

Standardized Patient Instructors used in a Dental OSCE

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Abstract

Purpose: Standardized patients (SP) are used to simulate patient interactions in dental education. The aim of this study was to measure students' perceived value of SP–interaction for information gathering, compared to information provided through paper-based patient-scenarios, in an OSCE using post-test questionnaires.

Methods: The methods of this study were deemed exempt from oversight by the local IRB. 101 students participated in a 2nd year OSCE assessment of a 2013 predoctoral program consisting of 5 stations. Likert scale questions and open-text comments were evaluated to measure perceived value held by students for assessment tools used within the OSCE. Response distribution ratios, as well as thematic analysis of open-text answers, were evaluated. Only one station included an SP–interaction for clinical information gathering, where all other stations presented paper-based patient-scenarios. Each station required students to address associated clinical questions.

Results: A 98% response rate was observed for the post-test questionnaire completion in a cohort of 101 students. Where 25% of the students gave a neutral response when asked if they preferred the use of SP–interaction in presenting a patient-scenario, 56% either agreed or strongly agreed that the SP was better at presenting a patient information in an OSCE, compared with the use of a paper-based patient-scenarios. Thematic analysis highlighted descriptors of value held by students for assessment strategies using SP–interaction.

Conclusions: Students' perceived value of SP–usage in an OSCE assessment is high and students preferred SP–usage over paper-based patient-scenarios for the described dental OSCE assessment in this study.

Keywords: OSCE; Assessment; Dental Competency; Critical Thinking; Standardized Patients

Introduction

Several dental schools have incorporated the objective structured clinical examination (OSCE) in their curricula to assess clinical competence of dental students [1-5]. OSCEs have been used successfully in medicine since Harden and Gleeson introduced it in 1975 as a procedure to assess clinical competence at the patients' bedside [6]. During an OSCE the students rotate through a series of stations in which they are required to perform a variety of clinical tasks during a specifically-set time period [7]. This classic OSCE description is often combined with other assessment approaches to create a comprehensive assessment modality. For example, the Structured Clinical

Operative Tests (SCOT) using written forms for assessment are often integrated within the OSCE format to provide clinical task completion and demonstration of theoretical knowledge within the comprehensive assessment opportunity [8]. Furthermore, the use of a standardized patient (SP) who is specifically trained to simulate a patient in a case-based scenario may also be someone who evaluates the interpersonal and communicative responses of the student being assessed in a dental OSCE assessment.

The use of a comprehensive clinical OSCE in dental education has been proven to be a valid tool to measure clinical competency and predict clinical success in the transition phase between pre-clinical and clinical phases of curriculum in an undergraduate dental program [9]. In addition, Brown and colleagues describe a 17-station OSCE containing 7 skill-clusters of clinical competence to measure the clinical competency of 4th-year students in an end-of-program OSCE. Here they found high correlations for intra-domain and inter-domain OSCE scores, as well as inter-rater reliability. Reproducibility was also established, where these values were consistent in multiple exam period intervals [4]. Furthermore, when looking at the use of an OSCE to evaluate brief communication skills training for dental students, Cannick and colleagues determined that the use of faculty-facilitated standardized patient-based training to facilitate interpersonal and communication skills over time was an effective tool in an undergraduate dental curriculum [10].

Mossey, Newton and Stirrups noted in 2001 that student perception of the use of phantom heads for measuring specific operative procedures was poorly valued, where they were described by these same students to lack clinical authenticity [11]. Furthermore, this same study established that the assessed students using an OSCE format found the OSCE to be a useful examination of diagnostic, interpretation and treatment planning skills but has apparent limitations in the examination of invasive operative procedures [11]. The use of an OSCE for clinical competency assessment in dental education is still not as widely used in dental assessment strategies compared to other clinical education curricula [10]. Gaps in the literature are found concerning perceived value held by dental students concerning the use of simulated patients, such as a SP, for the purpose of presenting a patient scenario in a dental OSCE assessment.

