






COVID-19 SPECIAL COLLECTION

RESEARCH ARTICLE

Distance assessment of counselling skills using virtual patients during the COVID-19 pandemic

Dixon Thomas , Semira A Beshir , Seeba Zachariah , Kishore G S Sundararaj ,
Hossam Hamdy 

Gulf Medical University, Ajman, United Arab Emirates

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Correspondence

Dr Dixon Thomas
Department of Pharmacy Practice
Gulf Medical University
Ajman
United Arab Emirates
dixon.thomas@gmail.com

Abstract

Background: Reports on using virtual patients to assess counselling skills is scarce. **Aim:** This paper describes the feasibility and acceptability of assessing patient counselling skills of pharmacy students using a virtual patient simulator. **Description:** In this innovative method, a high quality simulator 'Virtual Patient Learning' (VPL) was developed at Gulf Medical University (GMU) and was used to assess the counselling skills of 15 pharmacy graduate students. Counselling skills were measured using a four-domain scoring rubric of 1 to 5 marks followed by instant feedback for improvements. Student and faculty satisfaction scores were collected based on the feasibility and acceptability of the assessment method. **Evaluation:** The average counselling skills score for all students was 68.4 (85.5%) out of 80 (range 54-76), with a standard deviation of 5.8. The overall student agreement on the feasibility and acceptability of the assessment method was 92.8%; it was 100% agreement for faculty. **Conclusion:** The use of a high quality VPL simulator in assessing counselling skills was deemed feasible and acceptable for students and faculty. The assessment was repeated among 30 Doctor of Pharmacy (Pharm.D.) graduates with similar outcomes. The virtual counselling method will be used in the programme exit exams, as well as in students entering their experiential year. Further studies are required to assess its validity and reliability with more students.

Introduction

In competency-based education, the domains of communication, professionalism, ethics, collaboration and teamwork are important core competencies. On the other hand, there are challenges in how students learn such skills and even more challenging as to how to assess their understanding. Counselling skills encompass communication, professionalism and building trust with patients. Counselling requires communication of scientifically valid content in an understandable way while focusing on patient problems and solutions (Lee *et al.*, 2019; Paulino *et al.*, 2019). Also, such communication should be clear

and empathic (Montgomery *et al.*, 2010; Beck & Kulzer, 2018; Kaplan-Liss *et al.*, 2018).

Traditionally, counselling skills are best taught and assessed at the workplace with real patients. Counselling skills of students are also assessed within experiential education settings, but limited evidence exists on the feasibility to assess such skills using virtual patients. The feasibility of such methods, along with the acceptability among students and faculty, is the purpose of this study.

Experiential education is basically developed on constructivist and community-of-practice theories. In the

real world, experiential education is offered with raw experiences in an unstructured way, making it difficult to define the pedagogy involved, though it is intended to build on existing knowledge (Dennick, 2016). As per the community-of-practice theory, in workplaces having experiential education rotations, students find themselves part of a community of patients and healthcare professionals (Lave & Wenger, 2002).

The aim of this paper was to describe the feasibility and acceptability of distance assessment of pharmacy students' counselling skills using a high quality 'virtual patient' simulator. The acceptability of this innovative method was also evaluated among students and faculty who participated in using the technology.

Description

The COVID-19 pandemic has disrupted the onsite educational activities and has forced educators to look for virtual options for teaching and evaluating students (Ferrel & Ryan, 2020). In addition, telemedicine/telepharmacy is gaining momentum to improve patients' access to healthcare services from a distance using various information technologies (Poudel & Nissen, 2016; Zanaboni & Wootton, 2016). The superiority of faculty-assisted virtual patient encounters versus student self-directed virtual patient experiences has been described in previous studies (Edelbring & Wahlström, 2016; Taglieri *et al.*, 2017; Hepps, Yu & Calaman, 2019). Simulation, in combination with feedback, has been an effective method in training and assessment (Bajis *et al.*, 2019).

Virtual patient learning simulator

The virtual patient learning (VPL) method has revolutionised simulation training in different disciplines (Hamdy *et al.*, 2017). There is increasing use of virtual patients as a substitute for bedside training and assessment in clinical education (Smith & Waite, 2017; Isaza-Restrepo *et al.*, 2018). A well-designed assessment method that uses available technology has paramount importance to measure clinical competencies of health professions students from a distance during these challenging times.

