

## Research Article



## Awareness of ABO and Rh Negative Blood Groups in Patient Population of Saveetha Dental College and Hospitals

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### ABSTRACT

ABO blood group system is the most important blood group system followed by Rh blood group system. At present, the ABO blood group system consists of two antigens namely A and B that determine one's blood group while Rh blood group system consists of 50 defined blood-group antigens, among which the five antigens D, C, c, E, and e are the most important. The commonly used terms Rh factor, Rh positive and Rh negative refer to the D antigen only. It has remained of primary importance in obstetrics, being the main cause of hemolytic disease of the newborn (HDN). HDN can occur only in Rh-negative mothers having Rh-negative baby. Injecting anti-D serum during each child's birth or abortion can prevent this complication. So the aim To find out the awareness of ABO and Rh blood groups and its complications among the patient population of Saveetha Dental College and Hospitals. A questionnaire based study conducted to determine the awareness of ABO and Rh blood group systems. When questioned about ABO blood groups, 54% had a good knowledge about blood groups. 54%, 38% had an incomplete idea but didn't deem completely unaware, however, 8% of the subjects were completely unaware of different blood groups. However, only 6% were aware of the Rhesus factor. This study showed higher frequency of subjects who were unaware about blood group antigens and complications related to Rh -ve blood group. The subjects however were responsive to the explanation given to them and they understood of the importance of being aware of their blood groups. All subjects were made aware of blood grouping systems at the end of the survey irrespective of how much knowledge they had before the survey.

**Keywords:** ABO, Rh, Antigen A, B & D, Hemolytic disease of newborn (HDN), Blood transfusion.

### INTRODUCTION

Blood is of utmost importance to human beings among all body fluids as it is essential for the circulation of various substances throughout the body, i.e., nutrients, enzymes, hormones and the most important one being oxygen. Blood is a man's complete and unchangeable identity. There are several blood group systems and the most important one among these is the ABO system<sup>1</sup>. Credit for the first and most important discovery of ABO system of blood grouping is given to Karl Landsteiner who made the discovery in 1901. The second most important, in view of blood transfusion, is the Rh blood group system which was the fourth to be discovered. The circulating blood volume of an adult human is about 4-6 liters. Blood consists of a variety of cells floating in a fluid called plasma<sup>2</sup>.

In the ABO blood group system, individuals fall under four major blood groups namely- A, B, AB and O according to the type of agglutinogens (antigens) and agglutinins (antibodies) present<sup>3</sup>. A and B constitute the surface antigens. The red blood cells in humans contain a series of glycoproteins and glycolipids on their surface, which constitute blood group antigens. The antigens are present on the surface of the RBC and presence of these is genetically determined<sup>4</sup>. Antibodies are present in the plasma of the blood produced by a type of blood cell known as B- lymphocytes or B-cells. Type A blood has antigen A, type B blood has antigen B, type AB blood has

both antigen A and B and type O blood is void of both antigen A and B<sup>5</sup>. In addition the plasma of type A blood contains anti-body B, plasma of type B blood contains anti-body A, plasma of AB type of blood is void of both anti-bodies namely A and B and lastly the plasma of O type blood contains both anti-bodies A and B. When an antigen and its corresponding anti-body mix, it results in agglutination or clumping of blood. Therefore it is for this reason that proper blood typing must be done before blood transfusion<sup>6</sup>. Based on the principle of agglutination we can conclude that the following table shows the blood groups, which are compatible with each other during blood transfusion.

The Rh system is one of the most complex blood groups known in humans. It is of primary importance in Obstetrics. Rh antigens are highly immunogenic and 49 antigens have been identified till now. D antigen is the most significant and D negative individuals produce anti-D if they encounter the D antigen through transfusion or pregnancy and causes hemolytic transfusion reaction or hemolytic disease of fetus and newborn. It is due to this that the Rh status is routinely determined in blood donors, transfusion and hemolytic disease<sup>7</sup>.