The aim of this study was to measure students' perceived value of using a SP for patient-scenario presentation compared to paper-based patient-scenario presentation in an OSCE assessment. The objectives of this study is to measure perceived value through the use of 5-point Likert scale questions on a post-test questionnaire and thematically analyze free-text answers provided by assessed dental students to determine value descriptors held by students.

Materials and Methods

The proposal of this study as it is described in this paper was deemed exempt by the University of Michigan Research Ethics Committee on the 13th of December, 2012 under the reference number HUM00070825 based on the fact that this research was being conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, and (ii) research on the effectiveness of or the comparison among assessment techniques and management.

Assessment tool and study design

This was a voluntary survey study where there was a collection of categorical (Likert scale ratings) and qualitative data provided by dental students concerning the measurement of their perceived value for the use of an assessment tool and its components. The number of subjects in this study (n = 99) was based on the practical aspects of data collection, in which the second-year cohort of 101 undergraduate dental students from the University of Michigan School of Dentistry in the 2012-13 academic year were asked to participate in the study by completing the post-test questionnaire. The OSCE assessment took place in the dental simulation laboratory of the University of Michigan School of Dentistry, where all simulated dental curricula and assessment normally occur each academic year of the DDS program. This OSCE is a comprehensive exam used as a "gatekeeper" for students entering the clinical learning environment in which they will begin providing dental care on patients under faculty supervision. This comprehensive OSCE was designed specifically to assess competence and knowledge in diagnosis and treatment planning, periodontics, restorative dentistry and prosthodontics, as well as

basic communication skills. There were 5 stations, one of which concerned diagnosis and treatment planning. For this specific station, a SP-interaction was used for presentation of a patient scenario so that the student could obtain the necessary information they needed to formulate an appropriate treatment plan. Twenty minutes were provided for the student-interaction with the SP in order to gather the necessary information to answer the questions associated with the presented patient scenario. The participating student-cohort had previous experience and training with SPs for skill building in communication with patients. All other stations did not involve a SP-interaction, but instead written information was provided about the patient case in order for the student to answer questions based on the presented clinical situation.

Data Collection

Collection concerning perceived value of SP-usage and paper-base presentation of patient-scenarios was carried out with post-test questionnaires. The post-test questionnaire contained 4 statements that students responded to using a 5-point Likert scale in which they 1) strongly disagreed, 2) disagreed, 3) neither agreed nor disagreed, 4) agreed or 5) strongly agreed to the statement presented. In addition, after each rating of student agreement they were provided the opportunity to comment about the statement and their response. The statements presented were the following:

1. The paper-based patient-scenarios were presented at the appropriate level of your current clinical knowledge and competence.
2. The standardized patient (SP) patient-scenario was presented at the appropriate level of your current clinical knowledge and competence.
3. You preferred the use of the paper-based scenarios over the standardized patient (SP) experience for the process of understanding the clinical condition and answering the related clinical questions.
4. You preferred the use of the standardized patient (SP) experience compared to the paper-based patient scenarios for the process of understanding the clinical condition and answering the related clinical questions.

Data analysis

The categorical data was collected from the Likert scale responses and a response distribution ratio was calculated for each statement on the questionnaire. In the literature Likert scales have been established to be an effective tool for measuring perceived value [12]. In addition, theme analysis of free text answers identified specific descriptors of value held by students for elements embedded with the OSCE assessment. This method is generally accepted in the literature for thematic analysis of qualitative data [13].

Results

101 students participated in the described-OSCE conducted in 2013 and a 99% response rate was observed with completion of the post-test questionnaires. The questionnaire used to measure perceived value of the assessment tools contained 4 statements in which an agreement distribution ratio was calculated. In addition, comments to each of the 4 statements on the questionnaire were collected and a theme analysis was carried out. Below you will find the results based on statement #1 and statement #2 of the questionnaire concerning the appropriateness of the patient scenarios presented in the OSCE, as well as statement #3 and statement #4 concerning the preferred method of patient-scenario presentation.

