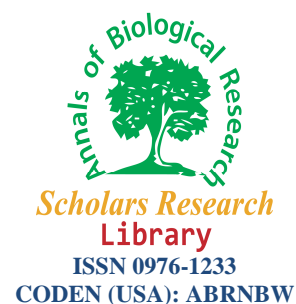




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## Distribution of ABO and rhesus blood groups among medical students in Bowen University, Iwo, Nigeria

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### ABSTRACT

*ABO and Rhesus blood groups are the most important blood groups that are useful for transfusion purposes. The ABO and Rhesus blood groups vary in different populations. Therefore, this study was aimed at providing information on the distribution of ABO and Rhesus blood groups among Medical students in Bowen University, Iwo, Nigeria. A total of 95 medical students were randomly selected among the medical students of Bowen University, Iwo and tested. The blood samples were collected by cubital venipuncture. A drop of each anti-sera A, B and D was added and mixed with each blood sample and then rocked gently for 60 seconds to observed agglutination. The results showed variation in the percentage frequency distribution among the students. Blood group O among the ABO blood groups has the highest percentage frequency (51.6%) while blood group AB has the least percentage frequency (3.2%). The Rhesus distribution also varies among the four ABO blood groups. The total percentage of Rhesus-positive was 93.7% and that of Rhesus-negative was found to be 6.3%. Therefore, blood group O and Rhesus-positive has the highest frequency while blood group AB and Rhesus-negative has the least frequency among the Bowen University, Iwo medical students. The present study gives vital information regarding the management of blood bank and transfusion services in the community.*

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

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### INTRODUCTION

ABO blood groups were discovered by Landsteiner in 1901 [1]. Later on in 1939, Rhesus blood groups were discovered by Landsteiner and Wiener in 1941 [2]. Since 1901, more than 20 distinct blood group systems have been identified but the ABO and Rhesus blood groups remain clinically the most important. Furthermore, they are also well defined genetic markers employed in population genetics [3].

The two blood group systems have proved to be the most important for blood transfusion purposes. In ABO blood group, blood is divided into four major groups- A, B, AB, and O based on the presence or absence of the antigens A and B. Type A blood has type A antigens, type B has type B antigens, type AB blood has both types of antigens, and type O has neither A or B antigens. In addition, plasma from type A blood contains type B antibodies, which act against type B antigens, whereas plasma from type B blood contains type A antibodies, which act against type A antigens. Type AB has neither type of antibody and type O has both A and B antibodies [4].

The distribution of ABO blood groups varies in different countries. In Australia, type O is about 49%; type A, 38%; type B, 10%; type AB, 3% and also in Canada, type O is about 46%; type A, 42%; type B, 9%; type AB, 3%. In Ogbomosho, Oyo state Nigeria, 50% of the population are blood group O, 22.9% blood group A, 21.3% blood group B and 5.9% blood group AB [5]. In Elele, Anambra state, Nigeria, 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 [6].

Rhesus system also emerged as second most important blood group system due to hemolytic disease of newborn and its importance in Rhesus D negative individuals in subsequent transfusions once they develop Rhesus antibodies [7]. The frequency of Rhesus factor blood types differs in various populations [8]. In African American, Rhesus (D) negative is approximately 7% and Rhesus (D) positive is 93%. In other Europeans, Rhesus (D) negative is about 16% and Rhesus (D) positive is 84%. In African descent, Rhesus (D) negative is less than 1% and Rhesus (D) positive is over 99% [8].

The present study, therefore, aimed at providing information on the distribution of ABO and Rhesus blood groups among Medical students in Bowen University, Iwo, Osun state, Nigeria.

## MATERIALS AND METHODS

This study was carried out at the Department of Physiology, Bowen University Iwo, Osun state, Nigeria. A total of 95 students were randomly selected among the medical students of Bowen University, Iwo and tested. The study was approved by the Ethics Committee of Bowen University Teaching Hospital, Ogbomoso, Oyo state, Nigeria and also carried out with the full consent of the individuals (Bowen Medical students).

The Subjects used were Medical students within 100 level to 400 level in Bowen University, Iwo, Nigeria. Blood samples were collected by cubital venipuncture using disposable 5ml syringe and emptied into the Ethylene Diamine Tetra Acetic acid (EDTA) anticoagulant bottle. Each of the bottles was labeled properly for identification. A drop of blood from each student was placed on a white tile in three places. A drop of each of the antisera A, B and D was added and mixed with each blood sample, with the aid of glass rods. Then, the mixture was rocked gently for 60seconds to observe for agglutination.

