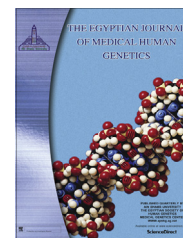




Ain Shams University  
The Egyptian Journal of Medical Human Genetics

www.ejmhg.eg.net  
www.sciencedirect.com



ORIGINAL ARTICLE

# Frequency distribution of ABO and Rh (D) blood group alleles in Silte Zone, Ethiopia



Kassahun Tesfaye, Yohannes Petros, Mebeaselassie Andargie \*

Biology Department, College of Natural and Computational Sciences (CNCS), Haramaya University, P.O. Box: 138, Dire Dawa, Ethiopia

Received 20 August 2014; accepted 3 September 2014

Available online 22 September 2014

## KEYWORDS

ABO;  
Blood groups;  
Population genetics;  
Rh (D)

**Abstract** *Background:* Frequency distribution of blood groups is important as it is used in modern medicine, genetic research, anthropology, and tracing ancestral relations of humans. The ABO and Rh blood groups are the most important blood groups despite the long list of several other blood groups discovered so far.

*Aim of the study:* To study and document the frequency of ABO and Rh (D) blood groups in three ethnic groups of Silte Zone, Ethiopia.

*Subjects and methods:* ABO and Rh (D) typing was carried out during 2012 and a total of 441 students from both genders were randomly selected from Silte Secondary and Preparatory School, SNNPR, Ethiopia. Finger prick blood samples from both genders were tested for ABO and Rh (D) blood groups by the open slide test method. A drop of each of the antisera, anti-A, anti-B and anti-D was added and mixed with each blood sample and rocked gently for 60 s to observe agglutination.

*Results:* The blood group “O” was predominant (36.73%, 40.14%, 46.26% in Sodo, Silte and Meskan ethnic groups, respectively) in all the Rh positive subjects whereas blood group “A” was predominant (5.4%) in the Rh negative subjects only in the Sodo ethnic group among the three ethnic groups. The percentage of Rh (D) positive and negative subjects was 91.16%, 93.19%, 91.84% and 8.84%, 6.81%, 8.16% in Sodo, Silte and Meskan ethnic groups, respectively.

*Conclusion:* The frequency of ABO blood groups in both Rh positive and negative subjects among the three ethnic groups of the Silte Zone, Ethiopia was O > A > B > AB, except in the Sodo ethnic group where the blood group A was the commonest among Rh negative subjects.

© 2014 Production and hosting by Elsevier B.V. on behalf of Ain Shams University.

## 1. Introduction

Blood is the most important body fluid, which is responsible for circulation of important nutrients, enzymes, and hormones all across the body, besides the most critical substance, oxygen. The ABO blood group system is widely credited to have been discovered by the Austrian scientist Karl Landsteiner, who

Abbreviations: Rh, Rhesus.

\* Corresponding author.

E-mail address: mebhel@yahoo.com (M. Andargie).

Peer review under responsibility of Ain Shams University.

<http://dx.doi.org/10.1016/j.ejmhg.2014.09.002>

1110-8630 © 2014 Production and hosting by Elsevier B.V. on behalf of Ain Shams University.

found three different blood types in 1900 [1]. He described A, B and O blood groups for which he was awarded the Nobel Prize in 1930. Alfred Von Decastello and Adriano Sturli discovered the fourth type AB, in 1902 [2]. The classification of blood groups into type A, B, AB and O in ABO system, Rh-positive and Rh-negative in Rh system is based on the presence or absence of inherited antigenic substances on the surface of the red blood cells. The antigens may be proteins, carbohydrates, glycoproteins, and glycolipids depending on the blood group system [3].

ABO and Rhesus (Rh) blood group antigens are hereditary characters and are useful in population genetic studies, researching population migration patterns, as well as resolving certain medicolegal issues, particularly of disputed paternity and more importantly in compatibility test in blood transfusion practice. The need for blood group prevalence studies is multipurpose, as besides their importance in evolution, their relation to disease and environment is being increasingly sought in modern medicine [4–7]. Percentages of people belonging to these blood groups are different in different communities. Distribution of these blood groups is also different in different races. The frequencies of ABO blood groups vary from one population to another and time to time in the same region. The knowledge of distribution of ABO and Rhesus (Rh) blood groups at local and regional levels is helpful in the effective management of blood banks and safe blood transfusion services [8]. Thus, this shows that the need for estimates of blood group and gene's frequency studies is multipurpose and provides very valuable information on the genetic similarity of different populations and to some extent on their ancestral genetic linkage, despite the cultural and religious differences of the two populations [9]. There have been no known data of the distribution pattern and frequency of ABO and Rh blood groups from Silte Zone, SNNPR, Ethiopia. This study aims at providing information on the distribution pattern of the phenotypes and genotypes, and the gene frequencies of these genetic variants in this region.

