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Effects of obesity on pregnancy in the antenatal period

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Abstract

Obesity affects one in three pregnancies and is the leading cause of high risk pregnancies in Australia. This discussion paper identifies the effect of a high Body Mass Index (BMI) on women and their pregnancies. It provides key midwifery strategies in the antenatal period to encourage healthy eating and life-long habits to improve the health and wellbeing of women and their families.

Introduction

Obesity has become one of the most significant factors affecting public health on a global scale (Obesity Working Group (OWG) 2009). Rates of obesity are increasing at an unprecedented rate in Australia (Monash Obesity and Diabetes Institute (MODI) 2012) in line with other western nations such as the United Kingdom (Phillips 2012) and the United States of America (Smith, Hulsey & Goodnight 2008). Maternal obesity has been reported to affect as many as one in three pregnancies and has become the leading cause of high risk pregnancies (De Jersey et al 2011). This paper will provide a brief overview of obesity and its prevalence in Australia. It will discuss the implications of obesity as it relates to the antenatal period, focusing on the effects of obesity on the pregnant woman and her unborn child, along with the potential for complications during pregnancy. The long term effects of maternal obesity during pregnancy will also be addressed emphasising the need for prevention of obesity while pregnant. This will be followed by a discussion of how maternal obesity influences midwifery practice and the health care system as a whole.
Prevalence of Obesity
Identification of obesity is performed using the body mass index (BMI) scale in which a person’s height and weight is used as an indicator of body fat. A normal BMI is in the range of 20-25 kg/m², while a BMI of 25-30 kg/m² is considered overweight and a BMI greater than 30kg/m² is considered obese (Elias & Gibbons 2010; McIntyre et al 2012; & Ramachenderan, Bradford & McLean 2008). Recent research has found that approximately 60% of adults in Australia are either overweight or obese (Australian Bureau of Statistics (ABS) 2011; & National Preventative Health Taskforce (NPHT) 2008), and that up to 50% of women of childbearing age are overweight or obese (Phillips 2012). Obesity during pregnancy is known to increase both maternal and foetal mortality rates (Phillips 2012; & Powell & Hughes 2012) and therefore the increasing prevalence of obesity during pregnancy has led to ‘mounting concern about the impact of an unhealthy body weight on pregnancy outcomes’ (OWG 2009, p. 10).

Complications in Pregnancy
Maternal obesity during pregnancy is known to increase the risks of a number of complications in the antenatal period. Firstly, there is a greater incidence of gestational diabetes in obese pregnant women. During pregnancy most women will develop a degree of insulin resistance due to the effect of the hormones of pregnancy (Elias & Gibbons 2010), but obese women are known to have a greater degree of insulin resistance during pregnancy (Phillips 2012) and in conjunction with this the pancreas is less able to produce enough insulin to compensate (Elias & Gibbons 2010). Gestational diabetes increases the chance of the pregnant woman experiencing hypoglycaemic episodes and diabetic ketoacidosis, and there is also an increased incidence of foetal macrosomia (Thorogood & Donaldson 2010).

Smith, Hulsey & Goodnight (2008) suggest that obesity in pregnancy also predisposes women to general cardiovascular disease due to the function of adipose tissue. This can lead to an increase in the incidence of deep vein thrombosis, chronic inflammation and increase in vascular resistance. Hypertension is more common in obese pregnant women, both chronic hypertension present prenatally and also hypertension that develops during pregnancy (Ramachenderan, Bradford & McLean 2008), and pre-eclampsia is more prevalent in obese pregnant women and is one of the leading causes of maternal and foetal death (Phillips 2012; & Ramachenderan, Bradford & McLean 2008).
Obesity during pregnancy can also have an effect on the foetus with an increased incidence of miscarriage (Elias & Gibbons 2010), stillbirth and neonatal death (Phillips 2012). There is also evidence that maternal obesity is related to premature birth and foetal growth restriction (Elias & Gibbons 2010; & Phillips 2012), although this has been attributed to the effects of maternal complications necessitating early delivery of the foetus rather than obesity itself (Ramachanderan, Bradford & McLean 2008). Congenital abnormalities are also more common (Dunlevy 2010; Smith, Hulsey & Goodnight 2008; & Tiran 2010) in particular neural tube defects due to folate deficiency (Ramachanderan, Bradford & McLean 2008) or decreased absorption of folate (Smith, Hulsey & Goodnight 2008). The incidence of foetal macrosomia is increased in obese pregnant women which is often attributed to the increased presence of gestational diabetes (Thorogood & Donaldson 2010), though Ramachanderan, Bradford & McLean (2008) suggest that obesity is an independent risk factor for macrosomia.

