



Diabetes and pregnancy: Management dilemmas

Online learning opportunity

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Article points

1. The prevalence of diabetes in pregnancy is on the increase, partly fuelled by the increase of obesity in women of childbearing age. Obesity and diabetes work in tandem to further increase pregnancy-related complications.
2. The current dichotomous approach to service provision, which separates the care pathway for pregnant women with diabetes from those with obesity, creates a gulf in holistic care of pregnant women who have the combined diagnosis of diabetes and obesity (diabesity).
3. A pro-active and creative multidisciplinary team approach that bridges the current gap between diabetes and obesity antenatal services is required to minimise the logistical and clinical challenges and optimise better outcomes for women with diabesity during pregnancy.

Key words

- Gestational diabetes
- Obesity
- Pregnancy management

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Obesity is becoming a global pandemic and is a potent risk factor for the development of type 2 diabetes, which increasingly is being diagnosed in women with future reproductive plans. Obesity is also a risk factor for the development of gestational diabetes during pregnancy. Currently in most centres, pregnancies that are complicated by either diabetes or obesity are managed under separate streams of multidisciplinary teams in defined specialist services. The significant overlap of risks in pregnant women with coexisting diabetes and obesity (diabesity) calls for a new approach that focuses on holistic risk-reduction strategies to lower the prevalence of pregnancy complications to the mother and child. The article appraises the maternal and fetal risks caused by diabesity, explores some of the logistical and practical difficulties encountered in managing women with diabesity during pregnancy and proposes strategies to improve overall care and outcome, including the potential for joint diabesity antenatal clinics.

Diabetes affects 2–5% of pregnancies in England and Wales (NICE, 2008), and this figure is rising due to an increased prevalence of obesity and type 2 diabetes in younger women of child-bearing age with future reproductive plans (Confidential Enquiry into Maternal and Child Health [CEMACH], 2007). Gestational diabetes is the commonest form of diabetes during pregnancy, accounting for 87.5% of cases (NICE, 2008), and it is well recognised that women who are overweight or obese are at a higher risk of developing gestational diabetes. It is, therefore, common practice to offer screening for gestational diabetes in the form of oral glucose tolerance testing to all pregnant women with a BMI of 30 kg/m² or higher. Pregnancy itself may be the first time a woman has the opportunity for screening, and thus may detect previously undiagnosed diabetes.

Diabesity in pregnancy

The concept of “diabesity in pregnancy” has received little attention as clinical care is separated along traditionally defined lines of “diabetes in pregnancy” and “obesity in pregnancy”. The significant overlap of risks between the two clinical entities calls for a

more robust approach in exploring risk-reduction strategies for pregnant women with coexisting diabetes and obesity.

Diabesity-related pregnancy risks and risk-reduction strategies

Both diabetes and obesity are individually recognised as risk factors for maternal and fetal complications during pregnancy and both require consultant-led care within a multidisciplinary team.

Risks to the mother

Diabesity is associated with hypertension (Kalra, 2013) in pregnancy and the development of pre-eclampsia (Rasmussen et al, 2014). Both type 1 and type 2 diabetes have been identified as risk factors for the development of pre-eclampsia, and, as such, aspirin 75 mg is commonly offered from 12 weeks until birth as a risk-reduction strategy (Redman, 2011).

Obesity is associated with a significant risk of venous thromboembolism; therefore, a risk assessment must be performed for all women with a BMI over 30 kg/m² to identify any other risk factors

that may warrant antenatal prophylaxis with low-molecular-weight heparin (Andersen et al, 2010).

The risk of pre-term labour is slightly increased in women with both diabetes (Köch et al, 2010) and obesity compared to women without these conditions (Raja et al, 2012). In addition, women with pre-gestational diabetes are usually delivered relatively earlier (at 38 weeks) due to the risk of unexplained late stillbirth (Miaillhe et al, 2013). In these cases, the timing and mode of delivery of the baby is dependent on the overall presentation of the mother and fetus, taking into account maternal glycaemic control, fetal wellbeing and the presence of additional obstetric complications.

