

NUTRITION INTERVENTION IN REDUCING GESTATIONAL DIABETES MELLITUS

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ABSTRACT

To review literature about Nutrition Intervention in reducing Gestational Diabetes Mellitus (GDM). We conducted a literature search for published articles on “Nutrition Therapy in reducing Gestational Diabetes” “Nutrition therapy” Gestational diabetes” “diabetes” and “Gestation” as keywords search in the Sothern Medical University Library Electronic resources (E-resources), PubMed, ScienceDirect, Web of Science and other databases including Google Scholar. A search strategy was developed for each database with no restriction on language and publication status, 75% of the papers used in this study were published in the last 5 years. Several studies have established that gestational diabetes mellitus (GDM) is an alarming health problem worldwide and is one of the most common complications of nutrition intervention in addressing GDM in pregnant women and one of the causes of the T2DM in the world. During pregnancy, it is most likely to be a critical moment for appropriate therapy and activities aimed at reducing the incidence of T2DM.

Keywords: *Nutrition, Nutrition therapy, Gestational diabetes, Gestation*



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INTRODUCTION

Gestational diabetes mellitus (GDM), has posed to be one of the most significant metabolic complications during pregnancy, the result of obesity prevalence and elevating maternal age has made the incidence of Gestational Diabetes Mellitus to be in the increase in the world, the increasing prevalence of GDM resulted in an immediate and future health consequences on the mother and as well as her child. The prevalence associated with GDM in the world ranges from 1 to 28% based on population demographic, screening type, and diagnostic criteria. In 2015 the International Diabetes Federation (IDF) reported 16.2% of women in the world had hyperglycemia during the gestation period, of which GDM takes up to 85.1% of the load. Different prevalence of GDM exists in the world with 5.4% in Europe to 11.5% in Asia. In another report by IDF, on the degree of hyperglycemia during the gestational period indicated regional differences, as an example; South-East Asia region accounting for the highest with (24.2%) when compared to 10.5% for Africa Region. Moreover, most cases of GDM (87.6%) occur in developing countries, with limited access to maternal and child healthcare.

It has been identified by some kinds of literature that GDM is a significant risk factor in developing impaired glucose tolerance and type II diabetes among pregnant women, the development of diabetes mellitus in women occurs within the of 20–60% around 5–10 years after pregnancy. The likelihood among women with GDM is 3 times higher in developing metabolic

syndrome and cardiovascular disease. Furthermore, there is an increased risk to develop impaired glucose tolerance and obesity to children born to women with GDM.

Nevertheless, in a recent study on Gestational Diabetes Prevention (RADIEL), the combination of physical activity and dietary intervention in obese pregnant women, the incidence of GDM is reduced by 39%. The results obtained may be conflicting which is due to the recruitment process to RADIEL study of obtaining obese women, that were identified as high risk on the basis one or both condition; BMI ≥ 30 kg/m² and presence of a history of GDM. Likewise, another study was conducted on Vitamin D and Lifestyle Intervention for preventing GDM, the study shows a drastic reduction by 33% incidence in GDM among obese pregnant women on healthy feeding habit compared with physical activity. With the burden and the consequence of GDM in the world on pregnancy outcome, perinatal morbidity/ mortality, and development of T2DM after the pregnancy, this has attracted the attention of the world to the alarming prevalence of GDM.

Some studies in the future will connect GDM with negative repercussions to mothers, like an increased risk of impaired glucose tolerance, T2DM, and cardiovascular disease and for the children; obesity and T2DM. Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. This definition is applied whether insulin or diet intervention is used for treatment and, with the condition after pregnancy. This definition does not also exclude the possibility of unrecognized glucose intolerance may have started concomitantly with the pregnancy

RESEARCH METHODS

We conducted a literature search for published articles on “Nutrition Therapy in reducing Gestational Diabetes” “Nutrition therapy” Gestational diabetes” “diabetes” and “Gestation” and “Pregnancy” as keywords search in the Sothorn Medical University Library Electronic resources (E-resources), PubMed, ScienceDirect, Web of Science and other databases including Google Scholar. A search strategy was developed for each database with no restriction on language and publication status, 75% of the papers used in this study were published in the last 5 years. Attached is a list of references for onward referral and verification.