A further complicating factor in the antenatal period is the difficulty encountered when attempting to assess the wellbeing of the foetus. Visualisation of the foetus on ultrasound is made more difficult by maternal obesity which can lead to undiagnosed congenital abnormalities (Howat 2008; Phillips 2012; & Ramachanderan, Bradford & McLean 2008). There is also difficulty encountered when performing an abdominal examination due to excess abdominal adipose tissue (Wildschut 1999) and Ramachanderan, Bradford & McLean (2008) suggest that general guidelines for assessment of foetal well being and foetal growth charts are not useful for the obese pregnant woman. There is greater difficulty in detecting foetal macrosomia, intrauterine growth restriction and determining foetal presentation (Ramachanderan, Bradford & McLean 2008; & Wildschut 1999). Use of doppler devices or CTG monitoring to auscultate the foetal heart has also been found to be difficult or unsuccessful (Howat 2008).

**Life-long Impacts of Obesity**

Obesity during pregnancy can have lifelong health implications for women and their infants.

Women who do not lose excess weight within six months of delivery are more likely to retain the weight long term, which can lead to continued obesity (De Jersey et al 2011; & Phillips 2012), cardiovascular disease and further complication in subsequent pregnancies (Smith, Hulsey &
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Goodnight 2008). Women who are obese, or become obese, during pregnancy are also more likely to develop diabetes later in life (3 Centres Collaboration (3CC) 2006; & Phillips 2012). An infants’ future health can be affected by the intrauterine environment (Ramachenderan, Bradford & McLean 2008) which in the case of obese mothers, may be ‘nutritionally sub-optimal’ (Phillips 2012, p. 4). Infants born to obese mothers have been shown to have increased rates of overweight and obesity during childhood and adulthood (De Jersey et al 2011; Heslehurst et al 2007; & Howat 2008), and are at greater risk of developing diabetes and cardiovascular disease in later life (Phillips 2012).

Prevention of Complications
Prevention of complications related to obesity in pregnancy is best achieved by prevention of obesity. Howat (2008, p.11) states that ‘by the time an obese woman is pregnant it is too late...all we can do...is deal with the consequences and risks’. Ideally, preconception care should be provided to women of childbearing age to provide education regarding the consequences of obesity during pregnancy (Dunlevy 2010; & Smith, Hulsey & Goodnight 2008). This is also an ideal time to implement weight loss interventions (McIntyre et al 2012) to assist women to achieve a healthy weight prior to pregnancy (Dunlevy 2010; & Phillips 2012). It should be recognised though, that prevention of obesity needs to begin in childhood. Research shows that obesity in childhood greatly increases the chance of obesity in adulthood (ABS 2011) and that once a child is obese there is a decreased likelihood that child will subsequently develop a healthy weight (Department of Health and Ageing 2010). Therefore, emphasis needs to be placed on educating children about healthy eating and exercise (Howat 2008).

