

The Changing Scenario of Obstetrics and Gynecology Residency Training

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ABSTRACT

Background Significant changes have been noted in aspects of obstetrics-gynecology (ob-gyn) training over the last decade, which is reflected in Accreditation Council for Graduate Medical Education (ACGME) operative case logs for graduating ob-gyn residents.

Objective We sought to understand the changing trends of ob-gyn residents' experience in obstetric procedures over the past 11 years.

Methods We analyzed national ACGME procedure logs for all obstetric procedures recorded by 12 728 ob-gyn residents who graduated between academic years 2002–2003 and 2012–2013.

Results The average number of cesarean sections per resident increased from 191.8 in 2002–2003 to 233.4 in 2012–2013 (17%; $P < .001$; 95% CI –47.769 to –35.431), the number of vaginal deliveries declined from 320.8 to 261 (18.6%; $P < .001$; 95% CI 38.842–56.35), the number of forceps deliveries declined from 23.8 to 8.4 (64.7%; $P < .001$; 95% CI 14.061–16.739), and the number of vacuum deliveries declined from 23.8 to 17.6 (26%; $P < .001$; 95% CI 5.043–7.357). Between 2002–2003 and 2007–2008, amniocentesis decreased from 18.5 to 11 ($P < .001$, 95% CI 6.298–8.702), and multifetal vaginal deliveries increased from 10.8 to 14 ($P < .001$, 95% CI –3.895 to –2.505). Both were not included in ACGME reporting after 2008.

Conclusions Ob-gyn residents' training experience changed substantially over the past decade. ACGME obstetric logs demonstrated decreases in volume of vaginal, forceps, and vacuum deliveries, and increases in cesarean and multifetal deliveries. Change in experience may require use of innovative strategies to help improve residents' basic obstetric skills.

Introduction

Obstetrics and gynecology (ob-gyn) residency training has evolved over the past decade. These changes are expected as the field of ob-gyn has expanded, and many newer technologies have come into play. Some of the common obstetric procedures from prior decades have almost become extinct. These changes have been noticed globally and could be attributed to various factors, including changes in patient populations, increased malpractice liabilities for obstetricians, the risky nature of certain procedures, and new evidence-based practices.

US ob-gyn residents are required to record their obstetric experience into an operative database managed by the Accreditation Council for Graduate Medical Education (ACGME). Procedures are logged using Current Procedure Terminology codes, and are used to evaluate residents' operative experience. The ACGME has imposed minimum thresholds to be achieved by residents in order to graduate.¹ Our study sought to evaluate the obstetric experience of

graduating ob-gyn residents over the last 11 years by analyzing the trends of several operative procedures recorded in the ACGME database. Changing trends in procedural distribution and volume have been investigated in other residencies, such as urology; general surgery, including general surgery residents' experience in operative trauma; pediatric surgery; and open abdominal procedures.^{2–6} We are not aware of any studies that have investigated the longitudinal changes in obstetric procedures performed by ob-gyn residents.

Several factors may affect the procedural volume of residents. The ACGME duty hour limits have been hypothesized to have negatively affected residents' experience across specialties. However, studies of their effect on operative volume have produced varied results.^{7–9} Many academic institutions employ a collaborative practice with certified nurse midwives in resident education and supervision of low-risk deliveries.^{10,11} How the presence of certified nurse midwives and nonobstetric physicians has influenced ob-gyn residents' experience with vaginal deliveries has not been studied.

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We hypothesized that there would be declining experiences in vaginal deliveries, breech deliveries, and operative deliveries, and increases in cesarean sections and multifetal deliveries.

Methods

We performed a retrospective analysis of ACGME operative logs submitted by the graduating ob-gyn residents from academic years 2002–2003 to 2012–2013, using data obtained from the ACGME Department of Applications and Data Analysis.

The data included the averages and standard deviations (SDs) for different categories of procedures, the number of graduating residents, and the median, modal, minimum, and maximum values for each obstetric procedure. ACGME data did not include information about individual residents or residency programs. We compared the mean number and SD of each procedure performed per graduating resident for academic year 2002–2003 with the last academic year that procedure was recorded by the ACGME. We also calculated the percentage increase or decrease between 2002–2003 and the latest academic year or the most recent year the procedure was recorded. An unpaired *t* test was used to calculate 2-tailed *P* values (set at $< .001$) and 95% CI. The

What was known and gap

Significant changes have occurred in obstetric training, raising questions about graduating resident proficiency.

What is new

Case log data show a sizable decline in vaginal deliveries, forceps deliveries, and vacuum deliveries, and an increase in cesarean sections and multifetal vaginal deliveries over the past decade.

Limitations

Making assessments about resident proficiency based solely on a review of case volumes.

