



Vaginal delivery simulation in the Obstetrics and Gynaecology clerkship

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SUMMARY

Background: Although simulation is now used in other areas of obstetrics and gynaecology, its utility in the training of an uncomplicated vaginal delivery is surprisingly under-explored. Here we describe our experience integrating simulation into the third-year Obstetrics and Gynaecology (OB/GYN) clerkship.

Methods: In 2013/14, at the start of each 4-week OB/GYN clerkship, each third-year student participated in a 90-minute vaginal delivery simulation session using the Noelle® simulator. Upon completion of the clerkship, they were surveyed

using a five-point Likert scale questionnaire (1, inferior; 5, superior) to assess self-perceived training adequacy, clinical preparedness and number of deliveries performed during the clerkship. Students who completed the clerkship in 2012/13, before the introduction of the simulation, were also surveyed to serve as a comparison group. Survey scores and number of deliveries performed were compared between the two cohorts of students.

Results: The 2013/14 cohort ($n = 98$) who received simulation training gave their training in vaginal deliveries an average

rating of 4.1, versus 2.7 for the 2012/13 cohort that did not receive the simulation ($n = 80$; $p < 0.001$). Self-perceived preparedness to perform a vaginal delivery was 4.0 in the 2013/14 cohort, versus 3.0 in the 2012/13 cohort ($p < 0.001$). There was no difference in the number of deliveries performed between the cohorts.

Discussion: Students that received simulation rated their training adequacy and readiness to perform a vaginal delivery higher than students that did not receive training. Simulation did not increase participation in real-life deliveries.

The utility of simulation in the training of an uncomplicated vaginal delivery is under-explored

Training opportunities are decreasing, such that many medical students graduate having performed few if any vaginal deliveries

INTRODUCTION

Along with a Pap smear, breast examination, and labour cervical examination, the vaginal delivery is a procedure that defines a medical student's Obstetrics and Gynaecology (OB/GYN) clerkship. These procedures are important because they are central to the practice of OB/GYN, and students are likely to have few exposures to these skills outside of their OB/GYN clerkship. Unfortunately, training opportunities are decreasing, such that many medical students graduate having performed few if any vaginal deliveries. We predicted that simulation would compensate for this by allowing students to practise vaginal delivery skills in a safe learning environment. This should better prepare them for their first real-life opportunity, diminish their anxiety with the procedure, and potentially increase a woman's willingness to have such a trainee participate in the birth of her child.

Simulation has been used in several medical disciplines, including OB/GYN,¹⁻⁴ and has been successfully employed with medical and nursing students.^{5,6} Surprisingly, there is very little information about the use of simulation in vaginal delivery training, and how best to integrate it into the medical curriculum. Studies involving small numbers of medical students have shown that trainee self-assessed confidence and participation in real-life deliveries was increased with the use of simulation.^{7,8}

As both of the studies cited above involved a limited number of students (each had 33 participants), and one involved volunteers only, we sought to determine whether the benefits in confidence and attitude and increased participation in real-life deliveries seen in these studies persist when vaginal

delivery simulation is used in all third-year medical students. Student self-assessed confidence in performing vaginal deliveries, attitudes towards training quality and number of real-life deliveries performed were compared before and after the introduction of simulation into the OB/GYN clerkship curriculum. Here we report the results of our study, a portion of which were published as an abstract at the 2014 meeting of the American College of Obstetricians and Gynecologists.⁹

METHODS

Institutional review board (IRB) approval was obtained prior to conducting the study (IRB no. 00024364). During the 2012/13 and 2013/14 academic years the OB/GYN clerkship consisted of 4 weeks of traditional clinical training, including between eight and 10 12-hour shifts on the labour and delivery ward, where students participated in patient triage, intrapartum care, caesarean sections, and vaginal deliveries. In 2013/14 during orientation to the clerkship, each medical student participated in a 90-minute vaginal delivery simulation session under the instruction of an OB/GYN attending physician and a labour

and delivery nurse. Other than the addition of the simulations to orientation there were no substantive changes to the clerkship curriculum between the two academic years, and the vaginal delivery simulation was added onto the orientation and did not replace other didactic content. The training included a 15-minute didactic session outlining the cardinal movements of labour and the proper birth-attendant techniques for uncomplicated deliveries. Students performed vaginal deliveries using the Noelle® birth simulator (Gaumard, Miami, FL, USA) during the remainder of the session. Each participant completed a post-clerkship Likert-scale survey assessing self-perceived preparedness, attitudes towards their training and the number of real-life deliveries performed (in increments of five). To provide a comparison group that did not receive the vaginal delivery simulation, the students that completed the OB/GYN clerkship in 2012/13 (the year prior to the introduction of the simulation) were e-mailed and asked to complete an identical survey. A copy of the survey is included in Table 1. Responses on the survey were compared between the 2012/13 and the 2013/14 cohorts using a Mann-Whitney *U*-test. The number of deliveries performed



The training included a 15-minute didactic session outlining the cardinal movements of labour

Table 1. Survey results

Survey Item

1. I understand the basics of the mechanisms of labour and delivery.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean $\pm$ SEM	Median $\pm$ IQR
2013/14	1%	0%	2%	54%	43%	4.4 $\pm$ 0.06	4.0 $\pm$ 1.0
2012/13	4%	0%	15%	64%	13%	3.8 $\pm$ 0.1	4.0 $\pm$ 0*

2. I feel comfortable performing a vaginal delivery in a real-life setting.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean $\pm$ SEM	Median $\pm$ IQR
2013/14	1%	1%	11%	72%	14%	4.0 $\pm$ 0.06	4.0 $\pm$ 0
2012/13	13%	20%	25%	39%	4%	3.0 $\pm$ 0.13	3.0 $\pm$ 2.0*