Appropriateness of Patient-Scenario

Statement #1 produced a distribution ratio with 82% of the cohort either agreeing or strongly agreeing that the paper-based scenarios were presented at the appropriate level for the 2nd year undergraduate dental students' current clinical knowledge and competence (Table 1). Furthermore, statement #2 produced a distribution ratio showing 96% of the cohort either agreeing or strongly agreeing that the SP patient-scenario was presented at the appropriate level of their current clinical knowledge and competence (Table 1). When looking at the theme analysis of the comments provided concerning these statements, students noted that they found difficulty approaching the topic of

full prosthetics as 2nd year dental students, where little experience in this subject had been collected at this curriculum point. Examples of comments to support this theme were the following:

<p>Statement # 1 (Paper-Based) The paper-based patient scenarios were presented at the appropriate level of your current clinical knowledge and competence.</p>	<p>Statement # 2 (SPI-Experience) The standardized patient (SP) patient scenario was presented at the appropriate level of your current clinical knowledge and competence.</p>																								
<p style="text-align: center;">Agreement Response Distribution 99% Response Rate n = 101</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="321 634 727 968"> <p style="text-align: center;">Statement #1</p> <table border="1"> <caption>Statement #1 Response Distribution</caption> <thead> <tr><th>Response</th><th>Percentage</th></tr> </thead> <tbody> <tr><td>Strongly Agree</td><td>35%</td></tr> <tr><td>Agree</td><td>45%</td></tr> <tr><td>Neither</td><td>10%</td></tr> <tr><td>Disagree</td><td>2%</td></tr> <tr><td>Strongly Disagree</td><td>2%</td></tr> </tbody> </table> </div> <div data-bbox="893 634 1266 968"> <p style="text-align: center;">Statement #2</p> <table border="1"> <caption>Statement #2 Response Distribution</caption> <thead> <tr><th>Response</th><th>Percentage</th></tr> </thead> <tbody> <tr><td>Strongly Agree</td><td>50%</td></tr> <tr><td>Agree</td><td>40%</td></tr> <tr><td>Neither</td><td>2%</td></tr> <tr><td>Disagree</td><td>2%</td></tr> <tr><td>Strongly Disagree</td><td>2%</td></tr> </tbody> </table> </div> </div>		Response	Percentage	Strongly Agree	35%	Agree	45%	Neither	10%	Disagree	2%	Strongly Disagree	2%	Response	Percentage	Strongly Agree	50%	Agree	40%	Neither	2%	Disagree	2%	Strongly Disagree	2%
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<p>Statement # 1 (Paper-Based) Theme 1: Difficulty approaching topic of full prosthetics as a 2nd year student. Theme 2: Difficulty not getting scenario in advance of the OSCE to consider.</p>	<p>Statement #2 (SP-Experience) Theme 1: Short time to talk with SP presented challenges. Theme 2: Working with SPs feels comfortable and builds confidence.</p>																								

Table 1: Perceived Value of Appropriateness.

Perceived value of patient scenario appropriateness between paper-based and SP scenario presentation. Agreement distribution ratios calculated from Likert Scale responses to Statements #1 and #2 of post-assessment questionnaires. Theme identification in comments provided concerning Statements #1 and #2 of post-assessment questionnaires.

- I felt it would be nice to be a little more prepared, possibly with five minutes in the hallway to look over the patient’s medical history before addressing the case.
- It would have been helpful if we were given more than 1 day notice on what the exam would be about. I realize that this is an exam that would be difficult to prepare for but I believe I would have benefited significantly from a sample case that would have shown us what the exam would be like ahead of time so we could review all of our old material before taking the exam.

In looking specifically at the appropriateness of the SPI patient-scenario, the first theme identified was that there was a limited time to talk to the SP and gather the information needed. Examples of comments made to support this theme were the following:

- I needed more time to do the health-history and there was no time for rapport.
- Somewhat of a time constraint. I couldn’t ask all of the questions I would have like ask.

An additional theme was noted in the comments to Statement #2, where students found working with SPs felt comfortable and built confidence in the OSCE assessment. Comments to support this theme were the following:

- The SP scenario was not too complicated so that I was able to have an interview with the patient comfortably.
- I enjoyed working with SPs; it really boosted my confidence.