Obesity and diabetes are also both associated with higher rates of caesarean section delivery (Weiss et al, 2004), which in turn significantly increases postpartum complications including haemorrhage and wound infection (Chelmow et al, 2004). There is also an increased risk of perinatal maternal mortality for women with diabetes (Wahabi et al, 2012).

Risks to the fetus and newborn

It is important to consider and offer increased fetal surveillance by serial growth scanning during pregnancy for women with diabetes and obesity. Both conditions can be associated with macrosomia (Stothard et al, 2009), and diabetes can be associated with polyhydramnios (excess amniotic fluid in the amniotic sac; Idris et al, 2010) and small for gestational age (SGA; Barnes et al, 2013). Serial growth scans are strategically useful for the assessment of fetal growth in mothers with significantly raised BMI as clinical assessment with measurement of the symphysis-fundal height and palpation for fetal lie are unreliable due to body habitus (Geerts et al, 2013).

Early pregnancy complications associated with the presence of diabetes and obesity in the mother during pregnancy include higher rates of miscarriage and congenital abnormalities of the fetus, including neural tube defects (Ray et al, 2004). The risk of fetal abnormality is 3–4% in the background population (Murdoch Childrens Research Institute, 2004), and obesity is thought to increase this risk 1.6-fold (Watkins et al, 2003).

Diabetes-related risk of congenital anomaly is related to the level of glycaemic control of the mother at conception (CEMACH, 2005). HbA_{1c} of no greater than 64 mmol/mol (8%) is associated with a 5%

risk of anomaly (Ylinen et al, 1984), so women with diabetes hoping to conceive are recommended to maintain their HbA_{1c} below 43 mmol/mol (6.1%) if it is safe to do so (NICE, 2008). An HbA_{1c} greater than 86 mmol/mol (10%) is associated with a 25% risk of congenital anomaly (Rose et al, 1988). Therefore, women with an HbA_{1c} greater than 86 mmol/mol (10%) should be advised to avoid pregnancy (NICE, 2008). After birth, there are also increased rates of neonatal admission (Watson et al, 2003).

Pregnancy and weight management

The current advice to pregnant women with obesity, in particular, is to discourage active weight loss, adopt a healthy diet to prevent weight gain and encourage an “active” pregnancy. Weight loss during pregnancy is associated with SGA babies, small placenta, short umbilical cord length, pre-term delivery and pre-term rupture of membranes (Yee et al, 2013). A reduction in the development of pre-eclampsia and a fall in elective caesarean section complication have been associated with weight loss during pregnancy, but these do not outweigh the risks of disrupted placental development caused by severe weight loss during pregnancy (Hasegawa et al, 2012).

However, weight loss before pregnancy is encouraged and has been associated with a reduction in the development of gestational diabetes and hypertension (Villamor and Cnattingius, 2006). This should be remembered when planning antenatal care with the offer of increased monitoring with serial scans in those that have recently undergone significant weight loss pre-pregnancy (Diouf et al, 2011).

Inter-pregnancy increases in BMI between the first and second pregnancy have been shown to increase a woman’s risk of gestational diabetes in a subsequent pregnancy (Ehrlich et al, 2011), highlighting the importance of weight maintenance postnatally as well.

Diabetes in pregnancy: Challenges and their solutions

Diagnostic challenges

Ultrasound scanning of the fetus becomes more difficult with increasing BMI of the mother as maternal tissue impairs visualisation of fetal anatomy, especially the fetal spine and heart, thus making it more difficult to detect abnormalities with either standard or targeted sonography (Dashe et al, 2009). There is a 97% detection rate of fetal anomalies in

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2. Early pregnancy complications associated with the presence of diabetes and obesity in the mother during pregnancy include higher rates of fetal abnormalities. Therefore, it is important to consider and offer increased fetal surveillance by serial growth scanning during pregnancy for women with diabetes and obesity.
3. The current advice to pregnant women with obesity, in particular, is to discourage active weight loss, adopt a healthy diet to prevent weight gain and encourage an “active” pregnancy.

