Original Article

Simulation for Labor and Delivery: What is the Impact on Undergraduates?

Fareesa Waqar[1], Wajiha Shadab[2], Beenish Khurram[3], Safia Khalil[4]

[1]Professor of Obs and Gynae,[2] Assistant professor,[3] Assistant professor
[1-3]Deptt. Of Gynae/Obs, Pakistan Railway Hospital Westridge Rawalpindi
[4]Senior Medical Officer, Cantonment General Hospital Rawalpindi

Correspondence: *Dr. Wajiha Shadab*
Assistant Professor
Gynae/Obs Department , Pakistan Railway Hospital Westridge Rawalpindi
Email: drwajeha@hotmail.com

Abstract

Objective: To assess the impact of simulation for labor and delivery on the knowledge and skills of undergraduate medical students.

Methodology: A cross-sectional study was conducted at Railway General Hospital from June to December 2016. This study involved undergraduate medical students. Students of fourth year MBBS were divided into two groups; Group A was taught normal delivery through powerpoint interactive lecture, whereas group B was taught normal delivery on medium fidelity simulator. Both groups undertook a pretest comprising of MCQs and OSCE. After being taught labor through two different methods both groups had a post-test comprising of MCQs and OSCE. Pre-test and post-test consisted of questions related to knowledge component of normal labor and delivery mechanism. The two groups were compared on their knowledge and skills.

Results: Total of 44 students participated. There were 14(31.8%) students in group A and 30(68.1%) students in group B. The overall mean age of the students was 21.57 ± 2.17years in group A and 21.40 ± 1.84 years in the group B (p=0.14). Group B performed much better in skill of delivery having a mean OSCE score of 8.87 ± 0.10 compared to group A which had mean OSCE score of 5.54 ± 0.13 (p= 0.004).

Conclusion: Simulation based teaching showed significantly better results.There is dire need for the development of modern teaching and learning strategies considering the changing milieu of clinical practice in Pakistan.

Keywords: Simulation, Medical education, undergraduate fidelity.

Introduction

Simulation is a useful tool that may help the students to practice in a real environment. Simulation exercise allows the students to recognize their deficiencies in a controlled setting and enables them to repeatedly practice the skill on the simulator. This tool is very helpful for medical students and physicians, to train all the students in a safe environment without any risk to patients.[1,2]

In 2006, study reported that, training of simulation has increased students' confidence for vaginal delivery.[3] High fidelity simulation depicts the exact situation of a human patient in scientific atmosphere. Low fidelity simulation denotes to that is used in teaching the physical assessment and psychomotor skills.[4]

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Globally around 2.6 million stillbirths and 2.4 million newborn deaths occur each year. Most maternal and newborn deaths are avoidable.[5] A significant part of this mortality and morbidity is contributed to an inexperienced birth attendant. With changing norms, there is more patient awareness. The clinical environment is more prone to litigation and now, lesser numbers of patients allow students to examine them. This will result in a significant decline in clinical expertise if alternate methods like simulation are not inculcated into curriculum.

Most of the studies carried out regarding simulation based training proved its prospective benefits to serve as an alternative method to real clinical practice to be used for student's.[6] Simulation methods can be integrated to improve knowledge of healthcare practitioners in harmless atmospheres, without affecting the patients' safety.[7] Obstetrics simulators have been used to explain common and rare obstetric emergency procedures to increase patient safety and improve the capability of the students.[8]

This study aimed to assess the impact of simulation for labor and delivery on the knowledge and skills of undergraduate medical students.

Methodology

A Prospective cohort study was conducted at Railway General Hospital from June to December 2016, and involved undergraduate medical students. This study was approved by institutional review board (IRB). Students from fourth year of MBBS were recruited for the purpose of this study. The students were divided into two groups and then compared on their awareness, skills, observation and perception with regards to outdated and new teaching methods. Both males and female students were included in this study. Group A served as a control and taught normal delivery through powerpoint interactive lectures. Group B was taught normal delivery on medium-fidelity simulator. Non probability, convenience sampling technique was used. The sample was based on the number of medical students available at that time. All medical students who were rotating over the obstetrics and gynecology clerkship during the time frame of the study were included so that the skills taught using a simulator could be covered.

Informed consent was obtained from all respondents. The teaching-learning session formally started with the introduction of the faculty and respondents. A Pre-test comprising of MCQs and OSCE was conducted before start of session. After the students from both groups had completed their respective training sessions, they went through a post-test comprising of MCQs and OSCE. Both the Pre-test and post-test consisted of basic labor delivery knowledge and skills components.

All data were entered and analyzed using SPSS v 21.0. Mean and the standard deviation was calculated for quantitative variables such as age and test scores. Frequency and percentage were calculated for qualitative variables such as gender. An arbitrary p-value of 0.05 was considered to be significant.