While obesity during pregnancy increases the risk of complications for both the mother and the foetus, weight loss during pregnancy is not generally advised (Phillips 2012; Powell & Hughes 2012; & Tiran 2010). Rather, weight gain goals should be adjusted according to a woman’s pre-pregnancy weight and obese women should be advised to have a smaller weight gain than women of a healthy weight (Elias & Gibbons 2010). Ramachenderan, Bradford & McLean (2008) discuss weight gain goals during pregnancy and suggest that a woman’s pre-pregnancy BMI should be taken into account, along with the needs of the pregnancy and growing foetus. They cite recommendations made by the US Institute of Medicine (IOM) in 1990 that suggests women with a pre-pregnancy BMI greater than 26 kg/m² should aim for a weight gain of 7-11.5kg as opposed to
women with a healthy pre-pregnancy BMI who should aim for a weight gain of 11.5-16kg (Ramachenderan, Bradford & McLean 2008, p. 232). Further research is discussed that found women with a pre-pregnancy BMI greater than 30kg/m² had less complicated pregnancies if their pregnancy weight gain was less than 6kg (Ramachenderan, Bradford & McLean 2008). The IOM guidelines were reviewed in 2009 and were amended to include recommendations for women with a pre-pregnancy BMI greater than 30kg/m², which is in line with that previously mentioned (Elias & Gibbons 2010). However Smith, Hulsey & Goodnight (2008) cite research that found few women were able to meet IOM weight recommendations and have suggested weight gain goals should be made on an individual basis and take into consideration a woman’s metabolic rate, insulin resistance and exercise regime. This is supported by De Jersey et al (2011, p. 54) who discuss weight gain advice during pregnancy that is ‘individualised and appropriate for pre-pregnancy BMI’.

**Midwifery Management**

It is inevitable that midwives will care for obese pregnant women during the antenatal period and therefore midwives need to be well educated about the effects of obesity on pregnancy, the potential complications, and the interventions that may need to be implemented (Crafter 2003; & Smith, Hulsey & Goodnight 2008). Identification of obesity should be made at the initial booking visit. A woman’s height and weight is routinely measured at the beginning of pregnancy and these figures should be used to calculate the BMI (3CC 2006; Phillips 2012; & The Royal Women’s Hospital 2007). Following the identification of obesity the midwife should discuss with the woman the significance of the BMI reading and the risks associated with obesity during pregnancy (3CC 2006; & Phillips 2012). Obesity is an emotional topic for most women (Powell & Hughes 2012) and therefore the midwife should begin this discussion with sensitivity and tact (Crafter 2003; Modder & Fitzsimons 2010; & Phillips 2012). The midwife should be non-judgemental, empathic, client focused, friendly and supportive (Crafter 2003; & Powell & Hughes 2012). The midwife should make clear the possible health risks that obesity poses to the mother and the foetus in the antenatal, intrapartum and postnatal period (Phillips 2012). A clear and concise explanation, and provision of written material, will help the woman and her partner to understand what complications may arise and to make informed decisions throughout the childbearing experience (Powell & Hughes 2012).
Women should be encouraged to discuss any concerns they may have about their weight and should be given information about healthy weight gain during pregnancy (3CC 2006; Phillips 2012; & The Royal Women’s Hospital 2007). A healthy, nutritious diet should be advocated along with appropriate exercise for pregnancy (Crafter 2003; Modder & Fitzsimons 2010; & Powell & Hughes 2012). The midwife should encourage the woman to be involved in setting diet and weight related goals if these goals are to be achievable during the pregnancy (Phillips 2012; & Powell & Hughes 2012). The woman may also be referred to a dietician for further support and education (Crafter 2003; & Powell & Hughes 2012).

Pregnancy is also an opportune time to provide education to women and their families on the benefits of a long term healthy lifestyle. During pregnancy women and their families are in regular contact with health professionals who can continually encourage a healthy lifestyle throughout the months of pregnancy (De Jersey et al 2011). Pregnancy is also a time when women may be more motivated to change (De Jersey et al 2011; & OWG 2009), and these changes can extend to the entire family (Phillips 2012). There is also a case to be argued that health care providers, including midwives, need to be proactive in providing education on obesity prevention for the whole community. Obesity rates in the general population are expected to rise unless community attitudes towards healthy eating and exercise are improved (Howat 2008). Smith, Hulsey & Goodnight (2008) recommend involvement in community forums, advising on healthy lunch ideas for schools, participation at community expo’s and lobbying government for legislative changes to promote a healthy diet and lifestyle.

