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From tradition to simulation: An experience of team training on management of shoulder dystocia

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RESEARCH ARTICLE

From tradition to Simulation: An experience of team training on management of shoulder dystocia

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Abstract

Objective: To determine if simulation-based team training improves the management of shoulder dystocia compared to traditionally taught obstetrical emergencies.

Method: The prospective mixed-method study was conducted at the Centre for Innovation in Medical Education at the Aga Khan University, Karachi, from June to August 2018, and comprised doctors and nurses having up to five years of labour and delivery experience. The subjects were divided into two equal groups which were further subdivided into four equal teams. Group 1 was taught to manage shoulder dystocia using traditional lectures and hands-on pelvic models, while group 2 was trained in a simulated environment with a simulated scenario of shoulder dystocia. After two weeks, the performance of both teams were assessed and compared. Data was analysed using SPSS 19. A focus group discussion was subsequently conducted on the quality of the simulation experience.

Results: Of the 32 subjects, 16(50%) each were doctors and nurses. They were divided into groups having 16(50%) members each, and each group had 4 teams having 4(25%) subjects. The overall mean age of the sample was 31.9±2.8 years (range: 28-38 years). The mean score for performance on technical and communication task of group 2 was 10.25±1.258 compared to 5.7±2.500 in group 1 (p=0.028). Focus group participants agreed that training in a simulated environment was far superior than being traditionally taught.

Conclusion: Simulation-based team training in shoulder dystocia management was associated with better feedback than traditional-style teaching.

Keywords: Simulation, Shoulder dystocia, Team training, Obstetrical emergency. (JPMA 72: 47; 2022)

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Introduction

Millennium Development Goals (MDGs) has seen a reduction in maternal mortality. In Pakistan, however, maternal mortality rate (MMR) has remained stagnant with 276/100,000 live births, perinatal mortality rate of 75 per 1,000 pregnancies and neonatal mortality rate of 55 per 1,000 live births, according to the Pakistan Demographic and Health Survey (PDHS) 2012-13 report.[1] In order to improve maternal care in Pakistan, steps to address maternal health as well as effective management of obstetrical emergencies should be undertaken. One such obstetrical emergency is shoulder dystocia, which is a well-recognised obstetrical emergency with severe maternal consequences, including postpartum haemorrhage (PPH) and maternal injuries, as well as neonatal complications, like permanent brachial plexus injury, bony fracture, hypoxic encephalopathy and sometimes neonatal death. It is an acute emergency that complicates about 2% of all vaginal deliveries.[2,3] Although certain risk factors are associated with shoulder dystocia, most of the times it is unanticipated. When encountered, it needs prompt mobilisation and coordination by a team of obstetricians, midwives and paediatricians to quickly resolve the emergency to prevent foetal hypoxia, foetal/maternal injury and neonatal death.[4]

Simulation has been used in industries like aviation and military for many years for team training.[5] Its important role in training physicians has been increasingly recognised over the past few years. In medical simulation, real scenarios are re-created3. The last few years have seen the rapid development of simulation training as an educational modality, especially in the field of obstetrics.[6,7] Simulation provides authentic and focussed learning experiences for the participants in a controlled environment. It mimics practice situations and provides opportunities to enact, reflect and develop roles in synergy with actual practice experiences.[8,9]

A concurrent component of simulation is the debriefing given to the teams about their performance. Debriefing has been defined as 'a process to elicit information pertaining to an experienced event in order to gain a better understanding of it'.[10] Debriefing is "facilitated or guided reflection in the cycle of experiential learning.[11] It is the discussion and analysis of scenarios and events with the trainees after the conclusion of the simulation to reflect upon their performance and experience. It helps to identify

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areas of improvement with guidance provided by skilled instructors.[12]

Most traditional training on obstetrical emergencies, like shoulder dystocia and PPH, has been mainly through lectures, drills on pelvic models and through actual patient encounters. Although international studies have shown improved performance after simulation training, this teaching modality is new and just beginning to emerge in Pakistan.[13,15]

The current study was planned to determine if simulation-based team training improves the management of shoulder dystocia compared to traditionally taught obstetrical emergencies. The study also planned to get feedback from the participants on the quality of the simulation experience.

Subjects and Methods

The prospective mixed-method study was conducted at the Centre for Innovation in Medical Education[16] at the Aga Khan University (AKU), Karachi, from June to August 2018. Qualitative and quantitative data was used in a pragmatic paradigm after approval from the institutional ethics review committee. The study population consisted of inter-professional teams of doctors and nurses/midwives from the three maternity hospitals affiliated with AKU. Recruitment was done through voluntary participation on the basis of convenience sampling[17] technique. Labour room nurses and medical officers in the maternity hospitals with labour and delivery experience of 1-5 years were included. Those who had previous experience of simulator-based training on shoulder dystocia were excluded. The participants were divided into two equal groups, and each group was further divided into four equal teams having an equal number of doctors and midwives/nurses. This was done to mimic the reality of the labour room. Group 1 was taught shoulder dystocia through a traditional lecture on power point, and a video was shown to them on different manoeuvres to manage shoulder dystocia. The participants were then allowed hands-on practice of the different manoeuvres on the pelvic-model (PROMPT flex birthing stimulator advanced 80106 Limbs and Things Ltd, Bristol, United Kingdom), for 1.5 hours.

