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Full length article

Digital vs formal teaching of vaginal breech delivery: Which is the residents' choice?

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ABSTRACT

Objective(s): A critical area of obstetrics that demands proficient training is the management of breech deliveries. There was a notable decline in the number of vaginal breech deliveries in the following years, establishing CS as the preferred method of delivery for such cases. Cohort studies using targeted screening and skilled practitioners demonstrated little differences between the two delivery. Skills acquisition at the patient's bedside is very difficult to obtain, particularly in the youngest trainees. Simulation teaching has largely become a part of the training curricula for many obstetrics and gynecology residency programs.

Study design: This was a prospective, randomized, controlled, single-center study. Residents were randomly assigned in two groups with similar characteristics. Group A attended a formal lecture. Group B received the study material and recording of the lecture as digital home learning. Lecture and simulation focused on vaginal breech delivery. After one month both groups underwent a simulation test addressed to assist a vaginal breech birth. Four supervisors evaluated all videos. Time needed for birth, and evaluation scales as Objective Structured Clinical Examination were recorded. A questionnaire was completed online using Google Forms with 6 questions. The primary outcome was to compare the evaluation for each item and globally within groups. A secondary outcome was the evaluation of questionnaire results within the two groups.

Results: Thirty-two participants were recruited and randomized. None of the participants withdrew from the study. For the primary outcome, all examined variables (Time, Rumping, Legs, Body, Arms, Head, Total Point) did not present differences in supervisors' evaluations. For the secondary outcome, Group B showed higher values in two questions.

Conclusion(s): The major finding of our study is that digital learning and formal lecture presented similar results on resident knowledge. Teaching programs involving mannequin simulation – both high and low fidelity – are reproducible and efficient for skill retain in obstetric emergencies, particularly in low incidence emergencies. The main limitation of our study was the small sample size. In addition, it is possible that a scenario without deviation or a lecture more focused on possible deviation from normal could modify residents' results facing breech delivery.

Introduction

The incidence of breech presentation at term is approximately 3–6 % [1,2]. One critical area of obstetrics that demands proficient training is the management of breech deliveries. In 2000 the Term Breech Trial significantly impacted the approach to breech presentation at term, finding that cesarean section (CS) was safer than vaginal delivery for term breech presentations [3]. Consequently, there was a notable decline in the number of vaginal breech deliveries in the following years, establishing CS as the preferred method of delivery for such cases. Since

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most cohort studies using targeted screening and skilled practitioners demonstrated little differences between the two delivery modalities [4–7], concerns are growing internationally about maternal morbidity and mortality due to planned cesareans, without considering fetal presentation [8,9]. Vaginal delivery, as described in different National guidelines, and in three different trials, is a safe option for selected women with a breech presentation, provided it is performed by experienced health professionals [1,10–13].

A recent review highlighted that most contraindications for vaginal breech delivery lack strong scientific support, due to inconsistencies in national guidelines. Only fetal growth restriction has sufficient evidence as contraindications, suggesting that guidelines should be limited to these until more evidence is available [9,14].

Currently, skills acquisition at the patient's bedside is very difficult to obtain, particularly in the youngest trainees [6,15]. Simulation teaching has largely become a part of the training curricula for many obstetrics and gynecology residency programs all over the world, as it has shown promise in teaching and evaluating performance, and it correlates positively with patient-related outcomes [16]. Simulation has a key role in medical education for training particularly in low-frequency and high-acuity events.

Many factors could affect whether training programs reach their outcomes [17,18]. The mainstay of implementing training programs is accurately assessing impact, learners' satisfaction, and meaningful input and output [19–21].

The present study aimed to evaluate the impact of different teaching approaches on skills for vaginal breech delivery.

Materials and Methods

This was a prospective, randomized, controlled, single-center study. Participants were obstetrics and gynecology residents attending the residency program at the University of Chieti-Pescara from the first to the fifth year. All residents could withdraw from the study at any time after giving initial consent. Residents were randomly assigned in two groups with similar characteristics (sex, age, year of residency, previous courses) using an online randomization tool (www.random.org), and consented for data collection and video recording. Group A attended a formal lecture. Group B received the study material and recording of the lecture as digital home learning. Lecture and simulation focused on vaginal breech delivery.

