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Original Research Article

Role of simulation in AETCOM and skill development of surgery interns

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ABSTRACT

Background: Simulation is a way of learning skills in life like situations that are not real. Simulation based training according to many studies turned out to be effective method in skill development. In this study we have used bench top models available in our institute with simulated patients, which are accessible, and cost effective. The use of simulation in Graduate Medical Education has evolved significantly over time, particularly during the past decade. The applications of simulation include training budding surgeons in technical and non-technical skills and better prepared to face clinical situations.
Methods: After 5 days of focused group discussion, 60 interns were asked to perform the two basic tasks in bench models attached to simulated patents. Skills assessed by pre-test, post-test and feedback module created for the 2 tasks. Scores was compared and analyzed, at the end of the module by summative assessment. Tasks were graded to100 point system, using rubrics and difference calculated using pair t test.
Results: Mean of the skill score in pre-test 78.26±5.58, range found to be 86-73. There was significant improvement in post test score in which 86.54±4.41, range 97-66. t was found to be 5.5256, a significant improvement, and p value found in post-test 0.0002.
Conclusions: Skill development with Mannequins and Standardized patients is found effective in training the interns. In addition to developing technical and non-technical skills, interns also get to communicate with simulated patients, which will make them more competent.

Keywords: AETCOM, Competency, DOPS, Interns, Simulation, Skills assessment

INTRODUCTION

Standardized patients in simulated environment give the interns opportunity to learn clinical skills under supervision of the qualified faculty. Trained paramedical persons familiar with this situation need not be trained too hard about their role. It bridges the gap between demonstration and hands on practice in real like situations. The importance of this training course reflects in to more efficient interns, who are patient-oriented improved in attitude and communication for the students to learn and gain experience for a better clinical foundation.[1] MCI also stressed the importance of Attitude, Ethics and communication, and the new curriculum changes coming in to effect from 2019-20. Until recently Indian medical graduate is focused only in passing exams and getting a degree, and the curriculum also did not provide scope for competency-based education for under graduate students.[2] Now MCI has introduced changes in the curriculum, in which importance being given to Competency based Medical education. The purpose of this CBME is to train the

under graduate students in different competencies, they need to know to be a competent medical graduate including attitude, ethics and communication.[3] For successful implementation, faculty development plays an important role. Effective communication is the communication which brings results. Developing communication skill training in formative years is a positive investment for the health of the society. Regular courses on effective communication and attitude development should be included in the under graduate medical curriculum.[4] This study was conducted as a pilot program in our teaching hospital for interns using simulated patents in AETCOM and skill development. Advice, reassurance and support from the doctor can have a significant effect on recovery (placebo effect) It is not possible to train all the students directly on the patients, for obvious reasons of inadequate training on the part of the students, and risks and apprehension from patient side.[5] Though we demonstrate and allow the students to observe what a qualified person does, the trainees don't get hands on training. To be competent in skill and communication constant supervised training is essential. There should be some system in place to assess the performance and feedback for such training to be effective. CBME is specific, measurable, dimension of knowledge and skill that can be assessed.[6] As a pilot program, we used simulated patients (trained Para medical person) for this purpose with basic mannequins. The trainees were trained in two basic skills and their performance assessed and feedback given.

The objective of the standardized patient program for interns devised to train them in technical and non-technical tools such as competency in communication, attitude, ethics, and professionalism. The SP was expected to strengthen the interns understanding improvement skills assessed by overall grading.

METHODS

This study was conducted at Karpaga Vinayaga Institute of Medical Sciences, for interns posted in our department in Skill lab attached department of surgery. The study period was 6 weeks (5 days a week) June 11 to August 7, 2018 excluding Saturdays and Sundays.

Materials

- Basic bench models available in our skill lab
- Trained paramedics as simulated patients.

Study subject were Interns/ (CRRI).

Inclusion criteria

Interns willing to participate in this training module

Exclusion criteria

- Interns who had some kind of proficiency already
- Drop outs.

A semi- experimental study designed for interns using simulation method. These interns were introduced to Simulation to compare their understanding and performance based on the cumulative grading scores before and after the introduction of simulation training.

