Virtual Patients as Novel Teaching Tools in Psychiatry

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Effective interviewing skills are an essential core competency of psychiatric training, especially when eliciting sensitive clinical information from child and adolescent psychiatric patients. Since it is not always possible to interview patients with the full range of psychiatric disorders during training, simulations such as "standardized patients" (SPs), that is, actors hired to portray patients, are nearly universal in current medical education (1, 2), and have been used to evaluate trainees' skills with objective structured clinical examinations (OSCE) (3). Use of computer-generated "virtual human patients" (VPs) is increasingly appealing as technology produces VPs that are consistent and realistic (4–7). A recent randomized trial found that both VPs and SPs produced equivalent improvements in diagnostic ability among nurses, physicians, psychologists, and public health workers (8), and the versatility of VPs makes them well suited to teach clinical reasoning skills (9). VPs can be programmed to reflect a wide variety of clinical symptoms and behaviors useful in teaching trainees critical thinking and diagnostic acuity (9). VPs can also be utilized to evaluate psychiatric residents' and medical students' clinical-management strategies.

Both SPs and VPs offer a supervised practice for trainees before they encounter a challenging, live patient (e.g., patients with trauma exposure, sexual assault/rape, physical attacks, and physical/sexual abuse); however, VPs, unlike SPs, are not limited by potential financial constraints to train actors (2). At present, there is little published data to guide the design and integration of VPs into psychiatric education; thus, research is needed (9). The potential benefits of VPs in medical education are the unlimited realistic simulations of patients of all ages and diverse ethnic and cultural characteristics to students, in a safe and reproducible manner (10).

The objective of this pilot study was to investigate the feasibility of interviewing a virtual adolescent patient (VP) with posttraumatic stress disorder (PTSD) and to increase trainees' and educators' awareness of this technology (5–7).

Method

The first phase, the development of "Justina," a virtual adolescent patient (VP) with PTSD, was achieved through a collaboration between a group of child and adult psychiatrists and a virtual-reality design and computer programming group. The "psychiatry" group contributed a written script of pertinent clinical (interviewer) questions and relevant (patient) responses to simulate a diagnostic interview with a traumatized adolescent, while the "virtual reality" group programmed the voice-recognizer and speech, and provided voice-overs of Justina's responses, enabling a dialogue between interviewers and Justina. Justina moves her mouth when speaking, but does not exactly mouth the words that she is speaking. The interviewer speaks into a headset and then depresses a button in order to hear Justina respond, which varies, from approximately several seconds to approximately half a minute. Justina has several body gestures that are linked with particular responses and convey emotional reactions; for example, she lowers her head when responding about "sadness" or "depression" and raises her arms when she does not understand the question.

In the second phase, 15 trainees volunteered to conduct a 15–20-minute clinical interview with Justina. Each trainee received a brief clinical vignette consisting of Justina's chief complaint and parents' concerns, and was instructed to interview Justina as a new adolescent patient. Trainees spoke to Justina, and listened to her responses through a headset in front of a computer.

Trainees' pre-interview assessment included:

I. Tellegan Absorption Scale (TAS) (11). This 34-item scale measures *openness to absorbing and self-altering experiences*. This instrument measures an individual's self-rated likelihood to become absorbed in a task and has been used as an indicator of the tendency toward hypnotizability
II. Immersive Tendencies Questionnaire (ITQ) (12, 13) This questionnaire measures the tendencies of *persons*

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to feel immersed, rather than [feeling] like an observer, in a variety of situations, including watching television, movies, playing video games, reading books, day-dreaming, and leisure activities. The ITQ comprises 18 items, each rated on a 7-point scale.

III. Author-developed questionnaire assessing experience with virtual reality (5 questions). These included demographic information and perceptions of anticipated performance with the VP.

IV. A brief pre- and post-interview test of knowledge of DSM-IV-TR, PTSD; 10 multiple-choice questions were developed by the authors to determine trainees' knowledge of PTSD symptoms pre- and post-interview.

Trainees' post-interview measures included:

I. Presence Questionnaire, (PQ) (12, 13). The Presence Questionnaire contains 32 items pertaining to an individual's sense of mastery, response to sensations, control, and involvement "with regard to the index environment experienced."