After one month both groups underwent a simulation test addressed to assist a vaginal breech birth. None of the trainees had lectures od simulation training in the meantime. We used a PROMPT Flex Birthing Simulator (Limb and Things Bristol, United Kingdom). Residents were asked to assist breech vaginal birth. The mannequin position was suitable to supine and upright on trainees' request. None of the resident decided for upright breech assistance. The fetus in complete breech rumping in left transverse. After delivery of legs and body with descent in transverse position, the right arm remained stuck high in the pelvis. At this moment a maneuver should be performed to disimpact the arm and rotate to sacrum anterior. After delivery of the arms, the fetal head had to be assisted normally with Bracht or Mauriceau-Smellie-Veit (MSV) maneuver. The fetus was placed by the teacher-trainer (CC). The resident was not aware of the exact abnormality in descent.

Training tests were done with an actor facilitator (CC) and supervision of two young specialists. Each resident was video recorded. Four supervisors were enrolled within specialists with known expertise in vaginal breech delivery skills (CC, CM, FV, MSC), and evaluated all videos. Resident's face was not framed and audio was covered in records. Time needed for birth, and evaluation scales as Objective Structured Clinical Examination (OSCE) for "rumping", "legs approach", "body approach", "arm disimpaction", and "head approach" were recorded. Each supervisor evaluated on a 1–5 scale the 5 items.

After the test all participants had a de-briefing addressed to improve their skills with vaginal breech delivery.

A questionnaire was completed online using Google Forms with 6 questions and scores based on a 1–5 Likert scale (1 being highly disagreed, 5 being highly agreed) after a frontal lecture and simulation (Group A) and digital home learning and simulation (Group B) due to evaluate if the "lecture was clear and complete", "lecture gave new skills for vaginal breech birth", "scenario quality", "how I approached the scenario", "I think my performance in reality should be better", and "debriefing was appropriate".

Values of 4 or above are considered positive, whilst below 2 are considered negative or 3 neutral values.

In the questionnaire, the residents were asked if they had previously completed "Previous course on breech" (PCB), "Previous course on breech with mannequin" (PCBM), "Previous course on obstetric emergency" (PCE), "Previous course on obstetric emergency with mannequin" (PCEM), "Previous vaginal birth assistance" (PVB), "Previous vaginal breech birth assistance" (PVBB).

The primary outcome was to compare the evaluation for each item and globally within groups. A secondary outcome was the evaluation of questionnaire results within the two groups.

It was calculated for OSCE total value that a type I error rate of 0.05 and a type II error rate of 0.8 could be achieved with a sample size of 32 participants (https://www.clincalc.com).

Statistical analysis was performed using IBM *SPSS* Statistics 24.0 (Armonk, NY). Continuous variables were presented as means ± standard deviation (SD) and tested for normality. Continuous variables were analyzed using a *t*-test. Categorical variables were compared between groups using Chi-squared test or Fisher's exact test, as appropriate. A p-value of less than 0.05 was considered statistically significant. The study was conducted under the Declaration of Helsinki and was registered with https://www.clinicaltrials.gov (NCT 06339164). Since the participation was voluntary, and the study did not involve patients, the need for ethical approval for this study was waived by the Ethics Committee of the Medicine University of Chieti-Pescara.

Results

Thirty-two participants were recruited and randomized to either Group A (n = 16, frontal lesson) or Group B (n = 16, digital home learning). None of the participants withdrew from the study. Demographic characteristics of the two groups are shown in Table 1. Three residents in the formal lecture and one in the digital learning group had previous experience attending vaginal breech birth (p = 0.285) whilst 15 out of 16 and 9 out of 16 had previous personal experiences on cephalic vaginal birth (p = 0.0001). Residents in the frontal lecture group had more frequently attended other courses on breech delivery or obstetrics emergencies, both with and without mannequins use. (Table 1).

For the primary outcome, all examined variables (Time, Rumping, Legs, Body, Arms, Head, Total Point) did not present differences in supervisors' evaluations (Table 2).

For the secondary outcome, Group B showed higher values for

Table 1
Demographic data.

	Group A (n = 16)	Group B (n = 16)	p
Age	31.19 ± 2.10	30.94 ± 3.71	0.816
Residency year	3.25 ± 1.29	2.56 ± 1.15	0.121
Previous breech course	8	3	0.063
Previous breech course on mannequin	8	4	0.144
Previous obstetric emergency course	14	5	0.001
Previous obstetric emergency course on mannequin	13	4	0.001
Previous courses	16	11	0.043
Previous cephalic vaginal birth attendance	15	9	0.001
Previous breech vaginal birth attendance	3	1	0.285

Table 2
Performance on scenario.

