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Research Article

**Relationship between ABO, Rh Blood Groups and
Diabetes Mellitus, obesity in Namakkal town,
Tamilnadu.**

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Abstract

The present study was to evaluate the relationship between ABO and Rh blood groups with diabetes mellitus and obesity. This study was conducted at various nursing homes Namakkal, Tamilnadu from January to March 2014. A total of 890 subjects (540 males and 350 females) were taken for the present study. Among them, 509 healthy subjects (311 males and 198 females) and 244 subjects had diabetes mellitus (155 males and 89 females), and 137 subjects had obesity (74 males and 63 females). The present study included the different blood groups such as group A: 22.25%; group B: 24.38%; group AB :11.12% and group O: 42.25% respectively. The frequency of Rh-positive and Rh-negative blood were 91.13% and 8.87% respectively. There was a significant difference between healthy subjects and diabetic patients in blood group B and Rh-positive groups. On the subject of the healthy and obesity subjects there was significant difference in blood group B and Rh-positive groups.

Key words : ABO and Rh Blood Groups, diabetes mellitus, Obesity

INTRODUCTION

Since 19th Century, there has been diverse attempt to determine a potential relationship between ABO and Rh blood groups and various metabolic and malignant diseases. The extensive findings acquired from studies on patients with gastric cancer¹, salivary gland tumors², duodenal ulcer³, colorectal cancer^{4, 5}, thyroid disorders⁶, ovarian tumors⁷, Upper Urinary Tract tumors⁸, small cell carcinoma of lung⁹ breast cancer¹⁰, pancreatic cancer¹¹, coronary heart disease¹²⁻¹⁴ and hypercholesterolaemia¹⁵ have shown association with ABO blood groups. The wide information has directed to the assumption that some other metabolic and chronic diseases might also be connected with ABO and Rh blood groups. Based on the ample findings, it helps to identify vulnerability of the diseases and approve possible preventive actions and decrease the incidence.

Diabetes mellitus is a chronic metabolic endocrine disorder encompass significant morbidity and mortality¹⁶. It has a hereditary character, in spite of that environmental factors also participate their role in its hereditary expression. Similarly many other genetic traits, ABO and Rh blood groups are also hereditarily determined as a result of the relationship with diabetes mellitus¹⁷. Detection of a positive relationship with ABO and Rh blood groups may reflect increased susceptibility to and a negative relationship defense against diabetes mellitus. Previous studies has been comprehensively investigated the association between ABO and Rh Blood groups and diabetes in various countries. The increase frequency of blood group A among diabetic patients in Nepal¹⁸ and Taiwan¹³ and increase frequency of blood group blood group B among

diabetic patients in Iraq¹⁹, Qatar²⁰, Italy²¹, India²², Rh negative blood group is more frequent in Diabetic patients in Pakistan¹⁷. Also the study suggested that there is no association between the distribution of the ABO blood types and diabetes mellitus²³⁻²⁵.

Since diabetes is a chronic and serious disorders affects various organs such as kidney, neuron, eye, heart and cause various life threatened diseases like hypertension, stroke, cardiovascular disease and obesity. The present study was carried out to find out a possible relationship between ABO and Rh blood groups with diabetes mellitus and obesity in local populations of Namakkal town.

MATERIALS AND METHODS

This study was conducted at various nursing homes Namakkal, Tamilnadu from January to March 2014. A total of 890 subjects (540 males and 350 females) were taken for the present study. The purpose and procedure of study was explained to all diabetics coming to medical OPD or admitted in medical ward. About 244 consecutive diabetic patients who consented to be included in study were enrolled irrespective of their age, sex, socioeconomic status or duration of the disease. These patients were already diagnosed to have diabetes, were under treatment and coming for follow up to hospital for their management. The controls were taken from healthy individuals coming for blood donation at Nursing home blood bank over this study period. Obesity quantified conveniently using the Body mass index (BMI). It is calculated as the person's weight in kilograms divided by square of his or her height in meter (kg/m²)

$$\text{BMI} = \text{weight (Kg)} / \text{Height}^2(\text{m})^{22}$$

Category	BMI range (Kg/m ²)
Starvation	<15
Under weight	15-18.5
Normal	18.5-25
Over weight	25-30
Obese	30-40
Morbidly obese	>40

