

# The Distribution of the ABO and Rh (D) Blood Types in Type II Diabetes Mellitus Patients

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## ABSTRACT

**Introduction:** The etiopathogenesis of diabetes mellitus is multi-factorial & complex and appears to involve interactions of various immunological, genetic and environmental factors. Positive association with blood groups shows increased susceptibility and a negative association shows protection against diabetes mellitus. Present study was conducted to find out a possible association between type II diabetes mellitus (DM) and ABO & Rh blood groups.

**Material and Methods:** The study involved 313 patients who reported to Haematology Laboratory for blood investigations over a period of 5 months. On the basis of Random & Fasting Blood Sugar levels, we made Group I (Diabetic patients) & Group II (Healthy controls). ABO & Rh blood grouping done for both the groups.

**Results:** AB & B blood group showed less common association with diabetes mellitus. Diabetes mellitus (DM) were more associated with Blood group A, as compared to controls. Blood group O has same distribution among both groups. Diabetics has higher percentage than controls had Rh positive blood group (96.55% vs 94.69%), and diabetics showed less percentage of Rh negative blood group (3.44% vs 5.3%). Blood group B, AB and O were positive in higher percentage among diabetics, and it was same in blood group A.

**Conclusion:** According to Results, it has association between DM and Rh positive blood groups and between blood groups B & AB it has negative association.

**Key words:** Diabetes Mellitus, Blood group, ABO, Rh.

## INTRODUCTION

The etiopathogenesis of diabetes mellitus is multi-factorial & complex and appears to involve interactions of various immunological, genetic and environmental factors.<sup>1</sup> To discover a possible association between ABO and Rh blood groups and different diseases so many efforts have been done. Salivary gland tumors, duodenal ulcer, gastric cancer, colorectal cancer, ovarian tumors, thyroid disorders, and coronary heart disease patients have shown association with ABO blood groups.<sup>2-5</sup> Investigators assume that some other diseases might also be associated with ABO and Rh blood groups. Identifying possible susceptibility to diseases by such associations help and adopt preventive measures to decrease the prevalence of disease. Common emerging medical problem worldwide which have morbidity and mortality is diabetes mellitus. The etiopathogenesis of diabetes mellitus is multi-factorial & shows interactions of various immunological, genetic and environmental factors.<sup>1</sup> Genetic and environmental factors both influenced the diabetes mellitus.<sup>6</sup> Type-2 Diabetes Mellitus has

shown well replicated linkage to Chromosome 1q21-q23.<sup>7</sup> At 9q34.2 region ABO blood group genes are mapped.<sup>8</sup> Blood groups genetically predetermined and therefore may have an association with diabetes mellitus. Hence, positive association shows increased susceptibility and a negative association shows protection against diabetes mellitus. Present study was conducted to find out a possible association between type II diabetes mellitus (DM) and ABO & Rh blood groups.

## MATERIAL METHODS

313 Patients reporting for blood investigations over a period of 5 months were included in the study. On the basis of findings of Random Blood Sugar (RBS) levels and Fasting Blood Sugar (FBS) levels two groups were made. Diabetic patients is Group I; RBS > or = 200 mg/dl & FBS > or = 126 mg/dl & Healthy controls is Group II. ABO & Rh blood grouping is checked for both the groups. The blood samples were collected and labeled for determination of blood groups. Slide agglutination method done for ABO and Rh (D) blood grouping. Standard technique and manufacturer's directions were followed. Data was recorded on a proforma and saved for record. Analysis of the findings were done. Statistical analysis was done. Contingency Coefficient (CC) analysis was done to find out any association between DM and ABO-Rh blood groups.

