.REC.1398.875).

OSCE Implementation

This exam was carried out in 8 steps as follows:

Step 1: Deciding on OSCE Efficiency to Achieve the Evaluation Goals

The research team reviewed the literature related to assessment of students' clinical skills and competence (AOTA, 2014; Farajzadeh et al., 2012; Krusen & Martino, 2020; Krusen & Rollins., 2019; Sakurai et al., 2014). The evidence showed that the OSCE method was valid for this purpose. The first author presented the results of the literature review to an expert panel consisting of the research team members, and the director and clinical deputy of the OT department to decide whether to conduct an OSCE to assess Level II fieldwork clinical competency. The panel agreed to hold the OSCE on August 5, 2020.

Step 2: Identifying the Stations

Seven stations (based on the expert panel and evidence from the literature review) were identified (Chung-Pei et al., 2017; Matsell, 1991; Selim et al., 2012). See Table 1.

Table 1

Overview of OSCE Stations

Station Number	Focus
1	Communication skills
2	Psychosocial disorders (Adult)
3	Physical disabilities (Adult/neurology)
4	Rest
5	Physical disabilities (Adult/orthopedics)
6	Psychosocial disorders (pediatric)
7	Physical disabilities (pediatric)

To increase reliability of the OSCE, it was decided there would be two examiners (who were also the educators of the students in fieldwork) in each station score the students' performance (Navas-Ferrer et al., 2017). At each station, the mean score of the students' performance was calculated.

Step 3: Determining the Scenarios and the Simulated Patient
The initial drafts of clinical scenarios for each station with relevant scoring checklists were designed based on OT reference books (Trickey-Rokenbrod, 2017) and the OTPF-3 (AOTA, 2014) and then were sent to the examiners. The examiners revised the scenarios and sent back to the researcher. The scenarios were selected based on the most common OT clients who were referred to the general hospitals and advice from the expert panel. For example, in the station of physical disabilities (pediatric), the scenario of a child with cerebral palsy was included.

After the scenarios were confirmed by the examiners, initial preparations for the OSCE took place. The number and content of scenarios, scoring checklists, and simulated patients for each station were determined. Scoring checklists for each station were prepared based on the OTPF (AOTA, 2014). The students had to identify components of the OTPF in each scenario; and the examiners had to score separately on the scoring checklist.

Step 4: Preparing the Exam Environment
Due to the pandemic conditions of Covid-19, the OSCE environment was prepared in accordance with the health protocols published by Ministry of Health and Medical Education (Bastanhagh et al., 2020). The post-graduate department of the School of Rehabilitation Sciences of Iran University of Medical Sciences was used because the classrooms had maximum space and windows to create airflow. All tools were disinfected by service personnel and there were alcohol-based hand/surface sanitizer and a pack of gloves at each station. There were two quarantine rooms for the students. A bell was installed in the hall to alert students to change stations.

At each station, there were required equipment, scenarios, student questions (Appendix), and an overview of the OTPF. Given the importance of the OTPF and the fact that student learning was expected to take place during the OSCE, the research team installed an overview of the domain and process of the OTPF in the form of a poster at each station.

Step 5: Simulated Patient Education
The day before the exam, simulated patients including four adults and two children, were trained by the research team. The research team trained the simulated patients how to behave during the exam process. By doing this the simulated patients became familiar with the exam environment, the examiners, and practiced by role playing. A role-playing session specific to each clinical scenario was held separately by the examiners of each station and the simulated patient of the relevant station to resolve any problems and ambiguities.

Step 6: Training the Students

To follow the health protocols related to the Covid-19 pandemic, the students were provided education about the OSCE in a virtual session a day before the test on the Skyroom platform. In this session, students were given information about the start and end time of the exam, the number of stations, the general theme of each station, the length of time at each station, and the waiting time to enter the next station. The research team answered students' questions and clarified ambiguities. In this session, 13 students were randomly divided into two groups of six and seven people.

Half an hour before starting the OSCE, the students' first stations were randomly selected by the students themselves in the quarantine room. Students were reminded that after completing the station, they should go to the next station when the bell rings, until all stations were completed.