The results of agglutination were recorded immediately after mixing. The agglutination in blood drop A was considered as group A, and agglutination in blood drop B as group B. The agglutination in both drops was considered as group AB, and if both blood drops were not agglutinated, it was considered as group O. The agglutination in rhesus blood drop was considered as rhesus positive and non-agglutination as rhesus negative. 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 [9].

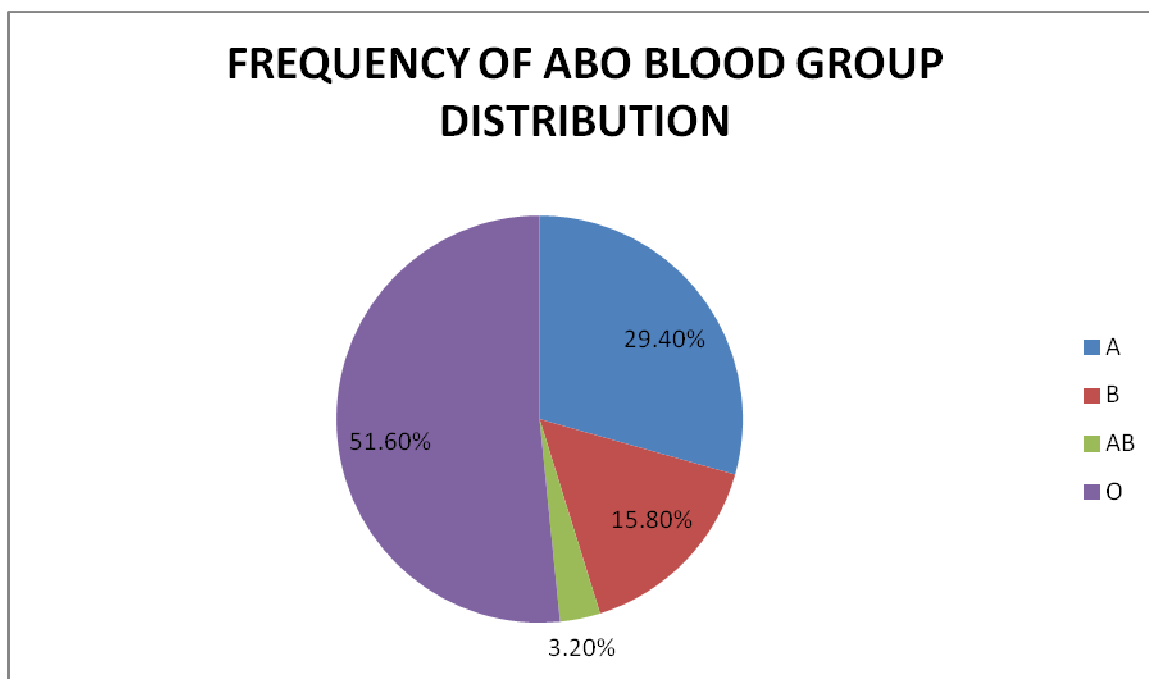
## RESULTS

The ninety-five medical students selected randomly consist of 40 males and 55 females. The frequency distribution of the blood groups A, B, AB and O is shown in Table 1.

**TABLE 1. Distribution of ABO Blood Group Among Male and Female Medical Students in Bowen University, Iwo, Nigeria**

SEX	A	B	AB	O	TOTAL
MALE	10 (10.5%)	9 (9.5%)	1 (1.1%)	20 (21.1%)	40
FEMALE	18 (18.9%)	6 (6.3%)	2 (2.1%)	29 (30.5%)	55
TOTAL	28 (29.4%)	15 (15.8%)	3 (3.2%)	49 (51.6%)	95

