Obesity

Toxic trio: Maternal obesity, gestational diabetes, and sleep-disordered breathing

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The World Health Organization (WHO) estimated that in 2008 over 1.4 billion adults were overweight and over half a billion were obese (WHO, 2013). At the time, 300 million women were obese (with this number believed to have increased since 2008). The prevalence of obesity in women is likely to have a significant impact on pregnancy and its outcomes.

Maternal obesity increases the risk of hypertension and thromboembolic disease in pregnancy, and pre-eclampsia. It also increases the risk of gestational diabetes by at least three-fold (Heslehurst et al, 2008). Obesity during pregnancy also increases the woman's long-term cardiometabolic risk, and in delivery, obese pregnant women are more likely to have labour induction and to undergo caesarian section. Of note, the 2003 to 2005 UK Confidential Enquiry into Maternal And Child Health (CEMACH) found that 28% of maternal deaths occurred in obese women (Centre for Maternal and Child Enquiries [CMACE], 2007).

For the foetus, maternal obesity increases the risk of stillbirth, pre-term delivery, macrosomia and perinatal death. There is also an increased risk of neonatal hypoglycaemia, jaundice, and a requirement for intensive care. There are long-term consequences for the child, and subsequent adult, born to a mother with obesity with variable supporting evidence. These include risk of obesity, insulin resistance, diabetes, hypertension, cardiovascular disease, cognitive dysfunction, attention deficit hyperactivity disorder, eating disorders and psychosis.

Obesity is a major factor that increases the risk of gestational diabetes, as well as maternal age, family history of diabetes, previous gestational diabetes, previous large baby and ethnicity. Identifying gestational diabetes early and recognising contributing factors are essential to avoiding complications for the mother and foetus, as well as subsequent metabolic consequences beyond pregnancy. The increased prevalence of obesity is driving an increased risk of not only gestational diabetes but also sleep-disordered breathing (SDB).

Several studies have demonstrated a relationship between SDB and dysglycaemia, as well as a relationship between vascular complications and diabetes (Pallayova et al, 2014). There has also been ongoing interest in the sleep research community of the impact of SDB on pregnancy outcomes. Even snoring has been reported to be associated with adverse outcomes such as hypertension and pre-eclampsia (O'Brien et al, 2012). Risk factors for SDB in pregnancy include maternal BMI and age, with SDB likely to become more apparent in the third trimester when there is increased mechanical restriction to breathing (Pien et al, 2013).

Luque-Fernandez and colleagues carried out a meta-analysis of observational epidemiologic studies examining the potential relationship between SDB and gestational diabetes (summarised alongside). The studies collectively included about 10 000 pregnant women, and the majority of the studies were from the United States. Many studies did not evaluate SDB objectively, and most studies focused on snoring as a marker of SDB. Remarkably, SDB was associated with a three-fold increased odds ratio for gestational diabetes, in a sub-group analysis that adjusted for BMI.

Given the rising prevalence of maternal obesity and gestational diabetes, there is now a need to pay more attention to the potential contributory role of SDB to adverse pregnancy outcomes. Events during pregnancy can have serious long-term consequences, and SDB may be a contributory factor. Clearly, more studies of the impact of SDB in pregnancy are needed from diverse populations, and particularly intervention studies. In the meantime, the toxic trio of maternal obesity, gestational diabetes, and SDB should be identified and tackled as early as possible to potentially prevent complications during and beyond pregnancy. ■

CMACE (2007) Available at: http://bit.ly/1itcFYp (accessed 10.03.14)
Heslehurst N et al (2008) *Obes Rev* **9**: 635–83
O'Brien LM et al (2012) *Am J Obstet Gynecol* **207**: e1-9
Pallayova M, Banerjee D, Taheri S (2014) *Diabetes Res Clin Pract* 14 Jan [Epub ahead of print]
Pien GW et al (2013) *Thorax* 21 Nov [Epub ahead of print]
WHO (2013) Available at: http://bit.ly/18pCdAN (accessed 24.02.14)

Diabetes Care

Sleep-disordered breathing and gestational diabetes

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓

1 This systematic review and meta-analysis examined the relationship between sleep-disordered breathing (SDB) and gestational diabetes (GD). A wide variety of electronic databases were searched for studies published before January 2013 and nine fitted the authors' criteria.

2 In total, 9794 women were included in the meta-analysis. SDB was found to be significantly associated with an increased risk of GD; women with SDB during pregnancy had a two-fold increased risk of developing GD (unadjusted pooled odds ratio 2.18; 95% confidence interval [CI], 1.59–2.99).

3 The pooled BMI-adjusted OR was 3.06 (95% CI, 1.89–4.96), suggesting the association between SDB and GD may be three times stronger in overweight and obese women.