Basic mannequins and trained simulated paramedics as standardized patients were used for this study. Each set of mannequins, and standardized patients were prepared to train interns for two basic tasks. Short focused group discussions were used to brief the interns about the tasks to be performed, as in real situation in addition to audio visual demonstration. Aseptic precautions, simultaneously talking to the simulated patient and showing professionalism were observed and scored. In our study interns were asked to perform two tasks of suturing, and Ryle's tube insertion. Interns in their surgical postings (n= 60) divided in to 6 groups of ten each, asked to perform the tasks each 6 consecutive weeks (June/August 2018). Informed consent from all interns with condition that they could not opt out in the middle. Interns were trained in group of 10 by qualified tutors, in both tasks. Pre-test, post-test assessment and feedback obtained from the interns used for analysis simulation. Tasks were graded to100 point system, using rubrics and difference calculated using pair t test.

Scores were obtained from the final summative clinical skills exams. Exams were conducted based on the standardized patients in simulated environment. Mean scores were calculated after obtaining the final summative grading points of the students in clinical skills before and after the introduction of simulation, comparison of the changes in scores was made, using paired t-test. Data were collected and analyzed using Stata 15.

RESULTS

The simulation-based training was designed to develop technical and non-technical skills for our interns to enhance better learning experience. Skill lab was used for this training with bench type mannequins and trained paramedics who were trained to be standardized patients. Faculties' video recorded the performance of the interns to assess their technical and nontechnical skills and score were given. Feedback was given immediately after each session. 60 interns 29 males and 31 females participated and completed the program. Homogeneity maintained in no of interns in each group, tasks given, time limits for task, and lab setup.

Scoring was done through the application of rubrics. Examinations were graded strictly following the rubrics. The rubric points were used for technical and non-technical skills assessment. Examiners were required to adhere to the rubric limits to grade each student within a

same set of a standard grading protocol. Final grading was converted to a 100 points scale for each intern.

Task 1

Suturing

Artificial suture pad fixed to the arm of a simulated patient, and the interns are asked to perform the task of suturing the wound, while monitored for Attitude, ethics, communication, and suture skills, by supervising faculty and same recorded for review and feed back

Task 2

Ryle's tube insertions

Bench model, and simulated patents mimicking real life situation created and same abilities observed. Faculties' video recorded the performance of the interns to assess their technical and nontechnical skills and score were given. Feedback was given immediately after each session. Pretest and post test scores were compared and analyzed, at the end of the module by summative assessment to compare the impact of simulated environment. Tasks were graded to 100 points system using rubric and difference calculated using pair t test.

Table 1: Evaluation of simulation (10 points scale).

Variables	Agree	Disagree	Strongly agree	Strongly disagree
Tasks given	4	1	3	0
Good learning experience	3	0	7	0
Skill development	4	1	4	1
Utility of SP	4	2	4	0
Good learning tool	4	1	4	1
Application to clinical	4	1	3	2
Apply in other skill development	4	2	4	0

Mean scores of the interns before the simulation was 78.26±5.58, (range: 86-73). Post simulation the mean scores of the interns after skill training was 86.54±4.41, range (97-66). The t was found to be 5.5256, significant. The mean difference between the two groups was 8.08 (95% CI: 5.05-11.12). There was a statistically significant increment in the scores of the students (t=5.5026, p=0.0002), leading to an improvement in the overall grading of the students.

Sixty interns (house surgeons) were given training using simulated patients, and basic bench models. Assessment was done by (DOPS). Study was conducted in treatment room adjoining surgical ward. Both technical and non-technical skills were assessed (Table 2 and 3).

Table 2: Technical skills assessment by DOPS (average score).

Tasks	Pre test	Post test
Selection of suture material	6	8
Naming instruments	4	8.6
Aseptic precautions	4	7.8
Selection of instruments	6	8
Time taken	20 mts	15 mts
Positioning the patient	4	10
Completion of task	4	10

Attitude, communication, professionalism and competency are observed by a tutor, and recorded as video, which is used for giving feedback (Table 4 and 5) by an independent faculty and student's feedback obtained with Likert chart questionnaire.

Table 3: Non-technical skills assessment.

Inter personal skills	Cognitive skills
Attitude	Anticipating problem
Effective communication	Clarity of situation
Planning	Problem assessment
Ethics	Respecting privacy
Stress management	Decision making

A 5-point Likert scale was used for feedback, (1 = I feel very unconfident; 5 = I feel very confident) with respect to each of the technical skills (Table 4) and for the evaluation of the non-technical skills training (1 = insufficient; 5 = very good). The questionnaire also included free text fields for personal comments to the trainers.

Table 4: Learning experience with mannequins *paired t test by interns.

