

# Obesity: Time to re-examine care for pregnant women

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## Article points

1. Obesity in pregnancy is associated with adverse outcomes for both the mother and the newborn.
2. Education, including advice on weight loss prior to conception, avoiding excessive weight gain during pregnancy and keeping up regular exercise, is the key tool to improving outcomes in this patient group.
3. Most advice hinges on the monitoring of weight, and obstetric practice in the UK would be greatly improved by the re-introduction of routine weighing during pregnancy.

## Key words

- Obesity
- Pregnancy
- Reproductive health

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**Obesity in pregnancy is a major health issue which affects both mother and child, and about which there remains a lack of knowledge, education and support. However, pregnant women are generally highly motivated to do the best for their children, and clinicians have a number of opportunities to improve outcomes by providing education and counselling before conception, during pregnancy and after the birth. This article outlines the risks associated with obesity in pregnancy and provides advice on improving the care pathway for this important group of patients.**

Obesity in pregnancy is a major issue that goes beyond maternal body image, as maternal obesity puts both the mother and the baby at risk. No mother knowingly places her baby at risk; however, the timing of health education and how this is delivered remains a challenging question. Many women in the reproductive age group are unaware of the evidence that a high BMI is associated with an increase in all pregnancy complications, such as the following:

- Reduced fertility.
- Increased rates of miscarriage.
- Fetal congenital abnormalities.
- Fetal growth restriction (smaller babies).
- Impaired glucose tolerance and gestational diabetes (GDM).
- Infectious morbidity.
- Thromboembolism.
- Hypertensive disorders of pregnancy.
- Difficulty monitoring the baby.
- Still birth.
- Maternal death.

In addition, children born to obese mothers have an increased risk of morbidity (e.g. a two-fold greater risk of obesity in later life) and premature

death (Galtier-Dereure et al, 2000).

Opportunities arise in the form of sex education, preconceptual counselling and education, both antenatally and after the birth. This article will detail when and how clinicians can intervene and offer advice to improve pregnancy outcomes in obese women.

## Preconception advice

Women with pre-existing medical conditions, including overweight and obesity, should receive individualised preconceptual counselling in order that they enter pregnancy in the optimum state (Knight et al, 2014).

Planned weight loss prior to conception, using reliable contraception in the interim, is advisable, with the aim of attaining a BMI within the World Health Organization (WHO)-recommended range of 18–25 kg/m<sup>2</sup>. Notably, this upper limit should be less for women of South Asian origin, at 23 kg/m<sup>2</sup> (WHO Expert Consultation, 2004).

Supplements (e.g. Inofolic), medications (e.g. metformin) and weight loss treatments (e.g. orlistat) have a good safety profile in early pregnancy (Källén, 2014; D'Anna et al, 2015; Zhao et al, 2015), which is important information for women

who conceive whilst taking any combination of these. In addition, these agents form part of the pre-pregnancy armamentarium in the race against time for weight loss, given that as age advances, fertility rates fall.

Bariatric surgery is indicated in women with either a BMI of  $\geq 40$  kg/m<sup>2</sup> or a BMI of  $\geq 35$  kg/m<sup>2</sup> plus comorbidities. The resulting weight loss is associated with higher fertility rates, double in teenagers (Armstrong, 2010). However, it is important to note that after bariatric surgery, mothers are more likely to have a preterm delivery and/or a growth-restricted baby (Roos et al, 2013).

Women who undergo bariatric surgery should postpone pregnancy for 1–2 years, as this is the period of most rapid weight loss and of malnutrition secondary to malabsorption. During this phase, reliable contraception is key. Oral contraception should be avoided owing to unpredictable absorption and consequent risk of failure. Nutritional dietary advice and support is indicated before the procedure and throughout the pregnancy. Although the joint guidelines of the Centre for Maternal and Child Enquiries and the Royal College of Obstetricians and Gynaecologists (CMACE/RCOG; Modder and Fitzsimons, 2010) fail to mention the care of this group of women, guidance is available in the literature (Sheiner et al, 2004; Armstrong, 2010).

In women with a BMI of  $\geq 30$  kg/m<sup>2</sup>, pre-conception folic acid supplementation is recommended at the higher dose of 5 mg and not the standard dose of 400  $\mu$ g (Modder and Fitzsimons, 2010). The former is not available in over-the-counter preparations and needs to be prescribed to coincide with planning a future pregnancy and continued until 12 weeks of the pregnancy. The rationale for a high dose follows from the results of a meta-analysis demonstrating that babies born to overweight, obese and morbidly obese women have a higher incidence of neural tube defects (odds ratios of 1.22, 1.70 and 3.11, respectively; Rasmussen et al, 2008).

Good sleep hygiene (i.e. habits and behaviours that promote good sleep) is advisable, as reduced sleep promotes neuroendocrine, metabolic and behavioural adaptations that drive caloric intake (Mann, 2014).