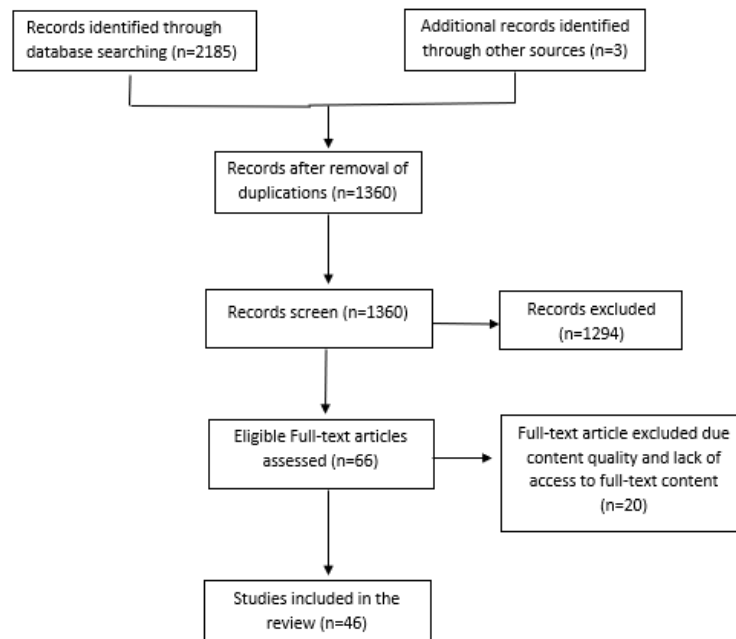


Figure:1 Review flow diagram

Eligibility Criteria

The eligibility criteria of all papers included in this review were focusing on Nutrition therapy in reducing gestational diabetes with available full text.

RESULTS AND DISCUSSION

Other risk factors

Several risk factors have been connected with the development of Gestational diabetes mellitus (GDM). Some particular populations are more susceptible than other and genetic aspects may be involved with GDM. In total, their similarities between the factors associated with overt diabetes include increased maternal age, obesity, ethnic background, family history of T2DM, and individual GDM history.

Studies have shown variants in many key genes with the mechanism of insulin resistance during pregnancy, together with adipokines, prolactin receptor, and the melatonin receptor [19], Notably, these genes are known to play a great role in the control of glucose homeostasis and metabolism. Polycystic ovarian syndrome (POS) is a medical condition which results in metabolic and hormonal dysfunction, which also increases the risk of developing GDM.

Nutritional risk factor

Some studies have shown to be effective during pregnancy (cross-sectional and retrospective), consuming a diet containing macronutrient constituents may result in the development of GDM, it also has shown an autonomous important connection between reduced polyunsaturated fat intake with GDM development. On the other hand, a study shows an evaluation of the effect of lifestyle behavior in white women, it depicts a strong correlation of high consumption of saturated fat and risk of developing GDM, in contrast, high consumption of polyunsaturated fat was related with decreased risk of developing GDM. There is an association between micronutrients and their influence on glucose tolerance.

In another prospective cohort study on pregnant women, an assessment was made on the effect of vitamin D status and the risk of developing GDM. 33% of women diagnosed with GDM had a maternal plasma level of 25-hydroxyvitamin D < 20 ng/mL when compared to 14% in the control group. After modifying some confounding factors, a maternal level of 25-hydroxyvitamin D < 20 ng/mL was connected with 2.66 times the chances of developing GDM compared with the control group.

Diagnosis and screening

It has been made clear in this studies that women who are at risk of preexisting diabetes should be tested during their first antenatal care (ANC) visit using the American Diabetes Association diagnostic criteria for nonpregnant women. The diagnostic criteria include; 25 kg per m² of body mass index and additional risk factors like; physical inactivity, a direct relative with diabetes, high-risk ethnicity, previous GDM, and hypertension may be screen with urgency. WHO and a group working on Pregnancy Studies in 2013, officially approved one-step test (two-hour GTT with 75 grams of glucose) for non-diabetic pregnant women for screening and diagnosis for GDM during the 24-28 weeks of pregnancy; In all pregnant women, the fasting blood sugar test should be carried out during their first visit for ANC. The blood glucose test results in the first visit of pregnancy are, fasting blood sugar (mg/dl) $\geq$ normal, 93-125 pre-diabetic, and $\leq$ 126 abnormal.

