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An educational Interventional study to assess acceptability and efficacy of clinical simulation on manikins and role play as a teaching-learning method for obstetrics among final year students of Pramukhswami medical college in Anand, Gujarat

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ABSTRACT

Background

Maternal mortality is an important indicator of health status for any state, but that is largely affected by availability of skilled medical officer in vicinity. Clinical simulation including role play and manikins are important tools of adult learning principles and have been widely used in different clinical settings across the world, however not much used in India. So, we suggest this interventional research with capacity building of the department for future developments.

Methods

Prospective educational interventional study was done Including 3 batches of 20,20 and 22 students respectively in clinical postings at Obstetrics and Gynecology department over a period of 4 months. Predefined core clinical skills were introduced with novel teaching learning method. Here all students were required to learn core obstetrics clinical skills by clinical simulation including role play and manikins. Checklists were used to achieve proficiency. Difference between pretest and posttest score (after intervention) was calculated.

Results

Difference between mean post test score and mean pretest score was 14.839. Applying paired sample t test for pretest score to post test score, statistically significant improvement was seen in scores which signifies improvement in competency of students after intervention and proves effectiveness of interactive teaching learning method. OSCE (Organized structural clinical examination) as an evaluation method is a more effective tool compared to conventional viva method during clinical examination as depicted by the difference in mean score between OSCE and conventional method which was 13.113. Applying paired sample t test for conventional test score to OSCE score t =19.298; difference was statistically significant. If given a choice between the two methods (conventional method and OSCE), 85.5% students believe that newer methods of learning on manikins and learning by doing are better, indicating the higher acceptability of the latter.

Conclusion

Use of clinical simulation (role play and manikins) to enhance basic obstetrics emergency skills among final MBBS students is effective, acceptable and more student centric teaching learning method compared to conventional clinical wards and lecturing.

Key-words: OSCE, Clinical skills, Obstetrics and Gynecology, Undergraduate, Simulation.

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INTRODUCTION

Indian Medical Graduate should be proficient in all cognitive, clinical, technical, surgical, communication, skills. Obstetrics & Gynecology (O & G) is one of the important segments of the entire course and involves key skills development. Training MBBS students in basic and emergency obstetric skills will empower them to manage obstetrical emergencies and recognize high-risk and emergency cases. Timely referral from periphery (as majority of MBBS students go to periphery and join as medical officers), is an important factor which in future will help reduce the burden of morbidities and mortalities related to Mother and child health.MMR is one of the important health indicators used by nations to monitor health level in the society. Reduction in MMR is one of the goals of vision 2020 of government of India. It has been observed that if one can acquire basic obstetric emergency skills, it can have great impact on reduction of MMR [1]The ongoing adoption of competency based medical education (CBME) across health profession training program draws focus to learner-centered educational design and the importance of fostering a growth mindset in learners, teachers and educational programs.[2] The conventional written tests and professional assessment have limitation in fair judgment of clinical competence, because the examiners may not have total objectivity and may lack standardization throughout the assessment process.[3] Because of some challenges in transferring clinical skill to the medical undergraduates, we are grossly deviating from our key domain. Over a period of time clinical postings and clinical examinations have become ritual and usually end up with testing memory as well as bookish knowledge. Education time constraints, diverse and overloaded duties of clinical teachers, lack of financial support, lack of an appropriate position for teaching, priority of research over education and the challenges in teacher's role, patient's safety and privacy are some of the most important factors affecting clinical teaching. There are many student, teacher, patient and administrative (system/culture) factors which lead to improper training. The effectiveness of CRE (clinical consultant responsible for postgraduate medical education) is dependent on individual, relational, attitudinal and structural factors. The factors are complex and inter related and may influence their effectiveness in positive or negative direction. [4]

While evaluating the status of mother and child morbidity and mortality across India it was observed that lack of availability of basic emergency obstetrics skills within nearby geographical area was the key issue. When government had studied the baseline data it was found that many MBBS doctors in service were lacking in confidence and correct knowledge of basic emergency obstetrics skills consequent to inadequate training. Training of outgoing students in a congenial atmosphere with adequate skill development is of paramount importance to equip future MBBS doctors in their service to the society.

