Author's response to reviews

Title: Trends in postpartum hemorrhage from 2000 to 2009: A population-based study

Authors:

Azar Mehrabadi (azar@interchange.ubc.ca)
Jennifer A Hutcheon (jhutcheon@cfri.ca)
Lily Lee (LLee-02@phsa.ca)
Liston Robert (rliston@cw.bc.ca)
K.S. Joseph (ksjoseph@cfri.ca)

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Author's response to reviews: see over
Dear BMC Pregnancy and Childbirth Editorial Team,

Thank you for reviewing our manuscript. We have made the recommended formatting changes and addressed the reviewer’s comments below. Please note that it came to our attention that Lutomski et al published a study in the BJOG (2011) that reported an increase in atonic postpartum hemorrhage between 1999 and 2009 in Ireland. We added it as citation #9 of our manuscript and added in the introduction that Ireland also reported increasing rates of postpartum hemorrhage.

REVIEWER’S COMMENTS AND RESPONSES:

Major compulsory revisions
1. It is very difficult to judge the validity of the results without further details about the registry e.g. its purpose, who codes the data, and particularly whether any other studies have been undertaken giving evidence of case validation – whether for this condition or others.

In response to this comment, we have added the following details about the registry in the methods section (highlighted below and included in the revised manuscript):

Data were obtained from the British Columbia Perinatal Data Registry, a population-based registry whose purpose is to collect and disseminate perinatal data for research, surveillance and planning. The database contains information on approximately 99% of births in the province, including detailed clinical and diagnostic information. Standardized forms were filled-out by care providers (physicians, midwives, obstetricians, and nurses) during pregnancy, labour and delivery and postpartum, and then compiled and coded by trained data abstractors. Accuracy and validity of data is ensured through ongoing quality checks by staff, automated data rules and ongoing use in research and surveillance.

We include in our limitations section the clause that “problems with the clinical diagnosis of postpartum hemorrhage since estimation of blood loss during childbirth is difficult to standardize” to highlight that there are general limitations to measuring postpartum hemorrhage, which we attempted to partially overcome by using several markers of severity.
2. Details of the change in the definition of PPH in 2006 should be included in the methods section so that the reader can interpret the results with this prior knowledge.

As recommended by the reviewer, we have moved the definition change of PPH to the methods section (highlighted below):

Subtypes of postpartum hemorrhage identified with ICD-9 or ICD-10 diagnostic codes included: 1) postpartum hemorrhage due to retained placenta (third stage hemorrhage), 2) postpartum hemorrhage due to uterine atony (occurring within 24 hours following delivery of the placenta), 3) delayed and secondary postpartum hemorrhage (occurring after the first 24 hours following delivery) and 4) postpartum hemorrhage due to coagulation defects. Code details for postpartum hemorrhage did not change between ICD-9 and ICD-10. In 2006, the definition of postpartum hemorrhage in the Canadian Institute for Health Information 2006 coding standards [16] expanded from only requiring specific documentation of postpartum hemorrhage by an obstetrician/clinician/midwife, to also include blood loss that met the definition of postpartum hemorrhage i.e., an estimated blood loss of ≥500 mL after vaginal delivery or ≥1000 mL after cesarean delivery.

3. Could the authors indicate whether they considered any statistical adjustment to account for the multiple comparisons e.g. a Bonferroni correction?

We acknowledge that Type I errors are a problem with multiple comparisons. We have attempted to address this issue by only testing risk factors for postpartum hemorrhage that have been reported in the literature, by reporting confidence intervals for each of our tests, and by not over-emphasizing p-values and their importance in our conclusions. We further included this issue in our limitation section.

We decided against a Bonferroni correction due to recommendations against adjusting for multiple comparisons in the epidemiology literature (some examples are Rothman, Epidemiology, 1990;1:43-6 and Perneger, BMJ, 1998;316:1236-8) and for the following specific reasons:

1) Due to the importance of identifying maternal morbidity, we did not want to increase our type II error and therefore potentially miss important associations.
2) We always report rates so that readers can interpret significance tests in the context of the effect sizes and their clinical importance.

Minor discretionary revisions

1. Could the authors describe why they chose the cut-offs of 4 days and 7 days for length of stay (methods p3)?

We have clarified this choice in the methods section:

Length of hospital stay greater than 4 days and hospital stay greater than 7 days were used as a measure of the burden of illness associated with postpartum hemorrhage. The 4 day cut-off was chosen as it is greater than the average stay for both cesarean and vaginal deliveries, while the 7 days postpartum cut-off has previously been used as an indicator for severe maternal morbidity [11, 12].
2. I am not convinced that tables 3 and 4 add to the overall message of the manuscript and they could be omitted. We included tables 3 and 4 in order to highlight the finding that the increase in both atonic and severe atonic postpartum hemorrhage occurred across the full range of maternal and obstetric determinants. This is part of the key message that: “The increase in atonic postpartum hemorrhage… occurred across regions, hospitals and various maternal, fetal and obstetric characteristics.”

We believe that these findings are of interest to researchers in this field, particularly those who are designing studies and attempting to determine mechanisms for an increase in postpartum hemorrhage. For example, the tables 3 and 4 show that atonic postpartum hemorrhage increased significantly among cesarean deliveries when there was no labour, but increased more markedly when there was spontaneous labour or labour following induction. However, postpartum hemorrhage with blood transfusion only increased significantly among cesareans where there was induction. This may help future researchers in deciding whether an over-stimulated uterus is more likely a cause as opposed to maternal or other factors.

Sincerely,

Azar Mehrabadi

Azar Mehrabadi, MSc
UBC School of Population and Public Health
Department of Obstetrics and Gynaecology
Room E418B, Shaughnessy Bldg
4500 Oak Street
Vancouver, B.C, V6H 3N1

Phone: (604) 875-2000, local 4800
Email: azar@interchange.ubc.ca