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## Incidence of ABO Blood Group in Type 2 Diabetes Mellitus in Western Uttar Pradesh, India.

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### ABSTRACT

Diabetes mellitus is most frequently occurring metabolic disorder. ABO blood group was found to be associated with various disorders. An association between ABO blood group and type 2 diabetes mellitus has been observed in various studies, but conflicting results were obtained. 1122 known diabetic patients, both male and female were enrolled for the study. ABO blood group, random blood sugar and body mass index were measured. Slide agglutination method was performed for measuring the ABO blood group. Obesity was measured by body mass index, which was obtained by dividing the weight of an individual by the square of height. Significant results ( $<0.05$ ) were obtained between male and female population among the various blood groups. There was a significant difference ( $<0.05$ ) between the obese and non obese persons of type 2 diabetes mellitus. The highest percentage of diabetic patients was observed in B blood group followed by O blood group in both male and female. Among the entire study population approximately 38% patients were having B blood group. Patients having AB blood group were lowest in the entire study population.

**Keywords:** Type 2 Diabetes Mellitus, ABO blood group, obesity

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## INTRODUCTION

Diabetes mellitus is fastest moving endocrine disorder, affecting worldwide. According to WHO, 90% persons suffers from type 2 diabetes mellitus [1]. Being a lifestyle disorder, usually results from excess body weight and reduced physical inactivity, affects male as well as female [2,3]. Diabetes mellitus is a chronic disorder occurs due to less production of insulin secreted from pancreas [4]. ABO and Rh blood group system is most frequently occurring blood group in India, found to be associated with various diseases.[5,6] Several attempts have been made regarding the relation between ABO blood group and various pancreatic diseases [7-9]. Very few studies have done regarding the prevalence of ABO blood group in type 2 diabetes mellitus (T2DM) [10-13]. So the aim of this study was to assess the percentage of blood group in T2DM patients.

## MATERIAL AND METHODS

Total 1122 persons, both male and female known type 2 diabetic mellitus patients were recruited for the study. The age group criteria for the patients were 30 to 60 years. Every patient was voluntarily participated in the study.

### Methods

Blood sample was taken from the participants by the veni-puncture in EDTA vials. ABO and Rh (D) blood grouping was performed simultaneously. Slide agglutination method was followed [14]. Blood sugar estimation was confirmed by glucometer. Patients having blood sugar level >200 mg/dl were said to be diabetic [15]. Patients having body mass index >29.99 kg/m<sup>2</sup> were considered obese [16].

### Statistical Analysis

Categorical data was analysed by using chi square test for differentiate ABO blood group between male and female of diabetic patients. This test was also applied between obese and non obese patients of Diabetes mellitus to differentiate A, B, O, and AB blood group. P value <0.05 was considered statistically significant.

## RESULTS

In this study we found that out of 1122 patients in whom 593 patients were male and 529 were female. The significant difference (<0.05) was observed among the A, B, O and AB blood group between male and female patients. Highest prevalence was found of B blood group (37.34%) in the diabetic patients followed by O blood group (32.53%). The patients having A blood group were only 21.47%. The lowest prevalence (8.37%) was observed in AB blood group (Fig.-1). In the entire study group 95.27% patients were Rh<sup>+</sup> and rest 4.73% were Rh<sup>-</sup>. (Table-1)

**Table 1: ABO Blood Group Percentage Distribution In Diabetes Group\***

| S. No. | Groups          | Blood Groups Of Type-2 Diabetes Mellitus Patients |       |     |       |     |       |     |       | Total |       |
|--------|-----------------|---|-------|-----|-------|-----|-------|-----|-------|-------|-------|
|        |                 | A   |       | B   |       | AB  |       | O   |       | No.   | %     |
|        |                 | No.   | %     | No. | %     | No. | %     | No. | %     |       |       |
| 1.     | Male            | 145   | 24.45 | 213 | 35.92 | 55  | 9.27  | 180 | 30.35 | 593   | 52.85 |
| 2.     | Female          | 99  | 18.71 | 206 | 38.94 | 39  | 7.37  | 185 | 34.97 | 529   | 47.15 |
| 3.     | Total           | 244   | 21.74 | 419 | 37.34 | 94  | 8.37  | 365 | 32.53 | 1122  | 100   |
| 4.     | Rh <sup>+</sup> | 236   | 96.72 | 402 | 95.94 | 91  | 96.80 | 341 | 93.42 | 1069  | 95.27 |
| 5.     | Rh <sup>-</sup> | 8   | 3.28  | 17  | 4.06  | 3   | 3.20  | 24  | 6.58  | 53    | 4.73  |

Chi square Test  $\chi^2 = 7.956$ , \*p value <0.05

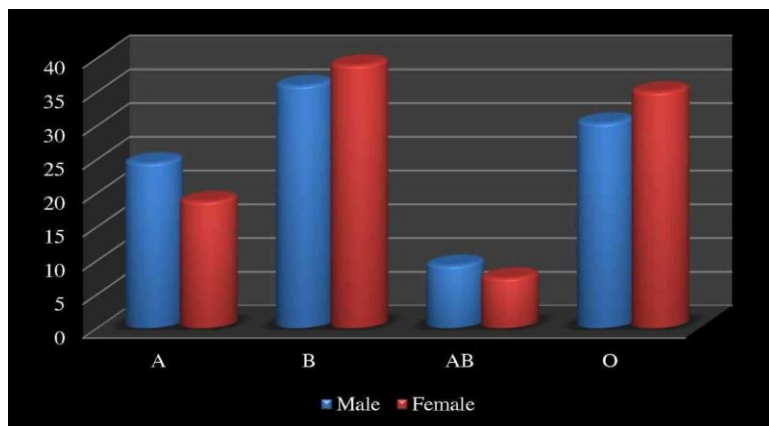


Figure 1: Percentage prevalence of different blood groups in male and female patients of type 2 diabetic mellitus