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1. Women with diabesity can be heavily personnel dependent, requiring additional staffing to ensure safe delivery of care during the peripartum period.
2. Obese women with diabetes are at a high risk of developing complications during labour, including failure to progress, malpresentation and increased risks of instrumental and caesarean deliveries.

pregnant women with a normal BMI compared with a 75% detection rate in pregnant women with class III obesity (Paladini, 2009). The detection rate reduces further among mothers with pre-gestational diabetes (a group already known to have a higher incidence of congenital abnormalities); thus adequate counselling is required for mothers to reflect the limitations of ultrasonography. Incomplete ultrasound examinations that require repeat examinations, are also more prevalent in pregnant women with obesity (Wong et al, 2002).

Equipment challenges

The provision of health and social care to people with obesity presents difficulties beyond the immediate clinical environment. Manual handling can be challenging due to the lack of space, equipment and transportation (Hignett et al, 1980). In hospital, severely obese people often require specialist furniture and equipment to receive basic care.

Professionals caring for morbidly obese individuals are also exposed to risk during manual handling, which is believed to be influenced by the nature and design of the environment, the limited range of handling equipment available and the efficacy of organisational procedures and training.

For pregnant women with obesity and a BMI over 40 kg/m², a manual handling risk assessment should be performed in the third trimester, and an up-to-date body weight should be included. Additional peripartum considerations include establishing the weight limits of equipment such as delivery suite beds, the operating table and the provision of specialist mattresses, especially in those with prolonged immobility who are at risk of pressure ulcers. Specific moving equipment such as hoists, hover mattresses or wider “pat” slides may be required instead of conventional equipment. In particular, positioning of women with diabesity into the lithotomy position in the second stage of labour needs careful planning to ensure that the leg supports are able to take the weight required.

In our experience, other modifications that require forward planning include provision of larger hospital gowns to ensure adequate patient privacy and dignity, wider blood pressure cuffs, longer cardiotocograph monitoring belts to optimise fetal monitoring and longer epidural needles.

In obstetrics, thromboembolic deterrent stockings

are commonly used as part of the risk reduction plan for venous thromboembolism; however, appropriate sizes may not be readily available for severely obese pregnant women, and hence appropriate thromboprophylaxis with low-molecular-weight heparin should be initiated promptly (Andersen et al, 2010).

Additional equipment may be required if operative intervention is required to improve surgical access. This may include the use of additional operating assistants or the use of surgical adjunct, such as the Mobius® elastic retractor, to allow better visualisation of the surgical field. The use of negative pressure drains, specialised wound dressings and interrupted non-absorbable sutures should also be considered to reduce the increased risk of post-operative wound infection in people with diabetes and obesity.

Women with diabesity during pregnancy can be heavily personnel dependent, requiring additional staffing to ensure safe delivery of care during the peripartum period.

Anaesthetic challenges

Obese women with diabetes are at high risk of developing complications during labour, including failure to progress and malpresentation, and are at increased risk of instrumental and caesarean deliveries (Magann et al, 2013).

The engagement of the obstetric anaesthetist in the management of pregnant women with diabesity should be performed antenatally so that an appropriate management strategy can be planned in advance. There is variation in the cut-off BMI prompting referral for anaesthetic review, but anaesthetic review is firmly recommended for women with BMI of 40 kg/m² or greater. This allows for discussion of pain relief options, assessment of feasibility of regional anaesthetic using ultrasound for epidural depth estimation and airway assessment in the event of a general anaesthetic.

Senior anaesthetic input should be readily available in any anaesthesia for morbidly obese women as complication rates of 8.5–11% have been identified in this risk group (Vricella et al, 2010).