A high quality VPL simulator was developed and used for problem-based learning (PBL) in the Gulf Medical University (GMU) College of Medicine. The simulator is mainly used by medical students for problem-based learning. With the COVID-19 lockdown, however, it has

been shared with different Colleges at GMU and within the region to use for learning and assessment of clinical competencies.

The simulator has 30 cases and uses artificial intelligence for interactivity. Virtual patients were professional actors trained to simulate variable moods, attitudes, and emotional responses through verbal and non-verbal communication. Separate actors acted as patients having health problems like chest pain, thyrotoxicosis, benign prostatic hypertrophy, cancer, and other conditions. Based on the questions selected by students, the pre-recorded response by the patient is played (Hamdy *et al.*, 2017). The simulator shows diagnosis and prognosis along with medications used. Segments of patients describing therapeutic problems and prognosis are entirely relevant to pharmacy students. Such segments are used in assessing the counselling skills of pharmacy students. A screenshot of one of the patient stations (myocardial infarction) is depicted in Figure A.

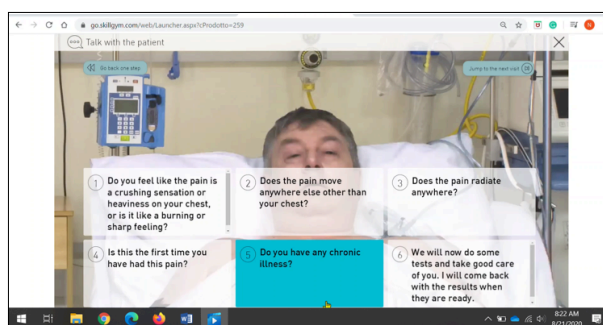


Figure A: Screenshot of Virtual Patient Learning (VPL) simulator

Simulated virtual patients can allow students to practice clinical skills in a controlled environment to improve their confidence to interact with real-life patients (Smith & Waite, 2017; Taglieri *et al.*, 2017). Simulation-based education using virtual patients is also critical to provide patient-focused training (Cheema, 2018). It can help simulate real-life clinical settings to boost students' engagement and participation.

The use of virtual patients can also improve knowledge retention and skills in medical education (Kononowicz *et al.*, 2019; Salem *et al.*, 2020). Furthermore, positive feedback by learners on the use of virtual patients in clinical education has been reported (Courteille *et al.*, 2018; Isaza-Restrepo *et al.*, 2018; Padilha *et al.*, 2019). To simulate real-life patients effectively, developers of virtual

patients need to make the virtual environment as close to reality as possible (Gustafsson, Englund & Gallego, 2017).

Developing and implementing a virtual patient-based assessment requires selecting a scenario, doing a brief of the task to the students, evaluating the students' performance, and providing helpful feedback. Virtual patients can be used as a teaching and assessment method for improving communication skills, inter-professional education, clinical reasoning, procedural training, and patient safety (Hepps, Yu & Calaman, 2019).

Assessment process

The virtual patient-based assessment was formative. It is similar to the Objective Structured Clinical Examination (OSCE) but replaces the actual patient with an authentic virtual simulated patient and conducts the interview from a distance. All 16 students who completed the first year of masters in the clinical pharmacy degree program at GMU were invited to participate. All students had previously received a bachelor's pharmacy degree and most were working as pharmacists. Counselling was selected as a primary competency to be assessed, as it incorporates more than one clinical soft skill: communication, knowledge of practice, and demonstration of empathy. Assessment of what is usually described as 'soft skills' in the domain of clinical competency, including communication, professionalism, teamwork, and empathy, is challenging. The authors believe these skills should be considered the 'hard skills' as teaching staff often struggle in finding the best ways to teach and assess them.

Students and faculty received an orientation to the simulator and process with a sample segment of virtual patients one week prior to the counselling skills assessment. Clinical faculty who evaluated the students were experienced in assessing students with real patients at the workplace. In addition, two practice sessions were conducted for faculty on how to assess counselling skills using virtual patients, as well as how to use the assessment rubrics.

Faculty assessors prepared a summary of the history, physical findings, management, and medication of the four selected virtual patients; students were to read this information and prepare before encountering the virtual patient. The four virtual patients chosen were a woman with thyrotoxicosis, an elderly man with lower urinary symptoms associated with benign prostatic hypertrophy, a man with chest pain due to myocardial infarction, and a patient with colon cancer receiving chemotherapy.