Much has been broadcast by the media about the poor correlation between exercise and/or diet

and weight loss. However, the simple messages are that regular physical activity improves wellbeing, should be encouraged preconceptually and is safe to continue at all stages of the pregnancy.

### Antenatal care

In a survey of pregnant women in the US, Rosenfeld and Everett (1996) found that only 35% of the pregnancies were planned. If the majority of pregnancies are surprises, pre-pregnancy planning is less likely.

Pregnant women are, in the majority, a highly motivated group who do not intend any harm to their unborn, hence advice needs to be balanced and individualised so as to avoid arousing feelings of guilt. Antenatal consultations with the GP, midwife or obstetrician are an opportunity to engage and support the mother, inform about weight gain and dispel any myths. Make no assumptions; some pregnant women are still under the impression that they need to be eating for two (Muktabhant et al, 2015).

The ideal antenatal care pathway for overweight and obese women includes the following:

- Early antenatal booking for hospital-based, multidisciplinary care, the team being mindful to share the plan of care with the mum-to-be.
- Starting higher-dose folic acid supplements, if not already initiated, until week 12 of the pregnancy (Modder and Fitzsimons, 2010). Daily 10  $\mu$ g vitamin D supplements are also advised.
- Arranging an oral glucose tolerance test at 28 weeks or earlier, in accordance with the NICE (2015) guidance on screening for GDM.
- Assessing fetal growth and wellbeing with the aid of serial ultrasound scans and customised growth charts (adiposity makes clinical assessment unreliable when measuring fetal growth and reduces image quality during ultrasound scanning, reducing the sensitivity of this tool; Phatak and Ramsay, 2010).
- Advising on diet and providing physiotherapy.
- Checking the thromboembolism risk and, where appropriate, starting prophylactic low-molecular-weight heparin in a dose regimen tailored to maternal weight, in keeping with the RCOG's Green-Top Guideline number 37a (RCOG, 2015).
- Reassuring about the safety and benefits of exercise and daily physical activity.

### Page points

1. Women who undergo bariatric surgery should postpone pregnancy, with reliable, non-oral contraception, for the first 1–2 years, in order to prevent risks associated with malnutrition.
2. Prior to conception, obese women are recommended to take an increased dose of folic acid, maintain good sleep hygiene and continue regular exercise.
3. Following conception, the ideal antenatal care pathway for obese mothers should include multidisciplinary care, folic acid and vitamin D supplementation, screening for gestational diabetes, advising on diet and exercise, and managing the increased risk of thromboembolism.

**Page points**

1. With the exception of women with a BMI of  $\geq 40$  kg/m<sup>2</sup>, NICE does not advocate weight loss during pregnancy.
2. Exercise is recommended during pregnancy, although the maximal heart rate should be lower than in non-pregnant women, and the core body temperature should remain below 39.2°C.
3. Excessive gestational weight gain should be avoided, and pregnant women should aim to meet the US Institute of Medicine's guidelines on weight gain.

**Advising on weight loss**

In mothers with a BMI of  $\geq 40$  kg/m<sup>2</sup>, targeted weight loss of up to 9 lbs has been shown to produce a better outcome; otherwise, NICE (2010) discourages weight loss, as does a Cochrane Review (Furber et al, 2013), based on evidence from studies showing that, while there are benefits to weight loss, these are countered by increased rates of small-for-gestational-age babies (Beyerlein et al, 2011; Blomberg, 2011).

**Advising on exercise**

The national patient-held clinical notes (available at: [www.preg.info](http://www.preg.info)) are correct to recommend pelvic floor exercises but are not so clear as to other exercise modalities. Notably, one of the aims of pelvic floor exercises is to reduce incontinence, which causes embarrassment and limits exercise. Clear advice about the need for daily physical activity should be shared during antenatal visits. RCOG Statement No. 4 (Bell and Dooley, 2006) offers some clarity, with recommendations on exercising safely (e.g. avoiding contact sports or exercise in the supine position). The following are examples of safe exercises: cardio, walking, running, swimming, yoga and Pilates yoga.

Previously sedentary women should aim for 15 minutes of exercise three times per week, increasing gradually up to 30 minutes four times per week, and look out for warning signs to terminate exercise, such as breathlessness, chest pain, dizziness/feeling faint, pre-term labour, bleeding and reduced fetal movements (Bell and Dooley, 2006). Note that most guidelines advocate a lower maximal heart rate than normal during pregnancy (Table 1). Core body temperature should remain below 39.2°C, thus reducing the risk of teratogenicity.

