The Impact of Increasing Obesity Class on Obstetrical Outcomes

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Abstract

Objective: Nationally, rates of obesity continue to rise, resulting in increased health concerns for women of reproductive age. Identifying the impact of maternal obesity on obstetrical outcomes is important to enhance patient care.

Methods: We conducted a retrospective cohort study of 6674 women who delivered a singleton infant at ≥ 20 weeks' gestation between December 1, 2007, and March 31, 2010, at The Ottawa Hospital. Maternal pre-pregnancy BMI was used to classify women into normal, overweight, and obese (class I/II/III) categories according to WHO classifications. Obstetrical outcomes among obese women were compared with those of women with normal BMI. Multivariable regression models were used to determine adjusted odds ratios and 95% confidence intervals.

Results: Compared with women with normal BMI, obese women had significantly higher rates of preeclampsia, gestational hypertension, and gestational diabetes, and these rates increased with increasing BMI (trend-test $P < 0.001$). There was a significant increase in rates of induction of labour in the obesity categories, from 25.3% in women with normal BMI to 42.9% in women with class III morbid obesity (aOR 1.67; 95% CI 1.43 to 1.93). Rates of primary Caesarean section rose with increasing BMI and were highest in women with class III morbid obesity (36.2% vs. 22.1% in women with normal BMI) (aOR 1.46; 95% CI 1.23 to 1.73).

Conclusion: Increasing BMI is associated with increasing rates of preeclampsia, gestational hypertension, and gestational diabetes. There is a significant increase in rates of induction of labour with increasing obesity class, and a significantly increased Caesarean section rate with higher BMI. Obstetrical care providers should counsel obese patients about the risks they face and the importance of weight loss before pregnancy.

Key Words: Morbid obesity, overweight, pregnancy outcomes, body mass index, Caesarean section

Competing Interests: None declared.

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Résumé

Objectif : À l'échelle nationale, les taux d'obésité continuent d'augmenter, ce qui occasionne une hausse des préoccupations en matière de santé pour ce qui est des femmes en âge de procréer. Pour en venir à améliorer les soins offerts aux patientes, il est important de s'affairer à identifier les effets de l'obésité maternelle sur les issues obstétricales.

Méthodes : Nous avons mené une étude de cohorte rétrospective qui portait sur 6 674 femmes ayant accouché (entre le 1er décembre 2007 et le 31 mars 2010 à L'Hôpital d'Ottawa) à ≥ 20 semaines de gestation à la suite d'une grossesse monofœtale. L'IMC maternel prégrossesse a été utilisé pour répartir, en fonction des classifications de l'OMS, les femmes en trois catégories : normale, surplus de poids et obèse (classes I/II/III). Les issues obstétricales

chez les femmes obèses ont été comparées à celles qu'ont connues les femmes présentant un IMC normal. Des modèles de régression multivariable ont été utilisés pour déterminer les rapports de cotes corrigés et les intervalles de confiance à 95 %.

Résultats : Par comparaison avec les femmes présentant un IMC normal, les femmes obèses ont connu des taux considérablement accrus de prééclampsie, d'hypertension gestationnelle et de diabète gestationnel; de plus, ces taux étaient directement proportionnels à l'IMC (test de tendance P < 0,001). Nous avons constaté une hausse significative des taux de déclenchement du travail dans les catégories « obésité », de 25,3 % chez les femmes présentant un IMC normal à 42,9 % chez les femmes présentant une obésité morbide de classe III (RCc 1,67; IC à 95 %, 1,43 - 1,93). Les taux de césarienne primaire étaient directement proportionnels à l'IMC et atteignaient leur apogée chez les femmes présentant une obésité morbide de classe III (36,2 % vs 22,1 % chez les femmes présentant un IMC normal) (RCc 1,46; IC à 95 %, 1,23 - 1,73).

Conclusion : La hausse de l'IMC est associée à la hausse des taux de prééclampsie, d'hypertension gestationnelle et de diabète gestationnel. Les taux de déclenchement du travail augmentent de façon significative en fonction de la classe d'obésité; les taux de césarienne connaissent également une hausse considérable au fur et à mesure que s'élève l'IMC. Les fournisseurs de soins obstétricaux devraient aborder, avec leurs patientes obèses, les risques auxquels elles font face et l'importance de la perte de poids avant la grossesse.

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INTRODUCTION

Rates of obesity, including an increased prevalence of morbid obesity (BMI > 35), are rising dramatically in developed countries.[1–4] This trend has led to a concurrent increase in health concerns for women of reproductive age,[1,4] and it is now well established that weight gain and obesity cause major comorbidities in pregnancy that contribute to adverse maternal and neonatal outcomes.[5,6]

In pregnant women, obesity has been shown to increase the likelihood of gestational diabetes,[7] hypertensive diseases of pregnancy,[8] and severe hypertensive sequelae such as preeclampsia and HELLP syndrome.[7] Obesity may lead to a number of adverse obstetrical outcomes, including an increase in rates of Caesarean section,[9,10] prolonged delivery interval,[11] and increased operative time and blood loss.[11] Rates of perinatal death and stillbirth,[12] as well as infant morbidity,[8,13,14] are also higher in obese populations. Following delivery, maternal health remains an issue, as obese mothers are at higher risk of postpartum hemorrhage,[15] venous thromboembolism,[16] endomyometritis,[17] prolonged hospitalization,[15] and wound infection and dehiscence.[7,17–19] Finally, obesity plays a role in future pregnancies; obese women are more likely to require a repeat CS because of their lower rate of successful vaginal birth after CS.[17,20,21]

Understanding the continuing development of trends in obesity and obstetrical and perinatal outcomes is integral to maintaining relevant clinical guidelines that ensure high quality care. In particular, there is a need to understand the impact of various levels of obesity during pregnancy, specifically the effect of morbid obesity. The primary aim of our study, therefore, was to examine how increasing obesity class affects adverse obstetrical outcomes and interventions in labour.

ABBREVIATIONS

BORN	Better Outcomes Registry & Network
PPROM	preterm pre-labour rupture of membranes
PROM	pre-labour rupture of membranes

MATERIALS AND METHODS

We collected data retrospectively from mothers who gave birth to one infant between December 1, 2007, and March 31, 2010, at a tertiary care centre in south-eastern Ontario. Only mothers with a known pre-pregnancy BMI (or height and pre-pregnancy weight) who delivered at ≥ 20 weeks' gestation were included in the study. Underweight mothers (BMI < 18.5) were excluded from the sample. All participants had their infants delivered by an on-call family physician or obstetrician.

Data for this study were obtained from Better Outcomes Registry & Network Ontario's Niday Perinatal Database, an Internet-based birth record system. The database was used to identify the study population. The study centre is a participant in the BORN database and transcribes patient information to the registry. This database is administered by the Children's Hospital of Eastern Ontario and has a 100% capture rate for hospital births in Ontario. The Niday database includes information on maternal demographic characteristics and health behaviours, pre-existing maternal health problems, obstetric complications, intrapartum interventions, and birth outcomes. When a woman is admitted to hospital for delivery, data are collected from medical records, clinical forms, and patient interviews. After the birth, these data are either entered into the database through a secure website by hospital staff or uploaded directly from hospitals that have electronic record capability. An ongoing program of data verification, quality checks, and formal training sessions for individuals collecting and entering data into the system assures that a high level of data quality is maintained.[22]

Maternal pregnancy and intrapartum outcomes examined in the study included preeclampsia, gestational hypertension, gestational diabetes, pre-labour rupture of membranes,