

# Breech assisted vaginal delivery and the role of simulation-based training according to the PROMPT in a low-income setting: a retrospective cohort study

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## Abstract

**Objective:** to assess the effect of a simulation -based training program (PROMPT) on the mode of delivery of breech presentation and to evaluate the neonatal outcomes. **Design:** a retrospective cohort study **Setting:** Rafic Hariri University Hospital (RHUH), a tertiary center in Beirut, Lebanon **Population:** A total of 92 pregnant women delivering a singleton with a breech presentation between June 2018 and December 2019 **Methods:** We used data from the local perinatal registry at the RHUH. Clinical outcomes were analyzed according to whether the obstetrician attended the “Train The Trainer” course of the PROMPT or not. **Main outcome measures:** Clinical measures include: the prevalence of cesarean deliveries in the groups R6 and R7 according to the Robson’s classification and neonatal outcomes (Apgar score at 1 and 5 minutes and admission to the neonatal intensive care unit (NICU) **Results:** The prevalence to deliver a breech presentation by assisted vaginal delivery is increased in group R6 of Robson’s classification and not in group R7 after the simulation and the retention of skills is time-related. No adverse neonatal outcomes were noted in both groups. **Conclusion:** The simulation-based course improved the management of assisted vaginal delivery in breech presentation mainly in group R6 of Robson classification, without increasing neonatal complications and the retention of skills decreases over time. **Keywords:** simulation, breech delivery, Robson classification, PROMPT

## Introduction

In obstetrics, a change in professional practice style and patient characteristics may affect the main obstetrical skills including breech assisted vaginal delivery due to lack of training of obstetricians. This has an impact on Cesarean delivery rate which has increased worldwide reaching a rate as high as 40.5% in Latin America, 25% in Europe, 19.2% in Asia, and 7.3% in Africa with a difference between low- and high-income countries<sup>1</sup>

Moreover, The Term Breech Trial in 2000 showed better neonatal outcomes in terms of morbidity and mortality in planned CD versus planned assisted vaginal delivery in breech presentation without any changes in maternal outcomes. This led to a steady decline in the rate of breech assisted vaginal delivery and to fewer opportunities for training and mastering vaginal breech deliveries for future generations of clinicians<sup>2</sup>.

The mode of delivery is registered through the Robson classification of cesarean sections (the ten-group classification system) endorsed by World Health Organization (WHO) since 2015 as the best tool for cesarean classification. Among the ten groups, group 6 refers to nulliparous women who delivered a singleton fetus with breech presentation, and group 7 refers to multiparous women who delivered a singleton fetus in breech presentation regardless of the previous mode of delivery<sup>3</sup>.

Given these facts, the role of simulation is getting more important to build specific skills in obstetrics and specifically in breech assisted vaginal deliveries as it previously showed benefit in maintaining obstetrical

skills.

Worldwide many simulation programs were attempted and evaluated.

A systematic review in 2018 has shown that simulation-based training has led to better clinical performance and quality of patient care especially in obstetrical emergencies <sup>4</sup>.

Another systematic review in 2019 showed that operative vaginal delivery simulation sessions are associated with improvement in the knowledge, competencies, and skills of healthcare professionals and better patient outcomes <sup>5</sup>.

A simulation training for vaginal breech delivery for resident doctors is associated with better performance and skills and more comfort that last for 10-26 weeks and this improvement declines over time<sup>6,7</sup>.

In the United Kingdom (UK), the Practical Obstetric Multi-Professional Training (PROMPT) is an evidence based multi-professional obstetric emergencies training package adopted as a local obstetric emergency training program in Bristol and showed significant improvements in obstetrical and neonatal outcomes compared in the 4 years before and 4 years after its introduction (neonatal hypoxic brain injuries, reduction in injuries after shoulder dystocia and in emergency cesarean section).

According to Draycott in 2015, training for obstetric emergencies may not be always generalized and effective <sup>8</sup>. It depends on the nature of clinical and non-clinical outcomes measured, the setting where the simulation is conducted (simulation center/ on-site..). Bergh et al. suggested that local training of teams at their unit using their own tools and supplies made them more familiar to their setting and led to the most effective training. This implies the integration of local clinical, medical, environmental and human factors<sup>9</sup>.

