



## Fetal and Maternal Health Implications by Pregnancy Trimesters in Gestational Diabetes

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Received: 19 February 2024 / Accepted: 15 March 2024 / Published: 23 March 2024  
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Doi: 10.56345/ijrdv11n09

### Abstract

*Introduction: Gestational diabetes (GD) is defined as intolerance to glucose or the presence of high levels of glycemia during pregnancy. Its incidence in Europe reaches 3-5% of all pregnancies, but in some Mediterranean countries it goes up to 7%. 1,2(This includes our country). GD usually disappears after birth.3 Its importance is not only important as a pathology of women's health but also because of the risk factors that lead to the development of the fetus. Occasionally new research and studies on the correlates of diabetes in pregnancy, glycemic values that affect maternal or fetal health, or changes in baseline parameters depending on external and internal factors affecting pregnancy. An indication of the latter is the prediabetes group or IGM. Our aim: To study intrauterine complications or fetal consequences by trimesters in diabetic pregnant women attending Regional Hospital Durres. Maternal health close observation of GD complications. Methodology: Following the primary processing of patient data, individuals at risk were separated, and categorized according to trimester of pregnancy. The data were worked out on cross-tabular statistical tables, where a selected number of participants with prediabetes or gestational diabetes were associated with a risk factor to analyze the correlational correlation in our population. Results. Reported to the gynecology services, for first-trimester pathology, 1954 women, of which 1176 have had one of the diagnoses: missed abortion, blighted ovum or recurrent abortion. Reported to the Pathology Pregnancy Pathology Service about 3268 of which were monitored and resulted based in examinations in 163 cases with prediabetes and diabetes in pregnancy. We have grouped and extracted the results based on correlations of baseline glycemic index to diagnose DG and the onset of complications in the fetus and in pregnancy.*

**Keywords:** GD, fasting plazma glucose FPG, pregnancy complications, first , second & third trimester

### 1. Introduction

A review of the literature also the changes in socio-economic levels necessitates new research and studies from time to time on the correlates of diabetes in pregnancy, and in particular its impact on the health of the mother or fetus - the future child. Its incidence for Europe reaches 3-5% of all pregnancies, but in some Mediterranean countries it reaches 7%. Gestational diabetes diagnosis in a pregnant woman in this study is based on some global key criteria such as the recognition of risk factors, which help us a great deal further.<sup>4,5,6</sup> First contact with a pregnant woman is very important to getting an anamnesis so in detail; This is a key to a previously undiagnosed diabetes<sup>7,8</sup>

- Obstetric anamnesis
- Family history.
- Anamnesis vitae
- Laboratory examinations.

The basic examination of this pathology is the measurement of glycemic value and glucose hemoglobin . In a normal pregnancy, given the tendency for maternal hypoglycemia, these values rarely exceed 90 g / ml. Glycemic values

are required from the first trimester of pregnancy, coherent with blood type, whole blood, and urine.

Ultrasound is the basic examination in the pursuit of embryonic and fetal development<sup>9,10,11</sup>. A pregnant woman should regular screening during the trimesters. It measures CRL, DBP, AC, controlled Doppler, amniotic fluid and placenta. Fetal weight, amniotic fluid intake, placental calcifications, and baby's positioning are also monitored.

Fetal monitoring is a last trimester examination that summarizes fetal movements, cardiotocography, ultrasound and laboratory examinations<sup>12,13</sup>.

The more important impacts on the fetus health, are:

- Recurrent and missed abortions.<sup>14,15</sup>
- Congenital abnormalities mainly cardiac and neural tube<sup>16</sup>
- Changes in fetal weight, from the hypotrophy to the macrosome<sup>17</sup>

The most frequently impact on maternal health are the renal's complications. There occupies first place in these organic changes. The most common complications for the fetus in a pregnant diabetic with renal problems<sup>18</sup> are:

- preterm birth with all the problems of prematurity in the fetus<sup>19,20</sup>
- Arterial hypertension to preeclampsia<sup>21,22</sup>,
- Fetal hypotrophy to *feto morto* in utero<sup>23,24,25</sup>
- amniotic fluid changes.<sup>26,27</sup>

