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## A study on the correlation of ABO blood group system and hypertension

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### Abstract

A well-known health problem hypertension have no clear symptoms show a strong correlation with risk factors like stress, age, high salt intake etc. It is defined as the sustained elevation of systemic arterial pressure to a level that places the patient at the increased risk for target organ damage. According to the most accepted classification systemic arterial pressure more than 140/90 mm Hg should be considered hypertensive and should undergo some treatment. This present study was performed to assess association between ABO blood group and hypertension.

**Material & Method:** A study was carried out on 100 patients during a period of one year. All the hypertensive patients were measured for ABO blood group system.

**Result:** Hypertension was seen most prominent in blood group B in our study.

**Conclusion:** The blood group B was more susceptible to hypertension.

**Keywords:** Blood group system, association & hypertension

### Introduction

Hypertension a major health problem by definition is difficult and by necessity it is arbitrary [1]. It shows unclear symptoms and this is the reason that many patients are unaware of this health issue [2]. Sir George Pickering formulated the concept that the blood pressure is distributed as a bell shaped curve without any real separation between normo tension and hypertension. It is also defined as the sustained elevation of systemic arterial to a level that places the patients at increased risk for target organ damage [3-22]. In simple words hypertension is sustained increase in blood pressure exceeding 140/90 mm Hg [18-35]. Increasing age, obesity, stress, high salt intake and lifestyle are its modification factors. Landsteiner in 1900 has discovered ABO blood group in humans by detecting A&B antigen. In addition known red cells are used to detect anti A and anti B in the serum by a process called reverse grouping [32-47].

The present study was undertaken to identify the association of ABO blood group with hypertension.

### Objective

To assess the association & distribution of hypertension & ABO blood group in the study group & assess the gender predilection for the distribution of ABO blood group in hypertensive patients.

### Material & Method

#### 1) Sphygmomanometer

#### 2) Blood group examination kit

The study was carried out on 100 known or diagnosed hypertensive patients which were selected from the dental OPD patients at ITS Dental College, Greater Noida. The patients were selected to the ABO blood group examination in a period of one year from April 2013 to August 2014. The group consisted of the patient suffering with the essential hypertension after taking a detailed history, complete examination and by measuring blood pressure by sphygmomanometer. The patients were in the age group of 18 years to 81 years study group included both males and females.

**Sample size:** total of 100 subjects were taken out of which 50 were males and 50 were females. Inclusion criteria: the subjects with blood pressure more than 140/90 mm Hg were included in this group

**Exclusion criteria:** subjects with renal hypertension with serum creatinine level above 1.5g/dl and diabetes mellitus type I and type II were not included

**Control group:** Normal healthy subjects whose systolic blood pressure is in the range of 110-130 mm Hg and diastolic blood pressure in the range of 60-89 mm Hg were included in the control group.

**Determination of ABO blood group**

**Procedure:** blood group is determined by slide haemagglutination technique. 2.5% suspension of red blood cells was prepared in normal saline (0.85g/dl sodium chloride in distilled water) preparation method given below. Mix 1 drop of blood with 1 ml of normal saline. This provided the red suspension. On one half of glass slide, one drop of Anti A human poly clonal or murine monoclonal blood grouping serum was placed. On the other half a glass slide one drop of Anti B (yellow colour) human polyclonal or murine monoclonal blood grouping serum was placed. Using a Pasteur pipette one drop of red blood cell suspension was added to each half of the slide. With separate applicator; the serums were well mixed back and forth and observed for agglutination.

**Determination of blood pressure**

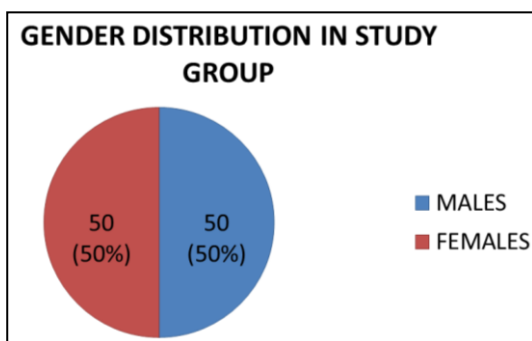
**Age Distribution of the Study Group**

Study Population	Minimum age	Maximum age	Mean age	Standard deviation
Males	26 yrs	77yrs	51.5 yrs	14.45
Females	27 yrs	81yrs	54 yrs	16.27
Total	26yrs	81yrs	53.5 yrs	14.29

Blood pressure was recorded in the hypertensive and normal individuals by the palpatory and auscultatory method introduced by Riva Roci.

