Review Article

International Journal of Food, Nutrition and Dietetics
Volume 4 Number 2, May - August 2016
DOI: http://dx.doi.org/10.21088/ijfnd.2322.0775.4216.4

Effect of Low Glycaemic Foods on Gestational Diabetes

K. Silambuselvi*, M. Hemamalini**

Abstract

Pregnancy is a relatively short period marked by dramatic changes of hormone profile and body composition with profound effects on metabolism. Evidences indicates that nutrition therapy is effective in reducing pregnancy and prenatal complications and also in attaining glycaemic control [1] .The nutrition treatment goal in Gestational diabetes mellitus is to achieve and maintain euglycemia in order to improve pregnancy outcomes. Over the past 15 years, low glycaemic index diets have been associated with decreased risk of, type 2 diabetes [2]. Many studies proves that following a low glycaemic index diet during pregnancy has been shown to improve maternal glycaemia .

Keywords: Pregnancy; Gestational Diabetes; Nutrition Therapy; Low Glycaemic Foods; Glycaemic Index.

Introduction

Gestational diabetes mellitus is one of the most common metabolic disorder diagnosed during pregnancy, and it refers to carbohydrate intolerance in various levels. Gestational diabetes mellitus affects a significant proportion of pregnant women each year and the prevalence is increasing worldwide [3]. The prevalence, however, varies from 1–14 %, depending on the population and the diagnostic criteria that have been used. Maternal diet is known to impact pregnancy outcome. Glycaemic index can be used as an adjunct for the fine tuning of post prandial blood glucose responses [4]. A low–glycaemic index diet is effective as a treatment for individuals with diabetes and has been shown to improve pregnancy outcomes when used from the first trimester [5].

Glycaemic Index Foods

The Glycaemic index value of a food is the response of blood glucose to a particular food, compared with an equivalent amount of the standard glucose [6]. *The glycaemic index is a ranking of carbohydrates on a scale from 0 to 100 according to the extent to which they raise blood sugar levels after eating.* Low-glycaemic foods have a Glycaemic index of 55 or below . *Low-*Glycaemic index *foods, by virtue of their slow digestion and absorption, produce gradual rises in blood sugar and insulin levels, and have proven benefits for health.. They have benefits for weight control because they help control appetite and delay hunger. Low* Glycaemic index *diets also reduce insulin levels and insulin resistance.* Low glycaemic index diets(e.g.-whole wheat bread, oat meal,nuts,peas,beans,legumes and lentils, on-starchy vegetables) have been shown to benefit those being treated for diabetes [7].

Carbohydrates and Low Glycaemic Index Diet

Carbohydrate is the main nutrient that affects blood glucose values . Its impact on blood glucose concentrations can be affected by the total amount and type of carbohydrate [8]. Carbohydrates are definitely not the same with respect to their immediate impact on our blood sugar. For example, non-whole grain breads and pasta noodles both contain similar amounts of starch, and their starches are similarly composed of long chains of the simple sugar, glucose. But the 3-dimensional structure of bread allows more of the starch to be exposed to enzymes in our saliva and in our digestive tract. This greater exposure to enzymes allows more of the starch to be broken down into sugar and gives non-whole grain breads a generally higher GI value than non-whole grain pastas. Similarly, two basic types of starch found in

Author's Affiliation: *Assistant Professor ,**Professor, S.R.M. College of Nursing, SRM University, Kattankulathur, Kancheepuram District, Pin Code : 603203 TamilNadu India.

Corresponding Author: K. Silambuselvi, Assistant Professor, S.R.M. College of Nursing, SRM University, Kattankulathur, Kancheepuram District, Pin Code-603203 TamilNadu India.

E-mail: selvivalavan@gmail.com

Table 1: Low glycaemic index Foods

Low GI (55 or less)*	Medium GI (56-69)*	High GI (70 or more)*
Breads:	**Breads:**	**Breads:**
100% stone ground whole wheat	Whole wheat	White bread
	Rye	
	Pita	
Cereals:	**Cereals:**	**Cereals:**
Bran cereal,	Puffed wheat	Corn cereal,
Oat bran cereal, Barley,	Oatmeal, Quick oats, brown rice	Rice cereal,
Parboiled rice		Short grain rice
Other:	**Other:**	**Other:**
Sweet potato, Yams	Potato (white)	Potato,
Legumes, Lentils	Sweet corn, Popcorn	French fries.
Chickpeas, Kidney beans Split peas,	Black bean soup	
Soy beans	Green pea soup	
Baked beans		

many foods - amylose and amylopectin - also influence their GI values, even if the foods have identical amounts of total starch.

