



# Fasting Glucose Metabolism in Pregnancy

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## BACKGROUND / AIMS

The HAPO study found a continuous association between hyperglycemia at 24-32 weeks of gestation, below the diagnostic levels of gestational diabetes mellitus (GDM), and adverse pregnancy outcomes, suggesting the need to reconsider the diagnostic criteria for GDM.<sup>1</sup> Recently, a consensus for diagnosis of diabetes in pregnancy was published, based on the results of the HAPO study. Diagnosing for diabetes is considered already in the first trimester with fasting plasma glucose (FPG), but oral glucose tolerance test is recommended to be performed only at 24-28 weeks of gestation.<sup>2</sup> Identifying all pregnant women at risk for GDM in the first trimester would allow an individualization of obstetric care and establishment of a dietetic and exercise plan since earlier stages of pregnancy with potential benefits for both mother and fetus.<sup>3</sup>

The glyceic metabolism varies throughout pregnancy, as insulin resistance increases during pregnancy.<sup>4</sup> However the cut-off values for blood glucose tests in screening and diagnosing GDM are independent of gestational age.

The objectives of this study are to verify if the pregnant women with and without GDM diagnosed in the second/third trimester are already different from each other in the first trimester regarding FPG levels and to study the evolution of the FPG throughout pregnancy.

## METHODS

Retrospective study

**Inclusion criteria:** 1. Singleton pregnancies

2. Risk factors for GDM: Maternal age  $\geq 35$  years-old, BMI  $\geq 30$  Kg/m<sup>2</sup>, family history of diabetes mellitus (1<sup>st</sup> grade), obstetric history of GDM, macrosomia, stillbirth or recurrent abortion

3. FPG in the first (5-14<sup>w</sup>) and second/third trimester (22-35<sup>w</sup>)

4. Followed the Portuguese protocol for screening and diagnosis of GDM (Based on ADA recommendations – 2-step approach)

**Exclusion criteria:** 1. Diabetes mellitus diagnosed before the current pregnancy

2. Multiple pregnancies

2 groups: with and without GDM - compared regarding the results of FPG in the first and second/third trimester.

## RESULTS

n = 231

### Comparison between groups

CHARACTERISTICS	NO GDM (n = 211)	GDM (n = 20)	p-value
Maternal age (years)	31 (28.5; 35)	36 (28.5; 38)	0.03
BMI (Kg/m <sup>2</sup> )	23.1 (21.3; 26.3)	24.7 (23.6; 27.4)	0.09
GA at delivery (weeks)	39 (38; 40)	39 (38; 40)	0.33
Birthweight (g)	3220 (2970; 3580)	3325 (2998; 3614)	0.66

BMI – Body Mass Index; GA – Gestational Age

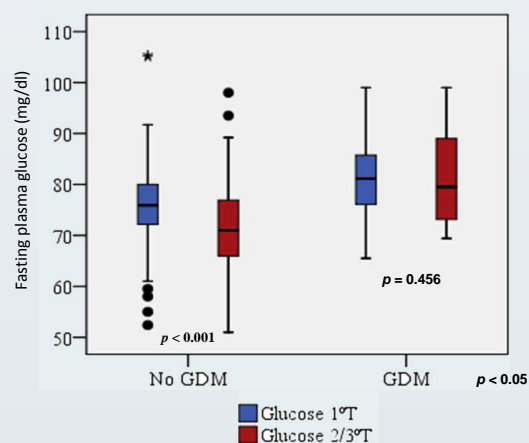
### Gestational age at measurement of fasting plasma glucose

GA FPG	1 <sup>st</sup> Trimester	2 <sup>nd</sup> Trimester
Median (Q <sub>25</sub> ; Q <sub>75</sub> )	8.4 (7.0; 10.7)	30.9 (25.1; 32.1)

### Fasting plasma glucose: Results

FPG (mg/dl)	NO GDM (n = 211)		GDM (n = 20)	
	1 T	2/3 T	1 T	2/3 T
Median (Q <sub>25</sub> ; Q <sub>75</sub> )	75.9 (72.1; 80.0)	71.0 (65.9; 76.9)	81.2 (75.3; 86.6)	79.5 (72.7; 89.0)

### Distribution of fasting plasma glucose throughout pregnancy



## DISCUSSION / CONCLUSIONS

The prevalence of GDM in this population of pregnant high risk women for intolerance to carbohydrates was 9.4%. Both groups were similar, differing only in maternal age. The mean of fasting plasma glucose was higher in the group of GDM, regardless the trimester ( $p < 0.05$ ). In the group of pregnant women without GDM, fasting serum glucose decreased from the first to the second/third trimester ( $p < 0.001$ ). In the group with GDM, fasting serum glucose levels remained stable throughout pregnancy ( $p = 0.456$ ).

Pregnant women with and without GDM (diagnosed in the second/third trimester) are already different from each other in the first trimester. In GDM fasting serum glucose doesn't vary throughout pregnancy, suggesting that a cut-off level for fasting serum glucose is independent of gestational age. Recently, a consensus for diagnosis of diabetes in pregnancy was published. This considers diagnosing for diabetes with fasting plasma glucose levels  $\geq 92$  mg/dl, either in the first or second trimester.<sup>2</sup> The fact that the cutoff for fasting plasma glucose is the same in the two trimesters is consistent with our results.

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