Original Article :

Students ' perspective of Simulation Based Clinical Teaching in Surgery Block - an experience at Qassim University, Saudi Arabia.

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Abstract

Background and Aims:
Due to the lesser availability of patients for bedside teaching, simulation-based teaching sessions were added to enhance clinical skills, and the perspective of the students and their impact on grades attained in clinical skills assessment were analyzed.

Methods:
Six simulation sessions were conducted using simulated patients and mannequins to cover topics including examination of the abdomen, thyroid, lump, ulcer, rectum, and breast. At the end of the block, a brief, self-designed anonymous questionnaire was used to conduct an online survey to assess the students' perspective, and the results were analyzed. The clinical skills evaluation results were compared to the grades of students who had previously graduated and received traditional training.

Results:
The satisfaction level was high, and the majority of students felt that their confidence levels and clinical skills had been enhanced. Various shortcomings in the conduct of simulation sessions were pointed out, and possible solutions were suggested. The grades attained by the students in clinical skills assessment had shown significant improvement.

Conclusions:
Simulation-based clinical skills teaching is an effective academic tool and has the potential to make up for the deficiencies in traditional bedside teaching.

Keywords:
Bedside teaching; Clinical Skills; Patients turnover; Medical training; Simulated patients; Mannequins.

Introduction

Bedside teaching (BST) has been a leading component of medical training and an essential tool in the creation of a competent physician ever since its introduction in modern medicine by Sir William Osler (1849–1919) in 18921. BST involves visual, auditory, and tactile experiences, thereby affording endless opportunities to learn clinical skills, reasoning, communication skills, empathy, interpersonal relations, and professionalism. A good medical history has been found to aid physicians in reaching the proper diagnosis in up to 56% of patients, and the figure may rise to 73% if an efficient physical examination is added [2].

In spite of these time-tested advantages, there has been a clear declining trend in BST in recent years, with the proportion of teaching time taken up by it falling from 75% three decades ago to only 8–16% today [2, 3]. The studies undertaken to assess the medical students' perspectives on BST also indicate that the students do not get extensively exposed to this tool during their undergraduate courses [4]. The decline in BST is attributed to various roadblocks, including in-patient unavailability due to a more rapid turnover resulting from newly introduced management concepts like 'day surgery' and 'A&E four-hour target', increased reliance on the latest technology in the diagnostic process, and the limited availability of clinician time [5].

Various strategies have been proposed by educationists to minimize the impact of declining BST, and simulation is an important proposed tool that has shown promising results in improving the confidence level, proficiency, and clinical skills of students [6-10]. Taking a cue from such recommendations in the recent literature, the Department of Surgery at the Unaizah College of Medicine and Medical Sciences, Qassim University incorporated simulation sessions in the Surgery Course of MD-3 students to address the difficulties arising from unavailability of patients for BST. The results of this endeavor are projected in this study.

Materials & Methods

Study design

There were two components of the study:

(i) an observational descriptive cross-sectional study that examined students' perceptions of simulation sessions through the use of a questionnaire

(ii) investigating the possible impact of the simulation sessions through comparison and evaluation of the scores students received on the clinical skills assessment

Sampling and defining the study population

Total sampling coverage was used for the cross-sectional study component, and as a result, all fourth-year female medical students who voluntarily agreed to participate in the study and were undergoing a general surgery clerkship at the Department of Surgery, Unaizah College of Medicine & Medical Sciences, Qassim University, Saudi Arabia in the academic year 2022–2023 were enrolled.

Execution

Six simulation sessions with small-group instruction using mannequins and simulated patients (SP) were carried out. The Surgery department came up with the idea for the activity after carefully reviewing the input it had received from instructors as well as students between 2016 and 2020. The feedback had identified gaps in clinical instruction, which were caused by the dearth of graduate-level patients at the teaching hospital. The subjects were chosen in accordance with the intended learning objectives (ILOs) that the college's curriculum design and quality committees had previously approved for the MD 3 (4th Year) Surgery block. Examinations of the abdomen, thyroid, lump, ulcer, rectum, and breast were conducted during the sessions. In coordination with the Skills laboratory unit, appropriate mannequins and simulated patients were arranged.

At the end of the block, a brief structured questionnaire (Table 1) was designed after adaptation of concepts from the previously published peer-reviewed studies [11-12]. That tool was then used to assess the students' perspective about the simulation sessions in terms of satisfaction level, confidence level in application of skills and the difficulties faced during the sessions. The 9- item questionnaire was a combination of Likert scale to assess students' perspective and two open-ended questions to register any comments about the difficulties faced during the sessions and the suggestions for improvements in future. The responses to the open-ended questions were summarized using thematic approach for the analysis of qualitative data. Five randomly chosen students were given the printed questionnaire at first, and after analysis of their responses, other enrolled students were involved in the activity. The final analysis did not include the responses from the first five students.

