Risk of Gestational Diabetes Mellitus During Pregnancy Due to Overconsumption of Potato During Pre-Pregnancy: A Review

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ABSTRACT

The review involved the study of GDM and its possible causes during the pregnancy phase. It focused on the link between overconsumption of potatoes (*Solanum Tuberosum*) and increased risk of GDM during pregnancy and effects of Glycaemic index. It also proposed the surveys and researches done on the same. The study thus briefly evaluated the entire concept of GDM in Women. The Nurses Health Study II performed some surveys to prove this linkage of potatoes and GDM risk with the help of some nurses in 1989. The survey involved only female nurses which were provided with some questionnaires comprising some basic data of their diets during their pregnancy times. A journal concerning the same survey was published in the British Medical Journal in 2016 describing the whole process and significance of this survey. A rapid increase in the glucose level observed in pregnant women who consumed more potatoes in their pre-pregnancy phase. Women with higher potato consumption were examined to have increased blood sugar levels than those with lesser potato consumptions. It can be inferred from this study that women should avoid consuming more potatoes in their pre-pregnancy period, else; they may develop Gestational Diabetes Mellitus during their pregnancy which can affect both the parent and the baby.

Key Words: Pregnancy, Pre-pregnancy, Potato consumption, GDM risk, Glycaemic index, Potatoes

INTRODUCTION

Consuming a healthy diet is essential for every individual irrespective of age and gender but it becomes even more essential for a woman who is carrying a new life in her womb i.e. when she is pregnant.¹ This is so because she needs more nutrients and a diet to support this condition during gestation. In terms of quality, she is eating for two. A female's diet during her gestation phase should be looked after appositely.² In addition to the dietary considerations of the pregnancy phase, the food intake and dietary patterns of the mother before pregnancy i.e. pre-pregnancy should also be monitored as this too affects the body of both the expectant mother and the developing foetus. The way a maternal's body reacts to any of the particular food materials (raw or cooked), may differ in both the phases (pre-pregnancy and pregnancy).³ This fact can be delineated precisely by the difference in responses shown by a female's body on the consumption of potatoes during both this stages.⁴ Potatoes serve as a source of energy and are unavoidable in a pregnant woman's diet.⁵

Whereas consumption of the same potatoes before pregnancy may lead to increased risk of Gestational Diabetes Mellitus (GDM) in women with no prior history of any chronic disease during pregnancy.⁶ This is a major commonly caused complication of pregnancy characterised by glucose intolerance which usually appears during the onset of pregnancy or the first trimester.⁷ This can result in many health issues for the mother including miscarriages, preterm labour, gestational hypertension, maternal distress, diabetic neuropathy, puerperal sepsis and many more.^{8,9} However, some major aspects like effects and causes of GDM were left unturned. Also, it didn't mention anything about the gestational weight gain and its effects.¹⁰

GESTATIONAL DIABETES MELLITUS RISK DURING PREGNANCY

Women usually crave for potatoes during their pregnancy phase. The energy in the form of glucose plays a vital role in

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ISSN: 2231-2196 (Print)

ISSN: 0975-5241 (Online)

Received: 12.08.2020

Revised: 15.09.2020

Accepted: 10.10.2020

Published: 12.11.2020

the development of the growing foetus.¹¹ So, potatoes are the most commonly consumed source of carbohydrate during pregnancy.¹² But potatoes according to some studies are not a good option to be consumed before the pregnancy. Some epidemiologic studies show that women who eat potatoes during their pre-pregnancy phase may show positive results for Gestational Diabetes Mellitus during their pregnancy.¹³ GDM is a major problem in pregnant women in which the blood sugar level increase in the body of the mother and also affects the future health of both the mother and the child. It is also explained as glucose intolerance with the beginning or first identification during pregnancy.¹⁴ It can cause health problems in the new-borns.¹⁵ They may suffer from breathing problems and low blood sugar just after the birth.¹⁶ Also, have a greater chance of dying before or soon after their births according to the US National Institute of Health.¹⁷ Today approximately around 7% of all the pregnancies are diagnosed by this ailment, with more than 200,000 cases per annum.¹⁸ It affects up to 10% of pregnant women in the US every year.¹⁹ There are two types of GDM. Women suffering from type A1 can manage this by following diet plans and by exercising whereas ones with type A2 need to take insulin or other medications.²⁰

