The Relationship between Maternal Hemoglobin Concentration and Gestational Diabetes Mellitus

Zafari. M*, Aghamohammady. A, Tofighi M, Tahmasebi. H.
Midwifery Department. Islamic Azad University Sari Branch. Sari. Iran

Abstract

Our purpose in this study is to evaluate the relation between Hemoglobin Concentration with GDM. In this cross-sectional study, 100 women (50 GDM and 50 non-GDM) selected randomly. Information had registered. There was meaningful difference between two groups from the point of parity, job, and education. But age, weight, gravity, BMI had meaningful difference. The mean of neonatal weight was not different in both groups. According to our study, there is no significant relation between mothers' hemoglobin concentration during the first trimester and GDM.

Keywords

Maternal Hemoglobin, Pregnancy Outcome, Gestational Diabetes

1. Introduction

Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance of varying degrees of severity with onset or first recognition during pregnancy. The current recommendation is to perform screening tests between 24 and 26 weeks of gestation, although there are reports claiming that between 40% and 66% of women with GDM could be detected during early pregnancy. The policy of screening in the third trimester has resulted in a significant number of pregnant women delivering big babies, despite good glycemia control, whereas an early screening for glucose in tolerance and care has resulted in the reduction of some of the hyperglycemia-related complications. (1)

Approximately 4% of pregnant women in the United States have diabetes. Eighty-eight percent of these women have gestational diabetes mellitus (GDM, 450,000 women per year), and the remaining 12% have either type 1 (12,000) or type 2 diabetes (50,000) pregnancy is a diabetogenic condition characterized by insulin resistance with a compensatory increase in \( \beta \)-cell respose and hyperinsulinemia, the placental secretion of hormones (progesterone, cortisol, placental lactogen, prolactin, and growth hormone) is a major contributor to the insulin resistance, which likely plays an role in ensuring that the fetus has an adequate supply of glucose. Pregnancy in patients with diabetes is associated with an increased incidence of congenital abnormalities in women with poor glycemic control. (2)

Frequency of congenital malformation among infants of diabetic mothers is estimated to be 6-10%. Factors responsible for these abnormalities are not fully understood but there are reports suggesting that increased free radical production and antioxidant depletion in diabetic pregnant female may contribute to this risk. (3)

The relationship between maternal hematological parameters and pregnancy outcomes has been a source of continuing controversy. In developed countries, not only maternal anemia but also high hemoglobin concentration during pregnancy has been reported to increase the risks of unfavorable outcomes such as small for gestational age (SGA) birth, preterm birth, and prenatal death. The association between hemoglobin concentration in early pregnancy, changes in hemoglobin concentration during pregnancy, and risk of stillbirth are not known. (4)

There is now accumulated evidence in the literature that high maternal Hemoglobin is associated with increased incidence of adverse pregnancy outcomes which include low birth weight and preterm labor.

In no pregnant population, an association between hemoglobin concentration with Diabetes Mellitus has been reported before. (5)

2. Objectives

We decided to study the relationship between maternal Hemoglobin concentration at the first trimester and occurrence of GDM.

3. Methods

Having a view to the past, this study was done by investigating the profiles of women who had gone to health care centers in the city of Sari in 2011. 100 profiles were chosen, which had exhaustive information about the mothers in-
cluding: demographic features, test requested at the first visit and next visits which were completely recorded. Sampling was random.

Criteria of being included in the study: conception with a living fetus amounts of FBS and HB in the first 14 weeks of conception and GCT in weeks 24-28 of conception.

And criteria for being excluded from the study were two types of dangerous pregnancies like having clozen-vascular diseases, and disease of heart, vessels, kidneys’, the anomy of tuberculosis cycle, anomic, using anti convulsion medications, varfalin and anti-cancer medication.

By using the questionnaire, pieces of information like age, weight, height, number of conceptions and giving birth, amount of HB, FBS in the first visit, GCT in the ages 24-28 and the infants’ weights were gathered. Also the pregnancy diabetes was diagnosed by GCT amounts above 135 in ages 24-28 and the disturbance of ct.

After gathering the information, the dates were analyzed by spss software. To analyze the data, the description, statistical and deductive methods were used.

4. Results

From the population of 100 people in this study, 50 persons had gestational diabetes while the other 50 did not.

According to table 1 there were not any differences between the two groups in the number of giving birth, employment condition and education.

