



Original Research – Quantitative

Developing a clinical care pathway for obese pregnant women: A quality improvement project

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ABSTRACT

Problem: Obesity in pregnancy is associated with an increased incidence of maternal and foetal morbidity and mortality, from conditions like preeclampsia, gestational diabetes, preterm birth and stillbirth. Between 20% and 25% of pregnant women in Australia are presenting to their first antenatal appointment with a body mass index (BMI) ≥ 30 kg/m², defined as obesity in pregnancy. These figures are concerning for midwifery and obstetric staff directly involved in the clinical care of these women and their families. In the absence of national or state clinical practice guidelines for managing the risks for obese pregnant women, a local quality improvement project was conducted.

Aim: To plan, implement, and evaluate the impact of an alternative clinical care pathway for pregnant women with a BMI ≥ 35 kg/m² at their first antenatal visit.

Project setting: The project was undertaken in the antenatal clinic of a rural referral hospital in NSW, Australia.

Subjects: Eighty-two women with a BMI ≥ 35 kg/m² were eligible for the alternative care pathway, offered between January and December 2010.

Intervention: The alternative care pathway included the following options, in addition to usual care: written information on obesity in pregnancy, referral to a dietitian, early plus repeat screening for gestational diabetes, liver and renal function pathology tests, serial self-weighing, serial foetal growth ultrasounds, and a pre-labour anaesthetic consultation.

Findings: Despite being educated on the risk associated with obesity in pregnancy, women did not take up the offers of dietetic support or self-weighing at each antenatal visit. Ultrasounds were well received and most women underwent gestational diabetes screening.

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1. Background to the problem

Midwifery and obstetric staff within a rural tertiary hospital facility regularly engage in clinical reviews of maternity consumer case studies. In 2009, the cases of four obese women who experienced significant adverse birth and post-natal outcomes, including caesarean section wound breakdown and Intensive Care admissions, were discussed. Clinician concerns prompted a review of the clinical management for obese pregnant women. In 2009, no Australian or state clinical practice guidelines addressing risk

management for obesity in pregnancy existed. Therefore, this evidence-practice gap became the focus of a year-long quality improvement project, which started by reviewing the available literature.

2. Search strategy

A literature search was conducted to understand the extent of the problem of obesity in pregnancy and identify existing guidelines and strategies addressing the antenatal care for obese pregnant women. Keyword search terms were used including 'obesity' AND 'pregnancy*', AND 'management', OR 'risks'. The initial search was run between January and June 2009, with the search updated after completing the project, in May 2014. Databases searched included OVID, Medline, CINAHL, Embase, Proquest, PubMed, Cochrane

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Collaboration, Science Direct, Nursing Consult and New South Wales Health Clinical Information Access Programme (CIAP). Guidelines, policies, and protocols were sought through additional searches of relevant health information websites including UpToDate, NSW Health Department, and Australian Government health service.

3. Background literature

Obesity has become a global epidemic that is linked to many serious health problems including the development of chronic disease such as diabetes, hypertensive disorders, coronary heart disease and stroke.¹ In Australia, over 50% of the adult population are overweight or obese.² In an analysis of the South Australian maternal and perinatal health database, Dodd et al.⁴ reported that 50% of pregnant women were overweight or obese, with a slightly higher incidence among rural pregnant women (54.4%).³ Cunningham and Teale³ specifically looked at maternal overweight and obesity in rural Victoria, reporting an alarming prevalence of 65% among more than 6000 pregnant women.⁴

The Australian Longitudinal Study on Women's Health predicts that approximately 60% of Australian women of childbearing age will be obese by 2050, with young women gaining weight faster than any other age group.² The Australia's Mothers and Babies 2011 report indicates that between 20% and 25% of pregnant women in Australia are presenting to their first antenatal appointment with a body mass index (BMI) ≥ 30 kg/m², defined as obesity in pregnancy.⁵

Smith et al.⁶ explains the pathophysiology of obesity stating that 'obesity represents a state of altered hormonal and inflammatory activity associated with the function of fatty tissue'. It is thought that this hyper-inflammatory state clinically manifests conditions such as hypertension, glucose intolerance, insulin resistance, elevated cholesterol and triglycerides.⁶ During the course of normal pregnancy insulin resistance increases up to 60%, facilitating the transfer of nutrition and energy from mother to baby. Hence, any underlying impairment in insulin sensitivity and insulin resistance due to pre-existing metabolic syndrome is likely to be exacerbated during pregnancy.^{6,7}