Clinical simulation including role play and manikins are important tools of adult learning principles and had been widely used in different clinical settings across the world. [5]. There is evidence that scores achieved on the Organized Structural Clinical Examination (OSCE), are strong predictors of a later clinical performance. [6] Somehow these tools are underutilized in clinical training of Undergraduate in medical colleges of India, effectively and in sustainable manner. Clinical simulation including role play and manikins can take care of clinical context, hands on training, student engagement [7] as well as scope of skill acquisition to skill proficiency without compromising patient safety. [8], [9], [10]

This method was tested with interns and occasionally with undergraduate final year students previously and was found to be useful in meeting objectives. But they were mostly unstructured, done in larger groups, majority of students were not evaluated for skill acquisition (i.e., some had chance to play as doctor, others were assisting, some were only observing). Skill evaluation was not a part of the assessment process.

AIM

To evaluate the effectiveness of new teaching learning method in enhancing clinical skills in final year MBBS students.

OBJECTIVES:

1. To evaluate competency of students at the end of clinical posting for basic obstetric and emergency obstetric skill by OSCE (organized structural clinical examination)
2. To evaluate acceptability and perception of students for regular use of clinical simulation, customized role play and Manikins usage

combination in transferring basic clinical and emergency obstetrics skill.

3. To determine efficacy of clinical simulation as interactive teaching learning method.

METHODOLOGY

Study Setting: Medical college and teaching hospital.

Study Period: 4 months.

Study Population: 3rd MBBS part II students.

Inclusion criteria: 3 batches of 20, 20 and 22 students respectively of 3rd MBBS part II students, who were posted in clinics of Department obstetrics and gynecology of Pramukhswami medical college, Karamsad,

Study Design: Prospective educational interventional study.

Sample Size: 62.

Study tool: Clinical simulation customized role play and manikins used as tool and evaluation was done by pre and posttest after intervention, OSCE and conventional method (case viva and table viva) were conducted at ward end along with perceptive feedback in the form of questionnaire.

Study analysis: done by frequency and proportion and paired t test. SPS version 2.0 was used.

Interactive teaching learning method: the following steps were followed

A brief introduction of new teaching and learning skills (role play and manikins) was given to all participating students.

Participating members were briefed about their role in the program

Brief presentation was given regarding the teaching learning methods, clinical skills to be acquired, indications, key steps, advantages and limitations, minimum required equipments, knowledge, and performance to have desired educational outcome.

Demonstration of skill on obstetric manikins with the help of volunteers (Residents and faculty) using standard algorithm/ clinical pathway.

Role play by faculty and residents (4 volunteer) using standard algorithm and clinical pathway.

Students were asked to repeat the procedure under supervision in 4 groups of 5 students.
Roles: 1. Patient
2. Performer(doctor)
3. Nurse
4. Attendant
5. One student was assigned to read aloud printed checklist /algorithm/ clinical skill
This was repeated 5 times so that each member had the opportunity to perform all the roles.

At the end, the group had to perform same procedure without printed checklist.
Faculty / supervisor assessed students objectively with checklist to ensure appropriate and complete skill acquisition.

- At the end of the ward posting, formative assessment was done along with case presentation, table viva (conventional exam), for 90 marks and OSCE for 90 marks.
- Data of pretest and post-test of 40 marks in the form of true and false was taken to analyse the gain in knowledge regarding subject and basic fundamental understanding.
- Feedback was collected from students/ faculty members regarding the perception on new teaching learning process and evaluation.

- Feedback questions were analysed to evaluate acceptability and perception of students, efficacy of clinical simulation and role play as interactive Teaching-Learning method.
- OSCE and conventional method (case viva and table viva) method of assessment were matched for the questions and difficulty levels.

Skills included were 4 basic obstetric skill and 4 emergency obstetric skill.