## 2. Basic Selection Examinations

### 2.1 Fast glycemie level.<sup>28,29,30</sup>

Oral glucose load test 50 mg. This test was discovered by O'Sullivan et al. And it consists of taking 50 g of glucose orally and measuring glycemie levels after 1 hour (GCT). Women who test positive for this test should receive 75 g of oral glucose (OGTT), which will be measured after 1, 2, 3 hours. a glycemie level 1 hour after taking over 140 mg / dl will give us a positive result.<sup>31,32,33,34,35</sup>

**Table 1.** Moderate presentation of results from glucose load test (OGGT)

Measurement time	Glucose value mg / dl	Mmol / l
Fast glucose	95	5.3
After 1 hour	140	7.8
After 2 hours	120	6.7

Note: the values test by O'SULLIVAN

Except the *diabets gestacional*, in this study we have got in considerete the term *prediabetes*<sup>36</sup> introduced in the 2008 nosology and approved in 2012, which calls for at least 95% / dl glycemie risk, but lower than 110 mg / dl, is considered at risk, and advises repeat examinations in these cases as well as tests of oral glucose load 50 and 100 mg between week 24 - 28 of gestation<sup>37,38</sup>.

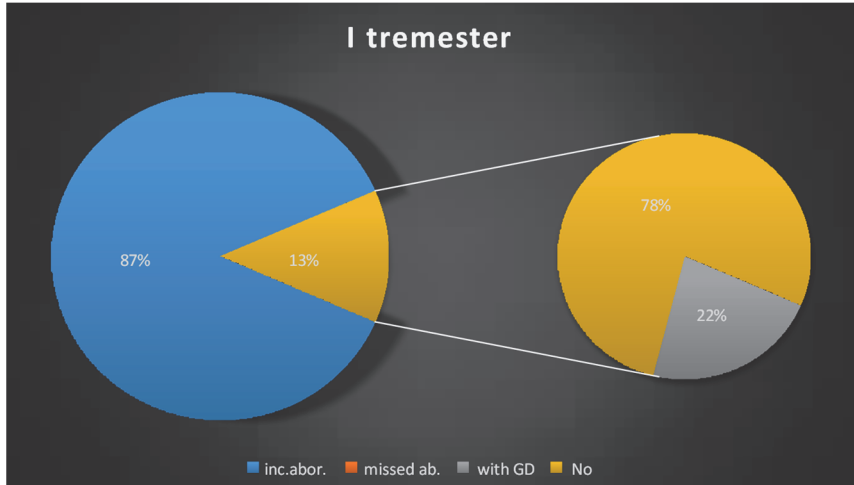
## 3. Results

The malformations or complications of the **first trimester** in gestacional diabetic women, are: a.Missed abortion b. Blighest ovum c.Abort recurrent

Based in our study the results in our hospital for this trimester are:

1. The total number of women admitted to gynecology with a diagnosis: abortion incipient, progressive, for 26 months straight is 1954.
2. Number of outpatients followed by diagnosis: incipient abortion (no hemorrhagic problems) is 1176 women
3. The number of treated women undergoing regular follow-up with laboratory examinations for glycemie values is 1085 women.
4. Women who did HbA1c screening is 769, out of which a value higher than 6.1 resulted in only 14 cases
5. Women who have completed their first trimester pregnancy in *abratio mucosae cavii uteri* for various reasons are 927 cases.
6. Based on these results it is noted that the incidence of missed abortion in total incipient abortion is 13%, while

missed abortion in the field of impaired glucose intolerance is 0.8% of total abortion or 6% of missed abortion in total .



**Second trimester fetal's malformations and complications.**

Second trimester fetal malformations or complications in diabetic pregnancy have shown an increase in cases of neural or cardiovascular tube abnormalities, indicating that high blood glucose or hemoglobin levels are directly related to the percentage of abnormalities of this kind. Nearly two-thirds of the abnormalities involving these systems belong to patients with impaired glucose tolerance or are known to have diabetes. Neural tube defects occur 13 - 20 times more frequently in diabetic pregnancies. Of particular importance is the value of HbA1c. Its rise above 8.5 has shown an increase in the value of fetal abnormalities<sup>39</sup> The total number of abnormalities recorded is 44, but of these 6 women did not complete their pregnancy at the Durres hospital.