Bottom line

The decline in procedural experience may necessitate innovative strategies to help improve residents' skills.

mean number of procedures per resident was plotted on a 2D chart to depict the trends in procedural volume over the past 11 years (FIGURE 1).

As a secondary objective of our study, we investigated the effect of duty hour restrictions on the residents' obstetric experience. We compared the mean numbers and SD of the obstetric procedures performed by the last class of chief residents graduating before the duty hour limits (2002–2003) and the class graduating 4 years after the duty hour standards had been implemented (2006–2007).

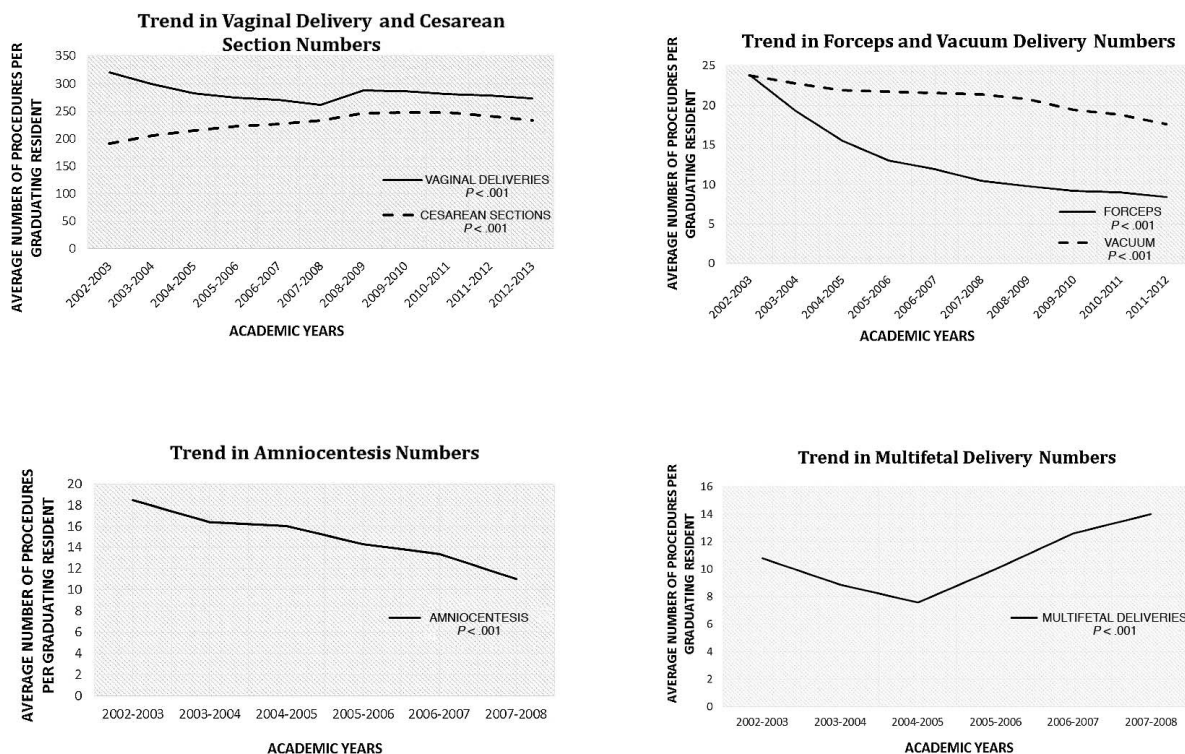


FIGURE 1

Trends of Basic Obstetric Procedure Numbers Reported by Graduating Chief Residents

TABLE

Number of Obstetric Procedures Performed Per Graduating Resident: Past and Present

Procedure	2002–2003 Mean Procedures (SD)	2012–2013 Mean Procedures (SD)	P Value	95% CI
Vaginal deliveries	320.8 (138.7)	273.2 (68)	< .001	38.842 to 56.35
Cesarean sections	191.8 (80.1)	233.4 (72)	< .001	–47.769 to –35.431
		2011–2012 Mean Procedures (SD)		
Forceps deliveries	23.8 (21.9)	8.4 (9)	< .001	14.061 to 16.739
Vacuum deliveries (not recorded since 2011–2012)	23.8 (17.1)	17.6 (11)	< .001	5.043 to 7.357
		2007–2008 Mean Procedures (SD)		
Amniocentesis	18.5 (17)	11 (12)	< .001	6.298 to 8.702
Multifetal vaginal deliveries (not recorded since 2007–2008)	10.8 (7.9)	14 (9)	< .001	–3.895 to –2.505

The study was approved by the Mount Sinai Hospital Institutional Review Board.