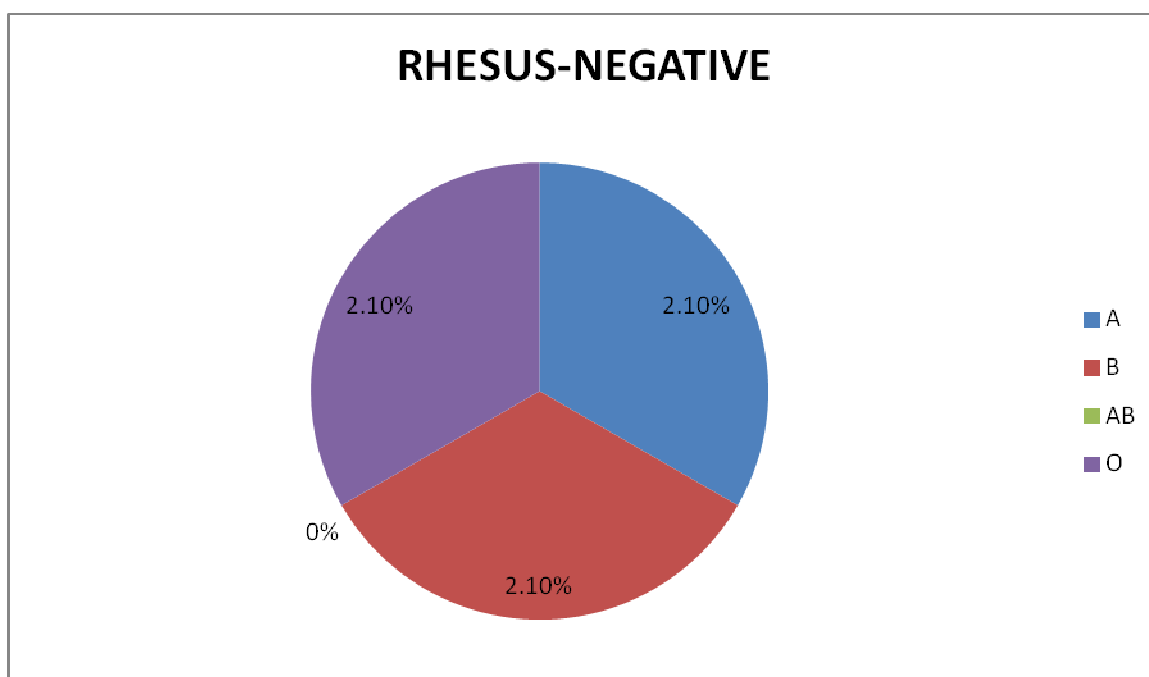
The frequency distribution of the medical students in Bowen University showed that blood group O has the highest frequency (51.6%) in which the male is 21.10% and that of the female is 30.50% while blood group AB has the lowest frequency (3.2%) with the males having 1.10% and the female, 2.10% as shown in Table 1 above.



**FIGURE 1: ABO Blood Group Distribution Among Medical Students (Male And Female) In Bowen University, Iwo, Nigeria**

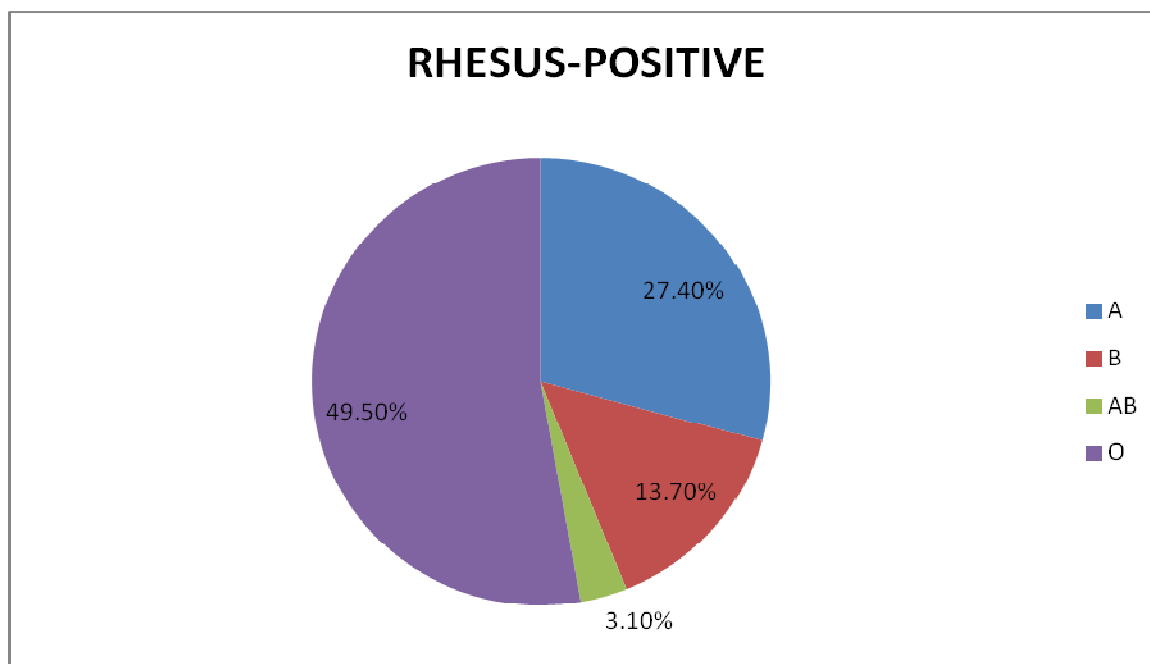
Figure 1 above shows the distribution of ABO blood group among medical students ( for both male and female) in Bowen University, Iwo, Nigeria.