Blood Type	Donate Blood To	Receive Blood From
A+	A+ AB+	A+ A- O+ O-
O+	O+ A+ B+ AB+	O+ O-
B+	B+ AB+	B+ B- O+ O-
AB+	AB+	Everyone
A-	A+ A- AB+ AB-	A- O-
O-	Everyone	O-
B-	B+ B- AB+ AB-	B- O-
AB-	AB+ AB-	AB- A- B- O-

Knowledge of blood group is important when it comes to blood transfusions as hemolytic reactions that may occur when incompatible blood groups are transfused to the patient. A precautionary step would be to give the same blood type to an individual at the time of need. Blood transfusions are often life saving at times of emergency for the patient. General population should be aware of importance of blood donation. ABO blood group examination is a pillar in forensic sciences, and studies show that similar antigens can be detected in saliva splatters as well <sup>8</sup>.

## MATERIALS AND METHODS

The study was conducted during the month of April in 2015 in Saveetha Dental College and Hospital, Chennai. Dental patients above the age of 20 who were willing to participate were included in the study. A total of 50 patients were selected randomly and questioned. All subjects were approached with a questionnaire and the answers were recorded through an oral interactive session. Hence proper assessment regarding subjects knowledge on the subject was made and explanation was given to them in case they were unaware. The questionnaire consisted of 11 structured questions to assess the patient's knowledge level, attitude and awareness regarding blood groups. The questionnaire included the information about patient's age gender, marital status, education level and profession. The questions were related to awareness of the existence of blood groups, differences between A, B, AB and O blood groups, to find out if they were aware that blood groups were termed either positive or negative, if they were aware of theirs, their spouses and their children's blood groups. We also wanted to find out the percentage of people who were married to a first-degree relative and if they were aware of the complications associated with mismatching of blood groups. The structured questionnaire was formatted in English and designed such that, investigation of basic knowledge on ABO blood grouping preceded that of Rh blood group system. For those patients who could not understand English, they were interpreted in Tamil. At the end of the interactive session, patients were made aware of the knowledge they lacked with the intention that at the end of the survey 100% of the subjects had knowledge on the

importance of being aware of blood groups. The data extracted were tabulated and statistically analyzed using SPSS version 17.0 and results were obtained.

The questions included in the questionnaire were as follows,

1. What do you know about blood groups?
  1. Do you know what are A, B, AB and O blood groups?
  1. Do you know why blood group is termed positive or negative?
  1. What is your blood group?
  1. What is your spouse's blood group?
  1. Are you married to a first degree relative?
  1. Number of Children and their blood groups
    1. Do you know of any complications that can be caused due to blood group?
    1. Do you know any of the complications related to Rh -ve blood group?
    1. An immediate family member with an Rh -ve blood group?
    1. Any advantage in knowing your blood group

Explanation was given to each subject following the questions.

## RESULTS

**Table 1:** Distribution of age of the study population (n=50)

N	50
Mean Age	33.6
Std. Deviation	9.90
Minimum	20
Maximum	58

**Table 2:** Gender profile of study population (n=50)

Gender	N	%
Male	20	40.0
Female	30	60.0
Total	50	100.0

**Table 3:** Marital status of the study population (n=50)

Marital Status	N	%
Unmarried	16	32.0
Married	34	68.0
Total	50	100.0



**Table 4:** Occupational status of the study population (n=50)

Occupation	N	%
AC mechanic	1	2.0
Accountant	1	2.0
BBA	1	2.0
Business	4	8.0
Driver	2	4.0
Engineer	3	6.0
Housewife	10+5	30.0
Labourer	1	2.0
Pastor	1	2.0
Sales	1	2.0
Senior Analyst Visteon	1	2.0
SIIMS Hospital	1	2.0
Student	10	20.0
Tailor	3	6.0
Teacher	3	6.0
Tube production	1	2.0
Welder	1	2.0
Total	50	100.0