Group 2 was initially given a short briefing on the concept of simulation-based training. The subjects were then familiarised with the simulated delivery suite, the Gaumard mannequin, and the equipment in the simulation laboratory. The training comprised experience on a simulator (Victoria maternal birthing simulator S2200 Gaumard scientific). The subjects were informed that video-recording during simulation would be conducted for the purpose of debriefing and their verbal consent was taken in this regard. The scenario given to the group was of an obese multipara with gestational diabetes who had been pushing in the second stage of labour for two hours. She ultimately pushed out the foetus, but after the delivery of the head, the body failed to deliver itself having gentle downward traction on the basis of which shoulder dystocia was diagnosed. Each of the four teams was called in to manage the situation, and the subjects were advised to treat the scenario as a real-life situation.

During the simulation, their performance was videotaped. This was followed by a debriefing of the individual teams by two skilled trainers who had undergone training in debriefing technique with pre-determined open-ended questions to ensure consistent experiences. The teams were debriefed using the relevant videotaped recordings of their performance.

After two weeks, both groups were called again for assessment of their learning through the two modalities and to compare the differences in their performance. Two participants dropped out, and, therefore, two helpers were incorporated to complete the four-member team structure. These helpers acted as members, but did not initiate any task; they only acted on the team leader's instructions.

A scenario similar to the one given previously was given to both the traditionally-trained and simulation-trained groups. Performance of each team was video-recorded and was reviewed by two faculty members of obstetrics and nursing each on a scoring checklist which was adopted from literature[18] and was further tailored by reviewing the Royal College of Obstetricians and Gynaecologists (RCOG) Green Top guidelines[19] on shoulder dystocia by two senior obstetricians and a senior nursing faculty. The assessment was done on the technical and communication skills and overall quality of performance of each team. The checklist included technical skills including McRoberts' position, suprapubic pressure, gentle downward traction, advanced manoeuvres, Rubins manoeuvre, and Woods corkscrew or delivery of posterior arm for resolution of shoulder dystocia. Included in the checklist were communication tasks, such as recognition of shoulder dystocia, calling out for help, call given for paediatrics team, informing the arriving team of the situation, identifying the team leader and task allocation. For each step that was correctly performed, a score of one was given. A score of zero was given if the incorrect manoeuvre was done or not done at all. Total 15 tasks were identified for scoring. The overall quality of performance of the teams were scored using a Likert scale from 1-5, ranging from poor to excellent. This took into account the quality of teamwork by demonstrating the timeliness of the procedure, counseling of patient and working in coordination in a composed

manner without creating a commotion. The time taken from delivery of the head to delivery of the shoulder was also recorded for each team.

The reviewers were blinded to the type of training received by each team. After the assessment, the group taught through the traditional method was also trained on the simulator for shoulder dystocia.

After the simulation experience, feedback from consenting participants was taken through a focus group discussion (FGD) on the quality of the simulation experience, specifically its impact on learning. A 60-minute FGD was conducted with eight participants, comprising doctors, nurses and midwives, using a semi-structured guide.

Quantitative data was analysed using SPSS 19. For quantitative data, descriptive analysis was done and data was expressed as mean±standard deviation or as frequency and percentage. Independent t-test was applied for inter-group comparison. P<0.05 was considered statistically significant.

The qualitative data, collected through the FGD, was recorded using a tape recorder and then transcribed manually by the researchers within 24 hours of the FGD. The transcription was coded, which included un-edited statements with no assumptions. These codes were arranged in categories which were grouped to form trends. From these trends, five themes finally emerged which were then linked together to formulate a conclusion.

Results

Of the 32 subjects, 16(50%) each were doctors and nurses. They were divided into groups having 16(50%) members each, and each group had 4 teams having 4(25%) subjects. The overall mean age of the sample was 31.9±2.8 years (range: 28-38 years). The mean score for performance on technical and communication task of group 2 was 10.25±1.258 compared to 5.7±2.500 in group 1 (p=0.028) (Table 1). The mean time for head-to-shoulder delivery was 84±4.57 second), for group 2 compared to 280 ± 48.4, seconds for group 1 (p<0.032). The overall quality of teamwork in group 2, with a mean score 3.50±0.577, was significantly better than group 1 which had a mean score

Table-1: Mean Scores of traditional and simulation-trained groups.