Also differences were meaningful in the two groups in age, weight, number of pregnancies and BMI.

| Variable | P value |
|----------|---------|
| Gravity  | 0.000   |
| Parity   | 0.182   |
| Job situation | 0.629 |
| Education | 0.292 |
| BMI      | 0.000   |

The age average in mothers contracted with pregnancy diabetes was 30, 24 and it was 22, 83 in the witness group p= 0.00001. Among healthy mothers, 100% were under 34 year old and among mothers having the disease, 74% were under 34 and 26% were over 34 years old, therefore in the mistake level of 5%, we can say that according to test, there is a meaningful relation between the mothers’ aging and contracting the pregnancy diabetes. Also the differences were meaningful in the number of pregnancy and BMI.

According to table number 2, among the people suffering from pregnancy diabetes, the hemoglobin density was above 13 in 28% of mothers, 12.4-13 in 32% of them and below 11.5 in 14%. So we can say that there is not a meaningful difference between the different levels of hemoglobin contracting and pregnancy diabetes.

Also according to t-test, the comparison between the ages of mothers in the two groups based on hemoglobin density shows that in all densities of hemoglobin’s the age average of the two groups have a meaningful difference. In comparing the mother’s weights in the groups, only in hemoglobin densities under 11.5, there was not a meaningful difference. According to tests, in mistake level of 1% in hemoglobin density BMI. There is a meaningful difference in the two groups, but in the level of 5%, the difference was meaningful only in densities of 11.6-12.3 and 12.4-13.

### Table 2. Comparison the Age, weight, BMI in Both groups

| Hb       | Age | Weight of mother | BMI  |
|----------|-----|------------------|------|
| < 11.5   | 0.042 | 0.175           | 0.056|
| 11.6-12.3| 0.001 | 0.005           | 0.006|
| 12.4-13  | 0.000 | 0.002           | 0.014|
| >13      | 0.000 | 0.000           | 0.060|

5. Discussion

It seems that the most important risk factor for gestational diabetes, is high maternal age at pregnancy with a positive family history and BMI during pregnancy.

The treatment process is expensive, and requires follow-up care which is appropriate for the control and surveillance of the financial burden imposed on the family.

In the present study, the levels of hemoglobin and risk of gestational diabetes showed no significant difference.

In the study conducted by Sir, this relationship was not meaningful.

According to studies done by the researchers, there is a high degree of hemoglobin which can be a predictor of gestational diabetes.

However, maternal factors, gestational age, starting taking iron pills, and weight gain at the beginning of trimester of pregnancy are determinants of hemoglobin in the blood.

In the present study, a meaningful relationship between maternal weight and gestational diabetes exists. In the study conducted by Garshasb and colleagues, increasing the pitch of the occurrence of gestational diabetes was associated with higher levels.

In the present study the relationship between birth weight and maternal age and hemoglobin level was significant.

In this regard, in the study conducted by Faraji, the relationship between hemoglobin concentration and birth weight in the first quarter was meaningful.

Also, Guzel asserted that weight gain during pregnancy is a powerful factor for predicting birth weight.

Avdl also believes that there exists an inverse relationship between maternal hemoglobin concentration and birth weight.

In comparison with the weight of infants in both groups, significant differences were seen.

Also, the relationship between hemoglobin concentration and birth weight was not significant.

The relationship between maternal age and birth weight were significant.

However, in relation to birth weight and maternal age and hemoglobin level, despite the dual linear model confirmed
the error level 5, the concentration of hemoglobin is minor. However, the presence of this variable leads to a high correlation with age is in a basic mode.

The study was conducted on the relationship between BMI and the weight of the four levels of hemoglobin. The research showed that at concentrations less than 1.5 and the error level of 5, there was a significant relation. Also, in the tri-linear model, the relationship between hemoglobin concentration and birth weight with BMI and the variables age, despite approval from the level 5, the concentration of hemoglobin is at the lowest level, and the BMI is at the highest level. In total, the three variables are correlated to high levels.

In total, the three variables are correlated to high levels. Although, we can say there is a positive relationship between the concentration of hemoglobin, the concentration of less than 11 m between maternal weight and infant's weight.

6. Conclusions

Finally, we can say that based on the logistic regression model, risk factors for gestational diabetes, maternal age and risk Hstd hemoglobin and BMI has a lower level.

