ORIGINAL ARTICLE

Role of Simulation based teaching in Management of Postpartum Hemorrhage amongst Postgraduate Students of Department of Obstetrics and Gynecology: A Prospective Study

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Background: Simulation teaching means recreating clinical scenario for training / evaluation. Aim: To expose postgraduates to simulation / didactic lecture for postpartum hemorrhage (PPH) management; to assess which method was more effective.

Methods: Present prospective study was conducted in Obstetrics Gynecology department of rural tertiary center of Northern India. Twenty postgraduates were randomly divided into two groups for simulation teaching / didactic lecture on PPH management. Analytic Data included pre and post lecture multiple choice questionnaire (MCQ), post-lecture Direct Observation of Procedural Skills (DOPS) assessment. Finally, feedback survey of students was conducted to assess perceptions about two modalities of teaching.

Results: Both groups showed no difference in pre-lecture MCQ results. Comparison of DOPS performance showed significant difference ($p=0.0026$) between two groups with mean marks 5.10 ± 1.10 in Group 1, 3.40 ± 0.84 in Group 2. Significant improvement was observed in post-lecture compared to pre-lecture marks in both groups (mean difference- Group 1: 7.60 ± 1.26, Group 2: 4.20 ±1.01), with greater improvement among simulation group. Students rated simulation better with regard to interest (70%), enjoyment (75%), topic (70%), understanding (80%), posing questions (75%).

Conclusions: Simulation teaching was more effective in imparting skills for PPH management compared to didactic lecture.

Key words: Critical care; Didactic lecture; Postpartum hemorrhage; Simulation based teaching.

دور التعليم على اساس النموذج فى ادارة النزيف بعد الولاده عند الطلاب القوابل (دراسه مستقبليه)

المقدمه: إن التعليم على اساس نموذج، هو عباره عن ايجاد سناريو سريرى بهدف التعليم و التقييم.

الهدف: وضع الطلاب فى مجال تعليم نموذجى و محاضره طى اداره النزيف بعد الولاده بهدف تقييم النموذج الاكثر تأثيرا.

الأسلوب: إن الدراسه الحاليه تم اجرائها فى القسم النسائى و التوليد فى المنطقه الريفيه الثالثه فى شمال الهند. تم اشراك ٢٠ طالب بشكل عشوائى عبر فريقين. فريق تعليم مبتنى على اساس نموذج و فريق على اسلوب محاضره فى مجال اداره النزيف بعد الولاده. تم تجميع المعطيات من خلال استماره قبل و بعد المحاضره و المشاهدة المباشره للمهارات. و فى النهايه تم ايجاد بحث فى مجال رؤيه الطلاب و تقييم اسلوب التدريس.

النتائج: اشارت النتائج الى أن لم يكن هناك اختلاف بين الفريقين قبل المحاضره. كان هناك اختلاف ملحوظ فى مقارنه الاداء عبرالمشاهده المباشره ($P=0.0026$) بين الفريقين بمعدل علامه ٥،١٠±١،١٠ فى الفريق الاول و ٣،٤٠±٠،٨٤ فى الفريق الثانى. كان هناك اختلاف ملحوظ و جيد بين الفريقين بعد المحاضره (الفرق فى المعدل عند الفريق الاول ٧،٦٠±١،٢٦، الفريق الثانى ٤،٢٠±١،٠١). كان هناك نسبه اعلى فى فريق النموذج. الطلاب، اشاروا الى النموذج عبرالرغبه ٧٠٪، اللذه ٧٥٪، الموضوع ٧٠٪، الإدارك ٨٠ ٪، السئوال و الجواب ٧٥٪ .

الإستنتاج: إن التدريس عبراسلوب النموذج، مقارنه بأسلوب المحاضره يعتبر أسلوب افضل فى نقل المهاره فى ادارة النزيف بعد الولاده.

كلمات المفتاح: المراقبات الخاصه، اسلوب المحاضره، النزيف بعد الولاده، التعليم على اساس نموذج.

