

# Frequency of ABO-Rhesus Blood Groups in the Western Region of Saudi Arabia

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Submission: 23 Jan 2018

Accepted: 16 Feb 2018

## Citation

Alzahrani FM, Shaikh SS, and Rasheed MA.  
Frequency of ABO-rhesus blood groups in the  
western region of Saudi Arabia. JKAU Med Sci  
2018; 25 (1): 9-13. DOI: 10.4197/Med. 25.1.2

## Abstract

The western region of Saudi Arabia is known as a multinational region with different ethnic groups of people. This study aims to evaluate the ABO and rhesus blood groups among study subjects in the Western area of Saudi Arabia and their comparison with other regions of the Kingdom. It is a retrospective study. 35,388 participants were included. ABO blood grouping was done using tube method. Agglutination in any tube or hemolysis was considered as positive. Blood grouping was done by a preliminary finger prick, and was repeated again and a serum sample was obtained at the time of donation. Statistical Package for Social Sciences software was used for the data analysis. Results showed that the most common blood group is O, (50.1%) followed by A (29.7%), B (16%) and less frequent is AB (4.1%). Rhesus positive were 91.3%, while rhesus negative were 8.63%. These results demonstrate that the most common blood group in the Western province is O. Blood group A was noticed to be less frequent. Understanding the frequencies of the blood groups and their phenotypes is crucial for blood banking and for setting transfusion service protocols.

## Keywords

ABO blood groups; Western region; Saudi Arabia

## Introduction

**K**arl Landsteiner, an Austrian scientist had discovered the concept of ABO blood grouping system in 1900 which was the major invention in the blood transfusion medicine history. He originated three diverse blood varieties and he labelled them as A, B, and O blood groups. In 1902, Alfred Von Decastello and Adrian Sturli revealed the 4<sup>th</sup> variety AB<sup>[1,2]</sup>. Basis of blood groups is grounded on genetical ingredients which are inborn over the outer layer of erythrocytes<sup>[3]</sup>. Therefore, these groups have been categorized into four varieties: A, B, AB and O in the ABO system<sup>[4]</sup>.

Many research reports have defined occurrence of ABO and rhesus (Rh) phenotypes in diverse inhabitants of the world. Even though ABO blood groups are determined at conception and continue during the course of life, deviating phenotypic consequences have been found through different ethnic residents in diverse environmental limitations<sup>[5,6]</sup>.

The worth of blood grouping system not only exist in laboratory medicine, their worth in people genome, residents journey designs, forensic medicine and doubtful parenthood cases is also well recognized<sup>[7,8]</sup>. Clinical implication of blood group systems rest on capability of agglutinins, which lead to the occurrence

of hemolytic transfusion reactions and hemolytic disease of the fetus and newborn.

Occurrence of ABO blood groups differs geographically all over the world. Variety as well as inventory of blood and blood yields existing in the hospital transfusion medicine section in any community have to preferably carefully associate through the delivery of the clinically noteworthy erythrocyte antigens in the common populace<sup>[9]</sup>. The awareness of dissemination of ABO blood grouping is vital for effective organization of blood bank portfolios at the provincial and countrywide stages<sup>[10]</sup>. Precise research studies have been passed out on the frequency of ABO and Rh blood groups all over the kingdom.

Therefore, the theme of our research was to govern the incidence of ABO and Rh systems in Saudi blood donors in King Abdulaziz Medical City of the National Guard, Jeddah, Western Region of Saudi Arabia.

### Materials and Methods

This is a retrospective study to review and analyse blood donor's data from the last two years.

Any healthy subject eligible for blood giving for donation purposes and not for therapeutic purposes. 35,388 participants were included in our research from February 2014 to February 2016. Altogether ABO and Rh were serologically tested in the transfusion medicine section of King Abdulaziz Medical City of the National Guard, Jeddah. ABO blood grouping were conceded out *via* tube technique by means of market based primed antisera. Agglutination in any tube or hemolysis establishes affirmative outcomes. ABO blood grouping was conceded out *via* primary digit puncture, and were repeated over and a serum taster was acquired on the spell of contribution. IBM SPSS Statistics for Windows, Version 20 (IBM Corp., Armonk, NY USA) was used for data scrutiny. We did not consider any ethical approval because the study was retrospective and was based on patient's past laboratory test result record.