Descriptive categorical variables of the respondents (gender, level of experience) were compared among both groups by applying chi square test. Combined pre-test and post-test scores were calculated from the MCQs and OSPE results to formulate overall pre-test and post-test scores for both groups A and B. The independent sample t test was used for comparing the mean pre-test and post-test scores between groups A and B. In order to assess the skills between the two groups, the post-test OSCE checklist scores were compared between Groups A and B using independent sample T test.

Results

Out of the 44 students, there were 14(31.81%) in group A and 30(68.1%) in group B. Overall, 23(52.2%) of them were female and 11(25%) were male. There was no difference in the mean age of students in Group A(21.57 ± 2.17years) as compared to students in Group B(21.40 ± 1.84 years) (p = 0.14).

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There was no difference in the overall mean pre-test scores between groups A and B (p = 0.53). Similarly, there was no difference in the post-test scores between groups A and B (p = 0.59). Interestingly, a significant difference was found for the OSCE checklist post-test score between groups A and B (p = 0.004). All scores for both groups A and B have been illustrated in Table I.

Table I: Overall Pre-test, post-test and OSCE Checklist Scores for Groups A and B.

	Group A N=14 Mean ± SD	Group B N=30 Mean ± SD	P value
Pretest total score	3.2 ± 0.25	3.54 ± 0.107	0.53
Post-test total score	7.14 ± 0.17	6.85 ± 0.13	0.59
Checklist total score	5.54 ± 0.13	8.87 ± 0.101	0.004

Discussion

In the modern age medical teaching and learning are evidence based. Miller's pyramid describes the levels of learning. These include knows, knows how, shows and does.[9] Simulation is the teaching method that focuses on the highest level of Miller's pyramid and prepares the student for real life scenarios. It can cater lower levels as well. Since learning in medicine is high stakes and involves human subjects, simulation is rapidly replacing other teaching methods in most of the high resource countries. Introduction of simulation based training has been recognized as one of the most important steps in curriculum development in the developed world.[10]

Now there is an increasing awareness about evidence based medical teaching in low resource countries as well. Athough it involves heavy investment in Medical Education Department the benefits outweigh the cost.[11] Benefits to the students include easier access, better retention of knowledge, improved application in real life scenarios, steeper learning curve, enhanced confidence and lesser risk to real patients.[12] Benefits to the faculty include better time management and availability.

Although the initial cost of simulation is high, it is a very flexible and durable form of training. Advantage of repeated rehersals is applicable to both teacher and student. Simulation is an ongoing, always accessible resource which can be practiced upon until the learner attains a desired goal. This flexibility is not present in live clinical scenarios and therefore mistakes remain uncorrected. Therefore it is a worthwile investment in the longterm.

Assessment drives the learning process. Simulated training has another advantage i.e. ease of assessment. Almost all assessment methods are applicable to simulated learning. So assessment can be tailored according to the available resources. Debriefing forms an integral part of simulation and is important for the seemless transition from undergraduate to clinical resident.[13]

In this study, we compared the traditional teaching methods with simulation in labor and delivery. Knowledge and skill of the undergraduate student were the main areas that were assessed. Knowledge was assessed through posttest and skill through OSCE at the end of the session. Our study showed that there was a significant difference in skill attained after simulation compared with traditional teaching (p value 0.004). Although the knowledge attained was also better but it did not reach the level of significance (p value 0.59).

Limited number of studies have been done regarding education through simulation in gynae and obstetrics. A study conducted in USA about the impact of labor and delivery simulation classes in undergraduate medical class learning showed that simulation group performed significantly better compared to the control group (p = 0.0017).[6] Similarly, a study conducted in 2014 in Saudi Arabia showed that most of the students had significant improvement in the self-reported knowledge of ordinary labor using at birth simulator NOELLE compared with simple tutorial class at labor room.[14] Comparable results were shown in other studies as well, including those

conducted by Deering et al.[15] and Issenberg et al.,[16] who showed improvement in performance of specific tasks and skills when learning was conducted on simulator. The world is now moving towards simulation in skill-based operative training. A study on cesarean section delivery method using an obstetrics simulator reported that students developed higher levels of confidence during these simulation exercises even without significant supervision.[5]

Limited number of studies of our region are available for comparison. Most of the studies regarding simulation have been done in india.[17] Simulation based learning has been reorted as a favorable mode of learning by medical students.[18] A study conducted at Jinnah Sindh Medical University; Karachi revealed that teaching medical students on simulator provided a much better learning experience as compared to self-learning group.[19] However several areas of improvement have been identified by Agha S et al.[20]

It has been shown that simulation improves the skills in the simulated atmosphere before moving to actual live patient care. Further research needs to be done to show how feasible they are in low resource settings.

Conclusion

Simulation-based skill learning displayed significantly good outcomes as perceived through and shown in OSCE. There is dire need for the development of modern teaching and learning strategies considering the changing milieu of clinical practice in Pakistan.

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