## 2. Subjects and methods

The study design was approved by the Research Ethics Committee, College of Science, Haramaya University, Dire Dawa, Ethiopia. A total of 441 subjects of both sexes from Silte Secondary and Preparatory school were randomly selected and included in this study. The students were divided into 3 major ethnic groups i.e., Sodo, Silte and Meskan. Informed consent was granted prior to the sample collection. Blood samples were collected fresh without any anti-coagulant by finger prick with sterile lancet using an open slide method of testing ABO blood types and Rh (D) factor [10]. Before pricking the bulb was ster-

ilized with alcohol swab, compressed and pricked slightly with the help of lancet, the oozed blood was placed on a clean slide at three places over a glass slide and to each blood drop placed at separate places a drop of anti-sera (anti-A, anti-B and anti-D) (manufactured by Tulip Diagnostics (P) Limited, Old Goa, India) was added and separately observed for the agglutination. The grouping was done by antigen-antibody agglutination test.

Allele frequencies were calculated under the assumption of Hardy–Weinberg equilibrium and expressed as percentages. Chi-square test was used to compare observed allelic and genotypic frequency distributions of the blood group and Rh antigens to that expected under the Hardy–Weinberg.

## 3. Results

### 3.1. Frequency of ABO and Rh blood grouping

The four hundred and forty one (441) Secondary and Preparatory school students selected randomly consist of 255 males and 186 females between ages 18 and 20. There are differences in frequency distribution of the blood group (ABO) among the ethnic groups of the students. Blood group O has the highest frequency while blood group AB has the lowest frequency (Table 1). Blood group O is highly distributed in the Meskan ethnic group than Silte and Sodo ethnic groups. The frequency of blood group A is higher in Sodo than Silte and Meskan ethnic groups and blood group B is dominant in the Sodo ethnic group than Silte and Meskan. Blood group AB has equal frequency in the three ethnic groups.

The variations in the frequency distribution of Rh-positive and Rh-negative among the three ethnic groups followed the same pattern as shown in Table 2. The percentage of distribution of the ABO blood group and ethnic groups varies significantly based on the Rh blood group (Table 3). The ABO blood group distribution based on Rh in Sodo and Silte is the same in blood group A with Rh positive (26.53%) but in Meskan the percentage of blood group A is reduced to 20.41% of the total population. As it is indicated in Table 3, blood group AB with Rh positive has a small percentage distribution in the three ethnic groups than blood group A and B. Blood group O with Rh positive of Sodo was 36.73% and that of the Silte was 40.14% which is higher than the Sodo ethnic group and 46.26% for the Meskan ethnic group. So, blood group O with Rh positive is dominant in the Meskan ethnic group. As compared to the other blood groups, blood group O with Rh positive percentage distribution varies significantly in the three ethnic groups. However, the percentage distribution of Rh negative is very small or rare in the three representative groups.

**Table 1** Phenotypic distribution of ABO blood group system among students of the three ethnic groups at Silte Zone, Ethiopia.

| Ethnic groups | Blood type frequency distribution |             |           |             | Total     |
|---------------|-----------------------------------|-------------|-----------|-------------|-----------|
|               | Type A                            | Type B      | Type AB   | Type O      |           |
| Sodo          | 47(31.97%)                        | 38(25.85%)  | 8(5.44%)  | 54(36.74%)  | 147(100%) |
| Silte         | 42(28.57%)                        | 34(23.13%)  | 8(5.44%)  | 63(42.86%)  | 147(100%) |
| Meskan        | 35(23.81%)                        | 31(21.09%)  | 8(5.44%)  | 73(49.66%)  | 147(100%) |
| Total         | 124(28.11%)                       | 103(23.35%) | 24(5.44%) | 190(43.08%) | 441(100%) |

Download English Version:

<https://daneshyari.com/en/article/2178104>

Download Persian Version:

<https://daneshyari.com/article/2178104>

[Daneshyari.com](https://daneshyari.com)