The midwife should also make modifications to the antenatal routine when caring for an obese woman (Ramachenderan, Bradford & McLean 2008). Pregnant women who are obese should be offered a glucose tolerance test at the booking visit to identify any pre-existing diabetes (Wildschut 1999). Midwives need to take care when measuring an obese woman’s blood pressure and ensure that an appropriate size cuff is used to prevent false high readings being recorded (Crafter 2003; Wildschut 1999). Routine weighing during antenatal visits is no longer advocated for the general pregnant population, and this also extends to obese women (3CC 2006). Weighing obese women at every visit can be disheartening for the woman and lead to increased stress (Crafter 2003). It has
been suggested though that if women are agreeable, regular weighing can assist in monitoring weight gain during pregnancy and help women to keep within their weight gain goals (3CC 2003). The midwife should also refer to the National Midwifery Guidelines for Consultation and Referral (Australian College of Midwives (ACM) 2008) when caring for an obese woman. The guidelines recommend that when caring for a woman with a BMI greater than 35kg/m², the midwife should consult with a medical or other health care provider to determine the most appropriate plan of care for the woman (ACM 2008, pp. 17&20).

**Midwifery Services, Considerations and Government Response**
As obesity during pregnancy increases health risks and complications for both the mother and the foetus, care of obese women during pregnancy places an additional burden on the health care system and its resources (Heslehurst et al 2007; & Phillips 2012). Maternity services need to ensure they have appropriate facilities and equipment to manage obese pregnant women. There needs to be a consideration of the physical environment such as wider doorways and larger rooms, along with ensuring beds, wheelchairs, scales and theatre equipment are able to cope with the weight of obese women (Modder & Fitzsimons 2010). Occupational health and safety issues for staff should also be addressed including education on the safe use of specialised manual handling equipment (Modder & Fitzsimons 2010). There are additional financial costs incurred when caring for women with complications of pregnancy and obese pregnant women are at greater risk from many complications, such as gestation diabetes and pre-eclampsia (Denison et al 2009), induction of labour and/or caesarean (Denison et al 2009), postnatal infections and longer hospital stays (Ramachenderan, Bradford & McLean 2008), and the increased likelihood that the infant will require admission to a neonatal intensive care unit (Ramachenderan, Bradford & McLean 2008).

Government publications estimate that in 2008, obesity in Australia cost a total of $58 billion, taking into consideration actual costs to the health care system, loss of productivity and costs to carers (ABS 2011; & OWG 2009). While these costs are shared between the federal government, state governments, industry, community and individuals (OWG 2009), Howat (2008) suggests that in terms of obesity in pregnancy, the effects will be mainly felt in the budgets of the public health sector. Howat (2008) also alludes to the cost of the anxiety and stress placed on health care workers as they attempt to minimise the risks and manage the complications of obesity in pregnancy.
The Australian federal government has provided funding in an attempt to address health issues in pregnancy and reduce the costs associated with obesity in pregnancy and in the general population. The ‘Maternity Services Budget Package’ was introduced in 2009-10 at a cost of $120.5 million, with the aim of increasing identification and support for health risks associated with obesity, smoking and alcohol in pregnancy. This has targeted services in rural and remote areas of Australia through the Maternity Services Outreach Assistance Package and a national telephone advisory service for pregnant women (NPHT 2010, p. 49-50). Preventative health measures are also being addressed through the $872 million ‘National Partnership Agreement on Preventative Health’. This program aims to provide healthy eating and exercise education to children’s groups, schools, workplaces and communities (NPHT 2010, p. 12-14), in the belief that prevention is the most cost effective way of dealing with the long term consequences of obesity (OWG 2009).

Conclusion
The incidence of obesity in Australia has been steadily rising and is now recognised as the leading cause of premature death and illness in Australia (MODI 2012). Rates of obesity during pregnancy have risen at an alarming rate and this has led to increased risk to the health of the mother and the foetus. Obesity during pregnancy is placing additional burden on the health care sector particularly in relation to the costs of managing the complications many obese women face during pregnancy. Midwives are well placed to educate, support and encourage obese women during their pregnancy in order to reduce the incidence of complications, manage any complications that do arise, and to maximise the health and well being of the woman and her foetus. To have the greatest influence midwives need to be well educated about obesity in pregnancy, and also need to adopt a non-judgemental, friendly and tactful manner when dealing with obese women. This approach has been shown to encourage and empower women to adopt lifestyle changes that will improve the health and well being of themselves and their families.
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