PERCEPTIONS OF TRAINEES ABOUT USE OF SIMULATION IN GYNAECOLOGY AND OBSTETRICS

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ABSTRACT

Objective: To explore the perception of Obstetrics and Gynaecology (OB/GYN) postgraduates about the use of simulation in improving their clinical skills.

Study Design: Explanatory sequential mixed method design.

Place and Duration of Study: Obstetrics and Gynaecology department of Sharif Medical and Dental City (SMDC) Lahore Pakistan, from Jun to Oct 2019.

Methodology: By using a homogenous purposive sampling technique eight postgraduate residents from Obstetrics and Gynaecology department were recruited. The study had two phases: In the first phase, quantitative data was collected and analyzed while in the second phase qualitative data were collected by following the quantitative phase and then analyzed. This framework was tracked through the procedure of instrumental delivery with vacuum application in a real-life situation. A survey was conducted before and after the simulation training by using a researcher-developed Likert scale questionnaire. After that in-depth qualitative interviews were conducted. The improvement in clinical performance was evaluated by paired-sample t-test and thematic analysis.

Results: Significant performance improvement (p<0.001) after simulation training was reported. The thematic analysis revealed a lack of proficiency in clinical experience before simulation at behavioural and technical levels while enhancement in clinical experience after simulation at both levels. The perceived benefits of simulation with the major trends of simulation as time-friendly, as a source of deliberate practice, and as safe practice in the unthreatened environment were explored. The theme of suggestions was also explored.

Conclusion: The participants showed improvement in their clinical skills by describing the optimized benefits of simulation. Few of them are supported by the easy access of simulators with the chance of peer group learning.

Keywords: Clinical skills, Obstetrics and gynaecology, Simulation, Vacuum-assisted delivery.

How to Cite This Article: *Haheez M, Sohail N, Waqar SH. Perceptions of Trainees About Use of Simulation in Gynaecology and Obstetrics. Pak Armed Forces Med J 2021; 71(6): 2001-2006. Doi: https://doi.org/10.51253/pafmj.v6i6.4277*

INTRODUCTION

It is a well-known fact that deliberate practice enhances knowledge, whether be in real-life situations or in an artificial simulated environment. Repetition at own free will, in a fearless, non-threatened environment with high fidelity models in Live, virtual, and constructive styles has improved skills and expertise in all fields of life.[1,2] It is expected that simulation improves the skill of Postgraduates of Gynae and Obstetrics for assisted vaginal delivery. I have used vacuum applications as a tool for the same purpose.

It is being used effectively worldwide in every field of life.[3,4] In medical education simulation is an unthreatened replica of the clinical situation, ranging from a paper scenario to high fidelity simulators used to not only attain psychomotor, affective and communication skills but also to assess these modalities. it is being used in almost every medical field as life supports, paediatrics, anaesthesia,[5] trauma,[6] intensive care, endoscopies, surgical skills, psychiatry and maternity units.[1]

Obstetrics and Gynaecology (OB/GYN) is one of the essential and core medical departments and it needs very fine and safe operative skills for surgeons. To overcome risk factors and complications related to OB/GYN procedures, many simulations based medical training programs are being offered internationally.[7,8]

Although teaching and assessment in skill lab with simulators have been made compulsory by UHS and PMDC but is still in infancy. Much work has been done in weather and disaster management; however, very limited local literature regarding its use in medical education is available. The current study was designed to explore what are trainee's perceptions about simulation in improving their clinical skills? How it can be made useful? What are its limitations? So, on

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Received: 09 May 2020; revision received: 13 Aug 2020; accepted: 26 Aug 2020

the grounds of research questions, the purpose of this study is to explore the viewpoint of OB/GYN PGRs of Sharif Medical and Dental City about the use of simulation in improving their clinical skills.

METHODOLOGY

The current study was conducted from June to October 2019 at the Obstetrics and Gynaecology department of Sharif Medical and Dental City (SMDC) Lahore after approval of the ethical review board of SMDC with certificate no SMRC/81-2018. The study design was explanatory Sequential which is a type of mixed-method research design as it has two aspects, quantitative followed by qualitative. The research was conducted in accordance with the framework given in Eikelboom.[9] The homogenous purposeful sampling was used for the recruitment of eight participants.

Inclusion Criteria: The postgraduate trainees undergoing Gynecology and Obstetrics training working at Sharif Medical and Dental City PGRs from OB/GYN unit were included in the study.

