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Full Length Research Paper

A-B-O and Rhesus Blood Group Distribution among Students of Benue State University Makurdi, Nigeria

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ABSTRACT

The knowledge of ABO and Rhesus D blood group is important in blood transfusion services, genetic studies of populations and also resolving medico-legal issues like disputed parentage. Literature search revealed that there is dearth of information about the distribution of ABO blood and Rhesus D among indigenes of Benue State where the highest number of unique tribes: Tiv, Idoma, Igede and a minority of other tribes reside. Therefore this study aims at investigating the pattern of the distribution in this population. A total of 1672 newly admitted students were randomly recruited for this study. This consisted of 930 males and 742 females. The tribes of these students were obtained, blood group and Rhesus factor determination was carried out by the antigen-antibody agglutination test. Result revealed that the tribal distribution of the sample population was; 920 (55.0%) belonged to the Tiv tribe, 425 (25.4%) Idoma, 270 (16.1) Igede and 57 (3.4%) were other tribes. The distribution of ABO blood group showed that blood group O constituted 52.5% (n=919), followed by group B with 24.5% (n=409), group A was 18.4% (n=307) and AB was 2.2 (n=37). The distribution of Rhesus D antigen showed that 96.7% (n=1617) were Rhesus and 3.3% (n=56) were Rhesus negative. In conclusion, the pattern of ABO and Rhesus blood group distribution of this population is similar to those reported in other regions of the country.

Key-words: ABO, Rhesus, blood group, Benue

INTRODUCTION

Nineteen blood groups systems with more than 200 antigens have been identified in man (Rehman *et al*., 2005). However, the ABO and Rh blood groups are the most important blood groups so far (Seeley *et al*., 1998). Individuals are divided into 4 major blood groups namely A, B, AB and O groups depending on the antigen present on their RBCs (Conteras and Lubenko, 2001; Knowles and Poole, 2002). Also the human red blood cells that carry antigen D are referred to as Rhesus positive (Rh+) while those without it are Rhesus negative (Rh-) (Conteras and Lubenko, 2001).

The discovery of ABO and Rh blood groups has contributed immensely to blood banking services and transfusion medicine. They are useful in genetic studies of populations and also resolving medico-legal issues like disputed parentage (Enosolease and Bazuaye, 2008). Some studies have also reported the association of ABO blood group with certain pathological conditions; for example a higher prevalence of stomach cancer has been found among people with blood group A, persons with O blood group are more susceptible to malaria infection than non O blood group persons (Akhigbe *et al*, 2009; Akhigbe *et al*, 2011). The ABO blood group system is one of the strongest predictors of national suicide rate and a genetic marker of obesity [Alamgeer *et al*, 2011].

The distribution of ABO and Rh groups varies very markedly in different part of the world and in different

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races [Khattak *et al*, 2008]. Among British, the ABO and Rhesus blood group is type A, 42%; type B, 8%; type O, 47%; AB, 3%; Rh +ve, 83%and Rh –ve, 17% (Giri *et al*, 2001). In Caucasians in the United State, the distribution is type A, 41%; type B, 9%; type O, 46%; type AB 4%; Rh +ve, 85% and Rh –ve, 15% (Giri *et al*, 2001). In Malaysia the ABO and Rhesus distribution is type A, 24.9%; type B, 30.2%; type O, 38.3%; type AB, 2.8%; Rh +ve, 98.4 and Rh –ve, 1.6% (Sivananthan *et al*, 2013). In the Turkish population, type A blood has the highest percentage frequency of 43.8%; type B, 16.2%; type O, 30.8%, type AB, 9.2%; Rh +ve, 86.0% and Rh –ve, 14.0% (Sari *et al* 2008).

In Uyo, Nigeria record showed that blood group O was the most common with 56.10%; followed by blood group A, 25.07%; blood group B was 16.4%; type AB, 2.45%; Rh +ve, 96.7% while Rh –ve was 3.30% **(**Ekanem, 2013**).** Among students at Ladoke Akintola University Ogbomosho, the frequencies of A, B, AB and O blood groups were 21.30, 22.73, 2.85 and 53.12%, respectively, 93.32% were Rhesus positive while 6.68% were Rhesus negative (Akhigbe *et al*, 2009). In Kaduna, a north-west region of Nigeria report showed that type A was 21.3%; type B, 24.3%, type AB, 5.2% while type O was 49.2% (Hassan *et al*, 2005), while result from students in Nasarawa State University revealed that blood group O was 45% of the population, groups A, 25.5%; B, 25%; AB 3.5%; Rh +ve, 94% and Rh –ve was 6%. 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).

There is a dearth of information on the ABO and Rhesus blood group distribution in Benue State a North central region of Nigeria. The Major tribes in Benue State include Tiv, Idoma, Igede, and Jukuns however there are some other tribes that are few in number that live in the State, these include: Yourba, Hausa and Igbo. Therefore the aim of this research is to investigate the ABO and Rhesus blood groups distribution in Makurdi, Benue State, Nigeria.

