Abstract

Background: Life style factors including adverse food habits contribute to increased risk of non-communicable chronic diseases like diabetes. Oxidant stress could contribute to this association. Pregnancy is a period of increased metabolic demands, with changes in the woman's physiology and the requirements of a growing fetus. During this time, inadequate stores or intake of micronutrients can have adverse effects on mother and fetus. Vitamin C is a nutrient with radical quenching property and has the capacity to influence glucose tolerance. Diet rich in vitamin C influences glucose homeostasis by preventing pancreatic beta cell damage from oxidative stress secondary to the progressive increase in hyperglycemia. The role of dietary factors particularly antioxidants in the etiology of gestational diabetes mellitus (GDM) has been given very limited attention.

Aims and objectives: This research aims to compare clinical and nutritional characteristics of GDM mothers with those of normal glucose tolerant (NGT). This includes comparing dietary intake and plasma vitamin C concentration, in the two groups and their association with pregnancy outcome.

Research design and methods: Forty two pregnant women diagnosed with GDM and 158 gestational age-matched healthy NGT women participated in this study at an average of 26 weeks of gestation. Maternal nutrient intake and specifically vitamin C and high oxygen absorbance capacity foods (HORAC) intake was determined using detailed local semi food frequency questionnaire (SFFQ) and 24 hour diet recall (week day and weekend day). Supplement intake was also considered in calculation. Plasma vitamin C was measured using spectrophotometric method in non-fasting samples. GDM was diagnosed by OGGT (75 gm oral glucose tolerance test) using IADPSG (International Association for Diabetes in Pregnancy Study Group) criteria (fasting >=92mg%, 1 hour >=180mg%, 2 hour >=153mg %).

Results: Study confirmed traditional risk factors for GDM (higher pre-pregnancy BMI, higher age, higher prevalence of family history of diabetes, higher parity, higher bad obstetrical history, higher weight gain during pregnancy, higher stress and lower pre-pregnancy physical activity).
GDM subjects were consuming higher amount of fats and calories and lower amount of protein, vitamin C and total fiber than that in NGT mothers. HORAC intake was similar. GDM mothers had significantly lower plasma vitamin C in comparison with NGT pregnant subjects. There was significant direct correlation between dietary and plasma vitamin C. Also there was significant inverse association of plasma vitamin C concentration and dietary vitamin C intake with OGTT parameters, and with levels of stress.

Plasma vitamin C concentration and dietary vitamin C intake were directly correlated with gestation at delivery (r=0.19, p<0.001, r=0.22, p=0.001 respectively) i.e. which means mothers with lower plasma vitamin C concentration and lower dietary vitamin C intake had higher risk of pre-term delivery. GDM mothers had higher morbidity in pregnancy compared to NGT mothers (pre-term and C-section deliveries). Babies of GDM mothers had higher perinatal morbidity (neonatal admission to NICU, hypoglycemia, RDS, LGA, macrosomia and hyperbilirubinemia) compared to babies of NGT mothers.

**Conclusion:** Should Vitamin C be taken to Prevent Diabetes? Evidence is not strong enough to recommend. However it is recommended to stick to the RDA of vitamin C (60mg/day) unless healthcare providers find need of higher doses. Role of vitamin C in improving glucose tolerant and reducing risk of prematurity need the further investigation.