**Table 2.** Comparison between fetal abnormalities and glycemic level for the second trimester

		Glycemic level		Total
		prediabetes	GD	
Fetal malformations	cardiac	5	2	7
	sp.biphida	4	3	6
	other	1	1	2
Total		10	6	16

Pearson Chi-Square 1,553<sup>a</sup>      OR= 1,559      p = 0.460  
 Note : GD =gestacional diabet ; other = multiple anomaly

**Fetal and mather consequences in the third trimester**<sup>40</sup> At this stage of pregnancy the fetus changes or adapts to its development with the mother's pathologies for this trimester. In addition to high levels of glycemia, which leads to macrosomes, the other most important maternal organ affected is the kidney. As a consequence, she has major renal problems: Frequent urinary tract infections, arterial hypertension and preeclampsia . Pathologies, which will be associated with fetal type changes: → Premature Partus ,--Fetal hypotrophy → Changes in the amount of amniotic fluid PI --Calcification of the placenta → Feto-morto in utero

The study group (who fully implemented the protocol from the beginning to the end of their pregnancy) collected 168 women. all had the examination of fast glycemic, glucose hemoglobin measurement ,OCG, weight measurement, fetal development closely monitored. Parallel to these data, the extent of GD in any of the third trimester pathologies was studied and it was noted:

**Table 3.** Correlation GD with the pathologie's third trimester

	GD.+ prediabetes	Non GD
Preeclampsia	66	72
Other path.	57	591
Partus prematur	34	310
Fetal hypotrophy	5	30
Urinary tract infection	30	110

**Note:** The values are from examinations in hospitalized patients ; GD=gestacional diabet

Of the total pregnancy complications, those of the third trimester associated with GD account for 11%.

#### 4. Conclusion

The increase in the population at risk of diabetes during pregnancy is on the rise. If we looked at the world reference in years we would notice a marked change from 1979, (2, 40,41) when it was designated as a nosology until the last decade (reaching 10.2%). Looking at the values derived from this study, it is clear that many of its signs or symptoms can be silently passed on for the benefit of the mother and child.

Importance should be given to risk factors <sup>6,7</sup>. GD was diagnosed in 6.7% of women overall, in 8.5% of women over 30 years, in 12.3% of women with a body mass index of 30 kg / m<sup>2</sup> or greater, and in 11.6% of women with a family history of diabetes (in a first degree relative). A combination of one or all of these risk factors predicts the occurrence of GD in 61% of cases. GD was present in 4.8% of women without risk factors.

According to the data collected, it was noted that regarding the number of abortion cases in the first trimester, the validity obtained exceeded the forecast, which means: if by 2012 reported cases of recurrent abortions were 5 %, after the appeal was made 20%. 45% of them did not know the cause of previous abortion, while 75% of them were not provided with examinations: salty glycemias or after lunch at the time of hospitalization or catheterization.

Concerning congenital abnormalities in the second trimester, no preliminary data were found on the levels of glycemias in these patients, but in patients diagnosed with this hospitalized problem it was found that 36% had changes in glycemias levels. sober.

Diabetes in pregnancy is pathologic on the rise. This results from the values derived in this study. During this period, 11% of all pregnancy pathologies in the hospital have glycemias changes. This demonstrates the importance of close monitoring by measuring baseline glycemias values, testing for oral glucose load or measuring HbA1c, and adding information to our population of screening or baseline pregnancy monitoring protocols.

#### 5. Strength and Limitation

- DG accounts for about 3-14% of pregnancies and is the most common cause of neonatal problems, which can lead to fatal outcome.
- In total, from all types of diabetes that appear in pregnancy, DG catches 90-95% of them.
- It has been observed that gestational diabetes recurs in subsequent pregnancies 33 - 70 % of cases and this is closely related to risk factors and the distance between pregnancies (<24 months)
- Introduction of the term prediabetes , as well as the inclusion of cases with its conditions.
- For the region of Albania (our region) , there are no statistical data , no incidence of gestational diabetes in general ,or in terms of its consequences or correlations on the mother and fetus. As a result this study has no preliminary study as a reference point.

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