MATERIALS AND METHODS

A total of one thousand six hundred and seventy two (1672) students, which consisted of 930 males and 742 females, who were newly admitted into the Benue state University, Makurdi Nigeria were randomly recruited for this study. An informed consent was obtained from each student before obtaining blood samples from each of them. Ethical clearance was obtained from Ethical Committee, Benue State University. All the blood samples were collected between 8am and 12 noon each day

Blood samples (5mls) was collected from each subject by veno-puncture into EDTA (ethylenediamine tetacetic salt) bottle and used for determination of blood groups and Rhesus factors. For ABO blood grouping, a drop of antiserum A, antiserum B and anti-AB was placed in clean tile and labeled 1, 2, and 3. To each anti sera was added a drop of 5% red blood cells, mixed thoroughly and observed for agglutination.

Similarly, for Rhesus D typing a drop of anti D serum was placed in a clean labeled tile, mixed with a drop of blood and watch for agglutination.

Statistic analysis.
Data were analyzed using the computer statistical analytical software (SAS). Frequencies and percentages were calculated.

RESULTS

The result of a total of 1,672 newly admitted students into Benue State University were obtained. This consisted of 930 males (55.6%) and 742 female (44.4%). Their age ranged between ages of 17and 25 year. Majority of the students belonged to the Tiv tribe (55.0%), Idoma (25.4%) and Igede (16.1%). The sex and tribal distribution of the population sampled is as shown in Table 1.

Table 1:
Sex distribution based on tribe of sample population

Tribe	Male	Female	Total (%)
Tiv	520	400	920 (55.0%)
Idoma	225	200	425 (25.4%)
Igede	150	120	270 (16.1%)
Others	35	22	57 (3.4%)
Total	**930 (55.6%)**	**742 (44.4%)**	**1672 (100%)**

The frequency distribution of blood groups is as shown in Table 2. Result shows that blood group O has the highest percentage frequency of 52.5% (n= 919), followed by group B, which constituted 24.5 % (n= 409). The blood group with the least percentage frequency is AB, which constituted 2.2% (n= 37). The Rhesus blood distribution of the sample population is as shown in Table 3. A total of 96.7% (n=1617) of the sample population was Rhesus positive, while 3.3% (n= 56) were Rhesus negative.

Table 2:
ABO blood group distribution among male and female students in Benue State University Makurdi, Nigeria

Blood Group	A (%)	B (%)	AB (%)	O (%)	Total (%)
Male	177 (18.6)	217 (22.8)	2.2 (2.4)	534 (56.2)	951 (100)
Female	130 (18.0)	192 (26.6)	14 (1.9)	385 (53.4)	721 (100)
Total	**307 (18.4)**	**409 (24.5)**	**37 (2.2)**	**919 (52.5)**	**1672 (100)**

Table 3:
Distribution of Rhesus-D antigen by gender

Rhesus D antigen	Rhesus-D positive (%)	Rhesus-D negative (%)	Total (%)
Male	917 (96.4)	34 (3.6)	951 (100)
Female	700 (97.1)	21 (2.9)	721 (100)
Total	**1617 (96.7)**	**56 (3.3)**	**1672 (100)**

DISCUSSION

This study is significant because the blood group distribution was observed in Benue State which has a unique tribal composition in Nigeria. This study revealed that 55% of the sample population belonged to the Tiv tribe, 25.4% belonged to Idoma tribe while 16.1% were Igede. It is only within Benue State that high frequency of these unique tribes exist. Result showed that blood group O has the highest percentage frequency of 52.5%. This result is similar to those found in other parts in Nigeria; In Ogbomoso, Kaduna, Nassarawa, Uyo, Kaduna and Benin (Akhigbe *et al*, 2009; Hassan *et al*, 2005; Pennap *et al*, 2011; Enosolease and Bazuaye, 2008). There are no contrary reports to this within Nigeria. Internationally blood groups O is the most prevalent blood group among the British, American, Malaysians, Saudi Arabian (Giri *et al*, 2001; Sivananthan *et al*, 2013; Sarhan *et al*, 2009). The only population where another blood group other than group O is the most prevalent is the Turkish population where blood group A is the most prevalent (Sari *et al*, 2009).

The result of this study further revealed that after blood group O, the most prevalent blood group was Group B, followed by Group A. Within Nigeria, this is similar to result from Lagos, Ogbomoso and Kaduna where Group B were found to be more prevalent than Group A (Akhigbe *et al*, 2009; Hassan *et al*, 2005; Adeyemo and Soboyejo, 2006). There are however contrary report from Uyo, Akwa Ibom State, and Benin where group A are more in number than group B (Ekanem 2013; Enosolease and Bazuaye, 2008). Internationally, among the British and American and Saudi Arabians the percentage frequency of blood group A is several times higher than group B, for instance in the Bristish, Group A is present in 42% of the population whereas group B is present in 8%, in Caucasians Group A is 41% while group B is 9% and in Saudi Arabians, group A is 33.4% while Group B is 6% (Giri *et al*, 2011; Sarhan *et al*, 2009). In Malaysia however, the prevalence of group B is higher than group A (Sivananthan *et al*, 2013).