Preferred Assessment Tool within OSCE

Statement #3 produced a distribution ratio with only 31% of the cohort either agreeing or strongly agreeing that the paper-based scenarios were preferred over SP-usage for the purpose of understanding the clinical condition and answering the related clinical questions of this OSCE assessment (Table 2). On the other hand, statement #4 produced a distribution ratio where a majority at 56% of the cohort either agreed or strongly agreed that the SP patient scenario was the preferred assessment tool for the same purpose (Table 2). When looking at the theme analysis of the comments provided concerning these statements, many students found a combination of the both assessment tools used in the OSCE as beneficial and necessary. The following comments were made to support this theme:

<p>Statement # 3 (Paper-Based) You preferred the use of the paper-based scenarios over the standardized patient (SP) experience for the process of understanding the clinical condition and answering the related clinical questions.</p>	<p>Statement # 4 (SP-Experience) You preferred the use of the standardized patient (SP) experience over the paper-based patient scenarios for the process of understanding the clinical condition and answering the related clinical questions.</p>																								
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<p>Statement #3 (Paper-Based) Theme 1: Combination of paper-based and SPI provides different perspectives Theme 2: Paper-base provides direct concrete information</p>	<p>Statement #4 (SP-Experience) Theme 1: SP interactive, practical, and engaging Theme 2: More opportunity for information gathering with SP</p>																								

Table 2: Preferred Assessment Tool within OSCE.

Student preference between paper-based and SP presentation of patient case scenario within the OSCE assessment. Agreement distribution ratios calculated from Likert Scale responses to Statements #3 and #4 of post-assessment questionnaires. Theme identification in comments provided concerning Statements #3 and #4 of post-assessment questionnaires.

- I think both [paper-based and SP-interactions] should be continued to be used
- I think use of both is important.

Another theme that was identified in the comments to these statements was that paper-based scenarios provide direct concrete information. Comments to support this theme were the following:

- Paper-based lacks interaction with patients, but I am able to look closer to the case.
- I feel more comfortable having concrete facts on paper.

However, another theme expanded on this idea and gave further description of the two assessment tools looked at, where it was noted that SP-experiences are more interactive, more practical and more engaging than being provided with paper-based scenarios. Comments made to support this theme were the following:

- It was more interactive, more engaging than a paper-based scenario.
- Both have good and bad. SP can be more practical but it is also simulated.

In addition, it was also identified in the theme analysis of the comments that there is more opportunity for additional information gathering with the SP-interaction. The following comments below support this final theme:

- I can obtain as much information as I want from the [simulated] patient and I am not limited to the given information on paper.
- I think it is important that all students are able to think on their toes in a typical clinical situation and it is good for us to practice.

Discussion

Critical Thinking

There are indications in the literature that OSCE's may induce higher levels of stress than other forms of assessment, which may be due to the OSCE's demand for more critical thinking in order to make appropriate clinical decisions. It has been reported in the literature that a majority of medical students, radiology students and nursing students consider an OSCE more stressful than written examination [14-16]. When measuring assessment anxiety in dental students, Brand and Schoonheim-Klein found that dental students experienced more anxiety associated with an OSCE than a written examination [7]. Interestingly, our findings do indicate that many students felt more secure when provided with concrete information about a patient case on paper, where the generation of questions to the patient in order to gather information may require more critical thinking from the student and may be more realistic to a true patient encounter. Interestingly, Brand and Schoonheim-Klein also found that the expectation to succeed was also higher for an OSCE. Anxiety during an OSCE was associated with the level of preparation but not with the scores obtained [7]. This observation in the literature is supported with our findings in the present study, where the theme analysis for statement #1 of the questionnaire revealed that students found it challenging not to have been provided with the patient information or scenarios in advance of the OSCE. Where this assessment included both paper-based stations and an SP station, it did require the student to critically think through the clinical issues for the patient in each scenario. However, for the SP station, not being presented with the patient information prior to the assessment period required the students to "think on their toes", as one student commented, in order to interact with their SP and critically think through clinical decisions regarding the case. It is interesting that another theme identified in the present study was that students wanted more time at the SP station to gather information. Furthermore, they felt that interaction with the SP made them feel comfortable and confident in this OSCE period. One would question if a priority shift for the student to succeed in the patient-care elements of the exam, and not necessarily in the raw score of the assessment itself, was observed in this case.

