

**A STUDY TO ASSESS RELATIONSHIP BETWEEN GESTATIONAL  
DIABETES MELLITUS AND BLOOD GROUPS**

**Key Word:** ABO blood groups, Gestational Diabetes.

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***Abstract:***

***Introduction:*** Gestational diabetes mellitus(GDM) is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Gestational diabetes is condition that affects the wellbeing of mother and fetus. The study was done on 299 pregnant women attending antenatal clinic in civil hospital Ahmadabad in the months of May to August 2018.

***AIM:*** To find out the correlation between gestational diabetes mellitus and blood groups.

***Materials and Method:*** All 299 pregnant women recruited for the study were given 75 gm glucose orally. Their blood glucose levels were determined after 2 hour by glucometer. Those having blood glucose more than 140mg/dl were identified as

*GDM. Out of 299, 96 subjects diagnosed as GDM and 203 subjects diagnosed as NON GDM. Blood group distribution of GDM and non GDM were compared.*

**RESULT:** *46.86% GDM had blood group “O” and 87.5% GDM had RH positive blood group.*

**CONCLUSION:** *Blood group “O” is significantly associated with gestational diabetes.*

## **Introduction**

Gestational diabetes mellitus (GDM) is a common condition that is defined as glucose intolerance of varying degree with onset or first recognition during pregnancy. It affects approximately 5% of all pregnancies all over the world.<sup>1</sup> Prevalence is 16% of live births in 2013 (International Diabetes Federation)<sup>4</sup>.

High blood sugar is one of the most common medical conditions associated with pregnancy. If left untreated, it can have an intergenerational impact, adversely affecting not just the health of the mother, but also that of the newborn. Dangers include increased risk of high blood pressure, uncontrolled blood loss, infection, abnormal weight gain of the unborn baby in the womb, congenital malformation, spontaneous abortion and intrauterine death.<sup>2</sup> Other complications for mother and child are risk of cesarean and operative vaginal delivery, macrosomia, shoulder dystocia, neonatal hypoglycemia and hyperbilirubinemia.

Evidences from India show that women in the country are at much higher risk of developing glucose intolerance during pregnancy as compared to white women. In pan India study conducted by FOGSI and DIPSI shows about one-

third of the pregnant women are diagnosed with GDM during the first trimester and over quarter of them have a history of fetal loss in the previous pregnancies. Similar findings were also found in GDM demonstration project in Hoshangabad where pregnant women diagnosed for GDM during first, second and third trimester were 33%, 40% and 28% respectively.<sup>3</sup>

Several studies correlating “ABO” and “Rhesus” blood groups with type 2 DM are documented. There are limited studies available especially in Indian populations which correlate “ABO” and “Rhesus” blood groups with GDM. Present study was undertaken to correlate “ABO” and “Rhesus” blood groups with GDM. If any definite correlation is established, pregnant women with a particular blood group can be considered at high risk and should be screened and treated accordingly.

### **Material and Methods**

The study was done on 299 pregnant women attending antenatal clinic in civil hospital Ahmadabad in the months of May to August 2018. Pregnant women with preexisting DM, hypertension and other pregnancy related complications were excluded. Pregnant women of all ages and all trimester were included. All 299 pregnant women recruited for the study were given 75gm glucose orally. Their blood glucose levels were determined after 2 hours by glucometer. Those having blood glucose more than equal to 140mg/dl were identified as GDM. This 2h-75g OGTT(Oral Glucose Tolerance Test) for diagnosis of GDM is recommended by WHO and is accepted globally<sup>9</sup>.

Out of 299 pregnant women subjected to 2h-75g OGTT, 96 subjects were diagnosed as GDM and 203 subjects were diagnosed as NON GDM. ABO and Rh blood groups of all 299 subjects were determined by automated method using Diagast equipment. Blood group distribution of GDM and non GDM were compared.

### **Observation**

In our study total of 299 pregnant women were recruited out of which 96 were diagnosed as GDM and 203 were diagnosed as non GDM (Table I). Maximum number of cases diagnosed as GDM were in the age group of 18-25 (Table II). Also we found that most women who were diagnosed as having GDM were in their second trimester (Table III). Out of the total 96 GDM patients 45(46.8%) had O blood group, 23 (23.9%) had B blood group, 22(22.9%) had A blood group and 6(6.25%) had AB blood group. Out of total 203 Non GDM 50(24.63%) had A blood group, 73(35.96%) had B blood group, 18(8.86%) had AB blood group, 62(30.54%) had O blood group.

Using chi square test we found that association of blood group O with GDM statically significant ( $p < 0.05$ ). We additionally studied the distribution of Rh status in those diagnosed as having GDM and we found that 84(87.5%) had Rh positive blood group and 12(12.5%) had Rh negative blood groups.