With respect to their GI, foods are also differently impacted by cooking. Many legumes, for example, have cell structures that are fairly resistant to disruption and help prevent breakdown of the starches inside their cells. For this reason, legumes tend to have lower-than-expected GI values, provided that they have not been overcooked. Before they have been ground into flour, whole grains also tend to have lower GI values due to the sturdiness of their cell structures. But after being ground into flour, their starches become more susceptible to breakdown and their GI value tends to increase [9].

Benefits of Low Glycaemic Index Diet in Gestational Diabetes

Women with Gestational diabetes mellitus actually have similar nutritional requirements as other pregnant women but are much more likely to also be overweight. Strategies to minimize the effects of carbohydrates on the 1 hour postprandial glucose level have included limiting carbohydrates to approximately 40 percent of energy intake and distributing intake across six feedings, with 10-15 percent for breakfast, 20-30 percent for lunch, 30-40 percent for dinner and 10 percent for each of three between –meal snacks [10].

According to American Dietetic Association recommendation, carbohydrate intake should be approximately 40 % of total calorie intake and should be selected from foods with low glycaemic index values [11]. In pregnant women of normal body weight (BMI between 18.5–24.9), the recommendation is to consume 30–32 kcal/kg body weight, especially during the second half of pregnancy [12]. However, those who are overweight (BMI of 25 to 29.9) should ingest approximately 25 kcal/kg body weight [13]. Other guidelines recommend caloric intake based on BMI as follows: 30 kcal/kg for a BMI of 22–25, 24 kcal/kg for a BMI of 26–29, and 12–15 kcal/kg for a BMI of >30.

The primary aim of management for Gestational diabetes mellitus are to optimize glycaemic control and improve pregnancy outcomes [14]. A low–glycaemic index diet is commonly advised as treatment for women with gestational diabetes mellitus. In non-pregnant people with diabetes, evidence shows that using low- Glycaemic index diets helps lower HbA1C and gives better glycaemic control [15].

McGowan et al [16] assessed the impact of a low Glycaemic index dietary intervention on maternal Glycaemic index nutritional intake and gestational weight gain during pregnancy. Compliance and acceptability of the low Glycaemic index diet was also examined. They concluded that dietary intervention in early pregnancy had a positive influence on maternal Glycaemic index, food and nutrient intakes and gestational weight gain. Following a low glycaemic index diet during pregnancy has been shown to improve maternal glycemia and reduce infant birth weight.

Louie JC et al [17] study also proved that pregnant women with Gestational diabetes mellitus are likely to benefit from following a low- Glycemia index meal pattern, with no significant side effects, and consideration of the Glycaemic index should be given when formulating a diet for Gestational diabetes mellitus. Following a low GI diet may be particularly beneficial for women at risk of exceeding the gestational weight gain goals for pregnancy.

Moses et al also evaluated the effect of low Glycaemic index diet on the need for insulin therapy in women with Gestational diabetes mellitus. 63

women with Gestational diabetes mellitus were randomly assigned to a low Glycaemic index diet or a conventional high fiber, high GI diet. The need for insulin therapy was significantly reduced in low Glycaemic index group, 29%vs59%(p=0.023). Further moe, 9 of the 19 women in the higher Glycaemic index group were able to avoid the use of insulin by changing to the low Glycaemic index diet. This study suggested benefits of using low- Glycaemic index diets in Gestational diabetes mellitus management .

Conclusion

Dietary advice provided for women with Gestational diabetes mellitus should ensure adequate nutrients for normal fetal growth and maternal health, but not induce weight loss or excessive weight gain during pregnancy; it also aims to assist optimal glycaemic control [18]. Glucose is the primary source of energy for fetal growth [5] making maternal glucose levels influential on pregnancy outcomes - a primary consideration in gestational diabetes management. During pregnancy, the concept of Glycaemic index is valid [19]. Various Researches has proved that low glycaemic index foods control blood glucose levels and effectively manage diabetes in pregnancy.

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