Step 7: Administering the OSCE

The first group of students (n=7) entered the quarantine room at 8:30 a.m. for orientation, and their exam lasted from 9:00 to 10:30 a.m. The second group of students (n=6) entered the quarantine room at 10:30 for orientation, and their exam lasted from 11:00 a.m. to 12:30 p.m. At the end of the exam, the students and examiners completed the exam survey and evaluation form about the OSCE exam.

The OSCE was held in seven stations as follows:

Station 1: Communication Skills. First, the student was asked to randomly select one of four scenarios and communicate effectively with the simulated patient according to the scenario (scenario 1: parent of a child with Cerebral Palsy; scenario 2: a patient with a history of depression and attempted suicide; scenario 3: a 70-year-old woman with left cerebral vascular accident (CVA); and scenario 4: a 7-year-old girl with autism spectrum disorder (ASD). Then the student watched a short film in which an OT was taking a history and biography from his clients; the student should have pointed out two positive and negative points of the observed communication. The student had to state their response out loud and write down as well.

Station 2: Psychosocial Disorders (Adult). At this station, a film was used instead of a simulated patient, in accordance with the method proposed by McMaster University (Roberts & Norman., 1990). At this station, the student first read the scenario, then listened to a three-minute video in which a patient with schizophrenia was speaking about her problems, and then answered the questions. Please see the questions posed to the students in the appendix.

Station 3: Physical Disabilities (Adult-neurology). The students administered some procedures on the simulated patient (a patient with right CVA) according to the questions in the appendix.

Station 4: Rest Station.

Station 5: Physical Disabilities (Adult-orthopedics). The students took the necessary steps (based on the questions in the appendix) on the simulated patient (a patient with left Colle's fracture).

Station 6: Psychosocial Disorders (Pediatric). At this station, students took the necessary steps (based on the questions in the appendix) on the simulated patient (a 7-year-old child with attention deficit/hyperactivity disorder).

Station 7: Physical Disabilities (Pediatric). At this station, students took the necessary steps (based on the questions in the appendix) on the simulated patient (a 7-year-old child with diplegic Cerebral Palsy).

Assessment of the OSCE and Data Analysis

Three methods were used to assess the OSCE.

To check the face and content validity of the scenarios and checklists, their content was reviewed by 10 OT faculty members from Iran University of Medical Sciences. The correlation between scores from each station and total OSCE scores were obtained to assess construct validity using nonparametric Spearman's correlation coefficient. The score of each station was the mean score of two examiners and the total score of OSCE was the mean score of all stations.

Reliability of the OSCE was also examined. Some studies suggested that having at least 12 stations and one examiner in each station is needed for reliability (Navas-Ferrer et al., 2017). In our study, because of the environmental situation, we had only seven stations but to increase the reliability and compensate for the absence of additional stations, we used two examiners in each station. The two examiners rated the student's performance separately. The inter-rater reliability between two independent examiners who scored students simultaneously were determined; the coefficient of correlation was calculated and categorized as excellent (> 0.9), good (0.7-0.89), borderline (0.5-0.69), acceptable (0.3- 0.49), and poor (< 0.3; Vaseghi et al., 2013).

The participants' (including both students and examiners) reactions to and learning from the exam was assessed using a specific self-report questionnaire (Hastie et al., 2014; Panchenko, 2013) that included students' attitudes, satisfaction, and emotional response to the OSCE. A self-report questionnaire developed by Imani and Hosseini (2005) was used. This questionnaire included 11 questions with a three-point Likert scale (agree, disagree, have no opinion), one question about exam satisfaction and three open-ended questions about program strengths, weaknesses, and suggestions were included. All participants (students and examiners) completed the questionnaire after the exam. In addition, one day after the exam, in a focus group consisting of 12 examiners, the strengths and weaknesses of the exam were examined. The focus group was audio recorded.

Quantitative data (11 Likert type questions of the questionnaire, construct validity and interrater reliability) were analyzed by SPSS version 20.

Qualitative data (related to open-ended questions of questionnaire and focus group sessions) was analyzed by the qualitative content analysis method of Granheim and Landman (2004). First, the text written by students and examiners in the section related to open questions as well as the audio files of the interviews in focus group and their verbatim transcriptions were reviewed several times to achieve an overall perspective of the participants' comments. Afterward, the content of the interviews was examined several times by the first author. Then, the meaning units were extracted from the transcriptions and condensed. The condensed meaning units were considered as the primary codes (Graneheim & Lundman, 2004). After that, the primary codes were grouped based on their similarities and differences, and the categories and subcategories were formed.