زچگي کے بعد خون بند کرنے کی تدبیروں کی تعلیم ماڈل کا استعمال۔ امراض النساء کے پوست گریجویت اسٹوڈنٹس کی تحقیق

بیک گراونڈ: تعلیم اور تعلیمی صلاحیوں کا جائزہ لینے کے لئے سیمولیشن روش کا استعمال۔

مقصد: زچگي کے بعد خون روکنے کی روش سکھانے کے لئے کونسی تدبیر زیادہ کارآمد ہے سیمولیشن یا پھر سادہ لکچر کی روش۔

روش: یہ تحقیق ہندوستان کے تین دیہی علاقوں میں انجام دی گئي، بیس طلباء کو رینڈم طریقے سے دو گروہوں میں تقسیم کیا گیا اور پہلے گروہ کو سیمولیشن کے ذریعے تعلیم دی گئي جبکہ دوسرے گروہ کو سادہ لکچر کے ذریعے تعلیم دی گئي۔ طلباء کی مہارت کی جانچ کرنے کےلئے لکچر سے پہلے اور بعد میں آبجیکٹیو سوالنامہ دیا گیا تھا، اس کے بعد براہ راست طریقے سے طلباء کی مہارت کی جانچ کی گئي۔

نتیجے: لکچر سے پہلے کے سوالنامے کے جوابوں میں دونوں گروہوں میں کوئي خاص فرق نہیں تھا۔ طلباء کی مہارت کے سلسلے میں کافی فرق نظر آیا۔سیمولیشن کے گروہ کی کارکردگي بہتر تھی۔

سفارش: محض لکچر کے مقابلے میں سیمولیشن کا طریقہ بکافی بہتر اور مفید معلوم ہوتا ہے لھذا اس سے استفادہ کیا جائے۔

کلیدی الفاظ۔ سیمولیشن، زچگي، طلباء ۔

نقش آموزش بر اساس شبیه سازی در مدیریت خونریزی پس از زایمان میان دانشجویان کارشناسی ارشد زنان و زایمان: مطالعه ی آینده نگر

مقدمه: آموزش شبیه سازی به معنای بازآفرینی سناریوی بالینی با هدف آموزش و ارزیابی است.

هدف: قرار دادن دانشجویان در معرض شیوه آموزش شبیه سازی و سخنرانی برای مدیریت خونریزی پس از زایمان و با هدف ارزیابی روش موثرتر.

روش کار: مطالعه آینده نگر حاضر در بخش زنان و زایمان بخش سه روستایی شمالی هندوستان انجام شده است. بیست دانشجو به صورت تصادفی به دو گروه با دو روش آموزش مبتنی بر شبیه سازی و آموزش مبتی بر سخنرانی برای مدیریت خونریزی پس از زایمان تقشیم شدند. داده های تحلیلی شامل پرسشنامه چند گزینه ای قبل و بعد از سخنرانی، ارزیابی پس از سخنرانی به روش مشاهده مستقیم مهارت های رویه ای می باشد. درنهایت، تحقیقی برای دریافت بازخورد دانشجویان و ارزیابی روش تدریس انجام گردید.

نتایج: بر اساس نتایج، هر دو گروه در مرحله پیش از سخنرانی تفاوتی با یکدیگر نداشتند. مقایسه عملکرد "مشاهده مستقیم مهارت های رویه ای" اختلاف معناداری ($p=0.0026$) را بین دو گروه با میانگین نمره ۵،۱۰±۱،۱۰ در گروه یک و ۳،۴۰±۰،۸۴ در گروه دو نشان داد. پیشرفت قابل توجهی در نمرات قبل و پس از سخنرانی در هر دو گروه رویت شد (اختلاف میانگین: گروه ۱: ۷،۶۰±۱،۲۶ ، گروه ۲: ۴،۲۰±۱،۰۱)، و در گروه شبیه سازی رشد بیشتری دیده شد. دانشجویان، شبیه سازی را با توجه به علاقه (۷۰٪)، لذت (۷۵٪)، موضوع (۷۰٪)، درک (۸۰٪)، پرسش و پاسخ (۷۵٪) بهتر ارزیابی نمودند.

نتیجه گیری: تدریس بر اساس شبیه سازی در مقایسه با سخنرانی، روش بهتری برای انتقال مهارت در مدیریت خونریزی پس از زایمان می باشد.