In Australia the implementation of the PROMPT for the management of postpartum hemorrhage led to improvements in clinical skills and non-technical skills concerning confidence, leadership, communication and teamwork with no significant impact on all clinical parameters<sup>10,11</sup>.

To our knowledge the maternity department at the Rafic Hariri University Hospital is the only department in the middle east to follow the Train the Trainers” program and to adopt it as a training program for all maternity staff and one of the first maternity to adopt the Robson classification.

Given the plethora of evidence supporting the benefit of simulation in obstetrics and after the implementation of the PROMPT to our maternity staff, the aim of our study is to evaluate its effect on the attitude of the obstetricians to perform assisted vaginal delivery for breech presentation measured by the changes observed in the Robson classification (groups R6 and R7) and on the neonatal outcomes measured by the Apgar score and admission to the neonatal intensive care unit.

## Methods

This is a retrospective cohort study conducted at the Rafic Hariri University Hospital (a tertiary hospital in Beirut) where we divided the obstetricians into two groups: the first group received the PROMPT (Practical Obstetric Multi-Professional Training) and the other group who did not receive this training.

Then we compared the mode of delivery of breech presentation according to whether the obstetrician received the training or not. This comparison is based on the classification of the Robson 10-group classification adopted by the World Health Organization (WHO). The training sessions took place between June 2018 and June 2019 and included simulation sessions according to the PROMPT for the attending physicians then simulation sessions by these PROMPT-certified attending physicians for the residents in our department. The neonatal outcomes including the Apgar score and the admission to the neonatal intensive care unit (NICU) were noted as well.

Our study was approved by the Institutional Review Board (IRB) at our center.

## Results

During the period from June 2018 to December 2019, we had 92 cases of breech deliveries at our department after the exclusion of medical indications for cesarean delivery in case of breech delivery. These include: preeclampsia, placenta previa, placenta abruption, fetal distress and the scheduled cesarean in the absence of labor.

No induction of labor was performed.

In group R6 the prevalence of assisted vaginal delivery (VD) is significantly higher (7/17=41.1%) in the group of simulation and no assisted vaginal delivery (0/20) was attempted in the group of obstetricians who did not attend the simulation (Table 1).

The difference is significant ( $p < 0.05$ ), and the simulation has an effect in the category R6 where the obstetrician who attended the simulation session would try more frequently than the obstetrician who did not attend the simulation session to deliver the patient by assisted vaginal delivery. A senior physician (attending physician or senior resident) was present in these cases.

On the other hand, in group R7 the prevalence of assisted VD is comparable between both groups (6/29=20.7% in the group of simulation and 7/26=27% in the group of obstetricians who did not attend the simulation ( $p > 0.05$ ).

The rate of Cesarean delivery was significantly reduced in the groups R6 and R7 between July and December 2019, immediately after the end of simulation sessions and then it increases between January and June 2020, reaching comparable rates as before the training sessions (Figure 1).

Neonatal outcomes

The admission to the neonatal intensive care unit (NICU)

The reasons for admission to the NICU is mainly due to prematurity in vaginal delivery and cesarean groups.

The prevalence of admission to the NICU in the assisted vaginal delivery group was 20% (4/20) and the reason for admission was mainly prematurity because all the newborn admitted were delivered between 28 weeks and 33 weeks of gestation. All the term babies delivered vaginally did not need admission to the NICU.

The prevalence of admission to the NICU in the cesarean group was 14% (10/72) 3 of these were delivered at full term (39 weeks, 38 weeks and 38 weeks+2d) The reasons for admission to the NICU were intrauterine growth restriction (IUGR) in one case and respiratory distress in the 2 others and the other 7 cases were admitted to the NICU for prematurity. One of these was delivered at 29 weeks+2d, intubated then died.

Apgar score

8 of the 9 cases of term pregnancies who delivered vaginally had an Apgar score of 9/10 at 1 and 5 minutes of birth. The 9th case died at birth because of IUGR and multiple malformations. The evaluation of the Apgar score in the preterm group could be biased by the effect of prematurity.

A low Apgar score associated with admission to the NICU (due to IUGR and fetal distress) was found in term cesarean deliveries in 2 cases out of 57 (3.5%).