Regarding the second component, departmental record files were reviewed to see whether there was a difference in the marks the students received in the clinical skills/practical assessment that could be linked to the use of simulation as a teaching technique.

Data Analysis

The data were cleaned and checked for completeness to eliminate any possible errors using the Microsoft Excel-2019 and analyzed by Statistical Product and Service Solutions (SPSS Version 27). Qualitative data was expressed as frequency and proportions. Graphs and tables were used for depiction. Thematic analysis was used to examine open-ended questions (questions 8 and 9 of the questionnaire displayed in Table 1) where students were allowed to freely express themselves and reply in any way they preferred. After that, the answers were examined and grouped into themes that would cover each response. As a result, six difficulties and three suggestions were found to be recurring themes, as shown in Tables 2 and 3.

Study approval and ethical Considerations

The study was approved by the Committee of Research Ethics, Deanship of Scientific Research, Qassim University vide Order No: 22-05-04 / 2022. Confidentiality of the subjects was maintained by making the questionnaire anonymous and coded.

Table 1: Self-designed Questionnaire used in survey about Simulation Based Clinical Teaching Sessions

What is your satisfaction level with the way Simulation Based Clinical Teaching Sessions were conducted?				
Highly satisfied	Satisfied	Neutral	Dissatisfied	Highly dissatisfied
Would you like to have Simulation Based Clinical Teaching Sessions as an additional teaching tool in other clinical blocks?				
Yes		Neutral		No
Can Simulation Based Clinical Teaching Sessions be a replacement for bedside teaching?				
Yes		Neutral		No
Can newer clinical skills be learned in Simulation Based Clinical Teaching Sessions without real patient encounters?				
Yes		Neutral		No
Did Simulation Based Clinical Teaching Sessions enhance your confidence in approaching real patients in bedside teaching				
Yes		Neutral		No
Did Simulation Based Clinical Teaching Sessions enhance your confidence and accuracy in display of skills in Final exams?				
Yes		Neutral		No
Did Simulation Based Clinical Teaching Sessions cover most of the important clinical skills laid down in the objectives of Surgery Block?				
Yes		Neutral		No
What were the difficulties encountered during Simulation Based Clinical Teaching Sessions? Please mention.				
Do you have suggestions for improvement of Simulation Based Clinical Teaching Sessions?				

Results

Forty-six students took part in the study, and the responses of 41 students were analyzed. Student attendance ranged from 91% to 100% (mean: 96%) during the sessions. 39 (95%) students were either highly satisfied or else satisfied with the sessions, as shown in Figure 1, and 33 (80.5%) felt that the sessions enhanced their confidence in approaching real patients in bedside teaching. 39 (95%) of students expressed a desire to have simulation sessions as an additional teaching tool in other clinical blocks. 36 (87.8%) felt that simulation sessions enhanced their confidence and accuracy in the display of skills in the final summative assessment, whereas 5 (12.2%) maintained neutrality about this aspect. 35 (85.4%) felt that the sessions covered most of the important clinical skills laid down in the objectives of the surgery block, whereas 6 (14.6%) either disagreed or were neutral.

