Estimating the difference of glucose levels during 1st and 3rd trimester of pregnancy in Tikrit city in Iraq

Mayada Kamel Mohammed

1. Department of Family and Community Medicine, Tikrit Medical College, Tikrit University/Iraq

*Corresponding authors: Dr Mayada Kamel Mohammed (dmihadkhalawe@gmail.com)

Abstract
The occurrence of hyperglycemia among pregnant ladies who visit Salah Aladdin general hospital is examined in relation to age and no. of pregnancy to determine the occurrence of diabetes mellitus in pregnancy. Blood glucose levels were evaluated in the first and third trimesters of pregnant women by the glucose-oxidase principle using the Easy Touch® G blood glucose monitoring system. This study is a cross-sectional study, carried out in the Salah Aladdin general hospital, from the 15th of November 2018 to the 10th of March 2019. A total of 120 women ages ranged from (20 -45 years) have been selected. By using 14 direct factors questionnaire affecting pregnant women in the first and third trimester. Statistical analysis of data was done by manual statistics. The serum glucose levels elevated markedly in the third trimester of pregnancy and the glucose level not so increase in the first trimester. This raising in serum glucose level in the third trimester may lead the pregnant to hyperglycemia or diabetes mellitus of pregnancy. Over the majority of pregnant women are free from GDM 86.67% while 13.33% having GDM where 87.5% are in the third trimester and 12.5% in the first trimester of pregnancy. To conclude percentage % of first/third trimester of pregnancy having GDM are 12.5% 1st trimester. 87.5% 3rd trimester. Percentage % of pregnant women 13.33% have GDM while 86.67% are not having GDM Ranges of blood glucose level in first trimester 88 while in third trimester 100. The Aim of study was to estimate serum blood glucose level during 1st and 3rd trimester of pregnancy in Tikrit.

Keywords: Glucose Levels, first trimester, third trimester, gestational diabetes


Introduction
Pregnancy is an important stage where maternal adaptation occurs early to provide a good upshot for both the mother and her fetus. These physiological changes start at different rates throughout the whole body which allows the pregnant woman to save additional energy in preparation for delivery and gestation. Gestational DM is the commonest medical problems occur in pregnancy. In the past, it’s known as hyperglycemia primarily diagnosed in pregnancy and now described by the American diabetes association (ADA) as diabetes occurred in pregnancy (1). The incidence of diabetes in pregnancy ranges from 1-2% in Sweden while 22.3% in Sardinia based on the features used in diagnosing GDM (2, 3). Pregnancy DM is mainly determined in the late in 2nd and 3rd trimester due to real diagnostic methods for Pregnancy DM determination in 1st trimester are remain lacking (4).

Diagnosis of DM in pregnancy given a chance to know a woman who may be at risk of both transient and prolonged complications. Now, the early diagnosis and proper management may minimize the negative outcomes during the perinatal period (5, 6). The OGTT is considered the gold standard for the diagnosis of DM (7). It was founded that positive OGTTs and GDM are common in women aged more than 30 years, BMI of more than > 25 kg/m2 and parity >4 (8). DM in pregnancy has a negative effect on mothers and her fetus outcomes, like fetus overgrowth, shoulder dystocia, caesarian labor, birth injury, hypertension in pregnancy, bleeding, neonatal hypoglycemia, RDS and preterm labor (9, 10, 7 folds higher risk of the mother developing type 2 DM after pregnancy(11). DM in pregnancy has many risk factors, mainly the hyperglycemia, higher BMI and BMI after 28 weeks are strongly related to high insulin resistance at 28 weeks (12). DM not associated with bad pregnancy outcomes such as
macrosomia, increase caesarian section rates, elevated BP and fetal hyperinsulinemia \(^{13-14}\) as well as increase danger for prolonged complications for the mother and her babies.

**Complications of GDM:**
- **Maternal:** 1-miscarriage. 2-pre-eclampsia. 3-infection. 4-Prolonged delivery. 5-obstructed labor. 6-operative delivery. 7-postpartum hemorrhage.
- **Fetal:** 1-conginital abnormalities. 2-Increased amniotic fluid. 3-fetal demise.
- **Neonatal:** 1-birth injuries. 2-low glucose level. 3-convulsion. 4-increased red blood cell. 5-Electrolyte Imbalance. 6-dyspnea. 7-low calcium level. 8-low magnesium level. 9-elevated bilirubin level.

**Objectives**
1- Estimate the difference in serum level of glucose reading in 1st and 3rd trimester of pregnancy. 2- Assess the incidence of gestational diabetes mellitus. 3-Identify the risk factor of high blood glucose levels during pregnancy. 4-Determine the adverse effect of elevated glucose levels on mother and fetus.

**Subject and method**
Permission was taken from pregnant women themselves, and the paper request was not obligatory and was according to their responsibilities. The aim of the study was explained and only those who agreed to participate are included in this study, ensuring the confidentiality of information. A cross-sectional study was performed from the 7th of February 2019 to 15 of March 2019. This study was performed among pregnant women during 1st and 3rd trimester of pregnancy in Salah adding general hospital. The sample size was 120.

