

## Simulated Patients for Competency-Based Undergraduate Medical Education Post COVID-19: A New Normal in India

**ANIL KAPOOR,<sup>1</sup> ANJU KAPOOR,<sup>2</sup> DINESH K BADYAL<sup>3</sup>**

*From Departments of <sup>1</sup>Medicine and <sup>2</sup>Pediatrics, People's College of Medical Sciences and Research Centre, Bhopal, Madhya Pradesh; and <sup>3</sup>Department of Pharmacology, Christian Medical College, Ludhiana, Punjab.*

*Correspondence to: Dr. Anil Kapoor, Professor of Medicine, HIG, C/10, PCMS Campus, Bhanpur, Bhopal 462037, Madhya Pradesh. anil.faimer@gmail.com*

The conventional medical curriculum in India needed more focus on explicit teaching and assessment of interpersonal and communication skills, professionalism, team-work and reflection for prevention and better management of increasing incidences of violence against doctors by building good doctor-patient relationships. Increasing number of seats in Indian medical colleges, decreasing hospital stay of patients, and decrease in faculty requirements will hamper adequate supervised authentic clinical experiences of undergraduates for developing clinical skills. The recent COVID-19 pandemic has led to a significant decrease in student-patient encounters. Simulated patients are being used in many countries to address many of these issues. To make the Indian medical graduates competent to function as primary physician of first contact, competency-based medical education along with guidelines for use of skill-lab and simulation has been introduced from 2019. The current review is focused on the need and use of simulated patients; their advantages, limitations and role in students' teaching and assessment. It also gives a brief outline of their training process. Simulated patients should be used to supplement day-to-day learning, help in transition to attending real patients and also save enormous faculty time in the post-COVID-19 new normal. However, simulated patients are unlikely to completely replace real patients' experiences.

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**T**here has been an increase in incidences of violence against doctors in last few years in India, which had been partly attributed to lack of explicit teaching and assessment of interpersonal and communication skills, ethics, professionalism, team-work and reflection during the undergraduate (UG) training program [1,2]. UG students often miss to develop competence in soft-skills. There is a need to improve doctor-patient relationship with more trust and respect for each other. In order to address these issues and to make the Indian Medical Graduates (IMG) competent to function as a primary physician of first contact, Graduate Medical Education Regulations (GMER) amendment, 2019 has implemented major reforms by introducing competency-based medical education (CBME) [3]. It has emphasized more on knowledge application than knowledge acquisition and recommended use of simulations and simulated patients (SPs) for teaching clinical skills to achieve competencies in a safer environment; simulation labs have been made mandatory in all medical colleges [4].

Since there have been sufficient number of patients available, use of SPs is not a routine practice for teaching UG students in India. However, the times are changing

and coronavirus disease 2019 (COVID-19) pandemic has led to significant decrease in student-patient interactions and it seems that SPs are the need of the hour. The current review is focused on the need and use of simulated patients, and their advantages, limitations and role in student's training and assessment. It also gives a brief outline of their training process.

### HISTORICAL PERSPECTIVE

The concept of 'simulated patient' (SP) was introduced by Barrows and Abrahamson in 1964 for teaching clinical skills to medical students [5], which was later also expanded to their assessment [6]. During a board examination in psychiatry and neurology, Barrows observed that one patient with syringomyelia became uncomfortable with the way of examination by a resident and tried to fix him by providing wrong information and changing his sensory findings! He also noticed lack of direct observation of students during their encounters with patients; and students committing many mistakes during examinations. This led him to an idea of introducing trained persons, who can be used instead of real patients on whom medical students can do repeated practice and receive corrective feedback to learn the desired skills [7].

The American Board of Pediatrics (1978) has defined five clinical skills (attitude, factual knowledge, interpersonal skill, technical skill and clinical judgment) in which pediatric residents should be competent [8]. Factual knowledge can be assessed by various valid and reliable assessment tools, while assessment of other skills relies more on using standardized patients [7,9,10]. American Board of Internal Medicine, Medical Council of Canada and Educational Commission for Foreign Medical Graduates have also supported the use of standardized patients for assessment of clinical skills [10,11,12].