## RESULTS

Among 313 patients reporting to the laboratory, 87 were diabetics (group I) and 226 were healthy individuals (group II). ABO and Rh blood group distribution among diabetic patients and healthy individuals were recorded. Most prevalent group was blood group O in the whole population (36.42%), diabetics (43.67%) and controls (33.62%),

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Blood Group	Diabetics (%)	Controls (%)
A	29 (33.33%)	64 (28.31%)
B	15 (17.24%)	65 (28.76%)
AB	5 (5.74%)	21 (9.29%)
O	38 (43.67%)	76 (33.62%)
Total	87 (100%)	226 (100%)
CC = 0.151 & P value = 0.117		
<b>Table-1:</b> ABO blood groups distribution in diabetics as compared to controls		

Blood Group	Diabetics (%)	Controls (%)
Rh Positive	84 (96.55%)	214 (94.69%)
Rh Negative	3 (3.44%)	12 (5.3%)
CC = 0.069 & P value = 0.271		
<b>Table-2:</b> Rh blood groups distribution in diabetics as compared to controls		

Blood Group	Diabetics% (No.)	Controls% (No.)
A Positive	28 (96.55%)	61 (95.31%)
A Negative	1 (3.44%)	3 (4.68%)
B Positive	14 (93.33%)	62 (95.38%)
B Negative	1 (6.66%)	3 (4.61%)
AB Positive	5 (100%)	20 (95.23%)
AB Negative	0 (0)	1 (4.76%)
O Positive	37 (97.36%)	71 (93.42%)
O Negative	1 (2.63%)	5 (6.57%)
<b>Table-3:</b> Combined ABO & Rh blood groups distribution in diabetics as compared to controls		

Blood Group	CC	P value
A	0.000	1.000
B	0.105	0.388
O	0.092	0.3355
AB	0.124	0.621
<b>Table-4:</b> Contingency coefficient (CC) & P- values		

followed by blood group A (table-1). Rh positive blood group was the most prevalent in the whole population (95.20%), diabetics (96.55%) and controls (94.69%). Although blood group O>A>B>AB (whole population), no association between ABO & Rh blood groups with DM could be established. Frequency of blood groups blood group A & O were more common, in diabetics, whereas AB & B were less common as compared to controls. Similar distribution among both the groups by blood group O. It shows no association among ABO Blood Group & DM was noted. Rh positive shows higher percentage of diabetics (96.55% vs 94.69%) whereas less percentage of diabetics were Rh negative (3.44% vs 5.3%). Between Rh blood group & DM there is no association was seen (table-2,3). Among both ABO and Rh types together, it was same in blood group A, where as higher percentage of diabetics with blood group B, AB and O were positive for both the groups. CC & P values also did not show any association between DM and ABO & Rh blood groups (table-4).

## DISCUSSION

Between ABO & Rh blood groups with DM contradictory associations have been reported. Kamil & his colleagues done study, according to his study in diabetics, blood group A was less commonly seen. Blood group O also shows negative association, with the difference.<sup>9</sup> One more study found positive association with Rh negative blood group with DM and a negative association of blood groups A & B.<sup>10-12</sup> In another study, one more varying finding was a positive association of diabetes and blood group A and O negative. Some others study have found among diabetics and non-diabetics no such associations with DM and ABO & Rh blood groups. Contradictory to these findings however, other investigators have found equal distribution of ABO & Rh blood groups.<sup>13</sup> In the present study, the highest ABO blood group in both diabetics & controls in the whole population considered was blood group O. We found that the association with DM and blood group A & O more common blood groups and AB & B blood group were less common. Among Rh blood group, we found a positive association with Rh positive and a negative association with Rh negative blood groups. In combination the ABO & Rh blood groups together, we found equal distribution in blood groups A positive & A negative, lesser in B negative, AB negative & O negative, greater in B positive, AB positive & O positive and with DM. Although, we found some positive & negative associations of ABO & Rh blood groups, they were not statistically significant. Hence, an association could not be established with ABO & Rh blood group. The possible reason of these contradictory findings is role in genetic expression of this disease might be influenced by the racial and geographical factors.

## CONCLUSION

To find out the association of type II DM with ABO & Rh blood group if any an elaborate study, showed few positive associations, they were not statistically significant to draw definite conclusions.

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