REFERENCES

[1] Balaji V, Balajis, A shalatha S, SheelaS. Suresh S, S eshiah V. A 1c in Gestational Diabetes Mellitus in Asian Indian women. Diabetes Care. 2007: 30 (7): 1865 – 1867

[2] Gorge D, Harris M, Russell D, White M. Diabetes Management and Exercise in pregnant patients with Diabetes. Clinical Diabetes. 2003 : 23 (4): 165-168

[3] Chaudhari L, Tandon N, Vaney N, Agarwal. Lipid peroxidation and Antioxidant enzymes in Gestational. Diabetics, Indian J PHYSIOL PHARMACOL. 2003 : 43 (4): 441-446

[4] Stephansson O, Paul W. Johansson A, Cnattingius S. Maternal Hemoglobin Concentration During pregnancy and Risk of stillbirth. JAMA. 2000.2(20): 2611-2617

[5] Ebrahimzadeh S, Jabzarzadeh S, Khadem N, Vaziri Es. Evaluation of relation between maternal Hemoglobin Concentration at the first trimester and occurrence of GDM, ofogh – Donesh. GMuts Journal, 2008: 14 (3): 28-34

[6] Bastani F, Zarabi R. Correlation of self – efficacy among women with gestational diabetes. HAYAT J. 2010; 16(3-4): 107

[7] Sir. Relat ion ship of prevalence of Gestational Diabetes Mellitus with Maternal Hemoglobin 2005. JA Pl. 53: 11077

[8] Bencaiov G, Kraftt A, Burkhardt T, Zimmermann. Hemoglobinopathies, body iron stores and gestational diabetes mellitus. haematologica the hematology journal. 2005 + 90 (8): 1138

[9] Alamollahy H, kariman N, Hossein panah F, Alavi H. Relation Between Hemoglobin in first trimester and gestational diabetes. iranian J of Endocrine 48. (persian)

[10] Terence T, Louis Y, Kar- Fai T, Lai – Fong H. Maternal Hemoglobin and Risk of Gestational Diabetes Mellitus in Chinese women. 2002 + 99(3): 807 – 812

[11] www.medical–science.net/Gynemetrics. The Relationship between Maternal Hemoglobin Concentration , Red Blood Cell count and Hema tocrit and Gest tional Diabetes Mel- litus in Chinese women

[12] Shirifi F, Ziaee A, Feizi A, Mousavinassab N, Anjomshooa A, Mokhtari p. Serum ferritin Concentration in gestational diabetes mellitus and risk of Subsequent development of early postpartum diabetes mellitus. Diabetes, Metabolic Syndrome and Obesity: Targets and therapy. 2010: 3: 413 – 419. (Persian)

[13] Akbarzadeh M, Alizadeh L, Tahatabai H, RamziM. Relation Maternal fac tro with Hemoglobin in pregnancy. south medical J. 2009: 12 (2): 133 – 141. (persian)

[14] Garshasbi E, Salii Z, Faghih zadeh S, Naghizadeh M. the affect acceleration of Bml in pregnancy on pregnancy out come. Daneshvbar medical J. 2009 16 (77): 1-7. (persian)

[15] Tabandeh A, Kashani E. Relation Between primary Bml and weight gain in pregnancy with Maternal 8 neonatal out come. J Medical science of Gorgan. 2007+ 9 (1): 20 – 24. (persian)

[16] Faraji R, mirbolok F, Sharemi S Asgharnia M, Joafshani M, Glomzadeh M. Relation Between Maternal Hemoglobin Concentration and Bml during the first trimester in primiparous women and her neonatal s Bir th weight. 2010: 18 (1): 62 – 68 (persian)

[17] Geutzel L, Zamora Y, Wilkins I, Greisinger A , pregnancy out comes in women with Normal Bml AND WEIGHT GAIN OUTSIDE Recommen dation. Inter national Journal of Gynecology 8 obs tetrics. 2009 + 99 (4): 735

[18] Odul A, Amburgey M , Ing E, Gary J , Badger M, Berstein M, MATERNAL Hemoglobin Concentration and its Association with Birth weight in Newborns of Mothers with preeclampsia. J Matern Fetal Neonatal Med. 2009 + 22 (9): 740-744

[19] Cogswell M, parvanta I, Ickes L, Yip R, Bittenham M . Iron Supplemen tation during preg nancy, anemia and birth weight: a randomized Controlled trial. Am J clin Nutr. 2003 : 78: 773 – 781