### WHAT ARE SIMULATED PATIENTS?

Barrows initially introduced the term ‘the programmed patient’ [5] for a normal person who had been trained to act and react like a real patient with an illness and later revised it as ‘simulated patient’; while Norman coined the term ‘standardized patient’ [7,13]. The concept of SP is based on the philosophy of learning by doing and receiving immediate constructive feedback to have authentic experiential learning. Though the terms simulated patient and standardized patient have been used interchangeably, different educationists have described them differently. With simulated patients, the emphasis is on simulation (presenting the symptoms and signs of real patients) while “*standardized patients are those simulated patients who present the patients problem in standardized unvarying way to different students; therefore, they can also be termed as standardized simulated patients*” [14].

Later, standardized patients was used as an umbrella term, covering both the SPs as well as real patients, who have been coached carefully to present their problems consistently in a standardized way, to prevent students from knowing whether they are facing a real patient or a SP [7].

### ‘REAL’ PATIENTS IN MEDICAL EDUCATION IN INDIA

Till date, medical students are being trained and assessed on real patients. The greatest advantage of real patients is their availability with real symptoms and abnormal findings e.g., koilonychia, pallor, jaundice, hypertension, cardiac murmurs, irregular pulse, goiter, exophthalmos, pregnancy, edema, ascites, hepatomegaly, splenomegaly, crepitations over lungs etc. They are authentic and well accepted by teachers and students. They do not require any training or added cost for teaching-learning purpose.

However, using real patients can lead to opportunistic teaching; students are taught only those diseases whose patients are available. They are difficult to use in emergency or emotionally charged situations (e.g. HIV

positive patients, recently diagnosed cancer patients, dying patients, rape victims, acute exacerbation of psychiatric disorders etc.). Some patients are reluctant to be examined by trainee students; some feel uncomfortable by repeated interrogation and physical examination and become non-cooperative. They may pose different problems to different students; thus making the assessment less reliable [15]. It is difficult to standardize them as they see the situation from their own perspective. Students can not be allowed to examine very sick patients. With increasing number of UG seats in Indian medical colleges, decreasing hospital stay owing to rapid diagnosis with better management, day care facilities and apprehension after COVID-19, we are going to face a shortage of variety of patients in proportion to number of students for providing adequate clinical experiences.

### NEED FOR SPs IN CBME

Similar to Barrows’ observations, students in India also are mostly not observed while eliciting the history and clinical examination of patients and their mistakes and deficiencies often go unnoticed till they perform poorly in examinations as well as in real life situations. Regular supervision and feedback culture is sub-optimal at most of the medical colleges. Due to decrease in the official requirements of faculty in various departments, it will be difficult to supervise, provide feedback and certify all the students for acquiring all the competencies prescribed in the CBME curriculum, without using SPs. COVID-19 pandemic leading to a significant decrease in student-patient interactions is now a major reason for us to introduce SPs for clinical teaching and it might continue to be a supplement method in the ‘new normal.’ A scoping review of 33 studies related to use of the SP methodology found 24 studies to be effective in developing clinical skills of students in many countries [16]. Advantages of using SPs are enlisted in **Box I** [7,14,15,17,18].

### SPs AS A TEACHING TOOL

SPs are trained to follow a script to reproduce a particular problem or symptoms, and are given a set of guidelines to follow for certain responses and provide specific patient-centered feedback. They are helpful in developing all three domains of learning; technical, communication and cognitive skills.