Exclusion Criteria: Other medical staff like medical officers, nurses and house officers were excluded.

To get the general picture of the research problem from quantitative data, more analysis was done through qualitative data collection to refine, extend or explain the general picture. Signed informed consent, awareness regarding study purpose and procedure, right of withdrawal was carried out as an ethical practice.

For the first phase, a Likert scale questionnaire was developed including all steps for safe vacuum application from a textbook in order to evaluate an instrumental delivery with vacuum application. The questionnaire had 11 items with three responses and scored accordingly: 0 not done, 1 prompt required and 2 done (Figure).

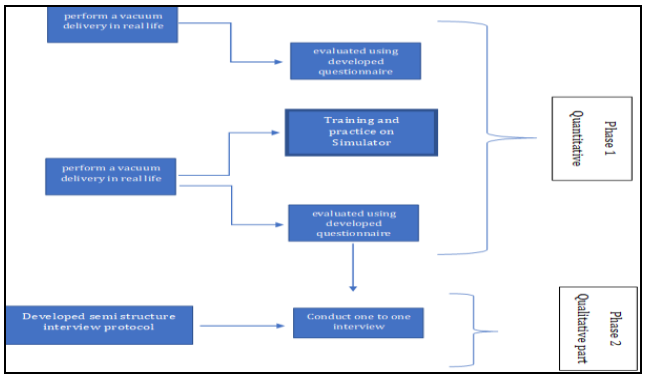

Figure-1: Flow chart of the study procedure.

All the participants were given literature and briefed about the safe conduction of vacuum applications. All participants performed vacuum vaginal delivery in a real-life situation. They were being observed and evaluated through a questionnaire using Likert's scale while applying vacuum. Briefing, training and practise on simulator follow this. The participants then performed vacuum delivery in a real-life situation. Performance was evaluated according to the same questionnaire.

For the second phase of the study, was followed by one to one interview to find out their viewpoints as regard to their training technique. An interview protocol was developed carrying instructions to be followed in each interview to ensure consistency. Interview protocol consists of perceptions, suggestions and limitations for testing recording instrument, headers for essential information, statements about the purpose of the study and signing of the consent form. The header was also about the trainee's educational background, position and organization they belong to; date, timing and place of interview. This was followed by five open-ended questions allowing participant's maximum flexibility to respond and freedom of expression, which is considered as the hallmark of a qualitative study. A pilot run of the questions before actual data collection was done to scrutinize the quality, strength and weakness of the questions.

Thereafter one to one interview with open-ended questions was conducted on an allocated pre-informed time in the demonstration room to avoid any disturbance. At the end of the interview, a note of thanks was given and their additional viewpoint/suggestion or comments are taken. This practice allowed getting an insight into issues that were probably not covered by the interviewer but are important according to the participant and may be beneficial for the subject matter. The interviews were audio-recorded and researcher reflection notes were taken which is followed by transcription verbatim to avoid any bias and to have a permanent record. The analysis was done with the consensus of two researchers by using the combination of emic and etic approaches.

SPSS-23 was used to compile and analyze the quantitative data. Before simulation training and after simulation training performance of vacuum delivery on a live setting were analyzed through paired sample t-test. While qualitative data was analyzed manually by using thematic analysis. Further verification check was done through triangulation, peer review, experts review, rich think description and pilot study as discussed above.

RESULTS

The total 8 PGRs completed the eleven item questionnaire using Likert's scale. The paired sample t-test was calculated which indicated there was a significant improvement in clinical performance after training as shown in Table-I.

Table-I: Pre and post training performance of PGRs.

Parameters	Mean ± SD	*p*-value
Pre training performance	10.37 ± 4.56	<0.001
Post training performance	19.75 ± 1.75	

Thematic analysis identified four dominant themes: clinical experience before simulation, clinical experience after simulation, perceived benefits of simulation and suggestions.

Table-II showed identified themes and major trends clustering. The first two themes are consistent with the study main question that what are trainees' perceptions about simulation in improving their clinical skills. While the third and fourth themes are consistent with the second question How it can be made

Table-II: Clustering of major trends and themes.

