

# Risk Factors Associated with Postpartum Hemorrhage in Western North Carolina

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**Objective:** The rate of post partum hemorrhage (PPH) is increasing in the US, Canada, Australia, and Europe. The etiologies of this increase have not been well-defined. Our objective was to use primary data sources to estimate the risk of PPH associated with patient variables and practice patterns.

**Study Design:** We examined two years of deliveries (2008-2009) of singleton, live births at a regional referral center utilizing a case-control design to assess differences in patient variables and practice patterns. We matched controls to cases, 2:1, by delivery route. We used Student *t* test,  $X^2$ , Fisher exact test, and multivariate logistic regression to examine the relative contribution of risk factors to outcomes while controlling for known risk factors for PPH in order to elucidate any new risk factors apparent in our population.

**Results:** We analyzed 269 cases and 538 controls; 75.1% of deliveries were vaginal and 24.9% were cesarean. Significant predictors included Hispanic ethnicity, BMI > 40, pre-eclampsia, post-date pregnancies, shoulder dystocia and manual removal of placenta.

**Conclusions:** The results of this study confirm suspicions of an association between PPH and obesity (especially BMI  $\geq$  40). Improved knowledge about the risk factors for PPH can inform inter-conception counseling and PPH preventive measures at delivery.

**Keywords:** Postpartum hemorrhage; obesity; risk factors