**Advising on weight gain**

In pregnancy, the BMI is calculated at the antenatal booking appointment. Targeting education at the risks associated with a high BMI is far easier than targeting excessive gestational weight gain (GWG), because pregnant women are not routinely weighed throughout pregnancy in the UK. However, both maternal BMI and GWG should be monitored because of their impact on fetal growth and pregnancy outcomes:

**Table 1. Modified heart rate target zones for aerobic exercise during pregnancy.**

Maternal age (years)	Heart rate target zone (beats/min)
<20	140–155
20–29	135–150
30–39	130–145
>40	125–140

- Excessive GWG predicts large-for-gestational-age neonates independent of BMI. Epigenetic studies have highlighted the *in utero* environment as a critical contributor to long-term health (put simply, maternal obesity contributes to the development of insulin resistance *in utero*; Catalano et al, 2009).
- Avoiding excessive GWG is associated with a lower BMI in the postpartum period (Linné et al, 2003).

The evidence has been limited for interventions in pregnancy, but this is now being looked at. Guidelines on optimal levels of weight gain according to pre-pregnancy BMI have been published by the US Institute of Medicine (IOM, 2009; Table 2).

The concept of limited weight gain in pregnancy is difficult to promote as part of health education unless mothers are weighed. The IOM guidance is based on observational studies and is applicable independent of age, parity, ethnicity or smoking background. However, the following patient groups are exceptions:

- Teenagers.
- Women with multiple pregnancy.
- Women with medical problems.
- Women with hyperemesis gravidarum.

Teenagers are advised to use the adult BMI categories to determine their weight gain range until more research is done to determine whether special categories are needed for them. For twin pregnancies, the IOM recommends a GWG of 16.8–24.5 kg (37–54 lbs) for women of normal weight, 14.1–22.7 kg (31–50 lbs) for overweight women and 11.3–19.1 kg (25–42 lbs) for obese women.

**Table 2. Institute of Medicine (2009) guidelines on weight gain in pregnancy.**

Pre-pregnancy weight class	Pre-pregnancy BMI (kg/m <sup>2</sup> )	Total weight gain range (kg; lbs)	Mean (range) rate of weight gain in second and third trimesters (lbs/week)*
Underweight	<18.5	12.7–18.1 (28–40)	1.0 (1.0–1.3)
Normal	18.5–24.9	11.3–15.9 (25–35)	1.0 (0.8–1.0)
Overweight	25.0–29.9	6.8–11.3 (15–25)	0.6 (0.5–0.7)
Obese (all classes)	≥30.0	5.0–9.1 (11–20)	0.5 (0.4–0.6)

\*Assumes a first-trimester weight gain of 0.5–2.0 kg (1.1–4.4 lbs).

### Postnatal care

The high-BMI group of mothers is at higher risk in the immediate postnatal period of complications such as postpartum haemorrhage, sepsis and thromboembolism. Weight gain between pregnancies increases the risk of developing hypertension and diabetes in later life (Furber et al, 2013).

Information and advice about diet and physical activity should be readily available, with the proviso that the new mother's diet is not rigid, as this can have a negative impact on breastfeeding. Addressing fallacies remains a priority (e.g. emphasising that neither gradual weight loss nor physical activity reduce the quality of breast milk). There is a lot of support available from dietitians, nutritionists and specialist midwives, as well as resources such as the Australian Breastfeeding Association website (available at: [www.breastfeeding.asn.au/bf-info](http://www.breastfeeding.asn.au/bf-info)).

### Concluding remarks

In summary, the interventions currently available include the following:

- Information giving.
- Calorie restriction (reducing GWG).
- Behavioural modification (increasing physical activity).

Current obstetric practice would be improved in this high-risk group of patients by re-introducing maternal weight measurement and advising about GWG accordingly. An example of one group of women who will benefit is those who start with a normal BMI at booking but whose BMI increases during pregnancy. Weighing pregnant women, if

re-introduced, would be as routine as urine testing and a blood pressure check at an antenatal visit.

There is an argument for early antenatal classes, (i.e. health education in the early second trimester), which would empower pregnant women at a stage when a change in diet and activity may yet impact on the rest of the pregnancy. This would also promote a greater understanding in mothers of the medical services provided.

In women with a high BMI, is it right or wrong to share the fact that scans are technically more difficult to perform, take longer and are less reliable, or that anaesthesia is more risky and takes longer to administer and take effect? Does this provide adequate explanation or merely foster guilt in pregnant women? The debate continues.

Weight remains a topical but highly emotive subject. In an era when we offer rubella and human papillomavirus vaccinations to schoolgirls, we need to revisit the timing and content of sex education. Anticipating future pregnancies, young women need to have information starting in school, preconceptually, as a natural part of their education in the university of life, and continuing through to the postnatal period. ■

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### Page points

1. Obese mothers are at an increased risk of complications in the immediate postnatal period, and weight gain between pregnancies increases the risk of hypertension and diabetes in later life.
2. Postnatally, advice on diet and exercise, and their effects on breastfeeding, should be given, as a large number of misconceptions remain.
3. Obstetric practice in the UK could be greatly improved by the re-introduction of routine weighing and early antenatal classes.

**“Anticipating future pregnancies, young women need to have information starting in school, preconceptually, as a natural part of their education in the university of life, and continuing through to the postnatal period.”**

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