In a large retrospective study of 287,213 completed singleton pregnancies, Sebire et al.⁷ found that obese women (BMI ≥ 30 kg/m²) had an increased occurrence of pregnancy and birth complications than women within the healthy weight range, which they defined as a BMI 20–24.9 kg/m².⁷ Complications include gestational diabetes (3.6% vs. 0.8%), preeclampsia (1.4% vs. 0.7%), induction of labour (24.6% vs. 15.3%), birth by emergency caesarean section (13.4% vs. 7.8%), postpartum haemorrhage (17.1% vs. 10.4%), wound infection (1.3% vs. 0.4%), infant birth weight above 90th centile (17.5% vs. 9.0%) and stillbirth (0.7% vs. 0.4%).⁷ More recently, Flenady et al.⁸ have shown that maternal overweight and obesity (BMI >25 kg/m²) was the highest ranking modifiable risk factor for stillbirths. In their systematic review and meta-analysis Flenady et al.⁸ calculated population attributable risks of 8–18% across the five countries, contributing around 8000 stillbirths (≥ 22 weeks gestation) annually across all high-income countries.⁸

Many other studies have demonstrated the same association between a high BMI and increased risk of common adverse pregnancy outcomes like gestational diabetes, gestational hypertension and caesarean births.⁹ One study, on a less frequently reported outcome, was a trial of labour after a previous caesarean section.¹⁰ Hibbard et al.¹⁰ reported that approximately 40% of morbidly obese (BMI ≥ 35 kg/m²) women were unsuccessful in their trial of labour following a previous caesarean section, compared to 15% of normal weight women.

Foetal anomalies are also more common with obesity during pregnancy. A systematic review and meta-analysis found that

obese women were at significantly higher risk of pregnancies affected by: neural tube defects (OR 1.9, 95% CI 1.6, 2.2), including spina bifida (OR 2.2, 95% CI 1.9, 2.7); cardiovascular anomalies (OR 1.3, 95% CI 1.1, 1.5); septal anomalies (OR 1.2, 95% CI 1.1, 1.3); cleft lip and palate (OR 1.2, 95% CI 1.0, 1.4); anorectal atresia (OR 1.5, 95% CI 1.1, 2.0); hydrocephaly (OR 1.7, 95% CI 1.2, 2.4); and limb reduction anomalies (OR 1.3, 95% CI 1.0, 1.7).¹¹ Hall and Neubert¹² explain that the reason neural tube defects may be more prominent in obese women, is due to poor absorption and decreased serum folic acid levels as a result of impaired metabolic functioning, with lower levels of folic acid reaching the developing embryo.

Detection of foetal anomalies by ultrasound is less reliable in obese pregnant women with obese women at twice the risk of having suboptimal visualisation of detailed foetal anatomy than normal weight women.¹³ A similar study reported that detecting foetal anomalies decreased with an increasing BMI.¹⁴

In light of these increased risks for obese pregnant women and their babies, many recommendations have been suggested throughout the literature. These recommendations include: assessment of weight and BMI at the first antenatal visit; stringent weighing of women at each antenatal visit; early glucose tolerance testing and universal testing at 26–28 weeks gestation; counselling about miscarriage, stillbirth, hypertension, diabetes, and nutrition; referral to a dietitian; detailed growth and anomaly ultrasound scans; anaesthetic consultation; and early evaluation of maternal kidney, cardiac and liver function due to the high incidence of hypertension and preeclampsia.^{15–21}

The aim of our project was to plan, implement, and evaluate the impact of an alternative clinical care pathway for pregnant women with a body mass index (BMI) ≥ 35 kg/m² at their first antenatal visit. Given that women with the highest BMI have the highest risks reported throughout the literature, it was considered reasonable to focus our limited resources on women with a BMI ≥ 35 kg/m². It was anticipated that by providing these women with education and clinical care about managing the risks associated with being obese that we would detect complications earlier and reduce their impact.

Implementation science, the study of methods that facilitate the uptake of research findings and evidence-based practices into routine health care, forms the foundations for this study.^{22,23} This body of research recognises that bridging the gap between theory and clinical practice can be difficult and requires an understanding of the uniqueness of the health systems in which changes are to be implemented.²⁴ As a result, the NSW quality improvement methodology was adopted to guide the project team.

4. Site and participants

The project was conducted within a rural maternity unit comprising of a 19-bed maternity ward, 3-bed birthing unit, level two special-care nursery and publicly funded antenatal clinic. In 2009, a total of 796 babies were born at the hospital. All women attending antenatal clinic for their first trimester antenatal clinic visit had their height and weight measured, and BMI calculated. Eighty-two women with a BMI ≥ 35 kg/m² were identified between January 2010 and December 2010.

A project team including a clinical midwifery consultant, a clinical midwifery specialist, four consultant obstetricians and one dietitian was formed. The chief investigators responsible for overall project planning, design, implementation and evaluation were the clinical midwifery consultant and clinical midwifery specialist.

5. Methods

This study utilised a NSW public health service quality project methodology.³ This design uses a five-step process including.

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