

# ABO and Rh Blood Groups Frequency in Denizli Province

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## ABSTRACT

The history of the studies on blood groups dates back to early 20th century. Today, more than 600 antigenic structure was detected among 29 blood groups. However, ABO and Rh antigenic structure were taken into consideration in transfusion medicine. To know the rates of the blood groups in a city really helps the citizens in need and blood bank employees. There isn't any study on frequency of blood groups in Denizli. In this study, we aimed to find out the rates of ABO and Rh blood groups in Denizli province and provide new data to the literature. This study is fulfilled by evaluation of 64.840 people, who were applied to Denizli State Hospital for identification of blood groups between January 2005 and August 2009. Blood groups were examined by gel-centrifugation method. In our study, 58.292 (89.9%) people were found Rh positive and 6548 (10.1%) people were found Rh negative. The frequency of the blood groups A, O, B, AB were found in order as 42.6%, 33.3%, 16.8%, 7.4% respectively. The rates of blood groups in Denizli are similar throughout Turkey and in city basis. We consider that this study, which is the first in our city, will contribute to the literature.

**Keywords:** ABO, Rh, Denizli

## ÖZET

### Denizli İlinde ABO ve Rh Kan Gruplarının Sıklığı

Kan grupları ile ilgili çalışmaların geçmiş 20. yüzyılın başlarına dek uzanmaktadır. Günümüzde, insanlarda 29 kan grubu içinde 600'den fazla antijenik yapı tanımlanmıştır. Fakat transfüzyon tıbbında ABO ve Rh antijenik yapı dikkate alınmaktadır. Bir şehirdeki insanların kan grubu dağılımını bilmek, gereksinimi olan insanlara ve kan bankası çalışanlarına çok yardımcı olmaktadır. Denizli'de kan gruplarının sıklığı ile ilgili bir çalışma bulunmamaktadır. Bu çalışmada Denizli ilindeki kan gruplarının oranını bulmak ve literatüre katkıda bulunmayı amaçladık. Çalışma, Ocak 2005 ile Ağustos 2009 tarihleri arasında herhangi bir nedenle kan grubu tayini için Denizli Devlet Hastanesi Kan Bankasına başvuran 64.840 kişi arasında yapılmıştır. Kan grupları jel santrifügasyon yöntemi ile bakılmıştır. Çalışmamızda, 58.292 (%89.9) kişi Rh pozitif ve 6548 (%10.1) kişi Rh negatif bulundu. A, O, B, AB kan grupları sıklığı sırası ile %42.6, %33.3, %16.8, %7.4 oranında saptandı. Denizlideki kan gruplarının sıklığı ülkemiz geneli ve şehirler düzeyinde benzerdir. İlimizde ilk defa yapılan bu çalışmanın literatüre katkıda bulunacağını düşünmekteyiz.

**Anahtar Kelimeler:** ABO, Rh, Denizli

## INTRODUCTION

The history of the studies on blood groups dates back to early 20th century. In 1901, Karl Landsteiner defined the blood groups A, B, C and Sturli and Decastello explored the blood group: AB. In the coming years, O was found more suitable in defining blood group C and the blood groups were named as A, B, O, AB. In 1940, serums, which were obtained by giving erythrocytes taken from Macacus Rhesus monkeys to rabbits, were found by Landsteiner and Wiener to agglutinate to human erythrocytes and this structure was called Rh antigen. The strongest antigen in Rh system is the D-antigen. Erythrocytes which are agglutinated with Anti-D are called Rh positive, and which are not agglutinated are called Rh negative.<sup>1-3</sup>

Today, more than 600 antigenic structure was detected among 29 blood groups. However, ABO and Rh antigenic structure were taken into consideration in transfusion medicine. For other blood groups, clinical problems rarely occur and only when a problem occurs, blood groups are examined.<sup>1,4</sup> ABO and Rh antigenic structure differs between regions and nations.<sup>1</sup>

To know the rates of the blood groups in a city really helps the citizens in need and blood bank employees in obtaining blood and its products and keeping them.<sup>5</sup> There are many studies in Turkey on blood groups frequency.<sup>5-7</sup> However, there isn't any study on blood groups in Denizli. In this study, we aimed to find out the rates of ABO and Rh blood groups in Denizli and provide new data to the literature.