**Determination of random blood glucose**
Random blood glucose is a blood glucose level taken from a non-fasting subject at any time. A drop of blood will be obtained from the subjects after pricking the fingertip. The drop of blood will be applied to the paper test strips of the glucometer, the reading will then be taken in six seconds by the glucometer and the result expressed in mg/dl.

**Collecting data**
All were analyzed by using manual statistical method. Data were represented by using suitable tables and charts using Microsoft office 2010 software. The questionnaire includes socio-demographic characteristics of women, followed by items related to her occupation, environment and history of GDM.

**Result**
The random blood glucose levels in pregnancy showed a significant increase between the trimesters as the pregnancy advances. From a total of 120 cases of pregnancy being surveyed from Salah Aladdin general hospital records, 104 cases (86.67%) of them were have normal glucose level and 16 cases (13.33%) were have GDM. In table 1 the number of pregnant women was 26 cases (21.67%) in the first trimester and 94 cases (78.33%) in the third trimester. Table 2: the average glucose level where it is 88 in the first trimester and begin to increase in the third trimester of pregnancy.

Figure (1) shows the increase of glucose level with increase trimester of pregnancy as it is maximally 128 in the first trimester of pregnancy while in the third trimester reach 223. Figure (2) shows percentage % of pregnant women who have GDM was 13.33% while 86.67% have normal glucose level. Figure (3) shows the percentage of pregnant women with GDM in the first trimester 12.5% and 87.5% in I third trimester of pregnancy. Figure (4) shows the relationship between age and raise of glucose level as it is increased after 25 years old. Figure (5) shows pregnant women with GDM who take medication 68.75% and other 31.25% without taking medication only controlling with diet. Figure (6) shows a percentage % of 93.75% of pregnant women who have GDM in current pregnancy while 6.25% have GDM in a previous pregnancy. Figure (7) shows risk factors for GDM during pregnancy and is increase with family history 37.5% and 6.25% with raised blood pressure and about 56.25% have not any disease or problems.

**Table 1:** Number of pregnant women in both first and third trimester of pregnancy.

<table>
<thead>
<tr>
<th>Trimester of pregnancy</th>
<th>No.(percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

©Annals of Tropical Medicine & Public Health S497
Table 2: The ranges of blood glucose level in 1st and 3rd trimester of pregnancy.

<table>
<thead>
<tr>
<th>Trimester of pregnancy</th>
<th>Average Ranges of blood glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>First trimester</td>
<td>88</td>
</tr>
<tr>
<td>Third trimester</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 1: glucose level with advance pregnancy as it low in first trimester while increase in third trimester.

Figure 2: The percentage %of pregnant women who have GDM from other who have normal glucose level.

Figure 3: The percentage of pregnant women with GDM in first and third trimester of pregnancy.
Figure 4: Relation between blood glucose level and age of pregnant women.

Figure 5: The percentage of pregnant women with GDM who take medication from other who are controlling GDM with diet without medications.

Figure 6: Percentage of pregnant women who have GDM in current pregnancy or in previous pregnancy.
Discussion

GDM is becoming a very common medical condition related to pregnancy due to an increased rate of overweight and DM. Pregnancy is a delicate stage where maternal adaptation occurs very early to provide a favorable state for both the mother and the fetus (15). The incidence of GDM increased from 5.9% to reach 23.9% in 2014 (16). This study revealed 13.33% GDM compared to other studies done in the United Kingdom, the United States and European countries which show the percentage of 5%, 3.7%, and 2.6% respectively. While the rate increase in other Arabic countries as 21% in Kuwait, 20.2% in Lebanon, 20% in Qatar. The explanation of the increasing rate of GDM is multidimensional transition in Arabic countries including the travel from rural to urban homing leads to a sedentary lifestyle and less physical activity and increase consumption of fast food that leads to the development of DM.

In Tikrit city the percentage of pregnant women with GDM 12.5% in 1st trimester and 87.5% in the 3rd trimester but in another study done in Baghdad, the percentage is 76% in 1st trimester and 24% in 3rd trimester. Maternal age is considered as a risk factor for developing GDM, this study show increasing the rate between 29-39 years old, the same result approximately found in Al-Mustansaria university in Baghdad which show highest rate between 25-35 years old and another study in Oman which show increasing GDM with increase mother age from 2.2% of women aged < 25 years old to 14.7% in women aged >35 years old. Frequency of recurrent GDM in subsequent pregnancy is increased in the women with impair fasting glucose and impaired glucose tolerance test 2 month postpartum were increased risk for recurrent GDM the percentage of these women is 6.5% compared to another study done in Oman which shows 27.3% in the study we found the most important risk factor for GDM, the highest incidence one is family history 37.5%, blood pressure 6.25%and 56.25% have no any problem, compared to study in Oman show family history 14.6% and 5.5% is blood pressure.

In conclusion, Percentage % of first/third trimester of pregnancy having GDM are 12.5% 1st trimester 87.5% 3rd trimester. Percentage % of pregnant women 13.33% have GDM while 86.67% are not having GDM. The increasing frequency of blood glucose levels to the borderline in the third trimester of pregnancy may predispose women to hyperglycemia or gestational diabetes and other adverse pregnancy outcomes.

Ethical Clearance:
From the research ethic committee in Tikrit university, college of medicine

Source of Funding: Self
Conflict of Interest: Nil
References: