

Simulation Based Clinical Skill Training; A Need Of Time

Sumera Nisar (✉ sumera.rehman@bmc.edu.sa)

Batterjee Medical College

Durraiz Rehman

Rabigh Medical College, King Abdul Aziz university

Areeb Rehman

University college of medicine and dentistry, UOL

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Abstract

Objective: To explore the perception and attitude about simulation-based learning (SBL) of clinical skills in undergraduate medical students.

Place and Duration of Study: College of Medicine, Princess Noura bint Abdulrehman university; Riyadh, Saudi Arabia, from March to September 2019.

Method: A pre-tested structured self-administered questionnaire was used to collect the data about student's perception about simulation-based learning. Informed written consent was taken from the students. Data analysis was done by SPSS version 21 and Chi square test was used to see the association between the variables of the interest.

Result: Mean age of the students was 21.5 (standard deviation ± 1.8) years. Majority of the students (81.6%) found SBL as a favorable mode of learning clinical skills. 59% of the students found it useful to manage to see the rarest cases in medicine. Many of them believed it useful to overcome the problems of uncooperative patients (59.1%) and to solve the problem in getting the patients during exam (60.2%). They also strongly believed that simulation should be integrated in medical school curriculum as an efficient tool for learning clinical skills

Conclusion: The study strongly suggests student's positive perspective towards learning through simulation. Medical educators and curriculum designers can use the results of the study to incorporate simulation in undergraduate curriculum to train and enhance student's clinical skills and maintain patient safety.

Introduction:

Bedside teaching is the most effective and pragmatic way of mastering clinical skills (CS) in undergraduate medical students (1). In the past; most of the clinical teaching, clinical skills, and procedures were used to be learned during bedside teaching. Although it is the most effective and important teaching modality to impart clinical skills to medical students; its use is declining (2). Due to the constantly decreased exposure of the undergraduate medical students to this critically important aspect of their teaching, they are lacking in mastering clinical skills (3). The reasons for the decline in bedside teaching are multiple; busy hospitals, increased patient turnover, busy senior clinical faculty, increase in paperwork with no extra time allotment for such tasks, increase in patient's privacy issues and legal aspects are the few common reasons (4). Incidences of preventable medical errors and patient safety concerns are a few other major concerns that have led to the decline in bedside teaching (5) (6). Current COVID 19 pandemic and its imposed restrictions have also led to many challenges and a humongous impact on medical education. It has pushed the medical curricula designers to think and explore the alternative options for the clinical training of undergraduate medical students (7).

Simulation based clinical skill teaching and learning is becoming a very favorable modality in such circumstances to enhance the clinical skill competency in undergraduate medical students in the absence of a real patient (8). It is a valuable tool for better clinical practice and provides a safe and controlled environment to develop and practice the competencies at the standard level (9). In simulation based clinical skill training, the clinical situations are simulated for teaching and learning (10). Skills are mastered without the involvement of the real patient; thus, patient safety is not compromised (11). Many forms of simulation can be used; from simple skill training models to full body mannequins for the clinical skills learning(12) (13).

Simulation is a generic term usually used to present an artificial situation to depict a real-world problem to achieve educational goals. Successful use of the simulators facilitates the active learning of the medical students for those problems which they do not see in the clinics. It also helps them to practice and master the common clinical skills in a controlled environment without the fear of harming the patients (14). The options of recordings and feedbacks in the modern simulators have also made it very useful for the student assessments as well (15) (16). Simulation-based learning not only improves the clinical skills but also helps to improve the other very essential skills e.g. communication skills, teamwork, decision making, and leadership roles (17). These are very essential skills for any health care provider in any health care system.

The simulation-based learning (SBL) of the clinical skills in undergraduate medical students is a very helpful tool to bridge the gap between the theory and practice which has been created due to the constant decline of bedside teaching. It is also beneficial and convenient in compromised situations like the current COVID 19 pandemic (18). This can also help to improve the competencies of patient assessment, clinical decision making, technical and communication skills (19) (20).

Proper incorporation of the simulation-based teaching of clinical methods into the medical curricula can help the students to learn clinical skills efficiently and effectively before the actual encounters with the patients. This can also help to shed the extra load on the clinical faculty and the hospitals while maintaining patient safety (21).

Due to high patient safety, privacy protocols, and over busy clinic schedules, bedside teaching is declining in undergraduate medical students. Whilst, on the other hand, a good number of new emerging private medical colleges are desperately lacking any reliable and satisfactory clinical attachment or attached teaching hospital for the clinical training of their undergraduate medical students. Therefore, to overcome this problem, the need to incorporate simulation-based teaching of the clinical skills into the undergraduate curriculum is inevitable which our current medical colleges lack in their curriculum. Very few private medical colleges have incorporated simulation into their curricula but the reaction of the students and its effects on student's learning of clinical skills still needs to be assessed.