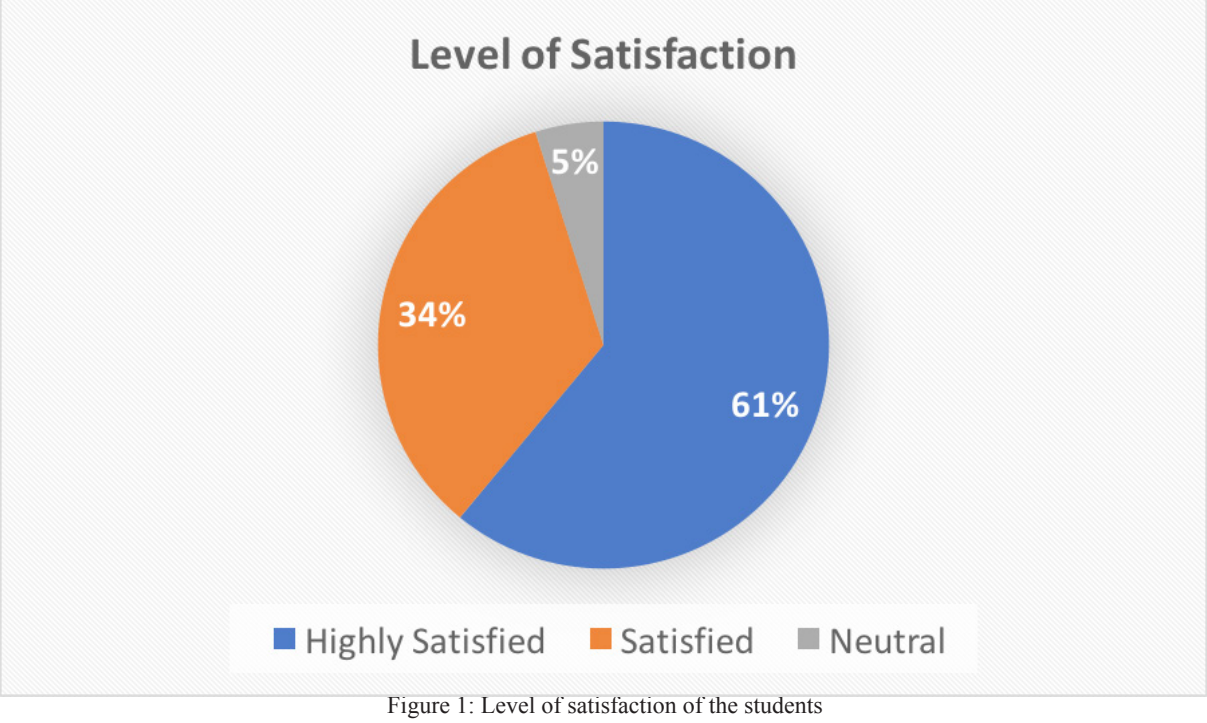


Figure 1: Level of satisfaction of the students

However, 31 (73.2%) opined that simulation-based clinical teaching sessions cannot replace traditional bedside teaching, and only 8 (19.5%) felt otherwise, whereas 2 (4.9%) were neutral. Similarly, only 18 (43.9%) students believed that newer clinical skills could be learned in simulation sessions without real patient encounters, whereas 9 (22%) expressed the opposite opinion and 14 (34.1%) were neutral.

The students documented a range of challenges they faced during the simulation sessions. Only 8 (19.5%) felt that there were no difficulties, whereas 33 (80.5%)

mentioned various difficulties that have been summarized as shown in Table 2.

Table 2: Difficulties encountered by students during the simulation sessions.

Difficulties	Number of Students
Same mannequins are used in different sessions for different purposes creating confusion; e.g., breast model is used for lump exam also	26 (63.4%)
Different instructors for different students' groups have different methods of teaching but in Final assessment of Surgery block, there is similar standard checklist for all	17 (41.5%)
Simulated patients do not have many clinical findings and hence do not act as an ideal substitute for real patients	12 (29.3%)
Mannequins are not adequate in range and number	12 (29.3%)
Time of each session is less and all students do not get an adequate chance to practice the skills	9 (22%)
There is a language barrier between stimulated patients and students	7 (17.1%)

The various suggestions put forth by the students to improve the quality and usefulness of simulation sessions in the surgery block are summarized in Table 3.

Table 3: Suggestions for improvement of Simulation Based Clinical Teaching Sessions

Suggestions	Number of students
Standardize the teaching methodology of clinical instructors that is in alignment with checklists set for Final summative assessment of Surgery block	24 (58.5%)
Enhance the range and number of mannequins	20 (48.8%)
Increase the number of sessions to include topics for which there is a deficiency of real patients in hospital; examples cited: Hernia, Scrotal Disorders, Vascular Disorders, Diabetic foot	17 (41.7%)

The mean score for the students' clinical skills assessments was 87.3% prior to the commencement of simulation sessions (2016–2021), and it increased to 96% in 2021–2022, according to an analysis of the grades they received (Figure 2). This difference can be related to the use of simulation in clinical skills education and is significant (p value less than 0.001) because other characteristics, such as the faculty, the location of clinical training, and the length of the course, have not altered in either phase.

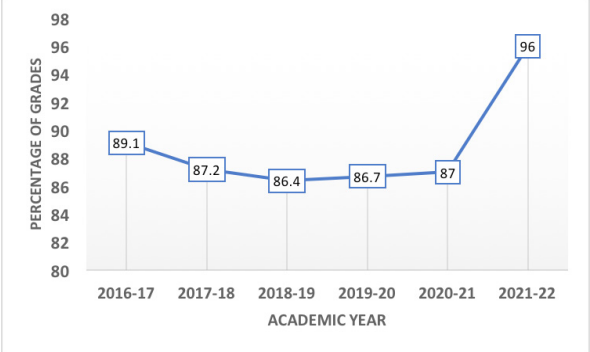


Figure 2 : Mean percentage grades in Clinical skills examination

Discussion

Bedside teaching (BST) has been a fundamental tool in medical education ever since Sir William Osler (1849-1919), one of Canada's most renowned physicians, in-

troduced it in 1892 [1,11]. His visualization of medical education is that of an art that is to be taught and mastered by the bedside and not in the classroom [12].