*Technical skills:* SPs are effective in improving students’ examination skills as students can actually perform various maneuvers on cooperative real human beings. Many physical findings have been simulated with proper training (**Box II**) [7,19]. Make-up or moulage is being used to make realistic portraying of wounds. Some specially trained SPs, known as ‘intimate examination

**Box I Advantages of Using Simulated Patients**

- SPs provide high fidelity learning environment that realistically replicates a patient encounter in a predetermined clinical scenario.
- They can be trained to be mentally prepared to co-operate and examined by numerous students and respond uniformly in every student encounter.
- They provide a safe and non-threatening learning environment that allows mistakes and interruptions to be made.
- Medical students can practice history-taking, clinical examination and counselling skills repeatedly with SPs till they feel ready to face the complex and unpredictable encounters in real world.
- Once trained on SPs, students feel more competent and confident while encountering real patients and patients too feel that an expert is examining them rather than a novice.
- SPs can be used in teaching and assessing critical illnesses and emotionally charged situations, which is practically not feasible with real patients; e.g. confronting with a dying patient, sexually abused patient, psychiatric patient etc.
- They can be manipulated as per educational needs. Complications can be added or deleted in the 'case scripts' based on students' level of training.
- They can be trained to change their presentation quickly so as to demonstrate the response to treatment and course of chronic illnesses in the same setting.
- They can be trained to provide assessment scores and specific patient-centered feedback that students require in order to further enhance their learning in cognitive, psychomotor and affective domains, thus saving enormous faculty time.
- As they are standardized, a criteria referenced assessment of students can be formulated.
- By using SPs in place of real patients, real patients' safety and privacy are maintained; thus avoiding risk of legal issues.
- They can be enrolled in a 'SP bank' and are available for use any time, as and when required.

**Box II Some Physical Findings That Can Be Simulated***Central Nervous System*

- coma/altered sensorium/confusion
- gait abnormalities/hearing loss/vision loss
- hyperactive tendon reflexes
- neck rigidity/Kernig sign/Babinski sign
- muscle spasm/muscle weakness
- sensory losses
- incoordination/abnormal movements etc.

*Abdominal examination*

- abdominal tenderness/rebound tenderness
- acute abdomen

*Respiratory system*

- cough/abnormal breathing pattern

*Joint examination*

- movement restriction
- tenderness/warmth/redness

*Psychological*

- depression/agitation

associates' (IEA) or 'teaching associates' allow for female (gynecological teaching associate) and male (urological teaching associate) intimate examinations (breast, pelvic, rectal, testicular), thus avoiding risk of mistreatment to real patients; and these IEAs are reasonably paid for that [20]. Trained SPs provide corrective feedback which allows students to reflect on their performance and improve on weaker areas in a non-

stressful and non-threatening environment [21]. Thus, SPs promote self-directed and collaborative learning.

*Communication and teamwork skills:* Interpersonal and communication skills and professionalism are core competencies as per Accreditation Council of Graduate Medical Education (ACGME) and are must for successful interaction between doctors and patients. However, standard norms were not set for teaching and assessment of these skills in traditional curriculum [17,22,23]. Poor communication with patients and caretakers may lead to dissatisfaction and risk of violence against doctors [24]. SPs provide a unique opportunity to students to learn and practice these soft skills; and also receive constructive feedback from them [17,18,25].

*Cognitive skills:* SPs are helpful in developing students' clinical reasoning and decision making skills and can address higher levels in cognitive domain. 'Time in - time out' and 'stimulated recall' are two powerful tools to develop competence in clinical reasoning and decision-making [7]. In 'time in - time out' technique, once a group of students had interacted with a SP, teacher calls 'time out' and the SP goes into suspended animation (as if he/she is not there). Meanwhile, teacher discusses with the students what they think is happening with the patient and future course of action then and there only. Once discussion is over, teacher calls 'time in' for the SP to join back and participate in the discussion. This method gives the opportunity to discuss freely regarding differential diagnosis, management, prognosis and sensitive issues

that can not be discussed in front of real patients. In 'stimulated recall', interaction between student and SP is video-recorded and discussed later with the teacher.

**Hybrid model:** Integrating SPs with mannequins provide opportunities to practice procedural skills on the mannequin while communicating with SPs simultaneously; thus enhancing their technical and interpersonal skills in same sitting [26, 27]. Few examples are wound suturing, giving injections, catheter insertion and conducting delivery, which can be performed side by side on inanimate models attached to SPs.