Two ml of blood sample was collected in EDTA tube from patients by a phlebotomist, labeled and transferred to laboratory for determination of blood groups. ABO and Rh blood groups were determined using tile method. All information was recorded on a proforma and saved for record and analysis of the findings at conclusion of the study. The data obtained were analyzed statistically to determine any association between DM and different ABO blood

groups. Data were expressed as percent and absolute number of frequency. Statistical analysis was using Chi-square test, P<0.05 was considered to be statistically significant

RESULTS

The distribution of ABO and Rh blood groups in Namakkal town were summarized in table-1. The table gave an idea about gender along with number and percentage of blood groups. The number and percentage of ABO and Rh blood groups of healthy and diabetic individuals showed in table-2. There was significant difference between diabetic patients and healthy individuals in blood group B (p<0.05), also there was significant difference in Rh positive among both groups (p<0.05). The noteworthy of frequency of Rh positive among diabetic in the present study was 86.89%. The blood group O and Rh positive blood group (40.16%) was most frequency blood group among diabetic patients. The numbers of healthy and obesity individuals and percentage of blood group ABO and Rh blood group were significant difference between healthy individuals and obesity persons in blood group B and Rh positive (p<0.05), which was demonstrated in table-3

DISCUSSION

The extensive studies have tried to investigate a possible relationship between ABO & Rh blood groups and diabetes mellitus. The results have been proved as inconsistent and differed from one county to other. Many researchers have recognized an relationship between blood groups and diabetes even though some studies has no relationship could be established^{17, 23-25}. Results of this study indicated that subjects with blood group AB was less likely while those with blood group O and B are more likely to have Diabetes. Blood group Rh positive is high frequent in diabetics. Our results are similar to those of Pramanik and Pramanik¹⁸ and Abdul Ghani et al.¹⁷.

Many research studies have been established equal distribution of ABO blood groups among diabetics and non-diabetics. Macafee²⁶ investigated an association between ABO blood groups and Diabetes Mellitus. Based on his observation the results suggested similar distribution of different blood groups in Diabetics and healthy subjects. Koley²⁴ also confirmed that there was no significant difference of ABO blood groups in diabetics and healthy subjects. Similar findings have been made by Sidhu et al.²³ and Qureshi and Bhatti²⁷.

The possible clarification of these conflicting findings is almost certainly racial and environmental factors have a role in genetic expression of disease. Moreover most of the studies conducted in this regards have small number of population. Most likely

studies on larger scale and a meta-analysis of task done so far will provide a solution to this dilemma. The study shows that significant difference between healthy subjects and diabetic patients in blood group

B and Rh-positive groups. On the subject of the healthy and obesity subjects there was significant difference in blood group B and Rh-positive groups.

Table-1
Distribution of ABO and Rh blood groups

Blood groups	Number of subjects	Percentage of subjects	Number of Males	Percentage of Males	Number of Females	Percentage of Females
A	198	22.25	98	18.15	81	23.14
B	217	24.38	216	40	134	38.29
AB	099	11.12	72	13.33	33	9.43
O	376	42.25	154	28.52	102	29.14
Rh+	811	91.13	501	92.78	304	86.86
Rh-	79	8.87	39	7.22	46	13.14
Total	890	100	540	100	350	100

Table-2
Comparison between the ABO and Rh blood groups of healthy subjects and diabetic patients

Blood groups	Number of healthy subjects	Percentage of healthy subjects	Number of diabetic patients	Percentage of diabetic patients	P-value
A	104	20.43	56	22.95	0.28
B	196	38.52	72	29.51	0.01
AB	80	15.71	18	7.38	1.76
O	129	25.34	98	40.16	1.82
Rh+	451	88.61	212	86.89	0.02
Rh-	58	11.39	32	13.11	0.49
Total	509	100	244	100	-

Table-3
Comparison between the ABO and Rh blood groups of healthy subjects and obesity patients

Blood groups	Number of healthy subjects	Percentage of healthy subjects	Number of obesity patients	Percentage of obesity patients	P-value
A	104	20.43	29	21.17	0.15
B	196	38.52	42	30.66	0.04
AB	80	15.71	12	8.76	1.82
O	129	25.34	54	39.41	1.76
Rh+	451	88.61	120	87.59	0.01
Rh-	58	11.39	17	12.41	0.34
Total	509	100	137	100	-

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