کلید واژه ها: مراقبتهای ویژه، روش سخنرانی، خونریزی پس از زایمان، آموزش بر اساس شبیه سازی

INTRODUCTION

PPH is one of the major causes of maternal mortality all over world with reported global incidence of 2–11% (1-3). It is frequent complication of delivery in India with reported incidence of 2% - 4% after vaginal birth and 6% after cesarean section, uterine atony is the most common cause (50%) (4). Furthermore, the latest Indian figures report that PPH is responsible for 19.9% (5) of all maternal mortality, accounting for 78,00035 to 117,00011 maternal deaths, annually (6). Hence, management of this dreadful condition in its golden hour can reduce overall incidence as well as burden of maternal deaths resulting from PPH. This can happen only with better training of postgraduate students of department of Obstetrics and Gynecology in managing this condition. One such teaching modality for training of critical care amongst postgraduate students is simulation based teaching. It is an interactive and innovative educational tool that can help in building confidence, improve clinical knowledge through practice, errors can be allowed to occur, can even be scheduled, and can provide realistic experiences managing common and rare situations where exposure is limited to real life cases, and also it enhances team work. Also simulation provides safe learning environment where Obstetrics and Gynecology residents can be taught, practiced, and evaluated on technical skills without putting patient at risk in a real situation (7). After sufficient practice on mannequin, students can then be assessed on live patients in their work place using DOPS structured checklist, which further help in increasing their confidence and skills in dealing with life threatening conditions in real life scenario. DOPS is a Work Place Based Assessment (WPBA) tool in which subjects are observed in an environment quite similar to actual activities, with real patient and procedure (8), and help in focusing on important points of considered skill required to be evaluated. This method makes it easier to provide feedback to trainee as well as trainer. Therefore, it not only provides motivation and learning encouragement for students, but also gives direction to their learning efforts (9).

Hence, present study was conducted with the aim to train postgraduate students with newer modalities of teaching learning followed by assessment on live patients in work place, so as to know whether these modalities resulted in better understanding of subject and increase their overall skills and confidence level in managing such obstetric emergencies.

Aim: To compare simulation based teaching with didactic lecture approach in management of postpartum hemorrhage amongst postgraduate students of department of Obstetrics and Gynecology.

Objectives:

1. To compare knowledge and skills gained in management of PPH by the students using two modalities of teaching,
2. To assess performance of students in management of PPH using DOPS,
3. To assess the perceptions about two modalities of teaching and to know which modality helped in better understanding of subject amongst students of Obstetrics and Gynecology department of rural tertiary care center of Northern India.

METHODS

Study Design: Prospective educational research study

Setting: The present prospective study was conducted in the department of Obstetrics and Gynecology of a rural tertiary care center of Northern India after proper Institutional ethical approval and informed written consent from the patients over a period of six months.

Sample size: All twenty postgraduate students of department of Obstetrics and Gynecology were enrolled in the study.

Study Protocol and Outcome measures:

All twenty postgraduate students of Obstetrics and Gynecology department were made to solve a pre-lecture MCQ of 20 marks on management of PPH, to know their baseline knowledge. They were then randomly divided into 2 groups by lottery system to remove bias. Group 1 received simulation based teaching using demonstration of all steps of management of PPH with hands-on practice of steps on mannequins for 6 encounters and Group 2 was taught by traditional method of didactic lecture using chalk and board. After teaching both the groups by either modality, students in two groups were asked to perform on live woman; the steps of managing PPH. Assessment of all students was then done using single encounter of DOPS structured checklist of 10 marks, to know level of competency attained by students in each group. Finally, post-lecture MCQ of 20 marks was taken to assess the level of knowledge and skills attained by each teaching learning modality and to compare the two modalities of teaching. In second phase, cross-over of students was done so that students in both groups receive teaching by both the modalities. At the end of the study a feedback survey was conducted to know the perceptions of students about the two modalities of teaching and to know which teaching learning method was better and why.

Data Analysis:

The quantitative data in the form of marks obtained in pre-lecture, post-lecture and DOPS checklist was analyzed using two-sample Mann–Whitney test while analysis of feedback form results (Qualitative data) was done by five point Likert scale rating.

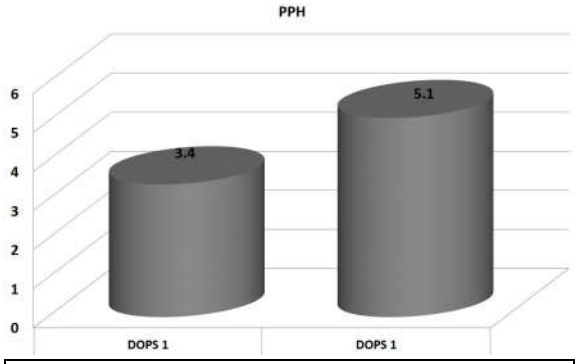
RESULTS

All twenty students attempted a 20 marks baseline pre-lecture MCQ and the marks obtained in two groups showed no significant difference (Table 1: Comparison of Pre-lecture Marks on PPH in Group 1 and Group 2). Then, the two groups were taught by the two methods of teaching, respectively. During their first DOPS checklist encounter on live patients; comparison of performance after simulation based teaching and performance after didactic lecture revealed statistically significant difference ($p=0.0026$) with mean marks achieved in Group 1 was 5.10 ± 1.10 and Group 2 was 3.40 ± 0.84, respectively (Table 2: Comparison of Student Performance on DOPS Encounter on PPH Management in Two Groups, Graph1: Comparison of Mean values of Student Performance on DOPS Encounter of PPH