	Group A (n = 16)	Group B (n = 16)	p
Time (sec)	200.31 ± 72.83	221.06 ± 75.57	0.435
Rumping	14.12 ± 4.30	12.31 ± 4.60	0.259
Legs	13.44 ± 4.94	11.44 ± 4.24	0.229
Body	10.31 ± 3.57	9.75 ± 4.02	0.679
Arms	11.56 ± 3.56	11.69 ± 3.26	0.918
Head	15.06 ± 2.08	15.87 ± 2.83	0.362
Total point	51.06 ± 8.61	49.63 ± 13.37	0.720

"Lecture was clear and complete" and "Debriefing was appropriate" topics, compared to Group A ($p = 0.009$ and $p = 0.046$, respectively). The other topics evaluated from questionnaires ("Lecture was giving new skills for vaginal breech birth", "Scenario's quality", "how I approached the scenario", "I think my performance in reality should be better") had the same results in both groups.

Discussion

The major finding of our study is that digital learning and formal lecture presented similar results on resident knowledge.

The results of our randomized controlled trial show that digital learning before facing a breech delivery scenario (Group B) results in a comparable improvement of skills compared to a formal lecture learning program (Group A) both for technical performances (Table 2), and for the majority of items evaluated by the questionnaire (Table 3).

Teaching programs involving mannequin simulation – both high and low fidelity – are reproducible and efficient for skill retain in obstetric emergencies, particularly in low incidence emergencies [22]. The present study showed that before facing a scenario the digital learning and the frontal lectures achieve similar results. The majority of the residents considered teaching useful, no matter whether the didactical approach consisted in a frontal lecture or digital learning.

The main limitation of our study was the small sample size, which was however appropriate for our primary outcome after sample size calculation. In addition, it is possible that a scenario without deviation or a lecture more focused on possible deviation from normal could modify residents' results facing breech delivery.

Our study implemented a simulation training program for vaginal delivery in our Unit, which allows resident to practice and gain significant technical skills. Residents and young specialist can train themselves through the simulation principle "never on patient first", and this could allow a more serene approach in the delivery room. As largely described in literature skills learning and retention represents the mainstay of modern obstetric school program, particularly for the management of emergencies such as vaginal breech deliveries in which there is a lack of consensus [6].

Comfort with twin vaginal delivery and presumably breech extraction is mandatory to improve knowledge, technical skills and interprofessional communication [23], particularly in Centers that want to reappropriate vaginal breech delivery as clinical intervention for optimizing CS rate [24]. Further research, such as multiple sessions on mannequin, is needed to evaluate retention of skills [25] and improvement in clinical outcomes.

CRediT authorship contribution statement

Giovanna Salvani: Visualization, Validation, Supervision, Investigation, Data curation, Conceptualization. **Barbara Matarrelli:** Writing – original draft, Supervision, Methodology, Formal analysis, Data curation, Conceptualization. **Federico Prefumo:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Investigation, Formal analysis, Conceptualization. **Maurizio Rosati:** Visualization, Validation, Supervision, Resources, Project administration, Investigation, Funding acquisition, Conceptualization. **Claudio Meloni:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization. **Claudio Celentano:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation, Conceptualization.

Table 3
Questionnaire answers (negative-neutral-positive results).

	Group A (n = 16)	Group B (n = 16)	p
Lecture was clear and complete	0-1-15	2-7-7	0.001
Lecture gave new skills for vaginal breech birth	0-3-13	0-1-15	0.599
Scenario quality	0-4-12	0-1-15	0.999
how I approached the scenario	6-6-4	1-5-8	0.281
I think my performance in reality should be better	7-7-2	7-8-1	0.999
De-briefing was adequate	2-4-10	1-11-4	0.046

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Declaration of generative AI in scientific writing

Authors declare that generative AI and AI-assisted technologies were not used in paper processes.

Ethics approval and consent to participate

The study was conducted under the Declaration of Helsinki and was registered in the Current Controlled Trials Register (registration number NCT06127706). Since the participation was voluntary and the study did not involve patients, the need for ethical approval was waived by the Ethics Committee of the Medicine University of Chieti-Pescara.

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