To ensure the trustworthiness of the data, the four evaluative criteria of Lincoln and Guba, including credibility, dependability, transferability, and conformability, were used (Ekramzadeh et al., 2020). Interviews with both men and women, and data analysis by a team of researchers were performed to enhance the credibility of the data. To establish dependability, in every step of coding the transcriptions, both the transcriptions and the obtained codes were audited by three separate researchers who were familiar with qualitative analysis and were experts in the area under study, and their comments and suggestions were considered in data analysis. Transferability was ensured through maximum variation sampling (men and women) and clear and transparent reporting of the data and results (by checking the extracted codes and obtained categories in an expert panel consisting of research team and examiners), which made auditability possible.

Results

All 13 students (100%) who had completed Level II fieldwork at this university in the current semester (8 males and 5 females) and 12 examiners (100%; 9 females and 3 males) completed the self-report questionnaire. The mean age of the students and examiners were 23.28 ± 1.26 and 47.16 ± 12.92 respectively.

Validity

Face and content validity were reviewed and confirmed by faculty members. The content validity was determined by the alignment between the OTPF and the OSCE using a blueprint. For this part, the researchers requested that the expert panel rate each clinical scenario based on a blueprint which had been prepared based on the OTPF by the research team. This blueprint consisted of: *History taking/ demands and expectations, Occupational performance, Client factors, Performance skills, performance patterns, Environment & context, SMART goals, and Occupational Therapy interventions.* If a scenario mentioned the item, it was rated + and if a scenario did not mention the item it was rated –. Scenarios rated – were rewritten by the examiner to achieve the +. The result of this part for the scenario of each station is available in Table 2; ultimately all scenarios scored + for all items.

Table 2

The OSCE Blueprint

Number of Stations	Name of Stations	Clinical Skills based on OTPF							
		History taking/ demands and expectations	Occupational performance	Client factors	Performance skills	performance patterns	Environment & context	SMART goals setting	Occupational Therapy
1	Communication skills	+	+						
2	Psychosocial disorders (Adult)	+	+	+	+	+	+	+	+
3	Physical disabilities (Adult/neurology)	+	+	+	+	+	+	+	+
5	Physical disabilities (Adult/orthopedics)	+	+	+	+	+	+	+	+
6	Psychosocial disorders (pediatric)	+	+	+	+	+	+	+	+
7	Physical disabilities (pediatric)	+	+	+	+	+	+	+	+

To assess construct validity, correlation between the station scores and the total OSCE scores were positive and statistically significant in all stations. The highest correlation was in the 7th station ($r = 0.690$, $p < 0.001$) and the lowest was in the 1st station ($r = 0.214$, $p < 0.05$) (see Table 3).

Table 3

Correlation Station Scores with the Total OSCE Score

Stations	1	2	3	4	5	6	7
Correlation with Total Score (r)	0.214	0.475	0.321	-	0.158	0.555	0.690

Reliability

The inter-examiner reliability for total scores of OSCE was calculated by the Intraclass Correlation Coefficient (ICC). The values of ICC were considered < 0.50, 0.50-0.75, 0.75-0.90, and > 0.90 as poor, moderate, good, and excellent reliability, respectively. As shown the results related to inter-examiners' reliability in relation to students' scores in Table 4, the highest inter-examiners' reliability was related to the 7th station (ICC = 0.86) and the lowest inter-examiners' reliability was related to the 5th station (ICC = 0.36).

Table 4

Inter-examiner Reliability

Stations	Inter examiner reliability (ICC)
Communication Skills Part 2 (Movie analysis)	0.66
Communication Skills Part 1(Interview with the mock client)	0.73
Psychosocial Disorders-1 (Adult)	0.77
Physical Disabilities-1 (Adult/neurology)	0.56
Physical Disabilities-2 (Adult/orthopedics)	0.36
Psychosocial Disorders-2 (pediatric)	0.76
Physical Disabilities-3 (pediatric)	0.86

Assessment of Participants' Reaction and Learning

All the students (100%) reported that the exam was stressful. Most of the students (n=8, 61%) and examiners (n=5, 42%) reported that there was not enough time for each station. The other comments related to the OSCE from the perspective of examiners and students are shown in Table 5.