Theme 1: Clinical experience before simulation
Trend 1: Behavioral level
Clustering: Lack of confidence, trouble to communicate with patient, difficulties to take consent, fearfulness,
Trend 2: Technical level
Clustering: Lack of experience, procedural mistakes (skipped specific steps of protocol), lack of proficiency in technical skills (determining the position of head, shoulder dystocia, identify flexion point etc.), lack of ability to identify and cope with risk of harm
Theme 2: Clinical experience after simulation
Trend 1: Behavioral level
Clustering: acquired confidence, effective communication with patient, obtained comfort ability
Trend 2: Technical level
Clustering: acquired skillfulness and experience, followed complete procedure, ability to identify risk factors
Theme 3: Perceived benefits of simulation
Trend 1: Simulation as time friendly
Clustering: No time limit, learning without clinical time pressure, rostered protective time,
Trend 2: Simulation as a source of deliberate practice
Clustering: progressive skills, developed automatism, developed prompt reflexes
Trend 3: Simulation as a safe practice
Clustering: learning through mistakes, no privacy issue, no need for consent, no risk of harm
Theme 4: Suggestions
Trend 1: Provision of simulator at wards
Clustering: easy access for simulator, opportunity to grow professional proficiency at ward
Trend 2: Implication of simulator for other procedures
Clustering: availability of simulators for all complex operative procedure
Trend 3: Provision for peer group guidance
Clustering: interpersonal interaction, opportunity to learn through each other by using simulator
Trend 4: Learning through videos
Clustering: availability of operative procedures videos, watching videos to augment practice for correction and retention.

Table-III: Frequencies of themes and major trends.

	P1	P2	P3	P4	P5	P6	P7	P8
Theme-1: Clinical experience before simulation								
Trend 1: Behavioral level	√	√	√	√	√	√	√	√
Trend 2: Technical level	√	√	√	√	√	√	√	√
Theme-2: Clinical experience after simulation								
Trend 1: Behavioral level	√	√	√	√	√	√	√	√
Trend 2: Technical level	√	√	√	√	√	√	√	√
Theme-3: Perceived benefits of simulation								
Trend 1: Simulation as time friendly	√	×	√	√	×	×	√	√
Trend 2: Simulation as a source of deliberate practice	√	×	√	√	√	√	√	√
Trend 3: Simulation as a safe practice	√	√	√	√	√	√	√	√
Theme-4: Suggestions								
Trend 1: Provision of simulator at wards	√	√	×	×	×	×	×	×
Trend 2: Implication for other procedures	×	×	√	×	×	√	×	×
Trend 3: Provision for peer group guidance	√	×	×	√	×	×	×	×
Trend 4: Learning through videos	√	×	√	×	×	×	×	√

useful?. Table-III displayed frequencies of major trends as they appear under each theme. Table-IV depicted verbatim of the participants corresponding to themes and major trends.

Table-IV: Verbatims of the PGR's regarding the themes and major trends.

Theme-1: Clinical experience before simulation
Trend 1: Behavioral level
P2: I was less confident, was more interested in being more supervised and being helped by seniors to apply vacuum.
Trend 2: Technical level
P8: I multiple times forgot to assess station of the head and proper positioning, analgesia, to anticipate shoulder dysto-cia. Many a times missed to get the bladder empty, as well as steps of traction and halt.
Theme-2: Clinical experience after simulation
Trend 1: Behavioral level
P4: I have a great experience, before simulation I was very afraid for applying the instrument on the live patients but after simulation, I became comfortable and quite at ease in application.
Trend 2: Technical level
P1: it was easy to identify flexion point and to apply traction properly.
Theme-3: Perceived benefits of simulation
Trend 1: Simulation as time friendly
P1: I could practice multiple times or whenever I had time, I didn't had fear of running out of time or the patient will be fatigued or in danger.
P3: Whenever felt like practicing or had time or high energy level I could practice on simulator.
Trend 2: Simulation as a source of deliberate practice
P1: It's like driving a car for the first time, one is afraid of hitting some thing or someone. With time as I become expert after driving again and again, it becomes part of one's nature. It is the same with practicing on simulation, with time one achieves automation and becomes expert.
Trend 3: Simulation as a safe practice
P7: I believe it helps in becoming a safe doctor after repeated simulator rehearsals. As we know that frequency of assisted vaginal delivery (AVD)is 5-7%, which means we don't get very frequent chance of vacuum applications, leading to long gaps in between procedures. This leads to hesitancy in the time of need.
Theme-4: Suggestions
Trend 1: Provision of simulator at wards
P2: I think It should be routine practice in all labour set ups to train doctors on simulators, this will help them in achieving expertise and becoming more confident.
Trend 2: Implication for other procedures
P6: All obstetric emergencies should be practiced on simulators to achieve an expert level.
Trend 3: Provision for peer group guidance
P1: This gives an opportunity of Peer learning as there is no limitation of patient privacy. While performing a procedure in front of my colleagues gives a chance of constructive feedback and helps in rectifying mistakes.
Trend 4: Learning through videos
P7: Watching videos of procedure before or after simulation augments learning and helps in correcting our mistakes.