Rhesus blood group distribution in this study revealed that Rhesus negative individuals constituted 3.3% of the study population. This is similar to the study of Ekanem (2013) in Uyo. This value is however lower than values in other parts of the country. Rhesus negative constitutes 6.68% in Ogbomoso, 6% in Nasarawa, 6% in Lagos and 5.2% in Kano (Akhigbe *et al*, 2009; Pennap *et al*, 2011; Adeyemo and Soboyejo, 2006; Chima *et al*, 2012). The percentage frequency of Rhesus negative is higher in several other countries; In British Rhesus negative blood group represents 17% of the population, in Caucasian it represents 15%, in Saudi Arabian Rhesus negative constitutes 7.2% and in Kurds, Iraq it is 8.27% (Giri *et al*, 2011, Sarhan *et al*, 2009; Mohamad, 2010).

In conclusion, the data from this study revealed that the pattern of ABO and Rhesus blood group distribution in Benue State in not very different from other tribes in Nigeria. This data will help in planning efficient and safe blood services in the State.

REFERENCES

Adeyemo O. A and Soboyejo O. B. (2006): Frequency distribution 0f ABO, RH blood groups and blood genotypes among the cell biology and genetics students of University of Lagos, Nigeria. African Journal of Biotechnology. 5;(22): 2062-2065.

Akhigbe R. E., Ige S. F., Adegunlola G. J., Adewumi M. O., Azeez, O. M. (2011): Malaria, Haemoglobin Genotypes and ABO Blood Groups in Ogbomoso, Nigeria**.** Inter. J. of Trop. Med; 6 (4): 73-76.

Alamgeer N. N., Khan H. U., Akram S. (2011): Study about Health Consciousness and awareness of blood groups in the Selected Population of University of Sargodha, Pakistan. Pharmacologyonline; 2: 11191125

Chima O. K., Mohammed T. B., Aisha K. G., Alhaji S. A., Muhammad B. M., Kwaru A. H. (2012). ABO and rhesus

blood groups among blood donors in Kano, North-Western Nigeria. Niger J Basic Clin Sci;9:11-3

Conteras M. and Lubenko S. (2001). Immunohaematology: Introduction In: Postgraduated Haematology, Hoffbrand, AV, Lewis SM and Tuddenhan EGD (Eds). 4th Edition, Arnold Publishers, London, UK, 11, 164-181.

Ekanem M. B. (2006): The distribution Of ABO and Rhesus blood groups in University Of Uyo Teaching Hospital (UUTH), Uyo, Nigeria. Ibom Medical Journal; 1 (1):18-20.

Enosolease M. E.. and Bazuaye G. N. (2008): Distribution of ABO and Rh-D blood groups in the Benin area of Niger-Delta: Implication for regional blood transfusion. Asian J. Transfusion Sci., (1): 3-5.

Giri P. A., Yadav S., Parhar G. S., Phalke D. B. (2011). Frequency of ABO and Rhesus Blood Groups: A Study from a Rural Tertiary Care Teaching Hospital in India. Int J Biol Med Res.; 2(4): 988 -990.

Hassan A., Babadoko A. A., Ahmed A. J., Isa H. A., Suleiman A. M. (2005): The pattern of distribution of ABO blood groups in North Western Nigeria. *Annals of Nigerian Medicine;* 1(2): 17-18.

Khattak I. D., Khan T. M., Khan P., Shah S M. A., Khattak S.T., Ali A. (2008). Frequency of ABO and rhesus blood groups in district Swat, Pakistan. J Ayub Med Coll Abbottabad; 20(4): 127-129.

Knowles S., Poole G. (2002). Human Blood group systems. In: Practical transfusion medicine. 1st Edition, Blackwell Publishing ltd., UK, pp, 72-93.

Mohamad S. J. (2010) ABO and rhesus blood group distribution in Kurds. Journal of Blood Medicine. (1): 143 – 146.

Pennap G. R., Envoh E. and Igbawua I. (2011): Frequency Distribution of Hemoglobin Variants, ABO and Rhesus Blood Groups among Students of African Descent. British Microbiology Research Journal, 1(2): 33-40.

Pramanik, T. and Pramanik S. (2000): Distribution of ABO and Rh blood groups in Nepalese students: A report. East. Mediterr. Health J., 6(1): 156-158.

Rehman A., Khan M. A., Ashraf M., Malik S. A., Saeed M. A., Rafique A., *et al*. (2005): ABO and Rhesus blood group. Professional Med J.; 12(4): 368-371.

Sarhan M. A., Saleh K. A., Dajem S. M. B. (2009): Distribution of ABO blood group and Rhesus factor in Southwest Saudi Arabia. Saudi Med J.; 30(1): 116- 119.

Sari I., Ozer O., Davutoglu V., Gorgulu S., Eren M., Aksoy M. (2008): ABO blood group distribution and major cardiovascular risk factors in patients with acute myocardial infarction. Blood Coagul Fibrinolysis 2008; 19(3):231-4.

Sivananthan M., Amar P. K, Che W. I. (2013): Distribution of ABO blood group and Rhesus factor among students in ASIA Metropolitan University, Malaysia. Int J Biol Med Res.; 4(1): 2962-2965