Therefore, our study aimed to explore the perception and attitude about the utility of simulation-based learning of clinical skills in undergraduate medical students to overcome the related challenges of clinical skill training.

Material & Method:

This cross-sectional study was conducted on undergraduate medical students of the College of Medicine, Princess Noura bint Abdulrehman University, Riyadh Saudi Arabia. The students of 3rd, 4th and 5th year were recruited by convenient sampling technique by the first (SN) and third (AR) authors. While all non-medical students were excluded. A sample size of 200 achieves 80% power to detect an equivalence difference of 10% using a one-sided exact test with a significance level (alpha) of 0.05. Informed written consent from students was taken. Ethical approval was granted by the Institutional Review Board (Princess Noura bint Abdulrehman University (PNU), Saudi Arabia, (IRB – Ref. # H-01-R-059). The study tool was a pre-tested structured self-administered questionnaire with 20 items based on a 5-point Likert scale from 1-5. Incompletely filled questionnaires were removed from the study. The questionnaire had two parts; the first part comprised of demographic data such as name (optional), age, and year of medical school. The second part was comprised of about 20 items on student's perceptions of simulation-based learning.

SPSS version 21 was used to analyze the data. Quantitative variables were described in terms of means and standard deviations while Qualitative variables were described by frequencies and percentages.

Result:

Out of 200 participants of the study, 191 (n=191) students filled the questionnaire. Mean age of the students was 21.5 (SD ±1.8) years.

Most of the students (81.6%) strongly believed that simulation support can help to develop their clinical skills. 59% of the students found it useful to manage to see the rarest cases in medicine (table 1).

Table 1: Simulation helpful to practice rarest cases

	Frequency	Percent
Strongly disagree	20	10.5
Disagree	20	10.5
Neutral	44	23.0
Agree	48	25.1
Strongly agree	59	30.9
Total	191	100.0

Many students found SBL as stress free learning environment as compared to stressful environment in wards (figure 1). Also, 66.49% considered it useful to improve patient's safety.

They also found it very convenient to learn to overcome the problems of uncooperative patients (59.1%) and to solve the problem in getting the patients during the exam (60.2%). They also strongly believed that simulation should be integrated into the medical school curriculum as an efficient alternative tool for learning clinical skills (table 2).

Table 2: Simulation as an efficient alternative instructional tool

	Frequency	Percent
Strongly disagree	9	4.7
Disagree	19	9.9
Neutral	47	24.6
Agree	54	28.3
Strongly agree	62	32.5
Total	191	100.0

Although most of the students believed that simulation-based learning (SBL) is a safe, reproducible, and stress-free learning environment, many of them did not agree on replacing the real patient with simulation. The participants also disagreed that SBL will minimize the importance of the role of the teacher in clinical skill learning (table 3).

Table 3: Simulation and clinical skill learning

	n	Mean	Median	Percentiles	
				25	75
1. Can simulation support the development of clinical skills?	191	4.22	5.00	4.00	5.00
2. Can simulation help to see and manage even the rarest of cases in medicine?	191	3.55	4.00	3.00	5.00
3a. Minimize standing hours	191	3.57	4.00	3.00	4.00
3b. Reduce overcrowding	191	3.50	4.00	3.00	4.00
3c. Reduce learners' fatigue	191	3.61	4.00	3.00	5.00
3d. Overcome the problem of uncooperative patients	191	3.62	4.00	3.00	5.00
3e. Solve the problem of getting patients during exams	190	3.65	4.00	3.00	5.00
3f. Minimize the stressful environment usually seen in wards	191	3.80	4.00	3.00	5.00
3g. Overcome language barrier	191	3.58	4.00	3.00	5.00
4. Will constant usage of SBL lead to deterioration in communication skills with the patients?	191	3.48	4.00	3.00	4.00
5. Do you feel that repeated practice of the procedure in SBL will improve the performance of the user?	191	3.64	4.00	3.00	5.00
6. Do you feel that SBL might improve patient safety?	191	3.84	4.00	3.00	5.00
7. Do you feel that SBL can replace live patients in practical examination?	191	3.32	3.00	2.00	5.00
8. Do you think that SBL will hamper the role of team efforts by minimizing role identity in an emergency situation?	191	3.26	3.00	2.00	4.00
9. Do you believe that the feedback provided by SBL at the end is better than that of bedside teaching?	191	3.22	3.00	2.00	4.00
10. Do you feel that SBL should be integrated into medical educational curriculum?	191	3.74	4.00	3.00	5.00
11. Will SBL help to increase the confidence levels of students while dealing with the real patients?	191	3.71	4.00	3.00	5.00
12. Do you feel that SBL can be used as an adjuvant for clinical practice and not as replacement to it?	191	3.79	4.00	3.00	5.00
13. Do you feel that SBL makes learning medicine easier?	191	3.85	4.00	3.00	5.00
14. Do you feel that SBL can create a highly realistic, safe and reproducible learning environment?	191	3.71	4.00	3.00	5.00
15. Do you feel that SBL will minimize the role of the	191	3.26	3.00	2.00	4.00