p=participants 1 to 8

DISCUSSION

Results vindicate the importance of simulation to improve clinical skills and experience at both behavioural and technical levels in OB/GYN units.[10] like procedural simulations for forceps-assisted delivery,[11] correct vacuum cup placement,[12] shoulder dystocia management,[13] and salpingectomy for ectopic pregnancy,[14] as well as at behavioural level confidence and professional behaviour with the patient also improvement.[15] A survey among OB/GYN trainees and fellows showed 80% responses regarding the improvement in surgical skills due to simulation and then the transfer of those skills at the real-life operating theatre.[16] A recent systematic review in 2020 reported 86% of researches showed virtual simulation as productive education to support better learning outcomes.[17]

One of the perceived benefits of simulation is time friendliness. There is no time constraints, rostered protective time was testified as Gorantla *et al,* identified simulation as a practice without clinical time constraints. It included the opportunity to practice at a pace without having urgency. Because Pressure of time in a real-life clinical setting often prevent effective and fullest learning opportunities while simulation gives a chance to learn in a stepwise manner and with a self-managed pace.[2]

Another proven benefit that came out from this study was "simulation as a means of deliberate practice". A meta-analysis reported 0.71 (95% confidence interval, 0.65-0.76; $p<0.001$) superiority of simulation-based medical education as compared to traditional clinical medical education for deliberate practice.[18]

Although initially, internee's practice clinical procedures under supervision but still there is a risk of harm for the patient. With all the other benefits of simulation one of the very important perceived benefits is, simulation is a safe practice as mistakes and learning were without fear of harming the patient. A recent qualitative study in 2019 emerged three major themes while one of which is learning in a safe environment without being anxious and fearful.[19] Moreover, Ennen and his colleagues also highlighted that the simulation session could be restarted, repeated to correct mistakes that were not possible in a real-life setting.[20] Another study in the context of a framework for considering simulation-based training highlight the evidence base fact that learner perceived a nonthreatening controlled environment with control over the material and gained information according to personally meaningful way. That perceived ability to control clinical material, im-

mediate feedback and learning through mistakes lead towards the practice of skill until proficient learning level or expertise is achieved with very less risk of harm to the patient, thus becoming a safe doctor.[15]

In current students under the theme of "suggestions" the most observed trend was easy to access towards simulation training because it was very important to gain appropriate outcome. Evidently a recent study was conducted in Australia and New Zealand. They investigated the current availability, perceived barriers and utilization of simulation training. The results revealed that limited access to the simulation was the highest-rated barrier for learning skills. While more than half of participants believed that simulation training has a lot of benefits for their skills and should be supported with a curriculum and teaching.[16]

Although simulation training is proven more effective than videos in understating procedures,[21] alongside simulation training additional videos can boost the learning for clinical procedures, as was suggested as a trend in this study.

The participants of the current study did not report any limitation of simulation procedure, which may be due to less clinical experience or overwhelming excitement of perceived benefits; however, with all the benefits of the simulator, there also exists a few limitations as suggested by the previous researches. As a dependency, fixation on idealistic setting,[22] and due to lack of diversity in simulation, practitioner's ability to think in a broader clinical context is affected.[23]

Overall, Simulation is exciting learning while the combination of didactic material along with formalized training process is supported for its effectiveness. The learning outcomes need to be clearly defined; further, time for repetitive training, appropriate supervision, feedback and debriefing are essential components of this technology to be more effective.[24]

ACKNOWLEDGEMENT

Ms Rabia Amjad for her guidance in thematic data analysis and Dr Iffat Hameed for her help in conducting and organizing interviews.

CONCLUSION

Simulation allows practising and gaining an optimal level of skill in a safe and protected learner-centred environment. Clinical skill labs with high fidelity simulators give credible and authentic monitoring, assessment of skill and behaviour which is not possible in a real-life setting. This can predict the effective technical and behavioural skills of the learner in reality.

Conflict of Interest: None.

Authors' Contribution

MH: Direct Contribution, NS: Intellectual contribution, SHW: Intellectual contribution.

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