The sample of 50 patients who reported to Saveetha Dental College comprised of 20 male subjects (40%) and 30 female subjects (60%). Tables 1 and 2 show the sex and age distribution of the subjects. Out of 50 respondents, minimum age was 20 and maximum age was 58. Those below the age of 20 were excluded from this study. 68% of the subjects were married, while 32% were unmarried shown in Table 3. In terms of education, 34% had a university education, 54% had high school education and 12% had elementary school education [Table 4]. When questioned about blood groups, 54% had a good knowledge about blood groups. 54%, 38% had an incomplete idea but didn't deem completely unaware, however, 8% of the subjects were completely unaware of different blood groups. When questioned on enumeration of the blood groups 10% were able to list all four blood groups, while 20% were able to identify a few of them but not all and a shocking 70% couldn't identify a single blood group. After investigating their knowledge on the ABO blood grouping, they were questioned about the Rh blood group system, only 6% were aware of why blood groups are identified negative or positive [Figure 1]. In patients who were aware of blood groups, media was their main source of information, a few among them were made aware of it through their doctors, friends and relatives. When asked about their blood groups, 90% of the subjects were aware of their blood groups and 69% were aware of their spouse's blood groups too [Figure 2]. From the study we identify that out of the 54% of the people who identified their blood groups, 84% of the people were Rh positive and 4% were RH negative while

12% were unaware. Out of the 69% who were aware of their spouse's blood groups, 58.8% of their spouses were Rh positive, 8.85 were Rh negative while 32.3 were unaware of their spouses Rh factor [Figure 3]. 32.4% of the subjects were married to a first degree relative. 2.9% were married to a distant relative, while 64.7% were not married to relatives [Figure 4]. About 4% were aware of the complications that can be caused during pregnancy brought about by mismatched blood groups, while 2% were partially aware of it. Approximately 20% of the subjects had an immediate family member with an Rh-negative blood group, 58% had no immediate family member with an Rh-negative blood group, while 22% were unaware. At the end of the dialogue, 88% said that knowing your blood groups and Rh factor is advantageous while 12% still couldn't didn't come to an understanding of its importance. Further counseling was given to clarify any doubts they had on the subject. Most patients stated that awareness of ones blood group and Rh factor comes into importance in situations like road traffic accidents and life threatening injury that require blood transfusions.