4 The unadjusted heterogeneity among the studies was I^2=53%, and the BMI-adjusted heterogeneity was I^2=63%.

5 One limitation noted by the authors was the nature of the evidence, which was based on observational studies only.

6 Studies in the general population of people with SDB have shown clear improvement in insulin resistance and glycaemic control after nasal continuous positive airway pressure treatment. This could be a potential treatment for pregnant women with SDB, as current guidelines for reducing SDB in pregnancy, such as sleep position, need evaluating.

Luque-Fernandez MA, Bain PA, Gelaye B et al (2013) Sleep-disordered breathing and gestational diabetes mellitus: a meta-analysis of 9,795 participants enrolled in epidemiological observational studies. *Diabetes Care* **36**: 3353–60

The Lancet

BMI mediators that affect coronary heart disease and stroke risk

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓

1 The Global Burden of Metabolic Risk Factors for Chronic Diseases Collaboration investigated the influence of BMI mediated through blood pressure (BP), cholesterol and glucose on coronary heart disease (CHD) and stroke.

2 Data from 97 prospective cohort studies were pooled, which included 1.8 million participants between 1948 and 2005. From this cohort, there were 57 161 CHD and 31 093 stroke events.

3 The authors estimated the hazard ratio (HR) of BMI on CHD and stroke with and without adjustments for all combinations of BP, cholesterol and glucose.

4 For each 5 kg/m^2 increase in BMI, the HR for CHD and stroke was 1.27 (95% confidence intervals [CI], 1.23–1.31) and 1.18 (95% CI, 1.14–1.22) respectively.

5 BP was the most important mediator, accounting for 31% of the excess risk of CHD and 65% of the excess risk of stroke.

6 The second most important mediator was glucose, adjustment for which lowered HRs to 1.23 (95% CI, 1.19–1.27) for CHD and 1.13 (95% CI, 1.09–1.18) for stroke.

7 The authors estimated that nearly half of the excess risk for CHD and three-quarters of the excess risk for stroke is due to high BMI mediated through BP, cholesterol and glucose. The remaining excess risk is due to other independent factors.

The Global Burden of Metabolic Risk Factors for Chronic Diseases Collaboration (2013) Metabolic mediators of the effects of body-mass index, overweight, and obesity on coronary heart disease and stroke. *Lancet* 21 Nov [Epub ahead of print]

JAMA

Systematic review: Long-term drug treatment for obesity

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓

1 The authors carried out a systematic literature review of PubMed from inception to September 2013 to investigate the effectiveness of long-term drug treatment of obesity.

2 Twenty-one studies met the inclusion criteria; meta-analyses, systematic reviews and randomised placebo-controlled trials that were at least 1 year in length, included at least 50 participants, reported 50% retention and reported results on an intention-to-treat basis.

3 The meta-analysis found that medications approved for long-term use when prescribed with lifestyle interventions produced increased weight loss relative to placebo: a 3% weight loss for orlistat and lorcaserin, and a 9% weight loss for top-dose phentermine plus topiramate-extended release at 1 year.

4 All three drugs show greater improvements in many cardiometabolic risk factors, but there were no reductions in cardiovascular morbidity or mortality.

5 Long-term medication for obesity is effective if it is part of a lifestyle intervention.

Yanovski SZ, Yanovski JA (2013) Long-term drug treatment for obesity. *JAMA* **311**: 74–86

Diabetes Care

Bariatric surgery versus non-surgical treatment for obesity

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓

1 The authors conducted a meta-analysis to quantify the overall effects of bariatric surgery compared with non-surgical treatments for obesity. Eleven studies were eligible for inclusion (the criteria included ≥6 months of follow-up and individuals with BMI ≥30 kg/m^2). In total, 796 individuals were included.

2 A finding of the study was that those that received bariatric surgery lost more weight compared to the non-surgical treatment (heterogeneity I^2=95%), and had a higher remission rate of T2D.

3 Limitations cited by the authors included the short follow-up time and the small size of each individual study.

Gloy VL, Briel M, Bhatt DL et al (2013) Bariatric surgery versus non-surgical treatment for obesity: a systematic review and meta-analysis of randomised controlled trials. *BMJ* **347**: f5934

Diabetes Metab Res Rev

Combined therapy for weight loss

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓

1 A systematic review and meta-analysis were performed to investigate the effectiveness of prescribing very low energy diets ([VLEDs] ≤800 kcal/day) followed by pharmacotherapy as a weight loss regimen.

2 A MEDLINE search was undertaken, and articles from 1970–2009 were considered. Six studies were eligible for inclusion, comprising 1401 individuals.

3 Four studies showed that a VLED followed by pharmacotherapy resulted in weight loss.

4 Limitations of the meta-analysis were that heterogeneity among the studies was very high (I^2=93.72%) and no risk bias assessment was performed.

5 This study contributes to the general understanding that combination therapy can achieve greater weight loss than monotherapies.

Koutroumanidou E, Pagonopoulou O (2013) Combination of very low energy diets and pharmacotherapy in the treatment of obesity. *Diabetes Metab Res Rev* 20 Sep [Epub ahead of print]

> ***"Long-term medication for obesity is effective if it is part of an lifestyle intervention."***