## Discussion

Main findings

To our knowledge, this is the first study that compared the rate of assisted vaginal delivery in breech presentation according to Robson's classification before and after the simulation-based training course. In assisted vaginal delivery for breech presentation, the simulation sessions for obstetricians seem to give more confidence to the obstetrician to try assisted vaginal delivery in the category R6, with no significant effect in the category R7. The introduction of a simulation-based course improved the management of vaginal breech deliveries and led to the presence of a more senior physician during the assisted vaginal delivery of

breech presentation (attending physician and senior resident). The effect of simulation is time-related and this is explained by the increase of the rate of cesarean deliveries in the groups R6 and R7 to reach the same rates as before the simulation, so repeated simulation sessions are needed to maintain the same level of performance.

In our study no significant changes were noted in neonatal outcomes in terms of admission to the NICU and the Apgar score in the vaginal delivery and cesarean groups. The main reason for unfavorable neonatal outcomes was prematurity. We could conclude that breech assisted vaginal delivery, after simulation sessions, in some well selected cases could lead to maternal and neonatal favorable outcomes.

### Strength and limitations

The strength of this study is that it evaluated, for the first time, the effect of simulation in the trend to deliver breech presentation vaginally and the changes emerged according to the Robson's classification in a low-income setting in Lebanon. Our results highlight the importance of simulation to decrease the cesarean rate in the group R6 in particular. Due to the small number of patients included in the study (92 patients) done at a public hospital, it is unclear whether we can extend the results of our study to general population and to private hospitals that contributes to a considerable proportion of institutional deliveries.

### Interpretations

Our conclusion that a simulation-based training led to better outcomes and more confidence in the management of breech assisted vaginal delivery aligns with previous findings by Hardy et al.<sup>12</sup>.

The retention of skills is time related. Stone et al. showed a decrease in retained skills in breech deliveries 10-26 weeks after the training, but the level of comfort was not affected by the time<sup>6</sup>.

Predictive criteria for a higher risk unsuccessful breech vaginal delivery include according to the Royal College to Obstetricians and Gynaecologists in 2017: hyperextended neck on ultrasound, high estimated fetal weight (>3,8kg), low estimated fetal weight (<10<sup>th</sup> percentile), footling presentation and antenatal fetal compromise. The presence of skilled experienced obstetrician leads to a safe breech vaginal delivery<sup>13</sup>.

This is where the role of simulation could be beneficial.

According to the new guidelines of the Collège National des Gynécologues et Obstétriciens Français (CNGOF) in 2020 the risk of neonatal complications is low in vaginal delivery or elective cesarean in term breech pregnancies<sup>14</sup>.

The implementation of an evidence -based training programme (PROMPT) in obstetric emergencies adapted to the local settings with collaborative collective efforts is generative of safety and high performance in local maternities leading to better maternal and neonatal outcomes.

Obstetric simulation is a cornerstone in cases of high-acuity, low-frequency obstetric events.

### Conclusion:

The prevalence of breech assisted vaginal delivery increased after implementation of a simulation-based training especially in the group R6 of the Robson classification, without increasing neonatal adverse effects.

### Contribution to authorship

Inaam Hatoum and Amina Krounbi collected and analysed the data

Inaam Hatoum, Charlotte El Hajjar and Janoub Khazaal wrote the manuscript.

George Yared revised the manuscript before the submission.

### Disclosure of interests

The authors disclose no conflict of interest.

## Ethics approval

Our study was approved by the Institutional Review Board (IRB) at Rafic Hariri University Hospital.

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## Figure and table legends

Table 1: Prevalence of vaginal delivery in breech presentation according to Robson' classification and the status of simulation

Figure 1: Prevalence of cesarean delivery in R6 and R7 between 2016 and June 2020

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Table 1: Prevalence of vaginal delivery in breech presentation according to Robson' classification and the status of simulation

Doctors who attend the simulation	Doctors who attend the simulation	Doctors who attend the simulation
Robson 6	Robson 6	Robson 6
Cesarean	Vaginal delivery	Cesarean
10	7	23
Prevalence of assisted vaginal delivery in each group (%)	Prevalence of assisted vaginal delivery in each group (%)	Prevalence of assisted vaginal delivery in each group (%)
7/17=41.1%	7/17=41.1%	6/29=20.7%

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Figure 1 breech.docx available at <https://authorea.com/users/727952/articles/709415-breech-assisted-vaginal-delivery-and-the-role-of-simulation-based-training-according-to-the-prompt-in-a-low-income-setting-a-retrospective-cohort-study>