Results

Obstetric procedures reported to the ACGME include vaginal deliveries, cesarean sections, operative vaginal deliveries (forceps and vacuum), multifetal vaginal deliveries, and amniocentesis. A total of 12 728 ob-gyn residents graduated between the academic years 2002–2003 and 2012–2013. The number of ob-gyn residents graduating each year increased from 1127 in 2002–2003 to 1221 in 2012–2013, an increase of 7.6%. During the same period, the number of training programs decreased from 248 to 241.

The TABLE shows the number of procedures performed per resident nationally for 2002–2003 compared to the latest academic year that category was reported to the ACGME. A significant decrease was noted for vaginal deliveries (18.6%, $P < .001$) and operative vaginal deliveries (64.7% decline in forceps deliveries, $P < .001$; and 26% in vacuum deliveries, $P < .001$). Cesarean sections per resident increased by 16.7% ($P < .001$; FIGURE 1). Amniocentesis and multifetal vaginal deliveries were recorded until academic year 2007–2008 and showed a significant decrease in amniocentesis numbers, while multifetal vaginal deliveries increased. The ACGME's defined category of multifetal vaginal deliveries does not specify the presentation of fetuses, making it difficult to deduce if residents are gaining experience in the delivery of nonvertex presentations.

Vaginal breech deliveries, low birth weight deliveries, and surgeries on antenatal patients were noted as separate procedures by the ACGME only for 2002–

2003. Data for external cephalic versions are not included under the ACGME list of defined categories. The average number of vaginal breech deliveries performed per resident for the year 2002–2003 was 6 (SD = 5.4), low birth weight deliveries was 49.6 (SD = 38.2), and surgeries on antenatal patients averaged 11.8 (SD = 11.7).

FIGURE 2 shows the changes in obstetric procedure numbers after duty hour limits were imposed. A statistically significant decline in the average number of normal vaginal deliveries (by 15.7%), forceps deliveries (by 50%), and amniocentesis (by 27.6%) was noted. Cesarean sections increased by 18.2% ($P < .001$) and multifetal vaginal deliveries by 16.7% ($P < .001$). Vacuum deliveries, which decreased by 9.7% ($P = .004$), were the only obstetric procedures that did not exhibit a statistically significant decline (cutoff of $P < .001$) in the class graduating after the duty hour reform.

Discussion

Over the last decade, the mean number of obstetric procedures logged by graduating ob-gyn residents has changed for all the defined categories of obstetric procedures. We found a statistically significant decline in average numbers for normal vaginal deliveries, forceps deliveries, vacuum deliveries, and amniocentesis, and an increase in multifetal vaginal deliveries and cesarean sections.

There has been a nationwide decline in the number of vaginal deliveries and an increase in the number of cesarean deliveries.^{12–14} Rates for multiple gestation pregnancies have also increased nationwide, with this largely attributed to the growing use of infertility