Figure 1

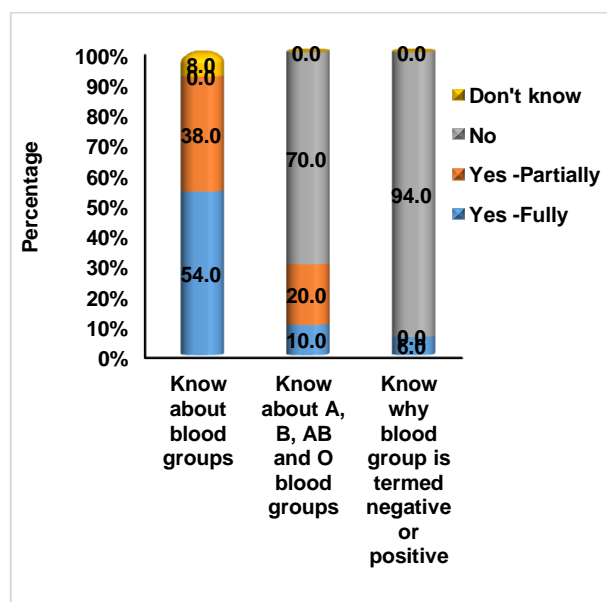


Figure 2

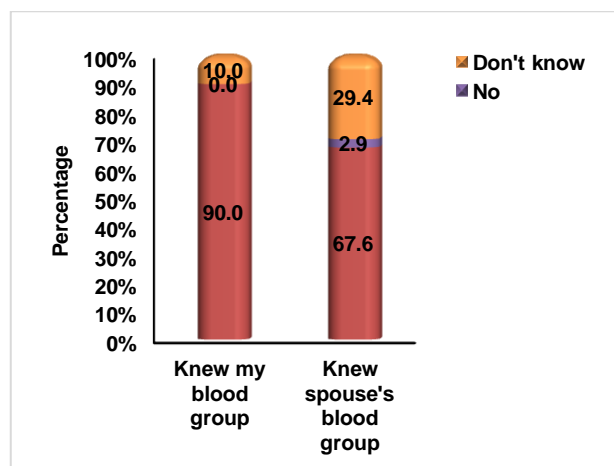


Figure 3

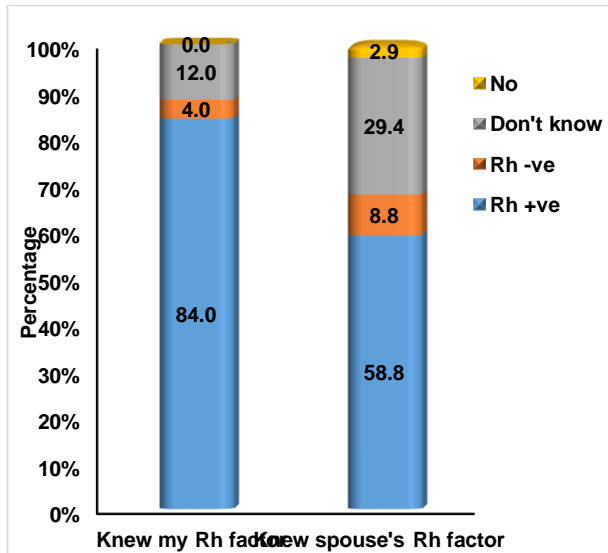


Figure 4

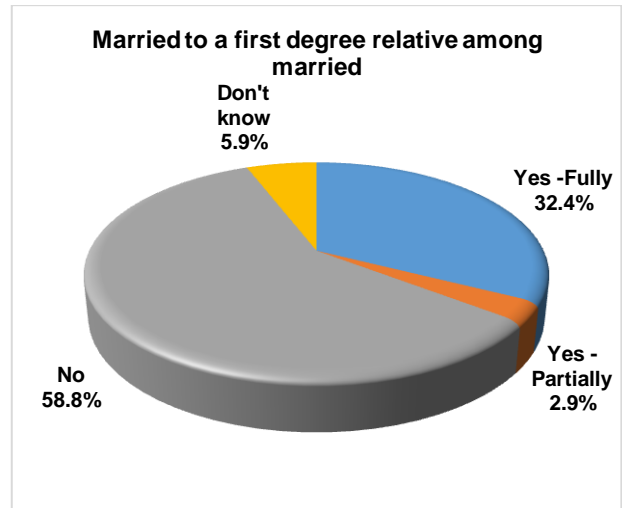
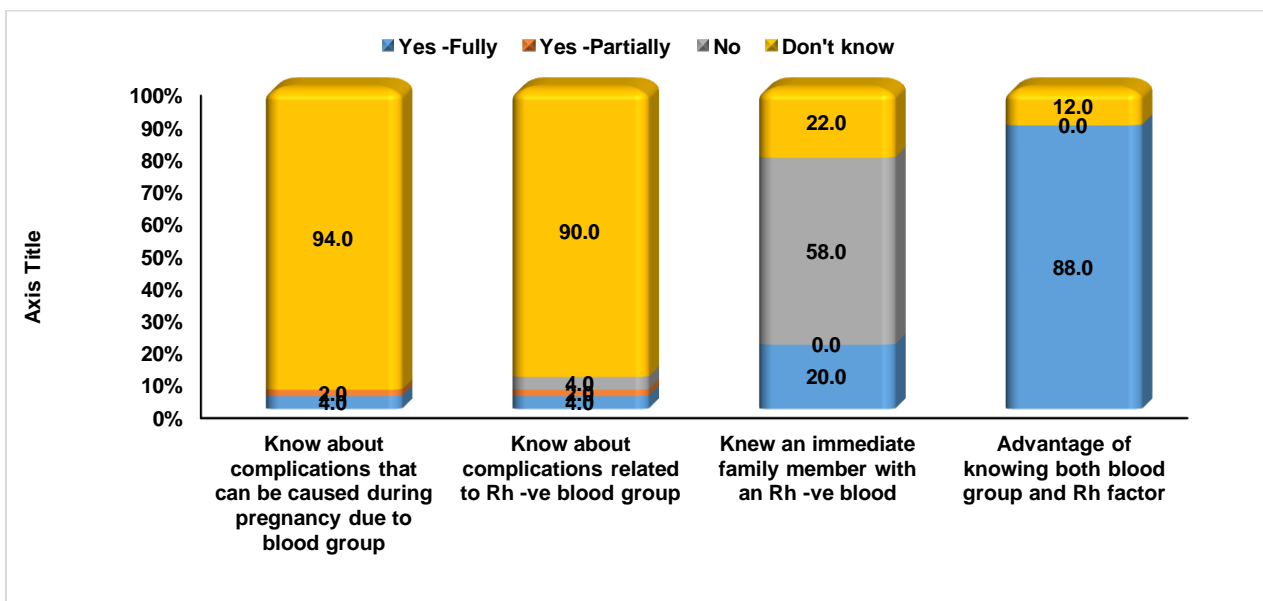