Basic obstetric skill	Emergency obstetric skill
Antenatal per abdomen examination	Management of Postpartum haemorrhage with role play
Per speculum and Pervaginal examination	Management of eclampsia (role play)
Foleys catheterisation	Manual removal of placenta (MROP)
Cu T INSERTION	Management of abruptio placentae

In checklist of clinical simulation, we included 10 points and in role play we had structured algorithm for each participant containing 8 to 10 points.

OSCE and conventional method assessment were done on different days. Both were allocated 90 marks.

We conducted 6 OSCE stations (5 min for each)

Conventional method: case viva of 10 min and table viva of 10 min.

Validation of questionnaire was done by department faculties by reviewing primary draft and testing on resident.

RESULT AND DISCUSSION

Table 1: Mean pretest score was 13.24 and mean posttest score was 28.08. Difference in mean post test score and mean pretest was 14.839. Applying paired sample t test for pretest score to post test score taking 95%CI; test result was found to be statistically significant. This shows that clinical simulation as interactive teaching-learning method is effective in imparting knowledge and skill. There was statistically significant improvement in the post test score after the intervention.

In 2015, similar study was conducted by Magda Mohsen M [11] on 70 4th year B Sc nursing students in university of Menoufia Egypt, for examining efficacy of OSCE as a tool for improving clinical skills (Antenatal examination). Results showed that mean and SD of OSCE before and after examination was 55.56+-8.66, 113.74+-14.54, 98.90+-7.26, 75.64+-8.12 and 21.56+-3.62 respectively compared with 26.01+-9.67, 58.507+-19.77, 63.67+-15.18, 41.96+-15.23 and 14.89+-3.46 and concluded that after intervention there was statistically significant improvement in final year B Sc nursing student's antenatal examination practice skills in posttest compared to pretest.

In 2019 Saima H [12] did a descriptive comparative research study on 50 nursing students and concluded that average mark scored in OSCE was higher as compared to traditional method (13.81+_3.814) which was statistically significant. In this study majority (74.45%) of students strongly agreed that OSCE is superior to traditional method which is similar to our study as 85.55% of students choose manikins and role play to learn clinical skill.

Table 1:Comparison between pretest and posttest score

	Total students	Mean score out of 40marks	Paired sample t test for Pretest score to post test score t = -47.416		
Pre test	62	13.24 (10 -17)	Mean= -14.839	SD = 2.464	95% cf (-15.464, -14.213)
Post test	62	28.08 (20 -35)			
			Significance(2-tailed) = .000		

Table 2**:** Shows that the mean score in conventional and OSCE exam was 50.94 and 64.05 respectively. Difference between mean score was 13.113. Applying paired sample t test for conventional test score to OSCE score t =19.298 difference was statistically significant indicating OSCE as a more effective and reliable method of evaluation compared to conventional viva method during clinical examination. There was statistically significant difference of score that students had achieved during OSCE. Performance was better in OSCE compared to conventional method.

Table 2:Comparison between conventional exam score and OSCE exam score

	Total students	Mean score out of 90 marks	Paired sample t test for conventional test score to OSCE score t = -19.298		
Conventional exam score	62	50.94	Mean= -13.113	SD = 2.464 5.350	95% cf (-14.472,-11.754)
OSCE exam score	62	64.05			
			Significance(2-tailed) = .000		

Table 3**:** Depicts the difference in the mean score before and after the intervention regarding the knowledge about basic and emergency obstetrics clinical skills, ability to perform clinical skill and the level of confidence they felt performing the skill which was 4.403, 4.839, 5.048 respectively. Applying paired sample t test before and after intervention, the difference was highly significant statistically which help us to understand the acceptability and perception of students for regular use of clinical simulation and manikins combination in learning basic clinical obstetric and emergency obstetric skill.It is obvious that there is statistically significant difference in knowledge, ability to perform skill and confidence of doing procedure after the intervention with innovative method in view of student's perception.