Table 1. Comparison of Pre-lecture Marks on PPH in Group 1 and Group 2		
Method of Teaching	Pre-lecture MCQ Marks	
	Mean(+/ SD)	
Simulation based Teaching (Group 1)	11.00 ± 3.16	p= 1 Not Significant
Didactic lecture (Group 2)	11.00 ± 3.16	

Table 2. Comparison of Student Performance on DOPS Encounter on PPH Management in Two Groups		
Method of Teaching	DOPS Result	
Simulation (Mean ± SD)	5.1± 1.10	z= 3.013 p= 0.0026
Didactic Lecture (Mean ± SD)	3.40 ± 0.84	

Management in Two Groups). Comparison of post-lecture MCQ marks showed that both groups demonstrated significant improvement in comparison to pre-lecture MCQ (Table 3: Comparison of Pre-lecture and Post-lecture MCQ Marks in two Groups), with more improvement observed among simulation group (Mean (+/ SD)= 18.60 ± 1.90) (Graph 2: Comparison of Mean values of Post-lecture MCQ Marks on PPH Management and Standard Deviation in Two Groups, Graph 3: Comparison of Mean values of Pre-lecture and Post-lecture MCQ Marks on PPH Management in the Two Groups). It was observed that simulation based teaching resulted in better understanding of subject and performance on live patients as assessed by DOPS in comparison to didactic lectures. Finally, a qualitative analysis of feedback survey form results revealed that students ranked simulation-based teaching method higher with regard to interest 70% (14/20), enjoyment 75% (15/20), topic chosen 70% (14/20), understanding of subject taught 80% (16/20) and ease of posing questions 75% (15/20) (Table 4: Feedback survey Results).



Graph 1. Comparison of Mean values of Student Performance on DOPS Encounter of PPH Management in Two Groups

DISCUSSION

Medical education is one of the dynamic fields that is undergoing major changes throughout the world and hence requires newer educational techniques and assessment modalities to cater for these ever changing demands. Also there exists an inherent difficulty in imparting knowledge on emergency medicine and critical care that are difficult to grasp, especially for medical students as it is often not possible to demonstrate live critical scenarios in hospital setting. Hence, a completely safe version mimicking such complex scenarios can be made using Simulation based teaching. Many studies have shown that use of simulation based teaching in training medical students and junior doctors is helpful in not only strengthening their knowledge but also in evaluating their overall performance in performing a particular task (10-12).

The present study compared simulation based teaching with didactic lecture and observed that simulation based teaching is a better modality of teaching learning especially for obstetric emergency situation than didactic lectures. Also the students in simulation group performed far better than didactic lecture group on their first encounter of DOPS structured checklist on live patients in labor room (p=0.0026). Similar results were reported by many studies in obstetrics that reveal simulation based teaching as a better modality to teach residents how to manage obstetric emergencies and how to recognize and avoid pitfalls in managing difficult deliveries (13-15). Similarly, Schroedl et al. examined simulation based education to teach topics related to medical ICU and observed higher scores in skills assessment among simulation training as compared to didactic lecture group (16). Another study demonstrated significantly higher performance in simulation group among residents and nurses taught about obstetrical emergencies compared to didactic teaching (17) and a similar study in Anesthesia also demonstrated an improved task performance among students taught by simulation based teaching as compared to those learning observed practice (18). A study observed use of simulation based teaching in medical emergencies amongst the final year of medical students and found superior performance as compared to didactic lecture (19). Some other similar studies on the other hand reported

Table 3. Comparison of Pre-lecture and Post-lecture MCQ Marks in two Groups

	PPH			
Method	**Pre-lecture MCQ Marks**		**Post-lecture MCQ Marks**	
	Mean(+/ SD)		Mean(+/ SD)	
Simulation	11.00 ± 3.16	p = 1	18.60 ± 1.90	p = 0.0043
Didactic Lecture	11.00 ± 3.16		15.20 ± 2.15	