The online setting was Google Meet. Students and clinical faculty joined the session from their residences. The students were organised into four groups; each had four students except one group, which only had three students (Table 1). Each patient station was observed by a clinical faculty, who controlled and ran the virtual patient segment twice, asked students to counsel, assessed students' counselling skills, and provided instant feedback. WhatsApp was used as a tool to communicate between faculty and students and to clarify or resolve any technical issues and confusion while navigating between patients. Each student counselled a virtual patient for four minutes on their preassigned patient profile, lifestyle, or medication-related tasks.

Table 1: Map for navigating through virtual patients and assigned counselling tasks

Time	VP 1: Thyrotoxicosis	VP 2: Benign Prostatic Hypertrophy	VP 3: Myocardial Infarction	VP 4: Colon Cancer
10.00 AM	Student 1 - Disease Student 2 - Lifestyle/diet Student 3- Propylthiouracil Student 4- Methimazole	Student 5- Disease Student 6- Lifestyle/diet Student 7- Tamsulosin Student 8- Finasteride	Student 9- Disease Student 10- Lifestyle/diet Student 11- Aspirin Student 12- Ramipril	Student 13- Disease Student 14- Lifestyle/diet Student 15- FOLFOX Student 16- ondansetron
10.30 AM	Student 13- Methimazole Student 14- Disease Student 15- Lifestyle/diet Student 16- Propylthiouracil	Student 1 - Finasteride Student 2 - Disease Student 3- Lifestyle/diet Student 4- Tamsulosin	Student 5- Ramipril Student 6- Disease Student 7- Lifestyle/diet Student 8- Aspirin	Student 9- ondansetron Student 10- Disease Student 11- Lifestyle/diet Student 12- FOLFOX
11.00 AM	Student 9- Propylthiouracil Student 10- Methimazole Student 11- Disease Student 12- Lifestyle/diet	Student 13- Tamsulosin Student 14- Finasteride Student 15- Disease Student 16- Lifestyle/diet	Student 1 - Aspirin Student 2 - Ramipril Student 3- Disease Student 4- Lifestyle/diet	Student 5- FOLFOX Student 6- ondansetron Student 7- Disease Student 8- Lifestyle/diet
11.30 AM	Student 5- Lifestyle/diet Student 6- Propylthiouracil Student 7- Methimazole Student 8- Disease	Student 9- Lifestyle/diet Student 10- Tamsulosin Student 11- Finasteride Student 12- Disease	Student 13- Lifestyle/diet Student 14- Aspirin Student 15- Ramipril Student 16- Disease	Student 1 - Lifestyle/diet Student 2 - FOLFOX Student 3- ondansetron Student 4- Disease

*Student 11 was absent in this activity.

Students' counselling skills were assessed using a five-point Likert scale; very poor 1; poor 2; fair 3; good 4; excellent 5. The rubric was contextualised by two experts

in experiential education, considering the feasibility of what could be assessed. Subsequently, the four domains of counselling skills assessed included clarity (understandable voice, accent, and logical order), content (information that contains key scientific messages), focus (tailoring information to the patient’s problems), and empathy (showing the ability to feel what a patient is feeling) (Montgomery *et al.*, 2010; Beck & Kulzer, 2018; Kaplan-Liss *et al.*, 2018). These are difficult-to-measure clinical competencies but are usually assessed in workplace settings by the clinical faculty using real patients.

Using the VPL simulator, it was possible to assess students' counselling skills from a distance. Fixed clinical faculty at each station, with training in the assessment of students’ clinical competencies, allowed more objectivity, consistency, and comparisons between all students upon encountering the same patient. Four counselling skill domains (clarity, content, focus, and empathy) were assessed for all four simulated patients encountered. All four faculty used the same rubrics. A formative assessment and feedback were provided, there was no pressure on the faculty to give a particular scores.

Technical issues encountered in multimedia communication from a distance can be rectified by making the electronic devices compatible and performing a trial run to optimise the settings. The simulated virtual patient counselling happened in a safe environment, allowed repetitions of existing cases, and minimised the marginal cost in assessing more than one students. Moreover, the online session allowed the students and the faculty to participate from a distance. These benefits are similar to previous studies (Quail *et al.*, 2016; Alhazmi, Butler & Junghans, 2018).

At the end of the session, student feedback of the exam was collected using a Google Form survey using 11 questions on a 5-point Likert scale (strongly agree to strongly disagree) and two open-ended questions regarding the positive aspects of the exercise and areas for improvement.