Table 5

Examiner and Student Comments Related to the OSCE

	Questions	Examiners (n=12)			Students (n=13)		
		Agree Frequency (%)	Disagree Frequency (%)	Have No Opinion	Agree Frequency (%)	Disagree Frequency (%)	Have No Opinion
1	Were the OSCE conditions same for all students?	12 (100)	0	0	9 (69)	4 (31)	0
2	Was the OSCE well planned and executed?	12 (100)	0	0	9 (69)	4(31)	0
3	Was the OSCE stressful?	9 (75)	3 (25)	0	13 (100)	0	0
4	Did the OSCE identify the strengths and weaknesses of students 'learning?	10 (83)	2 (17)	0	8 (61)	5 (39)	0
5	Did the OSCE cover a wide range of clinical skills?	9 (75)	3 (25)	0	10 (77)	3 (23)	0
6	Were the tasks requested at the stations based on the previous learning?	12 (100)	0	0	12 (92)	1 (8)	0
7	Was the time allotted for each station enough?	7 (58)	5 (42)	0	5 (39)	8 (61)	0
8	Was the physical space for the OSCE appropriate?	12 (100)	0	0	12 (92)	1 (8)	0
9	Were the instructions clear and unambiguous?	8 (66)	4(34)	0	9 (69)	4 (31)	0
10	Was the OSCE an opportunity to learn?	9 (75)	3 (25)	0	8 (61)	5 (39)	0
11	Did the simulated patients play their role well?	12 (100)	0	0	10 (77)	3 (23)	0

Qualitative Results
Qualitative analysis of the open-ended question data as well as focus group interviews were as follows:

Based on the content analysis, 174 primary codes were obtained. These codes were condensed to meaning units and the meaning units condensed to 2 main categories and 8 subcategories in relation to the opinions and views of students and examiners in relation to the OSCE (Graneheim & Lundman, 2004). The main categories and subcategories are shown in Table 6.

Table 6

Interview Content Analysis

Categories	Subcategories
Strengths of the exam	Factors related to condition of the exam
	Factors related to content of the exam
	Factors related to examiners
	Factors related to students
Weaknesses of the exam	Factors related to condition of the exam
	Factors related to content of the exam
	Factors related to examiners
	Factors related to students

Strengths of the Exam
Based on the participants' opinions (answers to open-ended questions at the end of the questionnaire and focus group with examiners), the strengths of the OSCE were categorized in four sub-categories.

Factors Related to Condition of the Exam
Accurate implementation of health protocols during the exam, the order and calm in the exam environment, good management of the exam, the presence of students in tracksuits with nametags, the presence of the simulated patients, accurate exam schedule, appropriate space of exam, and sufficient facilities in the stations were found as strengths of the exam condition.

> "*Adherence to health protocols such as wearing the mask, […] was very good, it created a sense of security that we did not have the least corona stress and that only the stress itself was the exam stress (student).*"

Factors Related to Content of the Exam

Existence of educational sessions for students before holding the exam, existence of the written scenarios and questions, the answer sheets, accurate scoring criteria in each station, emphasis on all areas of OT according to the philosophy of the field, and the same content of the questions in all stations were the strengths of the exam content.

> "*Since the test questions were based on OTPF, it was very good. At least, after the exam we learned that if clients come to us with any diagnosis, if we use a top-down approach, we can be successful in our work and have a good performance (student)*".

Factors Related to Examiners

Examiners' good communication with students, examiners' cooperation with students, giving some feedback by the examiners to the students at the end of each station, and proper communication of the examiners with the simulated patients were among the strengths of the exam in relation to the examiners.

> "*In many stations, of course, not all stations, the examiners welcomed the student with kindness and good communication, and somehow, as a result, our stress was reduced (student).*"

Factors Related to Students

Practice to manage time (they wanted to be able to practice in order to better manage their time during the actual exam), try to be creative and choose the best intervention in a short time, have the speed and flexibility of students in some stations, ability to manage stress by some students, create opportunities for students to deal with stressful situations, and prepare students to start clinical practice were some of the exam strengths related to students.