### SPs AS AN ASSESSMENT TOOL

Written examination and viva-voce do not assess clinical competence. Interpersonal skills and clinical performance is rarely observed during students' assessment [10]. Real patients used for clinical assessment of students are usually not standardized, which may affect the reliability of result. In a study, no significant difference was found between undergraduate students' performance on real and simulated patients; students favored use of SPs over real patients for assessment of communication skills [28].

Objective Structured Clinical Examination (OSCE) and Clinical Skill Assessment (CSA) both use SPs as assessment tool. While OSCE assesses discrete skills or small set of skills at one station, CSA assesses a group of clinical skills (history taking, physical examination and patient education) in one encounter [29]. Good reliability and validity of CSA is ensured by using three different types of encounters, as described here [10,30]:

- i) *History cases:* are used to assess history taking and interviewing skills of the students.
- ii) *History and focused physical examination cases:* are used to assess physical examination skill in addition to history taking and interviewing skills.
- iii) *Patient education-counselling cases:* are used to assess the ability to educate patients on common topics (breast/complementary feeding, vaccination, oral rehydration therapy, diabetes education, use of metered-dose inhaler etc.) or counselling in critical or emotionally charged situations.

SPs assess students objectively by filling the case specific content checklists which are pre-designed to determine 'What relevant history questions were asked? Based on that, what physical examination maneuvers were selected to perform? Whether performance was done correctly?'

Before entering into the examination room, each student is given an opening-scenario (basic information

of the patient) and examinee's-task (which student has to perform in that station). Time allotted for each station is 10-15 minutes. After every encounter, 5 minutes are given to the student to write a summary of information gathered from the SP, make differential diagnosis and complete other post-encounter exercises. Simultaneously, SP fills two forms: a case specific content checklist (up to 30-35 items) and an interview rating scale. Arizona Clinical Interview Rating scale (ACIR) or Kalamazoo Essential Elements Communication Checklist - Adapted (KEECC-A) are commonly used for assessing the interviewing skill [31,32]. SPs are trained about the criteria on which they have to judge and assess the student's performance and they are found to be precise and consistent in filling the checklists [33].

### USE OF CHILDREN AS SPs

Children have been used as SPs since 1980s [34]. A focus group discussion with child SPs (6-18 years) reported that play-acting (simulation) was found to be fun; they learned how to differentiate between a 'bad' and a 'good' doctor. Children and their parents unanimously told that simulation had overall positive effect on them [34]. A pediatric clinical skill assessment (PCSA) of the residents using children (7-11 years) reported child SPs' experience to be quite positive; they could memorize the checklists and rate the residents' performance fairly well and consistently [35]. Another study on the feasibility of using school children (8-10 years) for OSCE showed that these children can score/mark the examinees reasonably well with a reasonable correlation between their scores and examiners' predictions of their scores [36]. Use of child SPs can be very effective in developing 'soft skills' and humanistic values to acknowledge and address children's special needs as patients [37]. The benefits of being a SP (including a child SP) have been reported apparently to outweigh the known risks [38]. A systematic review suggested involvement of adolescent and younger children as SPs to be feasible and valuable; however, it doubted about their reliability to portray the SPs' role and provide feedback [39].

### TRAINING OF SPs

It has been stated that "*simulated patients, if appropriately trained, should not be distinguishable from a real patient even by experienced clinicians*" [40]. Medical colleges in many countries have developed dedicated simulated patients training programs. The Association of Standardized Patient Educators (ASPE) has also published standards of best practice (SOBP) [41].

Steps for training SPs are summarized in **Web Box I** [15]. Case scenarios prepared can be totally fictional or

drafted from the case histories of real patients. Patients' own laboratory results and clinical course can be used for discussion [7]. Script of the case scenario, objectives of the case encounter, instructions for the students, time for interaction, scoring system (marks or rating scale), relevant laboratory reports, ECGs, X-rays, CT/MRI reports etc. with their interpretation and abnormalities are given and explained to the SPs. Depending on the need, SPs are either required to follow strictly as per the script or given some freedom to tell some of their personal information during the interaction with students. They are trained to act and react in a specific and predictable way, according to the goals of the program (teaching, assessment or both). For doing so, they should be able to observe and memorize the student's verbal and non-verbal actions apart from role-playing [13].