Evaluation

Descriptive statistics were used to summarise the students' counselling competencies. The students' scores on skills domains (clarity, content, focus, and empathy) were calculated. The tabulated scores show overall student performance. Scored partly show feasibility as the

session completed, students were able to counsel, and faculty were able to assess. Confirmation of feasibility and acceptability were evaluated using a participant survey at the end of the patient counselling assessment for all four virtual patients.

Table 2. Rubrics for assessing patient counselling skills of Masters in Clinical Pharmacy students

Counselling on:	Clarity	Content	Focus	Empathy	Maximum Score
Disease (Patient 1)	1 - 5	1 - 5	1 - 5	1 - 5	20
Lifestyle (Patient 2)	1 - 5	1 - 5	1 - 5	1 - 5	20
Drug 1 (Patient 3)	1 - 5	1 - 5	1 - 5	1 - 5	20
Drug 2 (Patient 4)	1 - 5	1 - 5	1 - 5	1 - 5	20
Maximum score for counselling 4 virtual patients					80

Scoring rubrics: very poor 1; poor 2; fair 3; good 4; excellent 5

Fifteen students participated in the counselling session; one student was absent. There were 12 female and three male students. Out of a maximum score of 80, students scored 54 (67.5%) to 76 (95%). Thirteen students scored 80% or more. The average total score among students was 68.4, with a standard deviation (SD) 5.8. The average scores on counselling domains (maximum score was 20, five marks per four assessors per domain) were; clarity 17.13 (SD 1.5), content 17.07 (SD 1.6), focus 17.07 (SD 1.9), and empathy 17.13 (SD 1.8). Scores between the four counselling skill domains were consistent.

Student and faculty feedback were collected on completion of the assessment using an online survey. Feasibility and acceptability were measured from these survey responses and open-ended questions from students and faculty who participated in the counselling assessment. The responses are provided in Table III.

Fourteen (93.3% response rate) students provided their feedback immediately after the session without knowing their scores. No disagreements were observed on any feedback statements, and some were neutral. The degree of agreement (strongly agree and agree combined) by the students for the virtual patient authenticity was 96.4%. The process itself was 98.8%, the distance communication technology was 89.3%, and the overall agreement was 92.8%. Responses to individual items in the student feedback are provided in Table III (a).

Table III(a): Masters in Clinical Pharmacy Students' feedback on virtual patient counselling skills assessment from distance

Statements (Categorised as virtual patient authenticity, the process, distance communication technology, and Overall agreement)			Strongly agree	Agree	Neutral
1	The goal of the session was clearly stated (the process)	n	11	3	0
		%	78.6	21.4	0.0
2	The virtual patients' expression of symptoms was realistic (virtual patient authenticity)	n	11	3	0
		%	78.6	21.4	0.0
3	The background of virtual patients' (hospital setting) was realistic (virtual patient authenticity)	n	10	3	1
		%	71.4	21.4	7.1
4	The time allotted in each case was sufficient (the process)	n	11	3	0
		%	78.6	21.4	0.0
5	The assessment process was organised and easy to follow (the process)	n	11	3	0
		%	78.6	21.4	0.0
6	Audio and videos were clear and uninterrupted using Google Meet (distance communication technology)	n	10	2	2
		%	71.4	14.3	14.3
7	The clinical faculty provided the key clinical briefing in the context of actual patient care (the process)	n	11	2	1
		%	78.6	14.3	7.1
8	The time given for preparation for counselling was sufficient (the process)	n	12	2	0
		%	85.7	14.3	0
9	Technical difficulties if any were addressed quickly (distance communication technology)	n	11	2	1
		%	78.6	14.3	7.1
10	Team counselling was effective between students in a group (the process)	n	11	3	0
		%	78.6	21.4	0.0
11	I am satisfied with the overall exposure (Overall agreement)	n	12	1	1
		%	85.7	7.1	7.1

Total number of students completed the survey is 15

Student responses to the open-ended questions were:

'It helped to improve my communication and counselling skills.'

'It is a new patient counselling experience.'

'It was easy to go through the process; I never felt lost.'

'My confidence improved with this exam. Thank you for the quick feedback and even I feel I did well. Thank you for organising it well so that I could perform to best of my abilities.'

'I had difficulty in understanding the accent of the virtual patient.'

'In this case, I had to just counsel the patient on what is really important for them to know. So, it was brief and to the point. If we have a future session with history taking, I suggest giving more time.'