In pregnant women with diabesity, an epidural should be considered early in labour. Apart from providing analgesia, the presence of an effective epidural catheter can also be used to induce anaesthesia quickly in the event of an emergency caesarean section (Tan and Sia, 2011), thus avoiding general anaesthesia.

General anaesthetic should be avoided in women with diabetes if possible due to increased risks of aspiration, difficult intubation, barometric trauma, desaturation, hypotension and post-operative respiratory failure (Jones, 2007). Difficult airway equipment should be made available in the obstetric theatres in the event it is required. During labour, ranitidine should be given to all women with significantly raised BMI to minimise the risk of acid aspiration and its attendant consequences (Rout et al, 1993).

Diabetes in pregnancy: Management considerations

Bariatric surgery

The rising problem of obesity has been a trigger for an increasing proportion of people seeking bariatric surgery, including women of childbearing age with future pregnancy plans. Bariatric surgery is an option in the battle against the current pandemic of obesity and it is now part of the recommendations for the management of obesity (NICE, 2006).

Pregnancy following bariatric surgery should be regarded as high risk because there is significant risk of nutritional deficiencies following malabsorptive-type procedures. Current guidelines suggest checking serum levels of vitamin B12 and folate during pregnancy (Mechanick et al, 2009), along with a complete blood count, iron, ferritin, calcium and vitamin D levels in every trimester (American College of Obstetricians and Gynecologists, 2009). Conception should be postponed for at least 18 months after bariatric surgical procedures to avoid complications associated with nutritional deficiencies (Lavazzo et al, 2010).

Alternative testing for gestational diabetes should be considered for those women who undergo a malabsorptive-type surgery prior to pregnancy due to the risk of dumping syndrome, and home glucose monitoring is a pragmatic alternative to conventional oral glucose tolerance testing.

Lifestyle modifications

Lifestyle modifications including physical activity, dietary adjustments and weight are integral components in the management of diabetes and obesity. Weight loss on a structured hypocaloric diet with or without exercise improves emotional distress and quality of life in overweight and obese people with type 2 diabetes (Wycherley et al, 2014). Moderate

intensity exercise for about 30 minutes is advised three times a week (Kalra, 2013).

From experience, this can be a logistical challenge during pregnancy and any amount of exercise should be commended in people with diabetes for positive reinforcement. It is our practice to recommend taking opportunities to walk, such as walking other children to school (if within walking distance). A one-to-one session with the dietitian for dietary education and advice is also recommended.

Pharmacological Options

The pharmacological options in the management of diabetes in pregnancy should ideally extend beyond the traditional glucocentric approach, hence the use of metformin and weight-sparing insulin analogues should be given consideration (Kalra, 2013). In keeping with tight glycaemic control during pregnancy, the insulin regimen commonly employed in our practice at University Hospital of South Manchester consists of short-acting insulin with meals and intermediate-acting insulin at bedtime or morning. Currently only a handful of pregnant women with diabetes are using continuous subcutaneous insulin infusion (CSII) in the clinic, so there are no data to guide its specific benefit yet. Although recent reports show some glycaemic improvement is to be gained when CSII is used during pregnancy (Kallas-Koeman et al, 2014).

Education, follow-up and long-term health after pregnancy

Pregnancy can be an excellent opportunity to identify women at risk of developing chronic conditions in later life. The association between gestational diabetes and the life-time risk of developing diabetes has long been established (Hummel et al, 2013). Current practice in the UK is to carry out a fasting glucose test in the postnatal period (often at 6 weeks after birth) among women with gestational diabetes and then complete an annual review in primary care. The most rapid conversion from gestational diabetes to type 2 diabetes is seen within the first 5 years after birth, with a slower progression subsequently (Damm, 1998).