After going through the script, SPs prepare themselves for their role by watching relevant videos, observing previously trained SPs and/or meeting real patients suffering with the same problem [42]. Two to four training sessions, each of 2-3 hours may be needed depending on the scenario and time required for the SP to develop the desired level of competence in performing the role and use of checklists. They are monitored for 'accuracy' (how accurately they portray a given patient) and 'replicability' (how consistent they are in portraying the same patient to different students); and provided further training if needed.

### EXPERIENCE WITH SPs IN INDIA

Till date, there is limited documentation of use of SPs for teaching and assessment of students in India. A study on teaching patient interviewing, communication and counseling skills to UGs using Calgary–Cambridge guide

format recommended to conduct regular courses on effective communication in the MBBS curriculum [25]. Another study reported use of simulated interviews and role play for training PGs in psychiatry; trainees who performed as SPs reported the need of more clarity on their roles as SPs [43]. A study from dentistry assessed the effect of introducing a 'communication skills course' using interns to role play as SPs, reported improvement in communication skills of dental undergraduates [44]. The standardized patient methodology has also been used to assess standard for quality of care in healthcare settings [45].

### SET-UP REQUIRED FOR TRAINING SPs

CBME curricular reforms have recommended every medical college to develop 'Skills laboratory' with dedicated rooms, equipped with facility of video recordings and debriefing [4]. These labs can be used by trained faculty of the institute to develop and implement SP training program. People willing to work as SPs can be recruited by advertising in local newspaper, internet or through word of mouth; local actors can also be hired. Persons who are willing to become SPs should be able to act, memorize roles and checklists, good in communication skill, valid and reliable (accuracy and replicability), available at any time and setting (portability), able to adapt to many/different patients' roles and motivated to help educate students [4,11].

To reduce the cost, departmental staff, post-graduates, interns, senior medical students, or even mothers of admitted babies can be trained to participate in the SP program [43,46]. Additionally, nursing and other non-teaching staff, undergraduates, patients with genetic disorders or chronic stable illness like thalassemia, sickle

#### Box III Limitations of Using Simulated Patients (Adults and Children)

- Difficulty in finding people to work as SPs, especially for intimate examinations.
- Only a limited range of physical findings can be simulated using SPs; we can not teach and assess for organomegaly, heart murmurs etc. in healthy SPs.
- Training of SPs is costly in terms of money and time required, more so with child SPs; SPs have to be paid for every clinical encounter with students.
- Ethical issues in using children as SPs - In accordance with the Constitution of India (The Child Labour (prohibition and regulation) Amendment Act 2012), the minimum age for employment is 14 years; and violation of this rule can result in fine or even imprisonment. Written consent of parents and assent of children from 14-18 years has to be taken before recruiting them.
- Training children as SPs can be more challenging; younger children may have difficulty in understanding what is expected out of them and how to provide feedback. Their behavior may be inconsistent and difficult to control.
- Working long hours for child SPs can be taxing and may have negative psychological effects. They may get bored with repeated encounters leading to non-cooperation, inconsistency in their responses with poor feedback.
- Difficulty in getting child SPs because children are more likely to have acute illnesses, so their clinical findings will change or resolve over a short period of time.
- Parents may be too much concerned about their children's feelings during the SP encounters, and may not allow their child to miss school even for a day.