Nutrition Intervention

Various studies have evidenced, no available particular diet has been recommended as the sole nutrition intervention in this heterogeneous and multi-cultural woman with GDM. Nevertheless, the low gastrointestinal (GI) diet has continually shown improved glycemic control, reduced the use of maternal insulin, and decreased neonatal birth weights. With the Mediterranean diet, it has proven promising as it is of higher quality, with lower GI sources of food, but its

potency in GDM is yet to be established. Presently, the calorie-restricted together with ketogenic diets lack standard evidence for its effectiveness and safety to use in GDM. Both the low GI diet and high-complex carbohydrate most often move together as they show out nutrition plans that emphasize high-quality carbohydrates which contain high vitamins and minerals, with sufficient fiber. Instituting a high-quality intake of nutrient-dense carbohydrates during pregnancy has shown to be fruitful by reducing maternal FFA production, with results in improving insulin action and reducing excess fetal fat accretion.

It has noted that less carbohydrate restriction approach may perhaps be more productive to women with GDM, due to culturally adaptable, with a reduction in maternal anxiety of food choices, and may strengthen sustainable adherence. Low GI together with high-complex carbohydrate diet intervention, tends to elevate a healthier and more realistic diet moving into the postpartum period, which is of utmost importance seeing the risk of developing T2DM in these women. The National Institute for Health and Care Excellence (NICE) together with the International Diabetes Federation (IDF) recommended guidelines to replace high GI foods with low GI foods in GDM nutrition intervention. In a day, the recommended energy intake of complex carbohydrates macronutrients is 33-40%, with 35-40% fat and 20% proteins. Emerging studies encourage a well-balanced diet together with high-quality complex carbohydrates, low GI, and high fiber content that has been connected with successful perinatal results in GDM with no evidence of complication [29]. Supplement intervention with a high dose of vitamin D (50 thousand units every two-week) elevates insulin resistance in pregnant women with GDM. Although, future studies are needed in the field if GDM to establish the association or intervention and the most effective method of dietary counseling in women with GDM.

Prevention studies have established that pregnant women with complications of GDM have a higher risk of developing adverse maternal, fetal, and neonatal outcomes. Furthermore, a significant relationship between maternal glucose concentrations and perinatal complications has been reported in the HAPO study in pregnant women with little effects of GDM with glucose levels below, they are usually diagnosed as GDM. Most importantly early detection and prompt treatment are best in reducing perinatal and obstetrical complication. Studies have clearly shown that most women with GDM can successfully be managed with the intervention of a good lifestyle together with dietary counseling and effective physical activity, most precious is self-monitoring of blood glucose. Suitable nutrition intervention in women with GDM should become effective to meet the maternal together with fetal nutritional needs and to achieve and maintain glycemic control, which is most important in improving pregnancy outcomes and in turn result in saving cost more pressing medical care.

Moreover, T2DM and GDM share the same pathogenetic mechanisms, lifestyle is a risk factor for GDM, with frequent physical activity can help minimize this risk. However, in the more recent Finnish Gestational Diabetes Prevention Study, it has been established that the combination of physical activity and dietary intervention in obese pregnant women, minimized the incidence of GDM by 39%.

CONCLUSION

Conclusively, it has been established that gestational diabetes mellitus (GDM) is an alarming health problem worldwide and is one of the most common complications of nutrition intervention in addressing GDM in pregnant women and one of the causes of the T2DM in the world. During pregnancy, it is most likely to be a critical moment for appropriate therapy and activities aimed at reducing the incidence of T2DM. Both Overweight and obesity in pregnant women are risk factors for pregnancy complications such as GDM. The most effective way of managing GDM is through treatment and nutritional intervention. Obesity is the main challenge in inpatient counseling and interventions during pregnancy. GDM can cause serious health problems for both mothers and babies. The babies may grow large during pregnancy, which may result in injured at birth to either the baby or mother. Women with GDM are at risk of having an induced birth with most babies being born through a cesarean section. Some diets, like those with

low fiber and a high glycemic load coupled with physical inactivity, are a modifiable source of risk factors for GDM. Evidence by some studies that lifestyle interventions in the general population, that is promoting a healthy diet and physical exercise can prevent type 2 diabetes, which may in turn help in preventing GDM during pregnancy.

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