ASSOCIATED CAUSES

Food that contains carbohydrates affect blood sugar.²¹ Glycaemic index scores food on a 0-100 scale and ranks them as low, medium and high. The ones ranging to 55 or less are considered to be low, 56-69 is medium and 70-100 is high.²² Not to forget that potatoes have a high glycaemic index which increases the glucose level in the bloodstreams.²³ The glycaemic index of glucose is taken to be 100. So, the GI value of potatoes generally ranges from 53-111 as compared to white potatoes which typically show lower values in the index.²⁴ Boiled potatoes have 78 ± 4 glycaemic index and the mashed ones contribute to about 87 ± 3 GI in food.²⁵ The glycaemic index value of different varieties of potatoes and effect of cooking and maturity on glycaemic index²⁶ are represented in table I. Potatoes are found to be rich in vitamin C, potassium and fibre but unfortunately, the concentration of the presence of simple carbohydrate is more which can be easily broken down and absorbed into the bloodstreams.²⁷ Eating a cup of potatoes can take blood glucose levels skyrocketing. During pregnancy, the placenta forms extra hormones, these extra produced hormones level up the glucose concentrations in the blood of the mother's body.²⁸ So, overconsumption of food materials with high glucose percentage before pregnancy especially potato in any of its form (raw, cooked, fried, mashed, boiled) increases in already increased blood sugar level in the woman's body. Generally, the pancreas can send out enough amount of insulin to handle it.²⁹ But the body is not able to make enough insulin or stops using it in the way it should.

RELATED RESEARCHES AND STUDIES

The most significant study done to associate the consumption of potatoes and the risk of GDM is the one done by the researchers of Nurses Health Study II (NHSII) in 1989.³⁰ Nurses Health Study II was the largest prospective investigations into the various risk factors for major health complication of women. According to the former Secretary of the US Department of Health and Human Services Donna Shalala, NHS II is one of the most significant studies ever conducted on the health of women. The original focus of this study was on the methods of contraception, smoking, cancer, and heart diseases, but as time prevailed it expanded to include studies on many other lifestyle diseases and hence GDM in women was one of the major ones. So, the survey included 116430 nurses ageing 24-44 was done to solve the questions behind the risk of several lifestyle diseases. Dr. Zhang and her colleagues collected data from around 16,000 participants from this study of NHS II. Each questionnaire cycle resulted in a 90% follow-up. The first dietary information was captured in the year 1991. Therefore, the baseline for the analysis of GDM was set as 1991 and the survey involved only those pregnancies which occurred after the year 1991 and the last-ed till 2001 because by then almost all the nurses had passed their age of reproduction. At the initial baseline i.e. the year 1991, women with increased potato intakes were more likely found to be younger. The significant conclusion associated higher consumption of potatoes with the risk of GDM. Also, it mentioned that merging potato diet with other vegetables and legumes can reduce this risk up to 9-12%. Besides, the links did not differ by other risk factors of GDM involving the age, parity, family diabetes history, overweight status, overall diet quality etc of the patient. The study only showed a link between potato consumption and the increased threats of GDM in pregnant women and the survey didn't prove its causes and effect. It also explained the link between the risk of GDM and different ways of preparation methods of potatoes to be consumed.

CONCLUSION

The entire review concludes that consumption of potatoes before pregnancy should be avoided by a woman who is planning a child. Gestational Diabetes Mellitus in pregnancy may be caused by the higher consumption of potatoes. Therefore, potatoes may prove beneficial in giving energy to the growing child during pregnancy but if eaten by a woman during her pre-pregnancy phase, may result in GDM with so many complications for mother and even the newly born baby. So, potatoes are important parts of diet no doubt but they can even become affect a female's body adversely during the most important phase of a woman's life. Although there is no reason to banish potatoes from your life altogether. Therefore, it is

evaluated that substituting two servings of potatoes weekly with vegetables, legumes and whole-grain food can lower the risk of gestational diabetes mellitus by 9% to 12%. These facts are still scientifically unproven but all the studies and surveys give a clear picture of the association between GDM and potatoes during pregnancy.

ACKNOWLEDGEMENT

We would like to thank and express our gratitude towards the Department of Biotechnology and Life Sciences, Graphic Era (Deemed to be University) for all the guidance and support.

ABBREVIATIONS

GDM- Gestational Diabetes Mellitus

GI- Glycaemic index

NHS-Nurse Health Study

Conflict of Interest: Authors declare no conflict of interest.

Source of Funding: None

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Table 1: Glycaemic index of potatoes (different varieties, cooking methods and maturity ranges)

S. No.	Variety	Food	GI (glucose=100)
1	Sebago, peeled and boiled		87 ± 7
2	Desiree, peeled and boiled		101 ± 15
3	Pontiac, peeled and boiled		88 ± 9
	Cooking method		
4	Pontiac, peeled and boiled		88 ± 9
5	Pontiac, peeled, boiled and mashed		91 ± 9
6	Pontiac, peeled and baked		93 ± 9
	Maturity		
7	New, unpeeled and boiled		78 ± 12
8	New, canned and microwave heated		65 ± 9