However, recent studies point towards the declining trend of BST, and one of the major responsible factors is the unavailability of patients due to increased turnover and short stays [2,3]. Like elsewhere, in Saudi Arabia too, a great number of cases that would traditionally stay for a few days in surgical wards and be utilized for bedside teaching are getting managed as day cases, thereby rendering them unavailable. Al-Qahtani et al. reported that a total of 487 patients underwent laparoscopic cholecystectomy as a day case at the Department of Surgery, King Saud Medical City, Riyadh, Saudi Arabia, from July 2009 to June 2013 [13]. Similarly, from January 2015 to February 2021, a total of 6,771-day surgery cases were undertaken at King Fahad Specialist Hospital in Buraidah, Al-Qassim, Saudi Arabia, with laparoscopic cholecystectomy (36.4%) and hernia repair (12.1%) being the most common procedures [14].

Educationists are calling upon work to re-establish the hospital wards as a supportive environment for student learning [15] and to augment clinical teaching with tools like simulation to neutralize the ill-effects of exposure deficit, which medical students experience in bedside teaching [7]. As is obvious from our results, 95% of students expressed satisfaction with the conduct of simulation sessions , 80.5% felt that the sessions enhanced their confidence in approaching real patients during bedside teaching sessions in the same course, and about 88% felt that simulation sessions enhanced their accuracy in the display of skills in the summative assessment. These results are highly encouraging and concur with the results from other series in the literature. In a study conducted by Singer et al. [6] at the University of Chicago, the bedside critical care competency of first-year residents who received a simulation-based educational intervention plus traditional BST was compared with that of third-year residents who received only traditional bedside training, and it was observed that first-year residents had significantly higher scores on bedside assessments. Kurz et al. [7] conducted a training program to improve the knowledge of medical students in the field of pain medicine, wherein half of the students were made to attend a training with simulated patients (SP), followed by bedside teaching, and the other half performed the training programs in the reverse order. They evaluated the course using a standardized questionnaire and concluded that the training with simulated patients in combination with small-group teaching at the bedside with real patients achieves a

dramatic increase in student competence.

During the 2015-2016 academic year, Rocky Vista University College of Osteopathic Medicine (RVUCOM) enrolled 148 students in a mandatory one-week surgical simulation course at the start of the eight-week surgical clerkship, and it was found that the surgery simulation course significantly improved student performance academically and helped students acclimate to stress, increase their confidence level, and acquire surgical skills needed during the third-year surgery clerkship [16]. Lee et al. recently conducted a study to evaluate how simulated surgical clinics based on the safe and effective clinical outcomes (SECO) framework aligned with students' educational priorities, and it was concluded that integration of surgical simulated clinics into the undergraduate curriculum could facilitate the acquisition of clinical skills through active learning [17]. In our study also , the look at the trend of the grades depicted in Figure 3 aligns with previous research and indicates a positive impact in the development of clinical abilities.

The students freely expressed their opinion about the shortcomings and difficulties (Table 2) that they encountered and put forth certain valid solutions (Table 3). This data points towards the level of academic maturity and feedback delivery skills that the students attain at Unaizah College of Medicine and Medical Sciences as they progress through their years of education, and this is appreciable. Certain shortcomings that were pointed out are due to logistical deficiencies and are hence correctable by measures like an increase in the number and range of mannequins. And the calls for standardization concur with the recommendations from other series in the literature, wherein proper preparation and case design before the sessions have been stressed, along with alignment with the course objectives and standardization of assessment schemes for skills attained by simulation. [18]. Atesok et al., in an extensive review, concluded that as simulation has become more accepted as a teaching tool, techniques to measure skill proficiency also need standardization [19]. Seagull and Rooney also stress the development of standard subjective assessment tools for surgical simulation [20]. Cleland et al. state that it is critical to recruit, train, monitor, and use standardized patients (SP) for simulation sessions appropriately [21]. They have provided a detailed overview of how to attain that objective for teaching and assessment purposes. Such an approach would avoid difficulties like language and cultural barriers, as were experienced by students in our case. Murry et al., in their study, found that the medical students reported benefit from simulation sessions immediately and

at the 18-month follow-up survey during their clerkship, where there was a persistent impact of the sessions in recognizing the key features of relevant diagnoses [22].

Conclusion

Simulation-based teaching is a successful addition to the armamentarium of clinical education in the face of decreased patient availability, though it cannot replace traditional bedside teaching. Simulation sessions enhance the confidence of students to encounter patients during bedside teaching sessions as well as to display clinical skills in examinations. However, simulation sessions need to be standardized and improved in light of the feedback from the students.

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