The frequency distribution of Rhesus blood group among the medical students is shown in Figures 2 and 3.



**Figure 2: Rhesus-negative Blood Group Distribution Among Medical Students in Bowen University, Iwo, Nigeria**

The Rhesus- negative blood group distribution is the same in all the blood groups except that of blood group AB. The Rhesus-negative for blood groups A, B and O are 2.10%, 2.10% and 2.10% respectively.



**FIGURE 3: Rhesus-Positive Blood Group Distribution Among Medical Students In Bowen University, Iwo, Nigeria**

In the rhesus-positive blood group distribution, blood group A has percentage frequency of 27.40%; blood group B; 13.70%; blood group AB; 3.10% and blood group O; 49.50%. Blood group O had the highest frequency followed by blood groups A and then B. Blood group AB had the least.

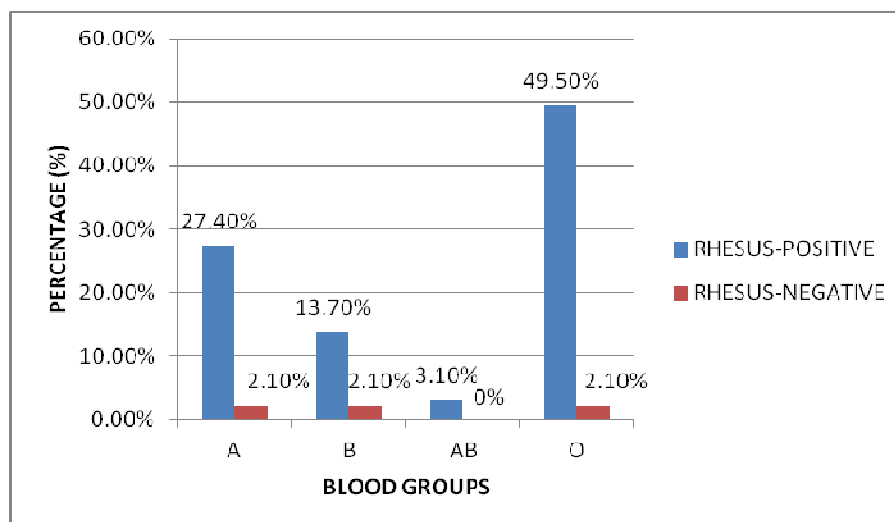
The Rhesus-positive and Rhesus-negative vary among the ABO blood group. Rhesus positive has the highest frequency (93.7%) while Rhesus negative has the lowest frequency (6.3%).

The table below shows the distribution of Rhesus blood groups by sex among the medical students.

**TABLE 2: Distribution of Rhesus Blood Groups by Sex**

GENDER	RHESUS-POSITIVE	RHESUS-NEGATIVE	NUMBER OF STUDENTS
MALE	36	4	40
FEMALE	53	2	55

The frequency distributions of ABO blood group based on Rhesus blood group is also shown in Figure 4.6. The percentages of the ABO blood group and Rhesus blood group varies significantly.



**FIGURE 4: Distribution of Abo Blood Group among Medical Students in Bowen University, Iwo based on Rhesus Blood Group**

Figure 4 shows the frequency of Rhesus blood group with respect to the ABO blood groups. Rhesus-negative was common to all the blood groups (2.1%) except blood group AB. Rhesus-positive was common to all the blood groups and was the highest in blood group O (49.5%) and the least was in blood group AB (3.1%).