**Table. I:-Distribution of results of OGTT done in ANC.**

<b>Sr no</b>	<b>OGTT result</b>	<b>Number</b>
I	Positive ( $\geq 140$ mg%) GDM	96(32.10)
II	Negative ( $\leq 140$ mg%) GDM	203(67.89)
III	Total	299(100)

Out of the total 299 ANC, 32.10 % were diagnosed as GDM and 67.89% as Non GDM.

**Table. II:- Age group distribution among the GDM.(n=96)**

<b>Sr No</b>	<b>Age group</b>	<b>Number (%)</b>
I	18-25	50(52.08)
II	26-30	31(32.29)
III	31-35	14(14.58)
IV	36-40	1(1.04)

Out of the total 96 GDM patient, 50 (52.08%) were in age group 18-25, 31 (32.29%) were in age group 26-30, 14 (14.58%) were in age group 31-35 and 1 (1.04%) was in age group 36-40.

**Table.III:- Trimester group distribution among the GDM. (n=96)**

<b>Sr No</b>	<b>Trimester</b>	<b>Number (%)</b>
I	1 <sup>st</sup> Trimester	17(17.7)
II	2 <sup>nd</sup> Trimester	51(53.12)
III	3 <sup>rd</sup> Trimester	28(29.16)

Out of the total 96 GDM patient, 51(53.12%) were in 2<sup>nd</sup> trimester, 28(29.16%) were in 3<sup>rd</sup> trimester followed by 17 (17.7%) were in 1<sup>st</sup> trimester.

**Table. IV:- ABO blood groups distribution among the GDM and Non-GDM.**

<b>Sr No</b>	<b>ABO Blood groups</b>	<b>GDM (n=96) (%)</b>	<b>Non-GDM (n=203) (%)</b>
I	A	22(22.9)	50(24.63)
II	B	23(23.9)	73(35.96)
III	AB	6(6.25)	18(8.86)
IV	O	45(46.87)	62(30.54)

Out of the total 96 GDM patients 46.8% had O blood group, 23.9% had B blood group, 22.9% had A blood group and 6.25% had AB blood group. The p-value is 0.038 .The result is significant at  $p < 0.05$ . Association of blood group O with GDM is statistically significant.

**Table. V:- Rh Blood groups distribution among the GDM and Non-GDM.**

<b>Sr no</b>	<b>Rh Blood groups</b>	<b>GDM (n=96) (%)</b>	<b>Non-GDM (n=203)(%)</b>
I	Positive	84(87.5)	193(95.07)
II	Negative	12(12.5)	10(4.92)

Out of the total 96 GDM patients, 87.5 % had Rh positive blood group, and 12.5 % had Rh negative blood group. The association between Rh positive blood group and GDM statistically significant.

## Discussion

In the present study, we found that blood group O and Rh positive is significantly associated with GDM. AB blood group is least associated with GDM. Our findings are in tune with Andrea Huidobro M et al 2017 who also concluded positive correlation between blood group O and Rh factor and GDM. Karagoz et al 2015<sup>4</sup> reported that blood group O had high risk of developing GDM. Zhang et al 2015<sup>5</sup> established that blood group AB linked as protective factor against GDM.

In our study, 51(53.12%) were in 2<sup>nd</sup> trimester, 28(29.16%) were in 3<sup>rd</sup> trimester followed by 17 (17.7%) were in 1<sup>st</sup> trimester.

Insulin sensitivity and secretion vary during different stage of pregnancy. In first trimester as well as early in second trimester, an increase in insulin sensitivity occurs mainly due to higher level of estrogens. In the late second and early third trimester the increase release of hormone including human placental lactogen, leptin, prolectin and cortisol from the placenta are responsible for the increase in insulin resistance<sup>6</sup>.

The possible mechanism in development of an association among ABO, Rhesus blood types and incidence of types 2 diabetes is still not well defined. The recent genome wide association studies suggest that the ABO blood group antigen enhance the general body inflammatory state. single nucleotide polymorphism at the ABO locus are linked with two serum markers of inflammation TNF alpha (tumor necrosis factor alpha) and interleukin 6. Increased expression of TNF alpha

has been associated with inflammation . It is well known that the systemic inflammation is the main cause of insulin resistance and play a role in development of type 2 diabetes<sup>4,5,7</sup>.

The study suggests that ABO blood groups and Gestational Diabetes may be interrelated because of broad genetic and immunologic basis. Overall this suggests that there may be a genetic link between blood groups and GDM that lead to a high association of blood group O with GDM and low association of blood group AB with GDM.

## **Conclusion**

From our study we conclude that pregnant women with blood group O are at high risk of developing GDM. Blood group AB is negatively related with development of GDM. We also conclude a positive association between Rh+ve blood group with GDM. It is advisable to screen the antenatal cases with OGTT for detection of GDM from early gestational period. This screening should continue strictly in second and third trimester as the insulin resistance is maximum in this period. At this point it must be remembered that ANC with blood group O+ve are under the higher risk of developing DM. So, these patients should be closely followed up in antepartum as well as postpartum periods by the OGTT.

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