Out of the entire diabetic population 684 (60.90%) patients were obese and 438 (39.10%). In the obese group 376 patients were male and rest 308 were females. While in the non obese group 240 patients were male and 198 were female. There was statistically (<0.05) significant between the obese and non obese diabetic groups in terms of ABO blood group. In the obese group highest prevalence was observed of B blood group (39.47%) which was followed by O blood group (29.38%), A blood group (22.07%) and AB blood group (9.06%). While in the Non obese result was different as there was highest prevalence was observed of O blood group (37.44%) followed by B blood group (34.01%), A blood group (21.38%) and AB blood group (7.30%). (Table-2)

Table 2: Occurrence of ABO Blood Groups In Obese And Non Obese Patients Of Type-2 Diabetes Mellitus\*

| S. No. | Blood Group | Type -2 Diabetes Mellitus Patients |            |              |            |            |              |
|--------|-------------|------------------------------------|------------|--------------|------------|------------|--------------|
|        |             | Obese                              |            |              | Non Obese  |            |              |
|        |             | Male                               | Female     | Total        | Male       | Female     | Total        |
| 1.     | A           | 90                                 | 61         | 151 (22.07%) | 55         | 38         | 93 (21.38%)  |
| 2.     | B           | 138                                | 132        | 270 (39.47%) | 78         | 71         | 149 (34.01%) |
| 3.     | AB          | 34                                 | 28         | 62 (9.06%)   | 17         | 15         | 32 (7.30%)   |
| 4.     | O           | 114                                | 87         | 201 (29.38%) | 90         | 74         | 164 (37.44%) |
|        |             | <b>376</b>                         | <b>308</b> | <b>684</b>   | <b>240</b> | <b>198</b> | <b>438</b>   |

Chi square Test  $\chi^2 = 8.528$ , \*p value = <0.05

**Observation**

There was significant (<0.05) difference was observed among the blood groups in obese (Fig.-2) and non obese (Fig.-3) group of type 2 diabetes mellitus.

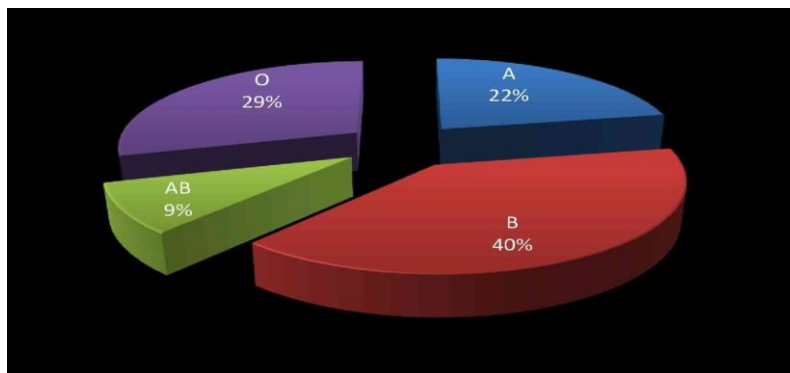
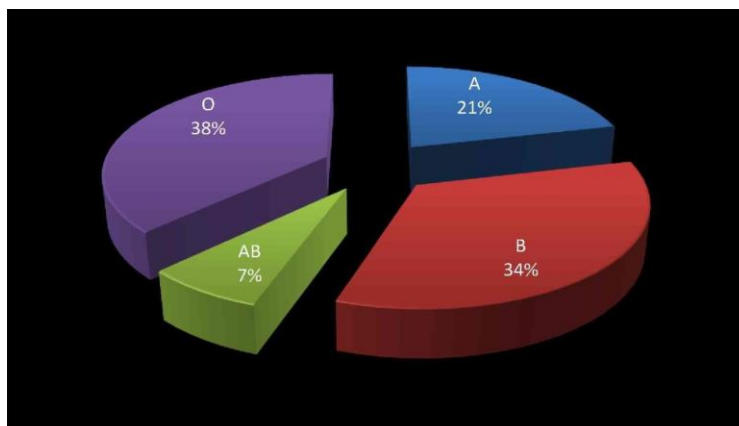


Figure 2: Percent prevalence of different blood groups in obese group of type 2 diabetes mellitus



**Figure 3: Percent prevalence of different blood groups in non obese group of type 2 diabetes mellitus**

### DISCUSSION

Various studies in the past have revealed the relation between blood group and other diseases [17, 18]. Conflicting results were obtained in the past regarding the association between ABO blood group and T2DM [19, 20]. In this study we observed that type 2 diabetes mellitus is quite frequently occurring in B blood group in both male and female population. This result was supported by other studies [21, 22]. On the other hand Padmini et al observed contradictory results by showing higher prevalence of diabetic patients both male and female in O blood group followed by B blood group [23]. In this study patients having blood group B and blood group O shows the greater risk of obesity related type 2 diabetic patients due to carbohydrate intolerance supported by Jaggi S et al study [24].

### CONCLUSION

As the observed data we can say that person's having B blood group are more likely to affected by type 2 diabetes mellitus followed by O blood group. The blood group sequence was observed to having diabetes mellitus B>O>A>AB. The B blood group and AB blood shows the highest and lowest percent prevalence by observing 37.34% and 8.37% from the Diabetic patients respectively. These results suggest the highest association of Blood Group B and least association of blood group AB with type 2 diabetes mellitus.

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