Influence of Resident Involvement in Obstetrics and Gynaecology Surgery on Surgical Outcomes: Systematic Review and Meta-Analysis


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Abstract

Objective: The effect of resident involvement during obstetrics and gynaecology (OB/GYN) surgery on surgical outcomes is unclear. This study sought to review the evidence systematically for the influence of resident participation in OB/GYN surgery on (1) operative time, (2) estimated blood loss, and (3) perioperative complications.

Method: Published studies were identified via searches of PubMed, Embase, Cochrane Central Register, Web of Science, and ClinicalTrials.gov databases. The study included randomized or observational studies that compared outcomes for OB/GYN surgery performed by attending surgeons alone or with residents. Risk ratios or mean differences were extracted from the studies. A random effect model was performed for each outcome, with subgroup analysis by type of surgery and study quality.

Results: A total of 13 studies were included in the meta-analysis, comprising 40 968 patients in seven countries. Surgical procedures performed only by attending surgeons had shorter operative times (mean difference 18.20 minutes; 95% CI 13.58–22.82), whereas surgical procedures with resident involvement were associated with an increased risk of blood transfusion (risk ratio 1.23; 95% CI 1.08–1.41). There were no observable differences in risk of estimated blood loss, wound infection, urologic injury, viscus injury, or return to the operating room. Significant heterogeneity (I^2 >50%) was present in one of seven outcomes.

Conclusion: Resident participation in OB/GYN surgery is associated with longer operative times and increased risk of blood transfusion; however, other perioperative complications are not increased.

Key Words: Obstetrics, gynaecology, resident, complications, patient safety

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Résumé

Objectif : L'incidence sur les issues chirurgicales de la participation des résidents aux chirurgies gynéco-obstétricales est méconnue. Notre étude avait pour but d'analyser systématiquement les données relatives à l'effet de la participation des résidents sur : (1) le temps opératoire; (2) la perte sanguine estimée; et (3) les complications périopératoires.

Méthodologie : Nous avons effectué des recherches dans les bases de données PubMed, Embase, Cochrane Central Register, Web of Science et ClinicalTrials.gov afin de repérer des études randomisées ou observationnelles comparant les issues de chirurgies gynéco-obstétricales réalisées uniquement par des chirurgiens à celle de chirurgies du même type auxquelles participaient des résidents. Les risques relatifs (RR) et les différences moyennes ont été extraits des études retenues. Un modèle à effets aléatoires a été utilisé pour chacune des issues, et des analyses par sous-groupes ont été réalisées par type de chirurgie et par cote de qualité de l'étude.

Résultats : Au total, 13 études ont été-retenues pour la méta-analyse; elles portaient sur 40 968 patientes recrutées dans sept pays. Les chirurgies réalisées uniquement par des chirurgiens avaient un temps opératoire moindre (différence moyenne : 18,20 minutes; IC à 95 % : 13,58–22,82), et les chirurgies auxquelles participaient des résidents étaient associées à un risque accru de transfusion sanguine (RR : 1,23; IC à 95 % : 1,08–1,41). Aucune différence n'a été observée quant au risque de perte sanguine estimée, d'infection de la plaie, de lésion urologique, de lésion viscérale ou de retour sur la table d'opération. Une des sept issues à l'étude présentait toutefois une hétérogénéité significative (I^2 > 50 %).

Conclusion : La participation des résidents aux chirurgies gynéco-obstétricales est associée à un temps opératoire prolongé et à un

risque accru de transfusion sanguine, mais pas à un risque accru d'autres complications périopératoires.

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INTRODUCTION

The training of future obstetricians and gynaecologists requires residents to perform surgeries independently and competently before entering licensed medical practice. Surgical expertise is essential in this specialty because these physicians perform some of the most common surgical procedures, including CSs and hysterectomies.[1] Residency training programs involve trainees performing or assisting in such surgeries because these residents gain the technical skills to become independent, proficient surgeons. Although there is great value in the observation of procedures performed by experienced surgeons, trainees must hone these necessary surgical skills through hands-on involvement as the primary operator or first assistant. However, from a patient care perspective, it is important to establish whether resident involvement in surgery has a negative impact on the quality and safety of surgical care. Specifically, the presence of significantly increased complication rates associated with resident surgical involvement would necessitate redesigning surgical education programs, such as through increased use of surgical simulation among junior learners. Furthermore, an increased risk of complications with resident-performed surgeries may necessitate its discussion in the informed consent procedure.

Several studies combining different surgical specialties have examined this question, with conflicting results,[2–4] Recently, a meta-analysis performed by D'Souza et al.[5] examined whether surgical outcomes differed depending on whether the surgery was performed by the resident or the attending surgeon, across all surgical specialties. These investigators found that surgeries performed by residents took longer to complete and resulted in an increase in minor complications.[5] Although D'Souza et al.[5] conducted a subgroup analysis looking at obstetrics and gynaecology surgeries, several important studies within this surgical specialty were published after this review. As such, it would be of value to review the evidence systematically and meta-analyze a summary effect measure, specifically in the field of OB/GYN.

The objective of this systematic review and meta-analysis was to examine the impact of residents' participation in OB/GYN surgery on the following outcomes: (1) operative time, (2) estimated blood loss, and (3) intraoperative or postoperative complications, compared with surgery performed by attending staff only.

ABBREVIATIONS

NOS	Newcastle-Ottawa risk of bias scale
OB/GYN	obstetrics and gynaecology
RR	relative risk

METHODS

Protocol and Registration

The study was developed in compliance with the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guideline.[6] This meta-analysis was registered with the PROSPERO International Prospective Register of Systematic Reviews (ref. CRD42016050428 at http://www.crd.york.ac.uk/PROSPERO) on October 31, 2016.

Sources

The search strategy was developed by the authors, with input from a research librarian. PubMed, Embase, the Cochrane Central Register of Controlled Clinical Trials, Web of Science, and ClinicalTrials.gov databases were searched from date of the database inception to October 10, 2016. In addition, abstracts from the following conferences were hand searched for the preceding 5 years: Association of Academic Professionals in Obstetrics and Gynaecology (APOG), Council on Resident Education in Obstetrics and Gynecology/Association of Professors in Gynecology and Obstetrics (CREOG/APGO), International Conference on Resident Education (ICRE), and International Association for Medical Education (AMEE). These abstracts were selected on the basis of recommendations from content experts. The search strategy included key words and MeSH (medical subject headings) terms including residency, training, obstetrics, gynaecology, surgery, CS, hysterectomy, long-term adverse effects, complications (intraoperative and postoperative), and adverse events. For details of the search performed, see Online Appendix S1. Endnote was used as the reference manager software to export and organize all the abstracts found through our search strategy and subsequently remove duplicate publications.

Study Selection

We included studies that reported on the associations between resident participation in surgery and surgical outcomes, including length of surgery, estimated blood loss, and