Table 3:Assessment of efficacy of interactive teaching-learning method (N is number of students)

Question	Mean score Before N=62	Mean score after N=62	Paired differences (before – after)			t	Sig. (2-tailed)
			Mean	SD	95% CI		
How much knowledgeable you were about obstetrics clinical skill{ 1= worst, 10= excellent} (N)	3.87	8.27	-4.403	1.674	-4.828,-3.978	-20.713	.000
How well are you able to perform the clinical skills before / after clinical posting ?(N)	3.44	8.27	-4.839	1.601	-5.245,-4.432	-23.795	.000
How confident you feel about yourself performing the skills if opportunity given?(N)	3.03	8.08	-5.048	1.796	-5.505,-4.592	-22.128	.000

Table 4 and Figure A: 27.4 % of faculty and students strongly agree and 62.9% agree that role play and manikins' usage teaching method is student centric compared to conventional method which is similar to study conducted by Bhat V et al [13] in 2016 in which student valued OSCE as a good assessment method and student centric.38.7% strongly agree and 37.1% agree that similar (role play and manikin) usage can be adopted by other departments in education to .

teach clinical skill.In 2017 Jelly p and Sharma R [14] conducted a comparative study on OSCE versus traditional educational method with the use of observational checklist regarding antenatal care which revealed that mean score of OSCE (65.4) was more than TEM (46.02) and difference was statistically significant. (p value <0.001)Evaluation method was rated good by 38.7% and very good by 50% of students and faculty

Table 4:Acceptability and perception of students toward clinical simulation on manikins and role play as a teaching-learning method

	Strongly Disagree	Disagree	Can't say	Agree	Strongly agree	Total
I agree that the teaching method was student centric (N)	(3.2%) 2	(3.2%) 2	(3.2%) 2	(62.9%) 39	(27.4%) 17	100%
How strongly do you feel that similar method can be adopted by other departments	(4.8%) 3	(1.6%) 1	(17.7%) 11	(37.1%) 23	(38.7%) 24	100%

to teach clinical skill? (N)						
	Very poor	Poor	Can't say	Good	Very good	Total
How do you rate OSCE as evaluation method for clinical skills evaluation? (N)	0% (0)	3.2% (2)	8.1% (5)	38.7% (24)	50% (31)	100%

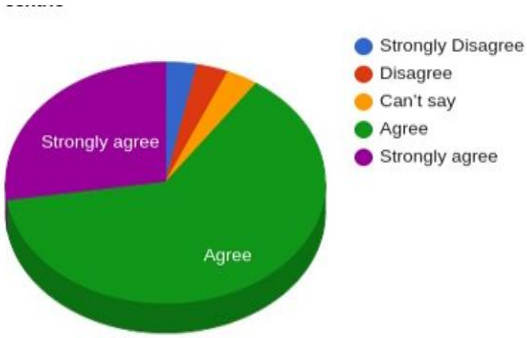

FIGURE A: Number of students finding the teaching learning method as student centric

Figure B shows >75% were of the opinion that similar method of teaching learning should be adopted by other departments for better skill transfer and confidence building. As shown in figure C: only 3.2% students believed that OSCE was not a good method of evaluation as it takes longer time.

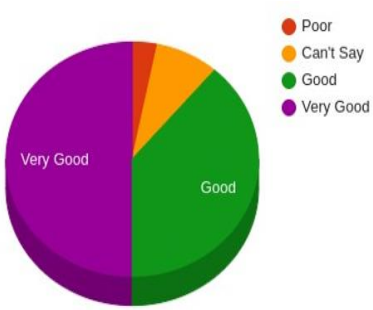

Figure B: No. of students rating OSCE as method of evluation.

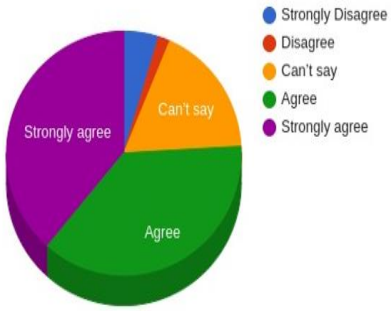

Figure C: Perception of students regarding adoption of similar methods by other departments

Table 5 and Figure D: shows that if given a choice between the two methods, 85.5% students believed that newer method of using manikins and learning by doing will be a better option. While 9.7% students believed that both methods of evaluation should be applied for better evaluation.