The importance of lifestyle modifications, which include a healthy approach to diet, exercise, as well as weight reduction and maintenance, have been proven to delay the onset of type 2 diabetes (Yamaoka and Tango, 2005), and are an important part of after care

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2. The importance of lifestyle modifications, which include a healthy approach to diet, exercise, as well as weight reduction and maintenance, have been proven to delay the onset of type 2 diabetes, and are an important part of after care for women with gestational diabetes during pregnancy.

“A one-stop consultation with all members of a multiprofessional team can improve efficiency and throughput of a clinic specialising in the care of women with diabetes and obesity during pregnancy.”

for women with gestational diabetes during pregnancy.

Obesity in itself is another independent risk factor for the development of diabetes, and it is also a cardio-metabolic risk factor. Ideally, all women diagnosed with obesity in pregnancy should have similar lifestyle advice to women who experience gestational diabetes, and should receive ongoing primary care with annual screening for diabetes.

It is important to identify the factors that may impact negatively on long-term adherence to healthy behaviours. Risk perception, health beliefs, social support and self-efficacy are the main factors identified to impact on the adoption of healthy behaviours (Kaiser and Razurel, 2013). A holistic approach to behavioural modifications must be considered, which takes into account psychological and emotional aspects. Depression and anxiety have both been identified to play a role in weight gain among obese pregnant women (Smid et al, 2012).

Is there a need for joint diabesity antenatal clinics?

Multidisciplinary clinics exist for women with diabetes during pregnancy with input from obstetricians, endocrine physicians, diabetes specialist nurses, diabetes specialist midwives and dietitians, and have been available in many centres across the UK for a number of years. This type of clinic allows for all aspects of care to be jointly managed in a single environment and provides an excellent opportunity for streamlining decision-making and sharing good practice.

As the prevalence of obesity increases, more units are developing specialist clinics to manage obesity in pregnancy in a similar way. There are ever-growing opportunities for interested midwives to develop additional skills in the area, allowing improvement in continuity of care and patient education.

With the current service structure implemented in many units, there are a number of crossovers in patient care between the obesity and diabetes clinic, for example, women with gestational diabetes, and pregnant women with type 2 diabetes and pre-pregnancy obesity. The existence of this subset of women with diabetes–obesity complex has initiated the discourse on the merits or otherwise of “joint diabesity antenatal clinics”.

In larger units with higher case loads and patient volumes, a dedicated joint diabesity antenatal clinic

would bring together a cohort of pregnant women with similar requirements, thus streamlining the process of decision-making and justifying the need for allied professionals such as dietitians and specialist midwives, with the sole benefit of improved patient care.

A one-stop consultation with all members of a multiprofessional team can improve efficiency and throughput of a clinic. It also prevents repetition of information and allows patient concerns to be addressed in a co-ordinated fashion. Clinicians working as a team allows for ongoing professional development and timely appraisal and integration of new evidence-based treatments and research findings.

Currently we do not have a joint diabesity antenatal clinic at the University Hospital of South Manchester; however, the steady influx of pregnant women being transferred from the obesity clinic to the antenatal diabetes clinic following a diagnosis of gestational diabetes has stimulated the need to consider rethinking the current service structure.

Final thoughts

Management of diabesity in the pregnant population is multifaceted and sometimes complex with significant clinical and logistical hurdles to overcome. Thankfully, good outcome is achievable with appropriate risk-reduction strategies. A recognition of the challenges posed by diabesity in pregnancy calls for a holistic approach to care through the provision of a seamless antenatal service that bridges the current gap between diabetes and obesity care. This approach requires creativity, targeted resources and a willingness by women and carers to adapt. Weight can be a sensitive issue but with the right approach, pregnancy can be used as a milestone for some women to pursue a path to better health. ■

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Online CPD activity

Visit www.diabetesonthenet.com/cpd to record your answers and gain a certificate of participation

Participants should read the preceding article before answering the multiple choice questions below. There is ONE correct answer to each question. After submitting your answers online, you will be immediately notified of your score. A pass mark of 70% is required to obtain a certificate of successful participation; however, it is possible to take the test a maximum of three times. A short explanation of the correct answer is provided. Before accessing your certificate, you will be given the opportunity to evaluate the activity and reflect on the module, stating how you will use what you have learnt in practice. The CPD centre keeps a record of your CPD activities and provides the option to add items to an action plan, which will help you to collate evidence for your annual appraisal.