Figure 5



**DISCUSSION**

The present study was carried out to determine the awareness of ABO and Rh blood groups among common people of Chennai city. The collected data on awareness of blood group system can be used as an educational asset for the subjects. They have been made well aware of the importance of knowing their blood groups and the establishment of blood banks as well as transplant services. In an emergency situation such as road traffic accident, the ability of a victim to volunteer appropriate information regarding blood group antigen status, coupled with requisite laboratory testing facilitates provision of safe blood<sup>9</sup>. Also in women of childbearing age, knowledge of Rh D antigen status of the mother is crucial to planning intervention for prevention of potentially fatal complications of alloimmunisation such as haemolytic disease of the foetus and the newborn<sup>10</sup>. Rh D alloimmunisation is associated with severe

haemolytic disease of the foetus and newborn<sup>11</sup>.

This study showed that most of the subjects were aware of the different types of blood groups in the ABO system. About 54% were completely aware of all the blood groups, while 38% partially knew about it and only 8% were completely unaware of this type of grouping. The knowledge of antigen A and B being responsible for the determination of blood groups in the ABO system was known to 10% while 20% were partially aware and 70% were unaware. Knowledge regarding the antigen D being the reason behind negative blood group was known only to 6% of the subjects while 70% were unaware of the reason behind a negative blood group. Complications related to Rh-negative blood group was only known to 4% of the population while another 2% were partially aware of the complications and 94% were unaware of the complications. The influence of genetic and environmental factors causes a variation in blood group

frequencies in different parts of the world. Comparison of data among the different studies in the Indo-pak continent revealed that there was an equal dominance of group B and group O<sup>12</sup>. Studies in Pakistan revealed that B blood group was predominated over many regions of Multan and Punjab<sup>13,14</sup>, while in Sindh and Baluchistan, group O was predominant<sup>15</sup>. Studies conducted in India showed that O is the predominant group followed by B, A and AB<sup>16,17</sup>. Among 158 individuals, the percentage distribution of various blood groups is as follows. There is a correlation between blood groups and bleeding time, another study conducted in Saveetha Dental College revealed that the bleeding time was prolonged in blood groups AB followed by blood groups B, O, A<sup>18</sup>. A study on correlation of blood groups in a Tamil Nadu based population study revealed that O positive blood group was seen in 41.8%(66) individuals, B positive in 27.8%(44) individuals, A positive in 16.5%(26) individuals, AB positive in 7.6%(12) individuals, AB negative in 2.5%(4) individuals, B negative in 1.90%(3) individuals, O negative in 1.3%(2) individuals, a negative in 0.6%(1) individual<sup>19</sup>. The genetic factors may alter the oral ecology and have a bearing on the etiopathogenesis of periodontal diseases. Research of ABO blood typing with regards to dental field is still at a primitive stage, however a study conducted by Ramamoorthy has shown a relationship between blood grouping and periodontal disease. They concluded that a high fraction of generalized chronic periodontitis patients belonged either to 'B' or 'O' blood groups<sup>20</sup>. Study of blood grouping not only generates a simple database but also create a great social awareness about self-blood grouping and safe blood transfusion among the population of a country<sup>21</sup>.

## CONCLUSION

This study showed higher frequency of subjects who were unaware about blood group antigens and complications related to Rh –ve blood group. The subjects however were responsive to the explanation given to them and they understood of the importance of being aware of their blood groups.

At the end of the survey, all 50 patients were made aware of blood grouping systems, irrespective of how much knowledge they had at before the survey was conducted.

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