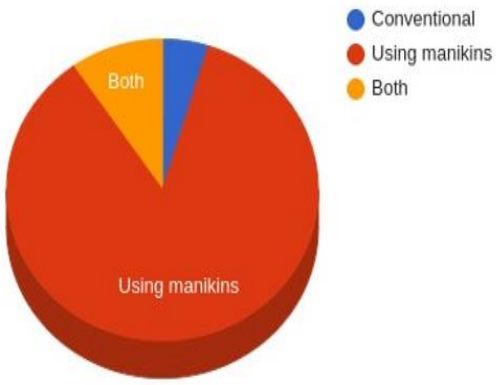

Figure D:Preferred method of learning clinical skills.

Table 5:Preferred method of learning clinical skills

Conventional (lecturing and demonstrating)	**(3) 4.8%**
using manikins (and doing your selves under guidance)	(53) 85.5 %
Both	(6) 9.7%
Total	(62) 100%

Table 6 and Figure E: Shows that overall training program was rated >=7 out of 10 by 95.2% of participants (students) which confirms validity of the program. Mean score of 8.37 was rated by the students in favor of overall program success. Informal discussion with the colleagues, residents and staff members made teaching learning more enjoyable and satisfactory. Immediate feedback from students was available which was a boost up for the ongoing program. While teaching, facilitating and conducting OSCE, teachers felt more confident and relaxed due to more objectivity. This newer method is adopted as ongoing activity to get uniformity and more advantage to students.This was a single centric study involving a small sample size and short duration of study. Multicentric studies over a long period of time can yield better and statistically reliable results. The number of case scenarios and clinical simulations were less. Number of participants were less; due to lack of time and less sfaculty we could not involve all batches and sample size was less.Anxiety in introvert students during performance created bias in final interpretation.

Table 6:Feedback for overall program (N is number of students)

Score (1-10)	1	2	3	4	5	6	7	8	9	10	Total	Mean score
How do you rate this clinical skill training program Over all (N)	1 1.6%	0 0%	0 0%	2 3.2%	0 0%	0 0%	6 9.7%	22 35.5%	18 29%	13 21%	62 100%	8.37

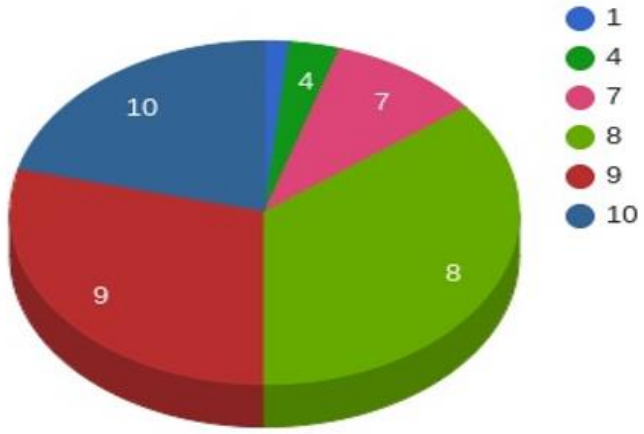

Figure E:Overall rating of clinical skill training program by students

CONCLUSIONS

Use of clinical simulation (role play & manikins) was found to enhance basic obstetrics emergency skills among final MBBS Students in our study. Facilitators and students found it as an effective, acceptable and more student centric teaching learning method compared to conventional clinical wards and didactic lectures. OSCE is more objective and preferred method of evaluation as well as tool to drive further learning.

FUTURE SCOPE

This study has given an edge of confidence and objectivity for ongoing Teaching learning process and assessment. This study can help to evolve more student centric curriculum and desired output for the society with more confident and skilled doctors rather than book warm gold medalist.

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