1. Which of the following is associated with diabesity during pregnancy? Select ONE option only.

- A. Increased rate of twin pregnancy
- B. Increased risk of cholestasis of pregnancy
- C. Hypertensive disorders in pregnancy
- D. Low-lying placenta
- E. Male fetus

2. Which of the following is not a risk factor for the development of gestational diabetes? Select ONE option only.

- A. Body mass index greater or equal to 30 kg/m²
- B. Family history of diabetes in a first-degree relative
- C. Previous baby weighing more than 4.5 kg
- D. Fertility treatment
- E. Afro-Caribbean ethnic origin

3. Aspirin as a risk reduction intervention for pre-eclampsia in women with diabetes and obesity should be given at what dose? Select ONE option only.

- A. 75 mg daily
- B. 75 mg twice daily
- C. 150 mg daily
- D. 150 mg twice daily
- E. 300 mg daily

4. Which of the following risks is NOT associated with diabesity in pregnancy? Select ONE option only.

- A. Increased risk of miscarriage
- B. Increased risk of breech presentation
- C. Increased risk of pre-eclampsia
- D. Increased risk of fetal macrosomia
- E. Increased risk of caesarean delivery

5. Selecting ONE option only, a pregnant woman with a booking body mass index of 40 kg/m² should be offered the following except:

- A. Consultant-led care
- B. Risk assessment for venous thromboembolism
- C. Ultrasound scan to determine fetal gender
- D. Glucose tolerance test between 26–28 weeks
- E. Antenatal anaesthetic review

6. Which of the following is a useful adjunct in reducing risk and improving the quality of care around the time of delivery in pregnant women with diabesity? Select ONE option only.

- A. Wider blood pressure cuffs
- B. Longer epidural needles
- C. Wider patient transfer slides
- D. Mobius® elastic retractor or equivalent
- E. All of the above

7. A follow-up plan for obese women who had gestational diabetes during pregnancy ideally should include all the following except:

- A. Routine full blood count one week postpartum
- B. Fasting plasma glucose at 6–12 weeks
- C. Annual fasting plasma glucose
- D. Weight management plan
- E. Pre-pregnancy planning for subsequent pregnancy

8. A 36-year-old woman is 24 weeks pregnant and has type 2 diabetes managed by lifestyle modification pre-pregnancy. She accepts that treatment is now

necessary as her fasting blood glucose measurements are rising, but she declines insulin. Which of the following anti-diabetic agents, if any, are SAFE to recommend? Choose ONE option only.

- A. Acarbose
- B. Exenatide
- C. Sitagliptin
- D. All of the above
- E. None of the above

9. A 27-year-old woman has just started insulin to control her gestational diabetes. Which of the following is the MOST appropriate interval (in weeks) between HbA_{1c} blood monitoring checks? Select ONE option only.

- A. 1
- B. 3
- C. 6
- D. 8
- E. 12

10. According to NICE guidelines, which of the following represents the diagnostic threshold ABOVE which a glucose tolerance test confirms gestational diabetes? Select ONE option only.

	Fasting plasma glucose	2-hour blood glucose
A.	≥5.1 mmol/L	≥8.6 mmol/L
B.	≥5.1 mmol/L	≥10.2 mmol/L
C.	≥5.1 mmol/L	≥11.2 mmol/L
D.	≥7.0 mmol/L	≥7.8 mmol/L
E.	≥7.0 mmol/L	≥11.2 mmol/L