Teams	Group 1 Traditional Total score/15	Group 2 Simulation Total Score/15	*p*-value
Team 1	5	10	
Team 2	6	9	
Team 3	3	12	
Team 4	9	10	
Mean score	5.7 mean	10.25 mean	<0.028

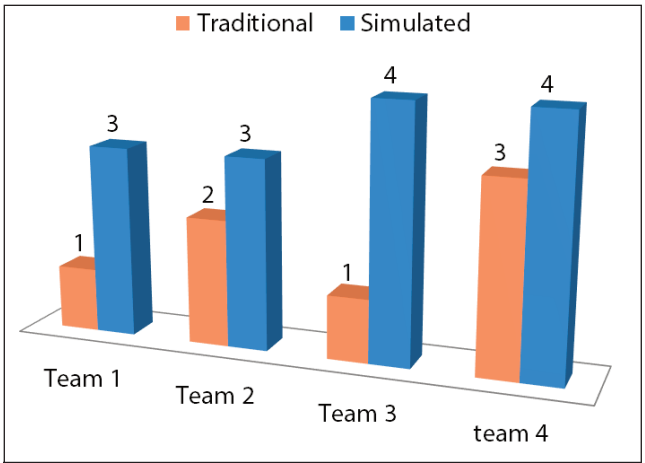

Figure: Overall team performance on the likert scale(1: Poor, 2: Fair, 3: Good, 4: Very good, 5: Excellent).

of 1.75±0.957 (p=0.026) (Figure).

The main themes derived from the FGD were noted (Table 2).

The first theme was situational control. Trends noted were time management, team work and communication.

This was echoed by one of the participants; "*The simulation experience helped us to manage time and allocate tasks as a team*" (participant C).

Another participant commented: "*Communication with each other helped us to manage tasks effectively … it was all about team work*" (participant A).

The second theme was psychological impact. This was derived from participants' comments on emotional control. One participant emphatically stated; "*After the simulation experience, I feel I can control my fear and anxiety*" (participant B).

Along the same lines, another participant commented; "*The training made me confident … I can truly understand how a patient feels*" (participant B).

The third theme was pedagogical significance. A participant remarked on "*inter-professionalism*" saying:"*While I was delivering the baby a trained nurse was counselling the mother which was so comforting*" (participant D).

This was reinforced by statement of another participant; "*I didn't realise as nurses we had a major role in shoulder dystocia delivery*" (participant F).

A participant commented on "*superior training*", saying: "*Training in a simulated environment is superior to the way we were usually trained*" (participant C).

Table-2: Overall team performance on the likert scale(1: Poor, 2: Fair, 3: Good, 4: Very good, 5: Excellent).

Trends	Number of comments	Verbatim comments
Theme 1 situational control		
Time management	7	The simulation experience helped us to manage time with proper communication with the team.
Team work	6	We were able to allocate task and as a team, we delivered patient in time
communication	6	The communication with each other helped us to manage the task effectively
Theme 2 psychological impact		
Emotional control	5	It felt as if it was happening in reality, but after the simulation experience I feel I can control my fear and anxiety
Confidence	7	Simulation training made me confident now I feel I can confidently manage shoulder dystocia
Empathy	5	Now I can truly understand how the patient feels
Theme 3 pedagogical significance		
Inter-professional	5	It gave me a sense of relief that while I was delivering the baby the trained nurse was counseling the mother
Superior training	6	Training in a simulated environment is superior to the way we were usually trained like on models and lectures
Innovative	5	I feel this is a much better and innovative way to learn to manage shoulder dystocia
Theme 4 experiential learning		
Realistic	6	the experience was real and lifelike
Debriefing/feedback	7	Debriefing gave us insight into our mistakes and provided us with an opportunity to improve
Environment	5	the environment helped us to learn to support each other
Theme 5 challenges		
Cost	7	This setup is very costly as compared to pelvic models we usually train on we can't practice this in our setup
Time-consuming	6	It was really good to learn but it took nearly the whole day to train on simulation
Resources	6	The simulation setup requires a team and equipment and we don't have such resources in our setup to train our colleagues and staff

Some felt this method of simulation training was *"innovative", as one participant noted: "This is a much better and innovative way to learn to manage shoulder dystocia*" (participant G).

The theme experiential learning emerged from the participants' comments on the realism of the experience, the impact of debriefing and feedback and the learning environment. Most participants felt the experience of learning through simulation was "realistic". One said: "*The experience was real and lifelike*" (participant E).

Another said, "*Debriefing gave us insight into our mistakes, we were not sure what we were doing wrong until we were debriefed*" (participant H).

Further another participant stated: "*The environment helped us to learn to support each other*" (participant D).

Along the same lines another comment was; "*The environment was such that made us aware of one another's capabilities*" (Participant E).

Participants' comments on the cost, resources and time-consumption for training on simulation formed the basis of the next theme, which was challenges.