Age distribution of the study group: 18 to 81.

**Result**



**Prevalence of ABO blood groups in hypertensive patients among gender**

Gender	A	B	AB	O
Males	11(22%)	21(42%)	6(12%)	12(24%)
Females	15(30%)	22(44%)	2(4%)	11(22%)
Chi square value	0.099	3.454	2.589	6.181
P-value	0.753	0.063	0.108	0.204

p-value < 0.05 – statistically significant and p-value>0.05- statistically non-significant (N.S.)

**Prevalence of ABO blood groups in hypertensive patients**

**The Frequency of Abo Blood Group:** a total of 100 male and females’ population was compared. Among all the people blood group B was found to be most prevalent, it was followed by blood group O then A and AB. Blood group B was 44% and was seen more in females.

**Table 3**

Gender	A	B	AB	O	P - value
Males	11 (22%)	21 (42%)	6 (12%)	12 (24%)	0.0249 (s)
Females	15 (30%)	22 (44%)	2 (4%)	11 (22%)	0.0008 (s)
Total	26	43	8	23	0.0001

**Discussion**

There have been immense researches done on ABO blood group due to its medical importance and genetic influences in different diseases. It is seen to be strongly associated with genetic markers of obesity, erythroblastosis in neonates, national suicide rate [48, 49] and it’s a well-known fact the genetic history of a person can be known by studying the blood group [50]

Around the globe there is a marked variation in ABO blood group system and this variation exists within different areas in the same country too. Different researches done in different countries exhibit predilection of some blood group like blood group O is prominently seen in Egypt [51], in 46% USA population [52], in 52% Saudia Arabia population [53] and in Iranian population [54]. Predominance of blood group A was seen in Russian population and blood group B was seen more in African population [55].

India being a country of diversity not only shows diversity in caste, creed, religion and race also shows diversity in blood group too. This diversity is seen within the same country in various states. J & K [56] and South Indian [57] population exhibits predominance for blood group O, Uttar-Pradesh [58] population exhibits predilection for blood group B. Our study which was based in Uttar Pradesh exhibited that blood group B was most prevalent in both males and females followed by O, then A and B. In our study, we found that the B blood group was more susceptible to hypertension as compared to blood group O and A; whereas AB blood group had less chance of getting hypertension in males and in females which is in accordance with the previous studies, in which they observed that the B blood group seen more in the hypertension followed by blood group O, A and AB. These figures are similar to other study carried out in Iran [59]

These results could suggest that Blood group B might genetically be more prone to hypertension as compared to other groups. B blood group generally is more common in Indian Population. Socially, one should know his or her own blood group and become a member of blood donor’s club so that he or she can be approached during emergency conditions. Judicially, it is helpful in medico legal cases to sort out parental disputes. Its knowledge is also helpful to save the child from the disorders like erythroblastosis fetalis [60]

Previous Studies showed an association between ABO blood group and severity of chronic periodontitis. Investigators concluded that the patients with group B were found to be at greater risk of developing more severe form of periodontitis [61]. The dental patient with hypertension poses some significant management considerations. These include identification, monitoring, stress and anxiety reduction,

prevention of drug interactions, awareness and management of drug side effects such as orthostatic hypotension, and management of drug effects on the oral tissues<sup>[62]</sup>

### Conclusions

In conclusion, our results suggest that the relative risk for hypertensive patients was found to be higher in blood group B and lowest in blood group AB. No correlation exists between the genders.

### Future Recommendations

- 1) More studies needed with increased sample size
- 2) Different geographical areas and populations should be included

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