



**Short communication:**

**Blood Glucose in Sudanese Women with Gestational Diabetes Mellitus (GDM)**

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**ABSTRACT**

**Objectives:** The aim of this study was to investigate the concentration of plasma blood glucose in Sudanese women with gestational diabetes mellitus (GDM).

**Materials and Methods:** Analytical, case-control hospital based study of 60 Sudanese pregnant with gestational diabetes mellitus (GDM). Their mean age was (32.8±7.4 years) compared with 60 pregnant women apparently healthy act as control group; whom their mean age was (29.7±6.0 years). Plasma samples were taken and blood glucose levels were analyzed using colorimetric method. **Results:** The fasting blood glucose for women with GDM was 114.4±40.3 mg/dl and for women without GDM was 86.9±16.5 mg/dL. But 2hrs post-parandial blood glucose among women with GDM was 189.6±40.2 mg/dL, whereas in women without GDM (control group) was 151.3±27.3 mg/dL. **Conclusion:** The study confirmed that high blood glucose in Sudanese women with GDM falls within the range of WHO reference values.

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**INTRODUCTION:**

Diabetes in pregnancy either Gestational Diabetes Mellitus (GDM) or pre-gestational diabetes mellitus (PGDM), is linked to several maternal and foetal/neonatal complications. These include pregnancy induced hypertension, preeclampsia, operative delivery, foetal macrosomia, neonatal asphyxia, birth trauma, respiratory

distress, prematurity and congenital defects (Cunningham *et al.*, 2005). With the advance of medical care, higher rates of complications among women with GDM are no longer justified. In 1989, the Saint Vincent Declaration stated as a 5-year objective that the outcome of diabetic pregnancy should be approximately to that

of non diabetic pregnancy (Diabetes Care and Research I Europe, 1990). Gestational diabetes mellitus (GDM) is defined as the appearance of hyperglycaemia in pregnant women not previously known to be diabetic. Risk factors for the development of GDM include obesity, diabetes in first degree relatives, a history of impaired glucose tolerance (IGT) and previous infants with macrosomia (Kjos and Buchanan, 1999). GDM is associated with a higher risk of subsequent development of maternal diabetes later in life (O'Sullivan, 1991; Damm *et al.*, 1992). In pre-diabetic state of GDM is characterized by impaired insulin secretion and insulin resistance (Kautzky-Willer *et al.*, 1997). This study was conducted to investigate the plasma blood glucose levels in Sudanese women with gestational diabetes mellitus (GDM).

#### **MATERIAL and METHODS:**

##### **Reagents:**

All chemical reagents were purchased from Bio-system Company (Spine Company for Analytical Material and Chemical Reagents).

##### **Subjects:**

Plasma samples were collected from pregnant women attending the out patients clinics in Khartoum State, Sudan (from December 2011 to March 2012).

##### **Blood glucose pattern studies:**

Blood glucose analysis was carried out on plasma sample from 60 pregnant women with gestational diabetes mellitus (GDM)

and 60 pregnant women without GDM represents the control group. The mean age pregnant women with GDM was (32.8±7.4 years). While mean age in the control group was (29.7±6.0 years).

##### **Blood samples:**

Blood sample were collected from women with GDM and control group between 8:00 a.m. to 10:00 a.m. after overnight fasting in a heparinised containers. After centrifugation, plasma samples were immediately analyzed using colorimetric methods (Bio-system) to determine fasting blood glucose levels, then women with GDM and control group allowed to take their ordinary meal and after two hour blood sample was taken to determine glucose level using the procedures for fasting blood glucose level mentioned above. In addition designed questionnaire was used to collect personal data, clinical findings regarding weight, height, body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial blood pressure (MABP) for both women with GDM and control group.

##### **Statistical analysis:**

Data analysis was performed using a computer program "Statistical Package for Social Sciences (SPSS) for windows version 19"; using t- student test to calculate mean ± SD. between women with GDM and control group. Differences were considered significant at P-value ≤ 0.05.

## RESULTS and DISCUSSION

Table 1: Age, Weight, Height, Body Mass Index and Blood Pressure of Sudanese women with Gestational Diabetes Mellitus (GDM) and pregnant women without GDM (control group).

Parameters	Pregnant women with GDM (n= 60)	Pregnant women with no GDM (control group) (n= 60)
Age (years)	32.8±7.4	29.7±6.0
Weight (Kg)	32.8±7.4	73.0±9.8
Height (Cm)	79.5±11.6	170.6±5.7
BMI (Kg/m <sup>2</sup> )	27.9±4.9	25.1±3.1
Systolic blood pressure (mmHg)	125.2±13.4	121.4±8.1
Diastolic blood pressure (mmHg)	83.1±14.8	79.2±7.4
Mean blood pressure (mmHg)	97.1±12.8	93.3±6.9

Table 2: The mean± Standard deviation (M±SD) of blood glucose levels of Sudanese women with Gestational Diabetes Mellitus (GDM) and Pregnant women without GDM (control group).

Parameter	Pregnant women with GDM (mean ±SD) (n= 60)	Pregnant women as control group (mean ±SD) (n= 60)	P –value
Fasting Plasma Glucose (mg/dL)	114.4±40.3	86.9±16.5	0.000 <sup>a</sup>
2hrs Post-parindial Blood Glucose (mg/dL)	189.6±40.2	151.3±27.3	0.000 <sup>a</sup>

a =Significant mean of difference.

Pregnant women with GDM reveal high BMI (27.9±4.9) versus pregnant women without GDM (25.1±3.1) which is classified them as obese individuals, and this may emphasized that elevated blood glucose level is associated with metabolic disorders. But the mean arterial blood pressure (MABP) for women with GDM and women without GDM seems to be equal (97.1±12.8, 93.3±6.9) respectively.

Fasting blood glucose is very appealing and inexpensive, reliable, reproducible easy to measure. It has been advocated as a screening test even for low-risk populations (Perucchini *et al.*,, 1999).

### **Fasting Blood Sugar (FBS):**

The mean fasting plasma glucose during the second half of gestation for women with GDM was (114.4 ± 40.3) mg /dL and for women without GDM (control group) was

(86.9 ± 16.5) mg /dL , the difference was significant ( p= 0.000 ), and this mean value fell within WHO reference values., which standardized the fasting plasma glucose level is ≤ 126 mg/dl for 75g GTT cutoffs (WHO, 1994),different population has been using FPG values (715.3 mmol/L (95 mg/dl)) as a higher FPG threshold to rule in GDM diagnosis(Rey, 1999).

This result was found to be in contrary with Sacks (1992) who concluded that the fasting blood glucose assay may perform better than the one – hour post glucose as screening test for women with GDM and they recommended for a population based prospective study.

### **The 2hrs postprandial Blood Sugar:**

The 2hrs postprandial blood sugar during the second half of gestation was 189.6 ± 40.2 mg/dl for GDM patient and 151.3 ± 27.3

mg/dl for normal group , the difference was significant (  $p = 0.000$  ) .

The high values of standard deviation in the postprandial results reflect the increased variation among the same group for postprandial; this is because of the wide variation in the ingest meal. This is why some health care providers prefer the OGTT than 2hrs. postprandial while those preferring the 2hrs. postprandial argue that this test exactly reflect real life style and not how to tolerate a glucose load (Abdel Marouf Mohieldien *et al.*, 2006).

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