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The maternal and fetal impacts of obesity and gestational diabetes on pregnancy outcome

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Obesity has reached pandemic proportions and is of growing concern worldwide. Adverse health outcomes associated with a raised body mass index present the greatest challenge currently facing clinicians across all disciplines.

Obesity is a chronic illness which is associated with metabolic disease, nutritional deficiency, musculoskeletal complications and cancer. These obesity-related health issues extend to pregnancy where they are responsible for producing a variety of medical and obstetric complications resulting in an increased incidence of maternal and fetal adverse outcomes.

Management of diet, gestational diabetes and gestational and inter-gestational weight may improve outcomes in women who are obese during pregnancy. Specific recommendations for the management of obesity in pregnancy have recently been published.

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Obesity... why worry?

There is no doubt that obesity (defined as body mass index (BMI) $> 30 \text{ kg/m}^2$) is an increasing problem and presents one of the greatest challenges to the practicing clinician, across all disciplines. The incidence of obesity, a modifiable risk factor for metabolic and cardiovascular disease, has increased to pandemic proportions over the past 20 years. In 2005, the World Health Organization

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(WHO) estimated that approximately 1.7 billion adults worldwide were overweight (BMI > 25 kg/m²) and 400 million obese with a projected increase to 700 million by 2015.^{1,2} Alarming, 10% of the world's children, under the age of 15 years are obese. In the United States the rate of childhood obesity has stabilized at 17% since 1999, having tripled in the period prior to this from 1980.³ The problem of obesity has more recently become apparent in the developing world where its incidence has also tripled over the past 20 years. Figures from developed countries estimate that between 24 and 35% of the general adult population are obese, with a further 40% overweight.^{1,4} It is interesting that adults of normal BMI are now in the minority, and that the prevalence of obesity in adult women is greater than that in men.

Concern relating to the obesity pandemic is far greater than a cosmetic consideration. This paradoxical condition of chronic, overfed malnutrition is associated with a plethora of medical complications. The association between obesity and the metabolic syndrome/type 2 diabetes mellitus is well established.⁵ We also know that the incidence of malignancy, musculoskeletal disorders and chronic respiratory disease are raised in obesity, and as a consequence of associated medical complications death by the age of 50 is increased two to threefold in those who are obese in middle age.⁶

Raised BMI and pregnancy

The increasing prevalence of obesity amongst females of reproductive age is of particular concern with epidemiological data describing an overall incidence of 32.4% in the United States. In women of reproductive age, the prevalence of grade I (BMI 30–34.9 kg/m²) and grade II (BMI 35–39.9 kg/m²) obesity has doubled since 1979 and that of grade III (BMI > 40 kg/m²) obesity has increased threefold over the same period.¹ Data from the Pregnancy Risk Assessment Monitoring System (PRAMS database) shows a pre-pregnancy incidence of obesity in the United States of 20%, which represents an overall increase of 70% over a ten-year period.⁷

At the time of presentation for a booking obstetric visit, 21% of Irish women are obese and 37% overweight (Fig. 1).⁸ In 2005, the prevalence of obesity in pregnant women in the United Kingdom at their booking visit was between 16 and 19%.⁹ The impact of obesity on pregnancy outcome and parturition is now considered a primary obstetric issue. Numerous studies have shown that a raised pre-pregnancy BMI is associated with a linear increase in adverse maternal and fetal outcomes. Adverse pregnancy outcome in obese mothers is attributed predominantly to impaired glucose

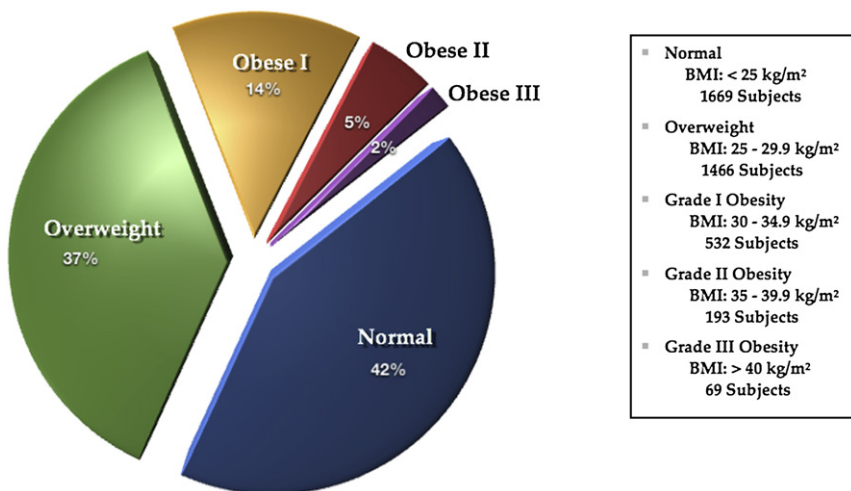


Fig. 1. Body mass index (BMI) measurements in an Irish obstetric population. Measurement of weight and height was taken at booking obstetric visit, prior to 28 weeks gestation. Data from ATLANTIC-DIP prospective observational study.

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