3. I felt prepared for my time spent on labour and delivery?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean $\pm$ SEM	Median $\pm$ IQR
2013/14	1%	10%	20%	59%	9%	3.7 $\pm$ 0.08	4.0 $\pm$ 1.0
2012/13	14%	34%	31%	18%	4%	2.6 $\pm$ 0.12	3.0 $\pm$ 1.0*

4. The training for vaginal deliveries in the OB/GYN clerkship is adequate.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean $\pm$ SEM	Median $\pm$ IQR
2013/14	3%	2%	9%	56%	30%	4.1 $\pm$ 0.09	4.0 $\pm$ 1.0
2012/13	14%	28%	34%	23%	3%	2.7 $\pm$ 0.12	3.0 $\pm$ 1.25*

5. How many vaginal deliveries did you perform during the OB/GYN clerkship? No. of students (%)

	1–5 deliveries	6–10 deliveries
2013/14	90 (92%)	8 (8%)
2012/13	76 (95%)	4 (5%)

SEM, standard error of the mean; IQR, interquartile range.

*p < 0.0001, Mann–Whitney U-test.

was compared using a Fisher's exact test. A planned sensitivity analysis was also performed to adjust for an incomplete response from the 2012/13 cohort to the e-mail survey. As the overall mean score on all survey items was four out of five for the 2013/14 cohort, the statistical comparisons described above were repeated assuming a score of four out of five on all survey questions for all the non-respondents in the 2012/13 cohort.

RESULTS

Ninety-eight (out of 125) students in the 2013/14 cohort

participated in the vaginal delivery simulation training, and 80 (out of a total of 114) students in the 2012/13 cohort responded to the e-mail survey. There were 63 males and 62 females in the 2013/14 cohort and 61 males and 53 females in the 2012/13 cohort (χ^2 p = 0.54). No student in either group had prior vaginal delivery experience. The results of the surveys are provided in Table 1. The 2013/14 cohort responded significantly more favourably to all of the items in the survey than did the 2012/13 cohort; however, the reported number of deliveries was not significantly different between the

groups. In the sensitivity analysis, the responses of the 2013/14 cohort remained significantly higher than the 2012/13 cohort for all survey questions (data not shown).

DISCUSSION

The impact on student self-assessed preparedness and attitudes toward the clerkship training described here is in keeping with smaller studies investigating vaginal delivery simulation in medical students.^{7,8} In addition, Dayal *et al.*⁷ also found an increased level of participation in the simulation-trained group;

Fewer than 10 per cent of students in the study performed more than five deliveries

however, in the present study the 2013/14 cohort that received simulation training did not participate in more deliveries than the 2012/13 cohort. This may be because of the different population of students in each study. The study performed by Dayal *et al.*⁷ enrolled student volunteers who were then randomised to receive simulation-enhanced or traditional training. The present study provided vaginal delivery simulation training to the entire 2013/14 cohort and used a large portion of the 2012/13 cohort as a comparison group. It is conceivable that the volunteers in Dayal's study were more eager and motivated than the overall medical student population assessed in the present study. Although both studies suggest that simulation training may have an impact on the students' confidence and attitudes toward the effectiveness of their training, our study suggests it may not have significant impact on the clinical participation of the average student.

Although the present study explored an area of medical education in need of further investigation in a very large population of trainees, it is not without its weaknesses. The retrospective survey of the 2012/13 cohort is susceptible to respondent bias and recall bias given the long time between their clerkship and the survey. As we had a response rate of 70 per cent (80 out of a total of 114), and the response rate of the 2013/14 cohort remained significantly higher in the sensitivity analysis, the impact of respondent bias is likely to be minimal. The potential for recall bias remains, however, as the 2012/13 cohort was not surveyed at the time of their OB/GYN clerkship.

In addition, the present study investigated student self-perceived assessments, which does not always reflect clinical skill. We did not assess student

clinical performance of a vaginal delivery, which of course is the ultimate goal of the simulation exercise. In the perfectly designed assessment of vaginal delivery simulation training, each student would perform a real-life vaginal delivery while being assessed by an experienced clinician; however, such an experiment is logistically impractical and raises ethical issues.

Finally, there is also the possibility that the two cohorts differed substantially in several important variables that could confound the results. Although we have taken some of these into account, such as gender or prior vaginal delivery experience, which we determined were not different between cohorts, there are still potential differences in other confounding variables that cannot be adjusted for. As there is no reason to suspect that these variables would be differentially distributed between the cohorts, the risk of bias is low; however, these confounding variables prevent us from making firm conclusions regarding the impact of vaginal delivery simulation without further prospective study that investigates both subjective student confidence and objective clinical skill.

Even acknowledging these weaknesses, the results of our study are still meaningful as they add to and clarify the very limited literature regarding the use of vaginal delivery simulation. Although the use of vaginal delivery simulation in medical student training has been investigated previously, the present study assessed much larger numbers of medical students and investigated the use of simulation when integrated into a clerkship curriculum, making the findings more applicable to the average medical student population. Although our experience with the integration of vaginal delivery simulation into the third-year clerkship

suggested that there were differences in student confidence and attitudes towards training adequacy between the student cohorts, it did not suggest that there was a difference in the level of student participation in real-life deliveries. In fact fewer than 10 per cent of students in the study performed more than five deliveries, despite the 3500–4000 vaginal deliveries performed each year by our teaching service. The low number of deliveries performed highlights the need to develop alternative training methods, and our findings suggest that our approach to vaginal delivery training might allow students to gain confidence in their ability to perform this important obstetrical skill amidst the continuing decline in clinical training opportunities.

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The low number of deliveries performed highlights the need to develop alternative training methods

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