"*The setup is very costly … it took nearly the whole day to train*" (participant H).

"*Simulation setup requires a team and equipment and we don't have such resources in our setup to train our staff*" (participant A)".

Discussion

Shoulder dystocia is an unpredictable and unpreventable event with serious consequences. The 5th Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) annual report declared that in 66% of deaths following shoulder dystocia, 'avoidable factors were identified and different management strategies could have reasonably been expected to have altered the outcome'.[20] Therefore it is imperative that obstetricians and labour room staff should be skilled to manage this unanticipated potentially devastating emergency.[2] Training of labour room staff as a team to manage shoulder dystocia is far superior to training individually as its management requires cognitive and psychomotor skills and coordinated teamwork which requires deliberate practice. In the current study, the traditional team displayed no teamwork, most of the tasks in the checklist were left undone or partially done. In routine training, technical skills to deliver the foetus is given more priority and less focus is stressed on other important aspects of management, such as timekeeping, patient-counselling, documentation and team performance. This often results in chaos in the face of a real situation rather than prompt and attentive management.[21] The simulated team was more focussed as they had experienced the simulated environment and were prepared to function as a team. All members knew their respective tasks and how to execute it. This supports previously reported results in which the team trained in simulated environment performed better than the didactic team.[22] Others revealed improved confidence among delivery staff after training for

shoulder dystocia and a significant reduction in brachial plexus injury and bony fractures among newborns.[23,24] A study[15] demonstrated a significant statistical reduction in clinical errors after the introduction of simulation training. An observation from 450 shoulder dystocia simulations revealed significant improvement in management post-training.[24]

The current study reported less head-to-shoulder delivery time in the simulation group compared to the traditional group (p<0.032). In a similar study, where team-based simulation training was employed to train residents on the management of shoulder dystocia, the mean head-to-shoulder delivery time was 61 seconds compared to 146 seconds by the controls with no specific training.[2] Similar findings were reported from a study which improved the head-to-body delivery interval from 161 seconds to 135 seconds after training on high-fidelity simulator.[21] It is generally assumed that the longer the head-to-body delivery time interval, the greater are the chances of foetal hypoxic injury.[25] However, there is no clear consensus on the head-to-body delivery time interval and foetal hypoxia.[26] A study revealed no foetal complications in delivery completed within 4 minutes, while it reported a sharp increase in neonatal depression after 3 minutes.[26]

Majority of the participants in the current study felt that team training was superior compared to the traditional training. During the FGD, participants responded that a simulated environment with a high-fidelity simulator prepared them for future such emergencies. They felt training as a team in a simulated environment provided a real-life situation which facilitated their recognition of the stress and emotions involved, as well as helped to control the anxiety usually experienced in such a situation. This is in line with other studies.[27,28]

Debriefing facilitates in developing strategies to improve future performance.[29,30] In the current study, the participants felt the debriefing exercise helped them to identify their mistakes and improved their performance. During the session, the participants were encouraged to explore what went wrong during the performance. They got an opportunity to reflect upon their mistakes by viewing the audio-visual recordings of their performance. This led to critical evaluation on their part and allowed the participants to reflect and analyse their own performance in a non-threatening environment. Literature supports the use of debriefing in simulation-based team training.[11] Many studies have utilised debriefing in team training and reported about its potential to improve behaviour change and foster effective collaborative health teams.[11,30] Simulation has the advantage of being innovative, and it provides an opportunity for measured practice with experiential and reflective learning. However, it also bears certain disadvantages. The barrier to the implementation of simulation-based training includes realism of simulators, cost, time allocation and availability of resources. The preliminary and periodic maintenance cost of the high-fidelity simulators as well the maintenance of a simulated environment which requires a trained dedicated team of trainers and operators, makes it very costly.[31,32] In the current study, FGD participants identified similar drawbacks in the implementation of simulation-based training, declaring it time-consuming and expensive.

The current study has certain limitations. The sample size was small and the participants had varying experience which could have affected the performance during the intervention. Besides, only short-term post-course reassessment was done. Two participants did not show up for the performance assessment, and, to complete the teams, two helpers filled in which could have had an impact on the performance. Further studies are needed to evaluate if the learning in the simulated labs is transferred to the practice areas. Recent advances in technology have made training safer through simulation, but however life-like the simulation setting may seem, the concern remains whether this modality is a true reflection of the skills in the face of an actual clinical event. Team training generates confidence and augments constructive learning. Organisations should establish proactive and systematic team-based care by skill-building, teamwork training and by collaborating and working in synergy with healthcare workers of various disciplines to offer effective patient care.

Conclusion

Training of serious obstetrical emergencies with simulation-based team training in the simulation lab was found to be superior to the traditional methods. It is an excellent platform for deliberate practice, and reflection on one's own action to develop competence.

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