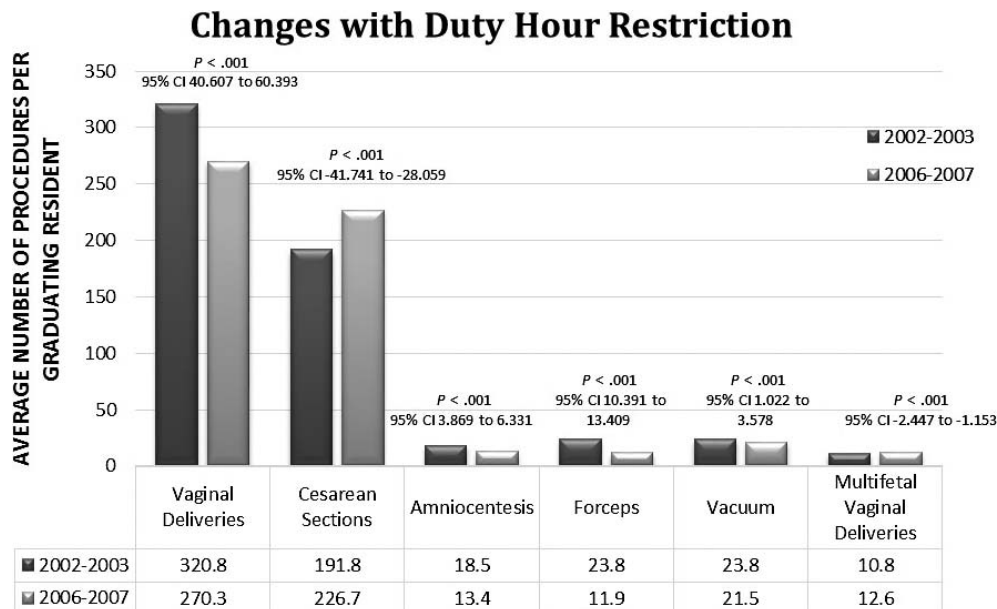


FIGURE 2
Effects of Duty Hour Restrictions on Obstetric Case Volume of Residents

treatments.¹⁵ These trends parallel the changes in procedural volume of graduating residents in our study. The art of forceps deliveries has become a disappearing skill in teaching institutions. Although both forceps and vacuum deliveries have declined in numbers, vacuum deliveries have gained favor in comparison to forceps deliveries, and the majority of recently trained practicing physicians feel more confident using vacuum extractions than using forceps.^{16–19} This is attributable to the safety and comfort of using the vacuum as compared to forceps. However, despite the ease of its use, training in the correct technique of vacuum application is absolutely necessary to prevent complications.¹⁸ Also, teaching the technique of forceps application needs to be reinstated in residency programs, as obstetricians are faced with situations in clinical practice where gentle and judicious application of low forceps may be preferable over a cesarean section.^{20,21}

The numbers of invasive perinatal procedures (amniocentesis, chorionic villus sampling) and vaginal breech deliveries also declined significantly. The safety of vaginal breech deliveries has been questioned due to increase in rates of fetal injuries and neonatal mortality, which has led to a decline in national rates for vaginal breech deliveries.²² In 2000, the Term Breech Trial resulted in the recommendation to perform elective cesarean sections for breech presentations.²³

Similar to our study, declining resident experience has been noted in other procedural areas of medicine, including general surgery, urology, neurological sur-

gery, and ophthalmology.^{2,4–6,21,24,25} Canadian and European literature also reports deteriorating volume in obstetric procedures, gynecological surgeries, and other surgical subspecialties.^{3,26–28} A study from New Zealand²⁹ reported inadequate exposure of registrars in vaginal breech deliveries to ensure proficiency in performing the necessary maneuvers. A US survey identified only 11% of final-year trainees planned to offer vaginal breech deliveries to their patients, although 53% reported feeling confident in performing the breech delivery.³⁰

In July 2003, the ACGME instituted an 80-hour weekly limit. Several studies have described the effect of duty hour restrictions on the operative experience of ob-gyn residents, with 1 reporting a negative impact of the duty hour restrictions.³¹ However, several studies in surgical specialties did not find a negative effect of duty hour restrictions on residents' operative experience. Our findings suggest that the changes seen after the duty hour reform were in keeping with a decline in certain procedures (normal vaginal deliveries, forceps, and amniocentesis) and an increase in others (cesarean sections and multifetal vaginal deliveries). This trend continued progressively over the 10-year period since the reform and is unlikely to have been caused by the duty hour limits.

Our study has several limitations. A major limitation is that it is difficult to assess residents' level of proficiency in performing a procedure based solely on the number of procedures recorded. Another limitation is that a retrospective review of cases logged by the residents only measures the volume of cases

reported by them. The data suggest a “ceiling effect” with reporting tapering off once residents reach the expected minimum number of cases, making it difficult to assess the effect of duty hour data on procedural volume. Further studies are needed to explore the confidence and proficiency level of graduating residents.

In July 2012, the ACGME released a document to ob-gyn program directors that proposed minimum thresholds for basic obstetric procedures, with 200 normal vaginal deliveries, 145 cesarean sections, and 15 operative deliveries (both forceps and vacuum), standing at the 10th percentile benchmark.¹ The majority of ob-gyn residents are able to meet these minimum requirements in the various defined categories. However, questionnaires sent out to graduating residents show that they may be hesitant to offer some of the basic procedures to their patients due to lack of confidence.³⁰ The ACGME document urges program directors to use minimum thresholds for the purpose of evaluating their residents’ experience, but simultaneously encourages them to improve numbers well beyond the minimum thresholds.¹

Our findings of declining numbers of some procedures suggest a need for strategies to improve the basic obstetric skills of residents. Some studies have investigated novel approaches to improve residents’ confidence in performing rare procedures. Appointment of proactive, full-time, and experienced attending physicians to train their residents in forceps deliveries led to a 59% increase in forceps deliveries, without any adverse fetal outcomes.³² Also, video and simulator training sessions can be used, where each trainee repeatedly practices the weak area of a procedure at his or her own pace.³³ A simulation-based curriculum has also been studied in improving the performance of amniocentesis by obstetric trainees.³⁴ Other proposed measures include 3-D computer models and cadaveric laboratories. Such tools can prove valuable to mature technical skills of residents and in achieving adequate proficiency and comfort level.

Conclusion

Over the past 11 years, the obstetric experience of graduating ob-gyn residents has progressively declined for vaginal deliveries, operative vaginal deliveries, and invasive perinatal procedures, while the number of cesarean sections and multifetal vaginal deliveries has increased. This decline in case volumes may require the use of innovative strategies to help improve residents’ basic obstetric skills.

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