#### Box IV Overcoming Problems in Using Child Simulated Patients

- Create scenarios where the adult SPs can be used to portray role of parent of a sick child, to assess history-taking skills of students.
- Take care of child SP's emotional and physical well-being; consider participation of the child SP's family/chaperones during encounters.
- Use adult SPs along with their healthy or sick children (6-14 years) as parents and pediatric SPs and ask students to elicit a complete history of child from parent including parent's concerns. Subsequently, ask students to do physical examination of child OR it is either presumed to be done and normal OR abnormal findings (as per the need of the case) are given on a piece of paper.
- After eliciting the history and a brief clinical examination, include interpretation of relevant laboratory reports, pulmonary function tests, ECGs, X-rays, CT scans etc.
- Select children for SPs roles who are cooperative and preferably have interest in acting/drama.
- Use Child SPs for situations/issues that cannot be adequately assessed using other methods.
- Assign the roles to child SPs which match with their personalities, developmental age, and actual complaints/physical problems they might have/had e.g. headache, abdominal pain.
- Older children (>14 y) can be coached to simulate complicated behaviors or emotional problem they themselves have not encountered.
- Organize SPs-led sessions outside school hours/on holidays with regular breaks for rest and snacks.
- Limit SP encounters up to 10 or less at a time or till the child is comfortable.
- Consider use of patient substitutes such as photos (skin disorders), videos (abnormal movements, gait disorders), mannequins, and computer simulation (audio-visual cardiac/respiratory system findings) for training and assessment of students.

cell disease, cerebral palsy, down syndrome, bronchial asthma, diabetes mellitus, chronic obstructive pulmonary disease, irritable bowel syndrome etc. can also be utilized if they are willing to participate. Limitations of using SPs (adult and children) with Indian perspectives are summarized in **Box III** [15,47-49]. Suggestions to overcome challenges in using child SPs have been presented in **Box IV** [37,49].

Trained SPs are a valuable resource, and retaining them in the SP program requires adequate remuneration, respect and recognition of their efforts, appropriate freedom to teach and give feedback to students [15].

## CONCLUSION

SPs are being used for clinical skills' teaching, observing, assessing and giving feedback to medical students in many countries for more than 50 years. They act out scenarios (history, physical examination, inter-personal communication skills, counseling and patient education), can simulate abnormal physical findings, use checklists to assess trainees objectively and give corrective feedback. Encounters with SPs have been found to be beneficial in developing cognitive, technical and communication skills and self-confidence in medical students. SPs are not going to replace real patients but help in transition to real patients. With the implementation of CBME curriculum in India, introducing SPs for training medical students, especially undergraduates, will be an effective approach for developing the desired competencies under supervision and also saving faculty time. If ethical and practical issues are addressed properly, use of child SPs

also can be feasible and rewarding. It is recommended to introduce simulated patients in regular practice as a supplement method for teaching and assessment of clinical skills in the post-COVID-19 new normal.

*Note:* Additional material related to this study is available with the online version at [www.indianpediatrics.net](http://www.indianpediatrics.net)

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**Web Box I Steps of Simulated Patient Training**

- Scripts for 'case scenarios', case specific content 'check list' to capture students' behavior and performance, feedback forms, rating scales and post-encounter exercises for the students are developed, reviewed and revised by experts.
- SP is selected based on case to be portrayed (age preferably within two years of required role, gender, built, weight etc) and skills to be taught or assessed.
- Recruited SP is given a case scenario, checklist and instructions beforehand to practice the role.
- First training session – SP reviews the script, patient's attributes and do repetitive rehearsals; trainer demonstrates how to listen and analyze the questions asked by students. They are instructed and trained how to –
  - respond, both verbally and non-verbally.
  - provide relevant information about symptoms of their illness only in response to questions asked by student without adding unnecessary explanations.
  - observe whether students have performed physical examination correctly or not, how to react, identify the gaps and give corrective feedback.
  - reflect on the overall experience with the student's interaction after the encounter is over.
- Second training session – SP does repeated rehearsal with mock students, fills case specific content checklists, scores and feedback. These encounters are video recorded and SP's filled checklists are collected and stored.
- These video recorded 'encounters' between SP and mock students are reviewed by another scorer (SP trainer or faculty member) who gives scores / rating and provides feedback to the SP on how to improvise the act.
- The 'Act' is finalized only after agreement between the ratings of SP and second scorer is reached; till then SP continues to practice with mock students.