### Results

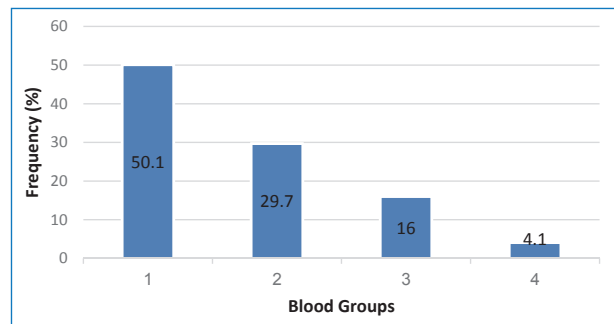
In this study, an aggregate of 35,388 blood donors were screened for ABO and Rh grouping. Results showed in Table 1 that the major blood group is O, (50.1%). The least frequent blood group is AB (4.1%). Overall occurrence of ABO blood groups during this study were the following: 50.1% Group O; 29.7% group

A; 16% group B and 4.1% group AB (Table 1). Incidence of Rh+ and Rh- existed as: Rh+ remained 91.3%, while Rh- remained 8.63% (Table 2).

These results demonstrate that supreme common blood group in the Western province is O. A was noticed to be less frequent relative to that observed in Western populations. Understanding the frequencies and

**Table 1.** Frequency occurrence of ABO blood groups among blood donors.

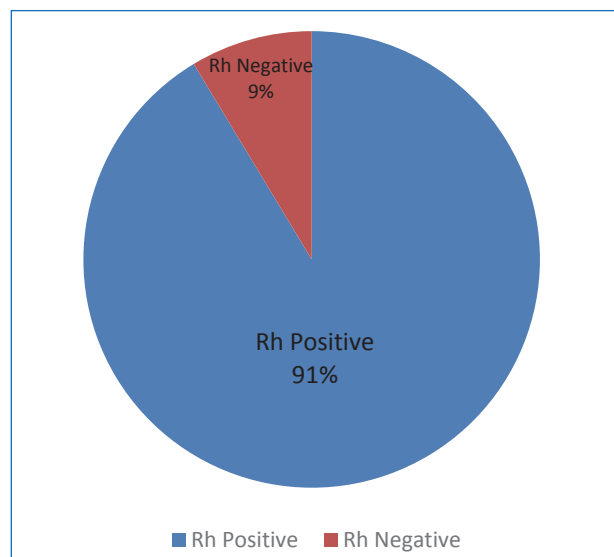
Blood Groups	Percentage (%)
O	50.10%
A	29.70%
B	16.01%
AB	4.12%



**Table 2.** Frequency occurrence of rhesus factor among blood donors.

Rh Factor	Percentage
Rh Positive	91.31%
Rh Negative	8.63%

Rh = Rhesus



distribution of the blood groups and their phenotypes is crucial for blood banking and for setting transfusion service protocols. This is also imperative for scientific and population studies (e.g., disease association).

### Discussion

Our research study revealed that the predominant blood group is O (50.1%) and the least frequent blood group is AB (4.1%). Some studies already described the incidence and dissemination of ABO as well as Rh systems in different parts of country. Mondal *et al.*<sup>[11]</sup> showed that incidence of O was recorded uppermost (36%), tracked by B (33%), A (22.5%) and lowermost incidence remained observed with AB (6.49%). Their outcomes stay very nearly to this research as well as to results reported by Hamed *et al.*<sup>[12]</sup>. All these studies including the present study display common occurrence of variety O and prove that this one isn't exclusive to any one area of the Kingdom. Keramati *et al.*<sup>[13]</sup> described ABO incidence over northern as well as eastern Iran in the direction of O>A>B>AB whereas this one also remained same (direction) in Nojavan *et al.*'s study<sup>[14]</sup>; both of these workings remained in similarity through the outcomes of our research.

