

Distribution of ABO and Rh Blood Groups among Major Ethnic Groups of Medical Students of Madonna University Teaching Hospital, Elele, Nigeria

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Abstracts: The ABO and Rh blood groups are the most important blood groups despite the long list of several other blood groups discovered so far. The ABO and Rh blood groups varies worldwide and are not found in equal numbers even among ethnic groups. Therefore, this study was aimed at having information on the distribution of ABO and Rh blood groups among the major ethnic groups of medical students in Madonna University Teaching Hospital, Elele, Nigeria. A total of 193 students were randomly selected among the medical students of the Madonna University Teaching Hospital and tested. The students were divided into 3 major ethnic groups i.e., Igbo, 68 (31 males, 37 females) students, Yoruba, 62 (42 males, 20 females) students and Hausa, 63 (29 males, 34 females) students. Blood samples were collected by cubital venepuncture. 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 sec to observe agglutination. There are differences in frequency distribution of the blood group (ABO) among the ethnic groups of the students. Blood group O and Rh-positive has highest frequency while blood group AB and Rh-negative has lowest frequency in the three ethnic groups. However, apart from the importance of ABO and Rh blood groups in blood transfusion practice, it is therefore imperative to have information on the distribution of these blood groups in any population group that comprise different ethnic groups.

Key words: ABO blood group, blood groups, ethnic groups, Rh blood group, rhesus factor

INTRODUCTION

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, glycolipids depending on the blood group system.

However, the ABO and Rh blood groups are the most important blood groups despite the long list of several other blood groups discovered so far (Worlledge *et al.*, 1974; Seeley *et al.*, 1998). The two significant blood group systems were discovered during early experiments with blood transfusions, the ABO group in 1901 and the rhesus group in 1939 (Landsteiner and Weiner, 1940).

Furthermore, the discovery of ABO and Rh blood groups has contributed immensely to blood banking services and transfusion medicine in order to avoid

morbidity and mortality in both adults and children. The ABO and Rh blood groups varies worldwide and are not found in equal numbers even among different ethnic groups. Among African-American ABO blood group, the distribution of type O, 46%; type A, 27%; type B, 20%; and type AB; 7%. In Caucasians in the United State, the distribution is type O, 47%; type A, 41%; type B, 9%; type AB, 3%. Also, among Western Europeans, type O, 46%; type A, 42%; type B, 9%; and type AB, 3% (Pramanik and Pramanik, 2000; Adeyemo and Soboyejo, 2006).

In addition, in Nigeria, among 7653 individuals in Ogbomoso, Oyo State, 50% had type O, type A, 22.9%; type B, 21.3% and type AB, 5.9% (Bakare *et al.*, 2006). Also, in Benin, Niger-Delta region, Nigeria, blood group distribution among 160,431 individuals showed phenotypes A, B, AB and O as 23.72, 20.09, 2.97 and 53.22%, respectively (Enosolease and Bazuaye, 2008).

Moreover, Rh-positive is documented as 95% in African-Americans, 100% in Africans whereas Rh-

Table 1: ABO blood group distribution among ethnic groups of 193 medical students of Madonna University Teaching Hospital, Elele, Nigeria

Ethnic groups	A	B	AB	O	Total
Igbo	21 (10.9%)	13 (6.7%)	4 (2.1%)	30 (15.5%)	68
Hausa	16 (8.3%)	9 (4.7%)	3 (1.6%)	35 (18.1%)	63
Yoruba	15 (7.8%)	9 (4.7%)	1 (0.5%)	37 (19.2%)	62
Total	52 (26.9%)	31 (16.1%)	8 (4.2%)	102 (52.9%)	193

negative is 5.5% in South India, 5% in Nairobi, 7.3% in Lahore, 4.8% in Nigeria (Mwangi, 1999; Omotade *et al.*, 1999).

Interestingly, apart from the importance of ABO and Rh blood groups in blood transfusion practice, they are useful in population genetic studies, researching population migration pattern. It is, therefore, imperative to have information on the distribution of these blood groups in any population group that comprise different ethnic groups. However, this present study was investigated to have information on the distribution of ABO and Rh blood groups among the major ethnic groups of medical students in Madonna University Teaching Hospital, Elele, Nigeria.

MATERIALS AND METHODS

This study was carried out at the Department of Physiology in collaboration with the Department of Medical Laboratory Technology, Madonna University Teaching Hospital, Elele campus, Rivers state, Nigeria.

A total of 193 students were randomly selected among the medical students of the Madonna University Teaching Hospital and tested. The students were divided into 3 major ethnic groups i.e., Igbo, Yoruba and Hausa. Out of 193 medical students, 68 (31 males, 37 females), 63 (29 males, 34 females) and 62 (42 males, 20 females) students were Igbo, Hausa and Yoruba ethnic groups respectively. Blood samples were collected by cubital venepuncture via disposable 5ml syringe and emptied into the prepared ethylenediaminetetraacetic acid (EDTA) anticoagulant bottle.