> "*I did not think at all, some students who did not show creativity at the class or during the fieldwork, were able to be creative in a good critique exam and use the appropriate intervention method in a short time (examiner).*"

Weaknesses of the Exam

Based on the participants' answers to open-ended questions and focus group with examiners, the weaknesses of the OSCE categorized in four sub-categories.

Factors Related to Condition of the Exam

Short time of the exam, low volume of the alarm sound, unfamiliarity of the exam environment for students, and lack of numbers on the answers and scoring checklists were among the weaknesses of the condition of exam.

> "*The alarm sound was often not clear. If the caretaker outside had not knocked on the door after ringing the alarm, students might not have managed the time well (examiner).*"

Factors Related to Content of the Exam

Some problems in the written scenarios, insufficient training of students on how to take the exam, the time-consuming aspects of the first question in all the stations, generality of checklists, not fitting the videos in first and second stations with Iranian culture, and ambiguity in question six, were the weaknesses related to the content of the exam.

> *"I think the film that was in our station [psychosocial disorders (adult)] should have been in line with our culture [Iran] because as soon as the film started, even though the film was dubbed, the students could not communicate with it when they saw that the film was not suitable for our country (examiner)."*

Factors Related to Examiners

Different expectations of each examiner for the desired answers, the different demands of the examiners in the stations, and the inappropriate attitude of the examiners about the questions in some stations were among the weaknesses of the exam related to the examiners.

> "*It is true that the questionnaire was the same in all stations, but the demands of the examiners were different in different stations. For example, in some stations, when we started answering questions on the simulated patients, they did not examine us and talked as if we had to answer the question and not run on the simulated patient (student).*"

Factors Related to Students

High stress of the exam for the students, different performance of students with the simulated patients, and poor performance of students on the simulated patients, were the exam weaknesses in relation to the students.

> "*Perhaps it would be better for students to justify that they should show the details and stays on the patient, rather than do something general on the patient, for example in question 7 [related to interventions] it would be better for the student to take more detailed actions while doing. It could have been better for the student to show the correct assessment method despite the facilities available at the stations (examiner).*"

Discussion

This study aimed to evaluate the first implementation, validity, and reliability of an OSCE in OT students' Level II fieldwork. Among the valid methods for assessing clinical competence, the OSCE is known in medicine, nursing, psychiatry, social medicine, and emergency medicine education (Joolaee et al., 2010; Rafati et al., 2020) but there are few reports of this method in OT (Krusen & Martino, 2020; Krusen & Rollins, 2019; Sakurai et al., 2014). Sakurai et al. (2014) showed the use of OSCE as well as clinical training based on OSCE assessment methods as one of the most effective training methods in OT fieldwork education (Sakurai et al., 2014). In this study, in order to validate the method of student evaluation, the OSCE was used to assess the clinical competence of OT students.

In this study, as in many other studies, the students mentioned the stressfulness of the OSCE as one of the most important factors affecting their performance during the exam. Krusen et al. (2019) showed that using the OSCE to assess the students' clinical skills is valid, and that students viewed attending the OSCE as a stressful but valuable learning experience. They suggested using the OSCE as an appropriate assessment strategy to assess the clinical competence of OT students (Krusen & Rollins, 2019).

Based on the opinions of the participants (students and examiners), it is necessary to change the scoring checklist to specify scoring in more detail. Given that the scenarios and questions were designed based on the concepts of OTPF, and the student was evaluating based on all OTPF domains (OTPF references), it is necessary to include details in each item checklist.

The participants requested culture-based videos. It seemed that watching a culture-based video by associating clinical experiences in fieldworks can better help retrieve information from the student's memory (Roberts & Norman, 1990). Also, especially in the communication station, some situations needed to be interpreted based on culture (Lorié et al., 2017) and the student may not have had accurate information about the culture of the actors in the film.

Due to the Covid-19 pandemic, the students were educated before the exam via a workshop that was held virtually. Although this virtual workshop tried to provide a good education, according to the students it was not enough. Other studies, such as the study of Shahmoradi et al. (2018), also showed that e-learning is not as effective as face-to-face training / or that students are dissatisfied with e-learning (Shahmoradi et al., 2018) and suggested that if the OSCE method continues to assess the clinical competence of OT students, face to face workshops to prepare students may be necessary. Training sessions on how to conduct the exam can also help reduce student stress as much as possible.