Our research study outcomes are also in accordance by means of the researches completed elsewhere in African countries<sup>[5,15]</sup>. Same dissemination of ABO system has been grasped in researches piloted amongst Western Europeans, Bangaali populace, the African-American and Caucasian populace of United States<sup>[16]</sup>.

Research reported in United States, Mauritania, Kenya, Thailand, Saudi Arabia, Gaza, Nigeria, and Jordan, blood group "O" was the predominant and AB the less prevalent blood group<sup>[17]</sup>. Their findings are similar to that of our research study results.

The results of this study describe occurrence of blood groups from the Kingdom's Western region where a multi nationality with different ethnic groups of people of which some originally belong to the Arabian Peninsula while others originally belong to different parts of the world, especially Asia. Our outcomes might support in framing a nationwide total for upcoming orientation or database setting for the ABO and Rh frequency.

### Conclusion

These results demonstrate O as the most common variety all over the Western province. A was noticed to be less frequent relative to that observed in Western populations. Understanding the frequencies and distribution of the blood groups and their phenotypes is crucial for blood banking and for setting transfusion service protocols. This is likewise significant for hospital based and population based researches (e.g., pathological relationship).

### Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

### Disclosure

The authors of this publication had received research support from the Deanship of Scientific Research of the Imam Abdulrahman Bin Faisal University, Dammam. The terms of this arrangement have been reviewed and approved by the University in accordance with its policy on objectivity in research.

### Ethical Approval

Not required.

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## معدل تكرار فصائل الدم ( ABO-Rh ) في المنطقة الغربية من المملكة العربية السعودية

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**المستخلص.** يعرف السكان السعوديون في المنطقة الغربية من المملكة العربية السعودية بأنهم خليط من مجموعات من الناس من خلفيات عرقية مختلفة ينتمي البعض منها أصلاً إلى شبه الجزيرة العربية بينما ينتمي آخرون إلى أجزاء مختلفة من العالم، وخاصة آسيا. لمعرفة تواتر فصائل الدم (ABO-Rh) بين المتبرعين بالدم في المنطقة الغربية من المملكة العربية السعودية ومقارنتها مع مناطق أخرى من المملكة وغيرها. إعدادات وتصميم: دراسة بأثر رجعي. وأدرج ٣٥,٣٨٨ مشاركاً. تم تجميع الدم باستخدام طريقة الأنبوب. ويعتبر التجلط في أي أنبوب أو تكسر خلايا الدم الحمراء نتائج إيجابية. تم إجراء فحص فصائل الدم عن طريق وخز الإصبع الأولي، وكرر مرة أخرى من شريحة وحدة المتبرعين بالدم وتم الحصول على عينة المصل في وقت التبرع. تم استخدام برنامج الحزمة الإحصائية للعلوم الاجتماعية (سبس) لتحليل البيانات. أكثر فصائل الدم شيوعاً هي O (٥٠,١٪) تليها A (٢٩,٧٪) B (١٦,٦٪) وأقل تكراراً هو AB (٤,١٪) وكان المتبرعون بالدم إيجابية Rh ٩١,٣٪، في حين أن المتبرعين بالدم السلبي Rh كان ٨,٦٣٪. أظهرت هذه النتائج أن أكثر فصائل الدم شيوعاً في المنطقة الغربية هي O. وقد لوحظ أن فصيلة الدم A كانت أقل تواتراً مقارنة بتلك التي لوحظت في السكان الغربيين. فهم الترددات وتوزيع مجموعات الدم ونماذجها الظاهرية أمر بالغ الأهمية في الخدمات المصرفية للدم ووضع بروتوكولات خدمة نقل الدم.