ABO and Rh blood groups tests: A drop of blood from each student was placed on a clean white tile in three places. A drop of each of the antisera, anti A, anti B and anti D was added and mixed with each blood sample, with

Table 2: Rh blood group distribution among ethnic groups of 193 medical students of Madonna University Teaching Hospital, Elele, Nigeria

Ethnic groups	Rh-positive	Rh-negative	Total
Igbo	63 (32.6%)	5 (2.6%)	68
Hausa	58 (30.1%)	5 (2.6%)	63
Yoruba	56 (29.0%)	6 (3.1%)	62
Total	177 (91.7%)	16 (8.3%)	193

the aid of glass rods. Blood was mixed thoroughly with the antisera and rocked gently for 60 sec to observe agglutination. In case of doubt, the test was examined under a microscope, or the results were confirmed by reverse grouping using known group A and B red cells (Dacie and Lewis, 2001). Data on the frequency of ABO and Rh blood groups were reported in simple percentages.

RESULTS

The one hundred and ninety three (193) medical students selected randomly consist of 102 males and 91 females between ages 18 and 26.

The frequency distribution of ABO blood groups and major ethnic groups is shown in Table 1. 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 as shown in Table 1. The frequency distribution of Rh blood group and major ethnic groups of the students is shown in Table 2. The variations in the frequency distribution of Rh - positive and Rh - negative among the three (3) ethnic groups followed the same pattern as shown in Table 2.

Table 3 showed the frequency distributions of ABO blood group and ethnic groups based on Rh blood group. The percentage of distribution of the ABO blood group and ethnic groups varies significantly based on Rh blood group.

Table 3: ABO blood group distribution among ethnic groups of 193 medical students of Madonna University Teaching Hospital, Elele, Nigeria based on Rh blood group

Ethnic groups	Rh blood group	A	B	AB	O	Total
Igbo	Positive	20 (10.4%)	11 (5.7%)	3 (1.6%)	28 (14.5%)	63 (32.6%)
	Negative	1 (0.5%)	2 (1.0%)	1 (0.5%)	2 (1.0%)	5 (2.6%)
Hausa	Positive	14 (7.3%)	8 (4.2%)	3 (1.6%)	33 (17.1%)	58 (30.1%)
	Negative	2 (1.0%)	1 (0.5%)	-	2 (1.0%)	5 (2.6%)
Yoruba	Positive	15 (7.8%)	7 (3.6%)	1 (0.5%)	33 (17.1%)	56 (29.0%)
	Negative	-	2 (1.0%)	-	4 (2.1%)	6 (3.1%)

DISCUSSION

In this study, the frequency distribution of blood group O was the highest with percentage frequency of 15.5, 18.1 and 19.2% in Igbo, Hausa and Yoruba respectively, followed by blood group A and blood group B, and the least percentage frequency is that of blood group AB in the three major ethnic groups as observed in previous studies (Nwauche and Ejele, 2004; Kulkarni *et al.*, 1985; Falusi *et al.*, 2000).

Also, it has been reported in several studies that there are variation in ABO blood group among different ethnic groups (Nwauche and Ejele, 2004; Kulkarni *et al.*, 1985; Falusi *et al.*, 2000). Many other studies have shown that blood group O was the most common blood group and blood group AB was the least common blood group in different ethnic groups (Nwauche and Ejele, 2004). For instance, in African-American ABO blood group, the distribution of type O, 46%; type A, 27%; type B, 20%; and type AB; 7%. In Caucasians in the United State, the distribution is type O, 47%; type A, 41%; type B, 9%; type AB, 3%. Also, among Western Europeans, type O, 46%; type A, 42%; type B, 9%; and type AB, 3% (Pramanik and Pramanik, 2000; Adeyemo and Soboyejo, 2006). Thus, the gene segregation for ABO systems always followed a particular pattern for its distribution in different ethnic group with exceptional cases. Therefore, the result of distribution of ABO system in the ethnic groups of this study followed the genetic segregation for ABO system that has been observed in earlier studies.

Moreover, this study further confirmed that Rh-positive has the highest percentage frequency while Rh-negative has the lowest percentage frequency as observed in previous studies among different ethnic groups (Nwauche and Ejele, 2004; Falusi *et al.*, 2000). In addition, Worlledge *et al.* (1974) reported the incidence of rhesus negativity in Nigeria, which was found to be between 1.69 and 5.5% (Worlledge *et al.*, 1966). Their finding confirmed the trend of the relatively low incidence of rhesus negativity in the country and even in the African population. However, over the years, the Rh blood group system has been distributed among any population to keep the frequency of Rh-negative very low. This similar pattern of distribution is also observed in this study and other studies. Thus, apart from the importance of ABO and Rh blood group systems and the variations in these blood group systems among ethnic groups, there is a need to have information on these blood group systems in any population of different ethnic group.

The relevance of having knowledge about the blood group systems among different ethnic groups in any

population is enormous. The types of information obtained from the findings are useful for genetic information, genetic counseling, medical diagnosis and general and physiological wellbeing of individuals in a population.

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