## MATERIAL and METHOD

This retrospective study is fulfilled by evaluation of 64.840 people, who were applied to Denizli State Hospital for identification of blood groups between January 2005 and August 2009. Blood groups and Rh antigenic structure were determined by gel centrifugation. ABO group types and Rh specificities of the blood samples are studied with DiaMed-ID Micro Typing System (DiaMed AG, Switzerland) and DG Gel ABO/Rh (Grifols, Spain) kits by gel centrifugation technique. In this test, 5x7 cm in diameter cards were used and there are 6 microtubes on each of the cards. Base of the microtubes are designed as conical; else the apex is designed wider. There is a gel inside the tubes including Sephadex-

G 100 substrate. The procedure of the centrifugation is processed as 70x, in 10 minutes. The gel substrate inside the microtubes, only allows the non-agglutinated erythrocyte to pass through. The non-agglutinated erythrocytes, passing through the gel layer during the centrifugation, precipitate down on the conical part. The agglutinated erythrocytes are conglomerated at the upper part at the same time.

## RESULTS

In our study, 34.495 (53.2%) of people in our study are female and 30.345 (46.8%) are male. 58.292 (89.9%) people were found Rh positive and 6548 (10.1%) people were found Rh negative. The frequency of the blood groups A, O, B, AB were found in order as 42.6 %, 33.3%, 16.8%, 7.4 % respectively. The profile of ABO and blood groups are shown on Table 1.

## DISCUSSION

Blood groups and Rh antigen are hereditary. ABO gene is on the 9th chromosome, Rh gene is on the 1st chromosome.<sup>8</sup> Antigens of ABO system are placing on the surface of erythrocyte and platelet as membrane antigens of vascular, intestinal, cervical and glandula mammaria epithelium cells and as antigens which dissolved in urine, feces, milk, saliva and plasma. On the other side, serum has strong antibodies against antigens, which are not placing on

**Table1.** Frequency of ABO and Rh bloods group

ABO and Rh Groups	%	Total %
A Group		
Rh(+)	38.8	42.6
Rh(-)	3.8	
O Group		
Rh(+)	29.8	33.3
Rh(-)	3.5	
B Group		
Rh(+)	14.8	16.8
Rh(-)	2	
AB Group		
Rh(+)	6.5	7.4
Rh(-)	0.9	

the surface of erythrocyte. These properties are doing ABO system as the most important antigenic system in transfusion and tissue transfer.<sup>3</sup>

Blood groups differ regionally and ethnically. A, O, B, AB groups are identified in order, 37.1%, 46.7%, 12.2%, 4.1% in USA; 41.8%, 46.6%, 8.6%, 3% in England; 48.2%, 34.2%, 12%, 5.5% in Greece; 39.9%, 35.8%, 16.8%, 7.6% in Bulgaria; 42%, 35.4%, 14.4%, 8.1% in Lebanon.<sup>9,10</sup> In Turkey, however, it is 42.8%, 32.7%, 16.5%, 8% respectively.<sup>10</sup> The rates of ABO blood group in our city is found in accordance with Turkey. As we analyse in city basis, the frequency of A, B, O blood groups in Gaziantep, Diyarbakır, Van, Ankara and Konya are detected as nearly our city.<sup>5,7,11-13</sup> The rate of A blood in terms of cities was between 39% and 45%.<sup>7</sup> The highest rate was detected as 44.6% and 45% in Ankara and Konya.<sup>12,13</sup> We found the rate of A group as 42.6% in our research. Eskişehir had the nearest rate to our city with 43.5%.<sup>9</sup> The rate of O blood group in terms of cities was between 30.8% and 41.2%.<sup>7</sup> O blood group rate in our city was 33.3%, which was same in Diyarbakır.<sup>5</sup> Throughout Turkey, the rate of O blood group was highest, interestingly, in Malatya.<sup>14</sup> B blood group, however, was determined in our city as 16.8%. The same rate for this blood group was detected in Eskişehir.<sup>9</sup> Throughout Turkey, the highest rate (18.1%) of B blood group was found in Gaziantep and the lowest rate (11.4%) in Malatya.<sup>11,14</sup> AB blood group is between 6%-9.2% in Turkey.<sup>7</sup> We found the rate of AB group as 7.45 in our research. This rate was in accordance with our country's data.

The rate of Rh positive in Turkey is nearly 85%, similar to Asian race.<sup>1</sup> In our study, Rh positive rate is found 89.9%. In spite of its being over the average, it is near to the rates detected in Gaziantep (90.8%), Malatya (89%), Diyarbakır (89.1%).<sup>5,11,14</sup>

As a result, to know the rates of blood groups in a region helps the blood banks of the regions. The rates of blood groups are similar throughout Turkey and in city basis. We consider that this study, which is the first in our city, will contribute to the literature.

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