OSCE in dentistry from Pre-clinic to Clinic

Performance assessments such as the OSCE only became widely used in dental education in the early 1990s [4], where a need to assess necessary skills in critical thinking for clinical decision making had been identified. Colleagues at the University of Columbia in New York provide evidence in the literature of successful use of an OSCE to measure clinical competency at the end of a preclinical curricular phase and have proven the value of an OSCE as a predictor of successful clinical performance for undergraduate students entering patient clinics [9]. Curits and colleagues report a study concerning the correlation of student performance in preclinical and clinical assessments [17]. Interestingly, here Curtis, *et al.* defined an OSCE as a knowledge-base assessment, a clinical task on a typodont in a phantom head as a skill-based assessment, and tooth preparation with fabrication of temporary and deliver of crown as a patient-based assessment. In this study they did not find that the OSCE performance was a predictor of competency in the skill-based and patient-based assessments [17]. Eberhard and colleagues, however, did find significant correlation between OSCE scores in a preclinical setting and with practical clinical tasks [18]. With the evidence in the literature today, the use of a 2nd year OSCE as a gateway assessment from a pre-clinical phase of the curriculum to a clinical phase of the curriculum, as was used here in this present study, is known to be good practice for educational purposes of measuring the necessary competency in critical thinking and clinical reasoning for students entering patient care. Interestingly, when asking the students how appropriate they found the patient scenarios in the OSCE in relation to their 2nd year curriculum point, many students described the need to better memorize clinical steps for fabricating a denture. With this theme identification in the comments provided, it is clear that these 2nd year students do not fully appreciate the necessity to critically think in clinical decision making, as appose to taking a traditional approach of memorizing curriculum content.

Many formats of an OSCE assessment have been looked at since their introduction to dental education in past decades. Larsen and Jeppe-Jensen, describe a specially designed OSCE that determined competence in knowledge, interdisciplinary knowledge, communication, clinical reasoning and practical procedures [19]. In this assessment, both self- and peer-assessors were used for one station of a 7-station OSCE. Here, feedback was not provided by faculty at the station assessed by students. Instead, the students met after being assessed and determined collaboratively the grading criteria of that station and then provided both self- and peer-assessor scores and feedback. The results of this study showed great variability of reliability of scores for this station, but perception measured for the overall OSCE held by both faculty and students was that self- and peer-assessment was a valuable reflective tool to promote learning [19]. Furthermore, to support these findings another study carried out by Tagawa and Imanaka confirmed that reflection and student-directed learning improve OSCE performance [20]. Where the present study found that the majority of the 2nd year student cohort preferred the usage of the SP-interaction in gathering patient information for clinical reasoning, future studies may need to concentrate on peer assessment of the SP-interactions for patient information gathering, where the learning potential may be amplified.

Conclusion

The conclusion of this study is that the student perceived value of SP-usage in a 2nd year dental OSCE is high and students preferred SP-usage over or in combination with paper-based usage for patient-scenario presentation in an OSCE assessment. The evidence gained from this study encourages the use of the SP presentation of patient-scenarios in an OSCE assessment and facilitates assessment strategy development in an era of current dental education reform. In the present study, theme analysis of comments to preferences of SP-usage over paper-based scenarios in OSCE assessment has identified that although students find security in obtaining concrete facts from paper-based scenarios, the SP-experience allowed them the opportunity to gather more information from the patient as they ask for it. This is, of course, a more clinically relevant approach to information gathering and requires a higher skill of critical thinking from the student. Our theme analysis did reveal student concerns and discomfort with time constraints at the SP station to gather necessary patient information and build rapport. Again, the SP-experience presents a real-life challenge that they will most certainly encounter throughout their dental career. The importance of using a SP in an OSCE assessment to demonstrate competency in clinical decision making from information gathered directly from the patient is highlighted in the theme analysis of this study.

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Disclosure

There are no disclosures of conflict of interest for the study presented in this manuscript.

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