teacher?					
16. Do you feel that SBL will be relatively costly than employing a trained resource person for training?	191	3.29	3.00	2.00	4.00
17. Do you feel that importance of ethical issues will be reduced by repeated usage of SBL?	191	3.25	3.00	2.00	4.00
18. Do you feel that the teacher will minimize his or her efforts in clinical teaching if SBL becomes a part of the medical curriculum?	191	3.35	3.00	3.00	4.00
19. Do you feel that SBL should replace the use of animals in medical experiments?	191	3.32	3.00	2.00	4.00
20. Do you feel that more of SBL will minimize the empathy among doctors towards patients?	191	3.43	3.00	2.00	4.00

Discussion:

In last few decades, simulation has become a useful alternative tool in training undergraduate medical students and in maintaining patient's safety. Nowadays due to strict patient privacy, safety policies and current COVID 19 pandemic with its restrictions, learning clinical skills in clinics or wards has become very challenging (22). The key challenge is to explore, provide and adopt a favorable mode of providing knowledge, interactive learning, clinical encounters and their assessment by using available recourses to keep moving the clinical training onwards without compromising student's safety (23). Many medical colleges are employing simulation as a key tool to help their students to master important clinical skills in stress-free environment. It helps them to learn in a realistic and immersive way, allowing them to experience almost real-world scenarios (24) (25).

The present study has explored student's perception about learning clinical skill by simulation. Most of the students in our study have endorsed that SBL is a safe, reproducible and cordial learning environment (26). The study has also explored and described the favorable impact of SBL on undergraduate medical students in learning communication skill, procedural skills and integration of basic and clinical knowledge in a comfortable environment. The simulation helped to minimize the anxiety, improved comfort, knowledge retention and confidence among the students to work confidently in clinics (27). With the evolution of technology, various kinds of simulators are available to teach and train the psychomotor skills in undergraduate medical students. Various studies have mentioned the importance and utility of different simulators in enhancing the psychomotor skills and cognitive learning. The simulators provide an opportunity to the students to learn manual skills and monitor their own performance (28) (8). However, the students still supported the need and role of the tutor in these sessions. They preferred the tutor's feedback and debriefing sessions. They found the debriefing sessions by the tutor after each encounter helpful to augment and improve their skill learning experience (29).

Finding rarest cases is another advantage of SBL. It is a deliberate practice of clinical skills under controlled environment. It supports to provide or create a rarest or important case scenarios for the

students to practice and react accordingly (30). Simulated high stake procedures and encounters can also be used to enhance student's competence in a particular field to compensate the exposure with rarest case presentations or diseases (31).

Medicine is perceived as one of the most stressful programs as compare to any other academic disciplines or programs. Clinical training stresses in medical students are mainly related to the fear of making errors, communication with patient, language barriers, fear of failing to perform in front of patient and peers, fear of not having enough knowledge and skill to deal with patients, and many more (32). Stress is a known factor affecting cognitive and psychomotor skill performance of the students and ultimately affecting patient care (33). Simulation based learning provides an opportunity to the students to work and practice in a controlled and stress-free environment (34) (35). The study participants also found SBL as controlled stress-free learning environment as compare to wards. They also found it useful to overcome the problems of uncooperative patients in wards, during exams and helps them to learn to handle the difficult patients. Minimizing standing hours, less overcrowding and reduced learner's fatigue are the other explored added advantages of SBL in our study.

Patient safety is one of the core attitudes of clinical training of health professionals. Ensuring patient safety in clinical settings needs structured and controlled clinical skill practice and training before patient encounter. Simulation based learning can be a useful resource to train and teach patient safety protocol to the undergraduate medical students (36). Meticulous training of the students in such controlled setups can help to create a climate of responsibility and accountability about patient care and safety among our students. Conscientious training sessions through SBL can also help to minimize the medical errors by students and can successfully be used to improve the quality of health workers and patient's interaction when each patient is unique (37).