Table 4. Feedback survey Results

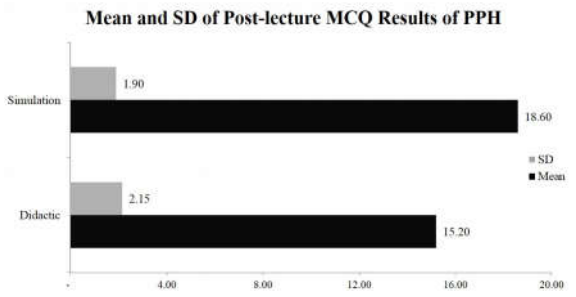
Teaching Modality	Enjoyment (N/Total 20)	Interest (N/Total 20)	Relevance (N/Total 20)	Understanding (N/Total 20)	Ease of asking questions (N/Total 20)
Simulation	75% (15/20)	70% (14/20)	70% (14/20)	80% (16/20)	75% (15/20)
Didactic	25% (5/20)	30% (6/20)	30% (6/20)	20% (4/20)	25% (5/20)

no significant statistical difference between simulation and didactic groups in knowledge or confidence attained and performance at any phase of study, rather they suggested that it is the combination of the two modalities (didactic and simulation based teaching) that resulted in significant improvement in knowledge ($p < .002$) and confidence ($p < .001$) (20)

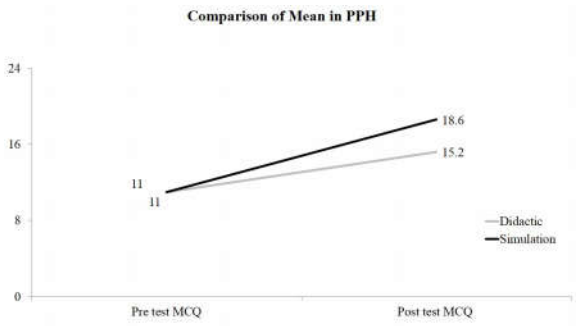
In the present study no difference was observed between the two groups in pre-lecture scores, but a significant difference was observed in post-lecture scores with significantly higher scores in simulation based teaching group. Similar results were reported by a study conducted in Radiology department which compared simulation based teaching with didactic lecture and reported no differences between the two groups in pre-lecture test scores, but significantly higher scores for model/simulation group on both the post-lecture multiple choice ($p = 0.038$) and post-lecture model ($p = 0.041$) examinations. They also observed significantly higher scores in the model/simulation group regarding overall interest in peri-operative ultrasound ($p= 0.047$) as well understanding of the physiologic concepts ($p=0.021$) on feedback survey (21). Another similar study comparing simulation based teaching with didactic lecture reported a significant difference in improvement from baseline and post teaching MCQ in simulation group compared to lecture ($p = 0.0387$). In the same study, students rated simulation-based teaching better with regard to interest ($p = 0.0068$), enjoyment ($p = 0.0044$), subject taught ($p = 0.0313$), understanding ($p = 0.0476$) and accessibility to posing questions ($p = 0.001$) (22), similar to our study in which also students rated simulation based teaching more interesting, interactive, enjoyable as compared to didactic lectures. Other studies also report that students enjoyed simulation based education more than the didactic lectures (23, 24).

Hence, simulation based teaching results in better understanding of subject as well as help in overall improvement of skills of students in comparison to didactic lectures, especially for teaching obstetric emergency maneuvers.

As these newer modalities of teaching and assessment are underutilized in obstetrics and gynecology critical care, hence their future implementation in the curriculum for



Graph 2. Comparison of Mean values of Post-lecture MCQ Marks on PPH Management and Standard Deviation in Two Groups.



Graph 3. Comparison of Mean values of Pre-lecture and Post-lecture MCQ Marks on PPH Management in the Two Groups.

teaching of postgraduate students can result in overall improvement of their knowledge, skills and confidence. Also DOPS as a teaching and assessment tool can be utilized in obstetrics for teaching postgraduate students on live patients in working environment which can further help in development of skills as well as increase in confidence of students in managing such emergencies in real life scenario.

LIMITATIONS

As both simulations based teaching and DOPS are time and resource consuming, their long-term advantages and disadvantages with regard to retaining knowledge and applying it on patient care need to be further evaluated by larger studies in future. The main limitation of present study was that it was conducted for a shorter duration with lesser number of students; hence in future more studies with larger number of students and more studies with larger number of students and for longer duration can be done for better understanding of such teaching-learning and assessment methods for development of newer generation doctors.

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