'Though it was manageable, for a few minutes, I had network-related issues.'

'For me transitioning from one patient to the next was confusing, but it was resolved quickly.'

All the four clinical faculty participated in the exam strongly agreed or agreed to all feedback statements.

Some of their open comments were as follows:

'VPL simulator has many good and different cases. It is innovative and realistic.'

'At this time of lockdown, a disruption in experiential education is unfortunate. Assessment in experiential education is challenging. I found this method of assessment as very promising. Moreover, it was not difficult for students or us.'

'There is not much teaching time. It's less labour intense for the faculty. The students displayed surprisingly good performance without even a practice session. Instant feedback from the faculty is a good way to teach what is essential. They have knowledge, skills, and attitudes, and it is not risky to provide them with opportunities to counsel as it was virtual patients.'

'This was the first experience for me too. It was not hard to prepare, just one day, to create a short patient profile based on the available virtual patients. I wish if there are many similar virtual patients.'

From the comments posted, both the students and faculty showed approval of the exam.

Implementation

The potential for implementing virtual patient exams should be explored especially during the COVID-19 pandemic lockdown. Clinical educators need to experiment with virtual patient methods and integrate the method with conventional learning and assessment methods (Ellaway *et al.*, 2015).

We did repeat the virtual patient counselling assessment from a distance among the graduating Doctor of Pharmacy (Pharm.D.) students during their exit exam. The exit exam is a preparation test for the pharmacist licensing examination with multiple-choice questions (MCQs). The exam is also used for quality purposes to determine if students achieved specific programme learning outcomes. Traditionally, we use OSCE along with a MCQ exam to cover more program-learning outcomes. In the 2020 Pharm.D. exit exam, it was not feasible to conduct OSCE due to COVID-19 pandemic restrictions. Instead of OSCE, we implemented the virtual patient method focusing on counselling skills similar to our 15 Master in Clinical Pharmacy (graduate-level) students. The same scoring rubrics were used for assessing counselling skills in clarity, content, focus, and empathy. Student and faculty feedback were also collected using the same survey form. The student survey was filled by 29 out of 30 who participated in the virtual patient counselling assessment. The overall students' agreement on the feasibility and

acceptability of the assessment method was 96.6% and 100% approval from faculty. The responses from Pharm.D. students are included in Table III(b).

To accommodate 30 students, one more virtual patient was added (a patient with infection). Six students joined a patient station allowing for the accommodation of all 30 students in five virtual patient stations with five faculty members as evaluators. All four previous faculty repeated managing their virtual patient stations, and the new patient station was managed by a new faculty (with experience in counselling assessment in real patient settings) after being trained to the process. As shown in Table 3.B, except having one or two students with time or technical issues, all others perceived the method as feasible and acceptable. The faculty continued to be in agreement with all statements in the response. Regarding faculty participation, since there were only five faculty members and they were all involved from the beginning to make the whole process a success, it is assumed that their responses are positively biased, and thus, not included as a separate table in this article. Even if in the future the virtual patient counselling assessment is used towards the end of the Pharm.D. programme or at the beginning of the experiential year of the Pharm.D. or Master in Clinical Pharmacy programme, it is not a total replacement for OSCE or real patient counselling assessment.

Table III(b): Pharm.D. graduate students' feedback on virtual patient counselling skills assessment from distance

Statements (Categorised as virtual patient authenticity, the process, distance communication technology, and Overall agreement)			Strongly agree	Agree	Neutral
1	The goal of the session was clearly stated (the process)	n	19.0	10.0	0.0
		%	65.5	34.5	0.0
2	The virtual patients' expression of symptoms was realistic (virtual patient authenticity)	n	17.0	12.0	0.0
		%	58.6	41.4	0.0
3	The background of virtual patients' (hospital setting) was realistic (virtual patient authenticity)	n	16.0	13.0	0.0
		%	55.2	44.8	0.0
4	The time allotted in each case was sufficient (the process)	n	18.0	11.0	0.0
		%	62.1	37.9	0.0
5	The assessment process was organized and easy to follow (the process)	n	17.0	12.0	0.0
		%	58.6	41.4	0.0
6	Audio and videos were clear and uninterrupted using Google Meet (distance communication technology)	n	16.0	13.0	0.0
		%	55.2	44.8	0.0
7	The clinical faculty provided the key clinical briefing in the context of actual patient care (the process)	n	17.0	12.0	0.0
		%	58.6	41.4	0.0
8	The time given for preparation for counselling was sufficient (the process)	n	16.0	12.0	1.0
		%	55.2	41.4	3.4
9	Technical difficulties if any were addressed quickly (distance communication technology)	n	15.0	14.0	0.0
		%	51.7	48.3	0.0
10	Team counselling was effective between students in a group (the process)	n	18.0	10.0	1.0
		%	62.1	34.5	3.4
11	I am satisfied with the overall exposure (Overall agreement)	n	18.0	10.0	1.0
		%	62.1	34.5	3.4