Although majority of the participant in our study believed SBL is a pragmatic approach to learn clinical skill, they still affirm that simulation cannot replace the importance of real patient in real environment. They also strongly exhibited their trust on the role of teacher in learning of clinical skills. They strongly believed that students try to adopt the attitude, attire, professional dealing and behavior of their teachers in clinical settings (38) (39). Personality and teaching skills of the tutor are positive attributes of role model which they feel lack in SBL.

Limitation of the study

The main limitation felt was the inability to take the perception of students about use of different types of simulators individually for learning clinical skills e.g. high-fidelity mannequin, task trainer, standardized patients etc.

Conclusion:

The study strongly suggests student's positive perspective towards learning through simulation. It can help to incorporate and enhance the main core competencies in a medical graduate in terms of patient

care, medical knowledge, practice-based learning, communication and interpersonal skills in a stress-free environment. Availability of a simulation lab for undergraduate medical student's clinical skill training is the need of time. Medical educators and curriculum designers can use the results of the study to incorporate simulation in undergraduate curriculum to train and enhance student's clinical skills and maintain patient safety.

List Of Abbreviations:

SBL	Simulation Based Learning
PNU	Princess Noura bint Abdulrehman university
CS	Clinical Skills

Declarations:

Authors contribution:

First author (SN) and second author (DR) conceived the idea and developed a research team. SN, DR and third author (AR) developed the objectives, questionnaire. AR validated and distributed the questionnaire. AR collected the data and did the analysis together with DR. DR wrote the introduction and SN used the analysis and wrote the discussion. manuscript was completed by SN. AR and DR reviewed the manuscript.

Ethics approval and consent to Participate:

Ethical approval was granted by the Institutional Review Board (Princess Noura bint Abdulrehman University (PNU), Saudi Arabia, (IRB – Ref. # H-01-R-059) and informed written consent was taken from all the participants of the study. All methods were performed in accordance with the relevant guidelines and regulations of PNU.

Consent to publication: Not applicable

Availability of data and materials:

The datasets generated and/or analyzed during the current study are not publically available as we were planning to generate another manuscript in the same sequence once we are able to publish the manuscript in this esteemed journal. However, the data are available from the corresponding author on reasonable request.

Conflict of interest: None

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Figures

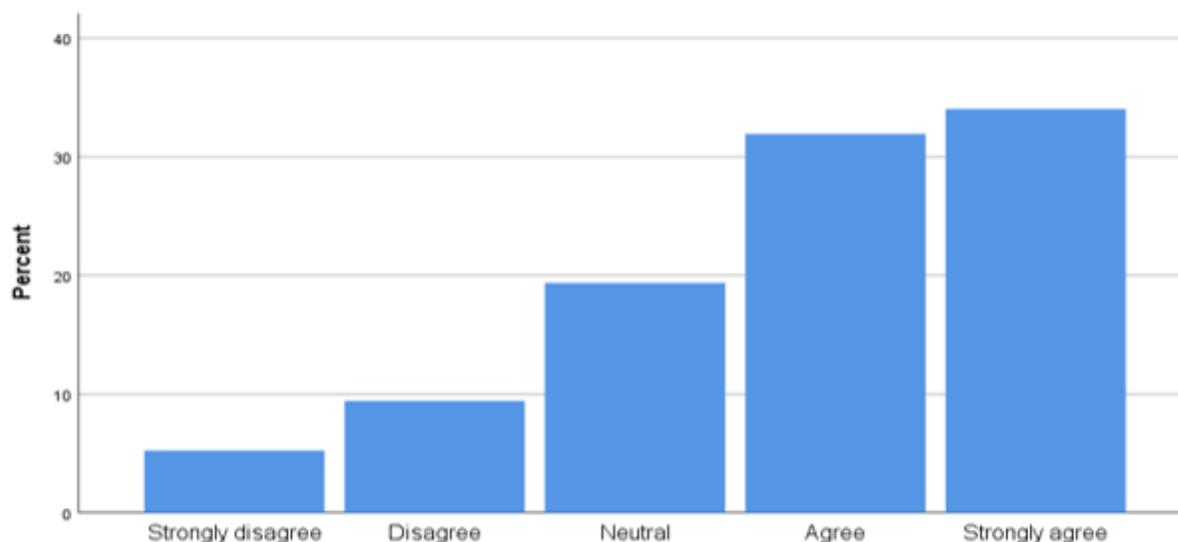


Figure 1

SBL minimize stressful environment usually seen in wards