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Educational and intervention programmes for gestational diabetes mellitus (GDM) management: An integrative review



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Summary

Introduction: Gestational diabetes mellitus (GDM) is a serious pregnancy disorder, which is linked to stillbirth, birth damage and later development of type 2 diabetes. Rates of GDM have increased dramatically in the past 20 years, related to obesity, sedentary lifestyles and ethnicity.

Aim: The aim of this integrative review was to identify and to critically review existing self-management programmes for GDM.

Method: A search for studies published between 2000 and 2013 was conducted on: PubMed, CINAHL, Medline, OvidSP, ProQuest, SCOPUS and Wiley online library. GDM search terms included gestational diabetes mellitus; GDM, pregnancy diabetes. Search terms for self-management programmes, included educational programmes; lifestyle intervention; exercise, diet, weight management in pregnancy; life-style interventions.

Results: Fifty papers were located in the search, and 12 were included in the review. Interventions fell into three main groups: (1) dietary and exercise interventions; (2) self-monitoring of blood glucose levels; and (3) counselling/behavioural interventions. This review found that although interventions varied in approach, most were successful in reducing insulin requirements; in reducing rates of macrosomia and hypertensive disorders, and in improving levels of knowledge and pregnancy outcomes. Only one study found that the intervention did not contribute some positive outcome.

Conclusion: Interventions that include adopting a low glycemic index diet and increasing levels of activity appear to be successful at reducing maternal blood glucose levels and reducing insulin requirements during pregnancy. Reducing maternal blood glucose levels, in turn, is associated with a reduction of macrosomia and maternal weight gain.

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Introduction

In recent years, women have become more susceptible to a number of pregnancy complications, due to increasingly sedentary behaviour and rising rates of obesity. One such complication is gestational diabetes mellitus (GDM) or diabetes first diagnosed in pregnancy. The incidence of this condition has increased considerably in the past 20 years (ACOG: American College of Obstetricians and Gynecologists, 2004; AIHW: Australian Institute of Health and Welfare, 2008; Dabelea et al., 2005). GDM, or diabetes diagnosed for the first time in pregnancy, currently affects approximately 2–10% of pregnant women in the US (NDIC: National Diabetes Information Clearinghouse, 2012), approximately 2–6% of pregnancies in Europe (Buckley et al., 2012) and 5–8% of all pregnancies in Australia (AIHW, 2008; Diabetes Australia, 2014). Risk factors for GDM include obesity (Ferrara et al., 2011; Luoto et al., 2011), older maternal age (Carolan, Davey, Biro, & Kealy, 2011) and migration from areas where high rates of GDM are found, such as Asia and South Asia (Indian sub-continent) (Hedderson, Darbinian, & Ferrara, 2010; Savitz, Janevic, Engel, Kaufman, & Herring, 2008). Each of these factors impacts on GDM incidence and maternal and infant outcomes. Rates are lowest for Caucasian women and may be as high as 14–19% in some population groups, such as: Asian, South Asian, South European, South American and indigenous populations (AIHW, 2008; Buckley et al., 2012; Carolan, 2013a; Carolan et al., 2011; Savitz et al., 2008). The aim of this integrative review was to explore the literature available to guide the management of GDM.

GDM

One of the major difficulties with GDM is that there few symptoms and the pregnant woman is usually unaware that she has GDM until it is diagnosed at routine prenatal screening. However, despite being virtually symptom free, serious pregnancy complications are associated with GDM and include stillbirth and infant death (Ben-Ziv & Hod, 2008), birth damage (Bodnar, Siega-Riz, Simhan, Himes, & Abrams, 2010), macrosomia or high infant weight (Langer, Yogev, Most, & Xenakis, 2005), and hypoglycaemia and respiratory difficulties which often results in admission to special care nursery (McIntyre, Gibbons, Flenady, & Callaway, 2012). Caesarean birth is also more likely and the mother is at increased risk of developing hypertension disorders in pregnancy (Schneider, Freerksen, Röhrig, Hoefl, & Maul, 2012). Moreover, although GDM generally resolves once the baby is born, women with GDM are predisposed to develop type 2 diabetes within 5–10 years of the pregnancy (Bellamy, Casas, Hingorani, & Williams, 2009) and are more likely to develop hypertension and heart disease at a later stage (Tam et al., 2012). Even more alarming is recent evidence that indicates that the offspring of mothers with GDM are predisposed to childhood obesity, early onset of type 2 diabetes (Gluckman, Hanson, Beedle, & Raubenheimer, 2007) and cardiovascular disease in adult life (Aceti et al., 2012; Marco et al., 2012).

Although these implications are very serious, when GDM is well managed, and blood glucose levels are kept within

normal limits, most pregnancy complications can be avoided. Management generally involves three measures: (1) self-monitoring of blood glucose levels; (2) dietary adjustment, and; (3) increasing exercise (Lapolla, Dalfrà, & Fedele, 2009; Turok, Ratcliffe, & Baxley, 2003). Insulin therapy is reserved for women, who for whatever reasons are unable to achieve normal blood glucose levels (Lapolla et al., 2009; Turok et al., 2003).

The seriousness of GDM and the dramatically increasing incidence of this condition make it one of the most urgent health challenges of this century. It is thus important to raise public awareness of this condition and to ameliorate the harmful effects of GDM once diagnosed. In spite of this urgency, there is limited evidence of successful intervention studies for women with GDM, particularly among low socio-economic groups, and seemingly, no consistent approach to treating this condition. At the same time, the value of GDM self-management is discussed in the literature, in terms of improving glycemic control and in reducing obesity and pregnancy complications (Cheung, 2009; Glastras & Fulcher, 2012). There is also a recognised need for the development of health resources to educate, motivate and empower women to self-manage their GDM (Carolan, Steele, & Margetts, 2010).

For all these reasons, this integrative review was conducted to explore the literature available to guide the management of GDM. The review was intended to provide background evidence which would inform the development of an educational programme to cater for a diverse multi-ethnic group of women, with high rates of GDM, in the Western suburbs of Melbourne.

Such a programme would hopefully lead to a reduction of complications of GDM and could also improve women's overall pregnancy experience and both their own and their infant's health.

Method

A range of databases was searched to source quantitative papers, and included: PubMed, CINAHL, Medline, OvidSP, ProQuest, SCOPUS and Wiley online library. We focussed on GDM management and educational programmes published since 2000. This time period was chosen as contingent on the current trend of rapidly increasing gestational diabetes. Papers were selected if they contained one key search terms for GDM such as gestational diabetes mellitus; GDM, pregnancy diabetes, and one search term for GDM management such as educational programmes; lifestyle/life-style intervention; exercise, diet, weight management in pregnancy. This broad approach was considered as likely to capture the relevant literature. Searches were also supplemented with bibliographic citation hand-searches on all literature that was related to GDM management, GDM lifestyle intervention and educational programmes, published in English.

Search strategies located a total of 50 papers and, for data management purposes, studies were classified into the following categories: (1) education programmes (2) lifestyle interventions, and (3), feasibility studies. At this stage, two duplicates and three abstracts were excluded as they were not directly related to GDM management, education, healthy lifestyle interventions, gestational weight

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