	Mean	Standard deviation
Suitability of mannequins	78.2	±20.6
Realistic simulation	86	±14
Skill of suturing	52.1	±21.5
Ryle's tube insertion	62.1	±12.5
Presence of trainers	71.5	±23.2
Behavior of std patients	40.3	±21.6
Achievement level	81.4	±22.4

Data analysis

Global ratings used to find mean±standard error of the mean (SEM). Pre/post tests were carried out, and analyzed using paired t test, and p-values of <0.05 were considered to be statistically significant (Table 4).

Of the 60 interns (82%) responded to all questions of survey tool. The quality of the skills lab training for interns was rated very highly among the learners (5.59±0.07) on a 6-point Likert scale). Interns strongly agreed with the statement that learning objectives were clearly explained and that there was enough time to clear their doubts from trainers. Students' ratings of the individual trainers ranged from 4.8 to 6.0, and a global rating of 5.56 ± 0.07 (6.0 = 'very good') was obtained. 86% of the interns considered this program sufficient for undergraduate skills development. All the sixty trainees felt this program helped them to gain confidence, and able to integrate skills with communication, purpose of this study. Though 66% (37) of the students were felt difficulty in communicating with the simulated patients while performing the task. Faculties too observed that students found it difficult in integrating skills with communication. 83% of students performed better in their second session, because of the feedback from first session. All the students felt the feedback with video instantly after each session very useful for them in improving their skills and AETCOM (Attitude, ethics, and communication) 53 interns felt that the scenario, of simulated patient and bench model were near realistic (88%) and agreed that this kind of simulation helped them to practice their skills and demonstrate competency (100%).

Table 5: Feedback from interns (Likert chart).

Not very confident	Nil
Not confident	Nil
Neutral	10%
confident	15%
Very confident	75%

DISCUSSION

Irby et al, in their study noted simulation helps in development of skills and evaluation based on a rubric.[7] The entire process allows the learner to encounter a "standardized patient" for exposure to a similar and challenging situation. Patient's safety and concern given more importance, so all interns cannot practice on patients, in order to close the gap by practice simulation.

Interns are not trained to be competent in all the domains they need to be. Their primary aim is to clear the exams and get degree rather than acquisition of skills and competency. To be competent in skills, and communication, it needs suitable environment and proper guidance and training.[8] Learns tend to make mistakes, so it's ideal that they learn in simulated environment under guidance, and formative assessment will help the students acquire the skill set.[9] Medical students will be competent only if they get chance to practice which reduces their error and hone the skills. Medical teachers also only teach them and not facilitate them, without any proper formative assessment, but only summative assessment in form of year end exams. Support for skill labs reinforce the fact that less on hand experience for interns can be overcome by skill labs, for the benefit of interns to get supervised training.[10]

The medical students in clinical posting attend only case presentation and discussion, and no scope for any skill development and communication, so when they graduate, they fall short in skills and effective communication.[11] To develop these skills of integrations, students should be given training with different modules in their subject. Since all students may not get to practice in real patients to get competent, this type of training in basic skills integrated with communication will definitely help them to be competent, better clinicians, with social responsibility.[12] This qualitative analysis by way of feedback and interview help us to conclude that this type of training in feasible even with limited resources. Benner developed five stages of competence for beginners to be competent, that has been widely applied in many fields of training.[13] The concept of Entrustable professional Activity (EPA) introduced by the Dutch, the way of integration in clinical skill development. CBME is student centric; it offers staged learning and formative assessment.[14]

Knowledge can be acquired with guide by side principle, and, all domains can be achieved in parallel not one after another. Effective way of integration helps the students to develop their skills. Since assessment is made in real like situations, using simulated patients, it assures accountability.[15] Bright well and Grant suggested that CBME is only for basic skills and not for specialist skills needed for professional practice.[14]

Frank et al, mentions pit falls of CBME as essence of subject may be lost if undue stress given to CBME. Successful implementation of CBME needs faculty development, suitable design and learning resources. Skill labs, simulated patients, time and involvement of faculty are crucial.[15] Longitudinal studies are required to find the effectiveness of CBME in clinical practice. Faculty development, competency-based curriculum, effective new assessment tools are needed for CBME implementation for surgical interns.

CONCLUSION

Simulation based DOPS is feasible, economical, with segmental assessment and constructive feedback. DOPS gives opportunity to observe and evaluate the students and feedback from surgery interns demonstrates that such assessments provide valuable insights into their development.

Though time tested present way of teaching can't be replaced fully by CBME, by bring suitable change can be incorporated in the medical curriculum and implemented in an effective way. Though authors had 100% participation from our interns we consider small study group is the limitation of present study.

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