## DISCUSSION

In this study, the frequency distribution of blood group O was the highest with percentage frequency of 51.6% followed by blood group A, 29.4%; blood group B, 15.8% and the least percentage frequency is that of blood group AB with 3.2%. In many other studies, blood group O has been found to be the most common blood group. In Caucasians in the United states, the distribution type O, 47%; type A, 41%; type B, 9% and type AB, 3% [4] and for the blacks in the United states, the distribution is, type O, 46%; type A, 27%; type B, 2% and type AB, 7%.

Also in some parts of Nigeria such as the Northern part, frequencies obtained are: 46.6, 23.05, 29.95, and 4.4% for blood groups O, A, B and AB respectively [10] and frequencies of 55.3, 25.3, 16.7 and 2.7% in the order O>A>B>AB were also obtained among 150 students of Cell Biology and Genetics at the University of Lagos, Nigeria [11]; In Elele, Nigeria, 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 groups A and B and the least percentage frequency is that of blood group AB in the three major ethnic groups all obtained at Madonna University Teaching Hospital [6]. When compared with other reports from similar studies carried out in different countries of the world, the data is consistent with previous findings from other parts of the world. In Britain, the percentage frequencies of O, A, B and AB are; 47, 42, 8, 3% [12]. Also in Guinea, the percentage frequencies of 48.9, 23.7, 22.5, 4.7% in the order of O>B>A>AB were observed [13]. This seems to be different in Guinea population in that, blood group B is higher in the population after blood group O.

Results from Ahmed et al in 2009 showed the predominance of blood group B in contrast to this study in which the percentage frequencies of 93, 66, 47, 15% in the order B>O>A>AB. Yousaf et al in his study from Bahawalpur showed the same prevalence of blood group with frequencies; 36.23, 31.03, 25.07, 7.67% in the order B>A>O>AB and also in Pakistan, the frequency distribution is; 32.40, 30.50, 22.40, 8.40 in the order B>O>A>AB [2]. The result in Nepal shows the predominance of blood group A with frequencies; 34, 32.5, 29, 4% in the order A>O>B>AB [15]. The frequency distribution in India is; 39.50, 34.00, 20.50, 6.50% in the order, A>O>B>AB [16].

This study further confirmed that Rhesus-positive has the highest percentage frequency while Rhesus-negative has the lowest percentage frequency. In this study, it was observed that blood group O Rhesus positive is the highest with percentage frequency of 49.5% which is followed by group A Rhesus positive with percentage frequency of 29.4%, blood groups B Rhesus positive is 13.7% and AB Rhesus positive, 3.1%.

The total percentage of Rhesus positive was 93.7% and that of Rhesus negative was found to be 6.3%. Rhesus-negative was found to be higher in males than in females but the Rhesus-positive was higher in Females than in Males.

The findings are consistent with report from previous similar studies among different sets of Nigerian population where the Rhesus positive was found to be higher than the Rhesus negative and this include: Calabar [17], Ogbomoso [5], Lagos [11], Ilorin [18] and Elele [6].

The low percentage of Rhesus negative of the Female in the population is an advantage because of the complexity of Rhesus negative in pregnancy and childbirth.

The data obtained from this study is also consistent with that from other parts of the world. In Britain, Rhesus positive (83%) was found to be higher than Rhesus negative [12]; Nepal had the Rhesus positive to be 96.7% and Rhesus negative to be 3.3% [15] and that of Pakistan and India are 93%, 7% and 93.5%, 6.5% in Rhesus positive and rhesus negative respectively [2, 16].

The knowledge of the blood groups and Rhesus factor is important in evolution, related to diseases and environment, essential in blood transfusion, organ transplantation, forensic pathology, anthropology and training ancestral relation of human [19] and also helps to prevent complications due to Rhesus Incompatibility.

## CONCLUSION

The study further confirms that blood group O was the commonest of the ABO blood group system in the population studied (Nigeria) and AB blood group was the least. Rhesus positive was commoner than Rhesus negative and that

people with blood group O and Rhesus positive are always higher in number in any population. The study also gives vital information regarding the management of blood bank and transfusion services in the community.

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