Total number of students completed the survey is 29

The counselling skills performance of 30 Pharm.D. graduating students (who had already completed their experiential year) were more consistent as a cohort than the Master in Clinical Pharmacy students who were just entering their experiential year. Twenty marks each in one of the five virtual patient stations provided a maximum possible score of 100. Out of 100 maximum score, the Pharm.D. students scored 83% to 99% (Please include all % to 3sf). All students scored 80% or more. The average score was 93.1, with standard deviation (SD) 3.9. The average of total scores on counselling domains (maximum score is 25, five marks per five assessors per domain) were; clarity 23.6 (SD 1.2), content 23.3 (SD 1.2), focus 23.3 (SD 1.1), and empathy 23.1 (SD 1.2).

The rubrics used in this virtual patient counselling assessment were not the same as what was used before for actual patient counselling in experiential education. A 25-item rubric was in use to cover all of the rotation evaluation competencies. The rubric was a generic instrument for all clinical rotations, and there were no sub-domains. All items were scored out of five points based on the ability to counsel independently and consistently during the rotation. One of the items in the 25-item rubric in the clinical setting is patient education. The construct of current virtual patient counselling assessment was contextualised by two experts in the field as validation for the process. The faculty involved in virtual patient counselling assessment were those who had previously assessed students in actual clinical settings. In their observations, the performance of students in counselling virtual patients were comparable to actual patient counselling by pharmacists though further studies are required to prove it. Studies are also planned to develop the rubric further; until then, this method is implemented as a formative assessment.

The virtual patient counselling skills assessment described in this paper was considered to be feasible. There are examples in the literature indicating that students are satisfied with virtual learning approaches (Quail *et al.*, 2016; Lichvar *et al.*, 2016; Padilha *et al.*, 2019; Clark & Dunham, 2020). Other similar studies have also reported the use of virtual patients as an alternative pedagogic method (Baumann-Birkbeck *et al.*, 2017; Courteille *et al.*, 2018; Kononowicz *et al.*, 2019). What is unique about this paper is the description of an advanced, high-quality simulator being used to assess counselling skills from a distance.

Therefore, educators should be innovative in using such a feasible and acceptable simulation. The application of simulated virtual patients on high-stake licensing

examinations should be explored further. It can test many clinical competencies that are usually not feasible for licensing agencies in real practice settings.

From this paper, it is clear that it is feasible to assess patient counselling skills by Pharmacy graduate students from a distance using virtual patients. Time and technological constraints are minimal. In this process, however, patient counselling was mostly one-way. It is not a full replacement for training and assessment in actual clinical settings. It has fundamental limitations in the simulation itself. Implementing virtual patient counselling assessments on areas such as clarity, content, focus, and empathy are measurable. The validity and reliability of this assessment method needs to be studied further. Additionally, the utility of virtual patients to assess other clinical competencies from a distance are to be studied further. Regarding financial and logistical aspects in comparison with OSCEs, a virtual patient simulator has some advantages. The cost of involving professional actors is a one-time expense. There are no logistics or space issues in arranging virtual patient assessment, only online technology issues are to be taken care of. With available virtual tools and increased internet speed, our method is very easy-to-use and of acceptable quality to students and faculty. The cost-effectiveness of virtual patient methods compared with OSCEs and workplace assessments using actual patients needs to be studied for various types of assessments of clinical competencies, including licensing examinations.

Conclusion

Positive responses (e.g., hassle free, students were able to counsel appropriately, faculty were able to assess as planned) by students and faculty show assessment of counselling skills using simulated virtual patients are feasible considering the time and technology used. Research to optimise the method, specifically on the quality and types of virtual patients, assessment rubrics for clinical competencies, generalisability to more case scenarios, and use with students from different health professions shall be needed. The value of summative assessments using virtual patients on licensing exams should be studied as well.

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