II. Author-developed, self-report questionnaire querying the believability of the VP and the quality of the experience on a 7-point Likert scale (1: minimum; 7: maximum).

Instruments are available upon request.

Fifteen trainees (mean age: 29.8; standard deviation [SD]: 3.67; 6 women, 9 men; Caucasian: 67%, Indian: 13%, Asian: 20%) participated in this pilot test. There were 7 medical students, 4 psychiatry residents, and 4 child-psychiatry residents. We obtained IRB approval from the USC Keck School of Medicine.

Results

The majority of trainee questions and VP responses pertained to building rapport with Justina, similar to what one might expect to find in an initial brief interview with a live adolescent patient. On average, there were 23 interviewer questions and 44 VP responses per interview related to rapport. Interestingly, there were more responses elicited from Justina related to rapport than questions asked. This indicates that even when the VP was asked about other topics, her answers were largely related to rapport with the interviewer. The average number of questions and responses pertaining to symptoms of PTSD were lower, on average—avoidance: (8 questions, 9 responses) and re-experiencing: (8 questions, 4.5 responses). Overall, the focus of the interviews reflected successful attempts by the trainees to engage the VP and develop rapport, rather than elicit a preponderance of diagnostic symptoms.

Trainee scores on the pre-interview TAS ("absorption") and ITQ ("immersiveness") were positively correlated with the post-interview Presence Questionnaire ("presence") scores. The strong correlation for these pre- and post-interview scales ($r=0.78$) is predictable, since all three of these scales measure the trait of feeling immersed in experiences; in this case, interviewing a VP. It is encouraging, however, that trainees' anticipation of "involvement in the experience" with the VP closely matched their actual experience.

Post-interview ratings provided information regarding the trainees' subjective experience of working with the VP. Trainee mean scores were: Believability of System (4.5), Understanding the VP (5.1), and Frustrating to Interview (5.3). Trainees were also asked to describe their experience with Justina in their own words. Overall, they expressed satisfaction in being understood and subsequently eliciting responses from Justina that were understandable and in context, despite frustration when Justina at times was unable to decipher questions. The source of Justina's misunderstanding appeared to be related to voice-recognition limitations, resulting in Justina's "default" response, "I don't get what you mean," which occurred overall about half of the time.

Discussion

The appeal of using a VP such as Justina in psychiatric training is that it is interactive and programmed to consistently simulate a particular clinical disorder with a high degree of realism. The increasing sophistication of speech-recognition technology is enabling VPs to be utilized for educational, diagnostic, and treatment applications (6). Furthermore, use of this technology can provide another "standardized patient" modality for teaching trainees interviewing skills, diagnostic skills, and management strategies. It would be of interest in a future study to compare the content and process of the brief initial interview with the VP to live "standardized patients."

The 15 trainees in this pilot study focused most of their dialogue with Justina on developing rapport. This is instructive, since it simulates a real first-interview with an adolescent psychiatric patient. Trainees were intrigued by the experience of interviewing a Virtual Patient. This was demonstrated through trainee comments such as: "Think this technology would be useful;" "Enjoyed experience;" "Liked trying different ways to talk to the character and getting an emotional response." Trainees indicated positive feelings about the VP experience, despite the fact that the VP was sometimes frustrating to interview.

Among the limitations of this initial pilot study of the VP is that all of the trainees and investigators were affiliated with the same academic medical center; this may have created an inherent bias for trainees to perceive the VP experience as positive. Another limitation was a lack of change in knowledge of PTSD symptoms from the pre- to the post-interview test; thus, if the trainees did learn about PTSD symptoms from the interview, the change was not captured with our test instrument. Our small and heterogeneous test sample, ranging from medical students to fellows, many of whom were already fairly well trained in PTSD diagnostic criteria, may have been too advanced and varied for our "test" instrument, so, in the future, the test instrument may need to be modified to better match the subject sample used. Also, as explained in the Method section, the technology is still being developed in facial and body features, which could be particularly important in psychiatric symptom recognition by the interviewer, given the importance of nonverbal cues.

Fortunately, VP technology is in rapid development, including advancements in enhanced speech-recognition, increased body gestures, and facial expressions. This pilot study with the VP, Justina, with PTSD, is encouraging in that trainees experienced the VP as a potentially useful interview exercise.

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