One of the weaknesses that the students and examiners pointed out during the exam process was shortage of time allocated to each station. In this study, based on a review of similar studies, it was found that the appropriate time for each station was between 8 and 12 minutes (Sakurai et al., 2013; Sakurai et al., 2014); so, the duration of each station was set at 12 minutes. But the findings showed that the time allocated to each station was too short. If the student had to analyze the scenario based on OTPF domain and process (AOTA, 2014) and demonstrate the answers on simulated patients, more time was needed for reasoning. It was suggested that the length of each station should be increased to 15 minutes, with a minute to transfer to the next station.

One item that helped to improve the OSCE was the presence of examiners along with the simulated patients in the role-playing session (Westmoreland et al., 2019). In this study, in order to educate and coordinate the examiners and simulated patients, a role-playing session was held the day before the exam; but after the exam and based on students' and examiners' opinions about poor coordination between examiners in some stations, it could be concluded that one session practice was not enough. And it was

suggested that role-playing sessions should be held more frequently to determine the coordination between the examiner and simulated patient. In addition, perhaps the difficult conditions of the examiners and patients due to having masks, shields, gloves, and the evaluation of the two groups of students had made them tired of enduring these conditions and their quality of performance had decreased.

In this study, the research team made a concerted effort to conduct the exam with OT standards. For this purpose, all scoring checklists, questions and exam framework were performed based on the OTPF (AOTA, 2014). In the meantime, most students believed they should be trained in fieldwork based on the OTPF in order to be successful in end-of-semester or OSCE exams. Therefore, in the focus group after the exam, the students' suggested that the OTPF be applied in fieldwork education and to use this framework for clinical training.

Limitations
The limitations of this study included sample size of the participants. For assessing the validity and reliability of an exam the number of the participants should have been greater. Additionally, the overall reliability of the OSCE in this study may have been low because the OSCE is considered reliable if the number of stations is at least 12 stations, and this study used only seven. Another limitation of this study was lack of time for preparing this exam so for the station 2 psychosocial disorders (Adult), we used a film instead of a simulated patient. Finally, face to face training of the students before the exam was not possible because of the pandemic so the training of the students was done virtually.

Implications for Occupational Therapy Education
This study was the first study to assess the validity and reliability of an OSCE in OT in Iran, so the findings should be applicable in conducting the next exams. Based on the findings of this study, the environmental limitations should be solved and the number of the stations for OSCE should be increased; the training of students and examiners before exam should be held as a workshop; the scoring checklists should be revised and rewritten with more details; the Psychosocial disorders (Adult) station should be held with a simulated patient; and the communication skills stations should be revised about scenarios and scoring checklists.

Conclusion
This study ascertained that the OSCE which was carried out based on the OTPF for OT students in Level II fieldwork has good and acceptable face, content and construct validity as well as inter examiner reliability.

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Appendix

Questions for Students

1. Main Complaints / General History / Demands and Expectations: Please perform this section during the conversation with the patient (the audience should be the simulated patient, do not talk to the examiners in any way).
2. Which occupational performance of the clients has been affected / what method do you use to evaluate it? *Perform skill on the simulated patient.*
3. Which of the client factors has been affected / what method do you use to evaluate them? *Perform skill on the simulated patient.*
4. Which performance skills of client have been affected / what method do you use to evaluate it? *Perform skill on the simulated patient.*
5. Which performance patterns of client has been affected / what method do you use to evaluate it? *Perform skill on the simulated patient.*
6. Has the environment & context of the clients been affected / what method do you use to evaluate them? *Perform skill on the simulated patient.*
7. What are the SMART goals you have set for your clients? (At least two)
8. Type of intervention and how it is implemented (occupations and activity), preparatory methods and task, environmental adaptation and assistive technology, training and learning (education and training), advocacy, group intervention: *Perform skill on the simulated patient.*

   ✓ **Exception: If some cases of evaluation and intervention are not possible, show them on the simulated patient. You can refer to the examiners and provide a brief explanation.**