Distribution of ABO and rhesus blood groups among HIV seropositives patients in Agbor, Delta state, Nigeria

Article *in* International Journal of Infectious and Tropical Diseases · July 2014

DOI: 10.14194/ijitd.1.1.3

CITATIONS
8

READS
297

4 authors, including:

Adu Matthew
University of Delta
18 PUBLICATIONS **112** CITATIONS

SEE PROFILE

International Journal of Infectious and Tropical Diseases
Volume 1 Issue 1
www.ijitd.com

Original Article

Distribution of ABO and rhesus blood groups among HIV seropositive patients in Agbor, Delta state, Nigeria

Adu E.M[1]*, Ezie E[1], Onyekpe J.O[1], Oseodion J[2]

[1]Department of Medical Laboratory Services, Antiretroviral Therapy Centre, Central Hospital, Agbor, Delta State.[2]Department of Medical Laboratory Services, General Hospital, Ubiaja, Edo State.

*Corresponding author: adumatthew10@yahoo.com

Received: 12.05.14; Accepted: 08.07.14

ABSTRACT

Background: The ABO blood group system discovered by Karl Landsteiner has been found to be associated with various diseases including Human Immunodeficiency Virus (HIV). **Aim:** To determine the distribution of ABO and rhesus blood groups among seropositive patients. **Methods**: ABO and Rhesus blood groups of 376 seropositives individuals attending the Antiretroviral Therapy Centre (ART) Agbor, Delta state between January and April 2014 were used for this study. The cell grouping using tile method was applied for the survey. **Results**: Out of the 376 volunteers use for this study, 282 (75%) where females and 94 (25%) were males. Blood group O has the highest prevalence, 204 (54.2%), followed by blood group A, 104 (27.7%), and B has 58(15.4%). Blood group AB has the least prevalence, 10(2.7%). **Conclusion**: This study re-affirms that blood group O is the most common blood group in this locality.

Keywords: ABO, blood group, Human Immunodeficiency Virus, diseases, rhesus blood group

INTRODUCTION

Blood Group antigens are hereditary determined and plays a vital role in transfusion safety, understanding genetics, inheritance pattern and disease susceptibility.[1] The ABO blood group system is widely credited to have been discovered by Karl Landsteiner in 1900.[2] The discovery of ABO blood groups was an important achievement in the history of blood transfusion that was followed by discovery of Rh (D) antigen.[3,4] Blood groups are inherited as Mendelian co-dominant[5] traits and should be expected to occur in somewhat comparable frequencies in the human race.[6,7] However, its distribution among different population differs.[6,7] Studies have attributed this to selection pressure as endemic diseases appear to have a

predilection for selected blood groups with consequent demise of individuals bearing susceptible blood group antigens.[6,7] Many researchers have made attempts to determine the significance of particular ABO phenotype for susceptibility to disease. Certain diseases show a strong association with ABO blood groups, notably peptic ulcer is much higher in blood group O[8] whereas cancer of stomach,[9] tumors of salivary glands[10] are more frequent in blood group A individuals.

On the other hand, HIV is a major health challenge. Some genetic factors have been cited as contributors to HIV susceptibility or resistance, among them blood groups such as ABO/Rh,[5,11] Duffy.[12] The risk of being infected by Human Immunodeficiency Virus (HIV) may be determined by the presence of the carbohydrate based blood group moiety P^K.[13] Individuals with high P^K levels exhibited a greater natural resistance to HIV infection.[13] Hence, blood groups appear to be associated with some diseases. There is paucity of literature describing the associations between HIV and blood group in Nigeria especially in this locality. Therefore the objective of this study is to determine the distribution of ABO as well as Rhesus blood groups of sero-positive individuals attending the Antiretroviral Therapy (ART) Centre, Agbor, Delta state, South- South Nigeria.

METHODOLOGY

Study Area

The Study was carried out at the Antiretroviral Therapy Centre (ART), Central Hospital Agbor, Delta state, South–South, Nigeria, between February 2014 and April 2014. The Antiretroviral Therapy Centre caters for referred HIV patients across the state especially in Delta North and some parts of Edo State. All HIV infected persons aged one year and above (1-75) of either sex between 3rd January to 30th April 2014 in the ART centre were included in this study. Pre- and post-tests HIV counseling were done for patients. Blood samples were collected and appropriate tests were carried out after obtaining informed consent from all patients.

Laboratory methods

Two assays were done for each patient; HIV screening by Rapid test methods using Determine and confirmed by Unigold and ABO blood group as well as Rh factor.

HIV test

The test for HIV was done using Determine by Abbott and Unigold by Trinity Biotech as recommended by the Federal Ministry of Health of Nigeria (FMOH) in the National Algorithm 1. Known Positive and Negative controls were added as quality control checks.

ABO and rhesus blood grouping

The ABO grouping and Rhesus factor were determined using the cell grouping method according to Waters and Lloyd.[14] Standard cells were used as Quality control panel.

Inclusion and exclusion criteria

Inclusion criteria are being HIV positives and a patient assessing treatment at the ART centre, Agbor while exclusion criterion is being HIV negative.

Ethical consideration/clearance

Ethical Clearance was approved by institutional Ethics committee, and informed consent was obtained from each patient.

Statistical analysis

The statistical analysis to find the level of significance was done using Chi-square at $P<0.05$.

RESULTS

Out of the 376 volunteers use for this study, 282(75%) where females and 94 (25%) were males (table 1). Blood group O has the highest prevalence of 204 (54.2%) followed by blood group A has 104(27.7%) and B has 58(15.4%). Blood group AB has 10(2.7%) is the least prevalence.

As shown in table 2, rhesus positive as the most prevalence 360 (95.7%) while rhesus negative is 16 (4.3%).

The distribution of HIV is highest in the age range 31-45years followed by age range 16-30 and 46-60 years. The least being 61-75years.

Table 1: Gender distribution of ABO blood groups in HIV positives

Blood Group	Male (%)	Female (%)	Total (%)	χ^2
A	30 (28.8)	74 (71.2)	104 (27.7)	18.6**
B	18 (31.0)	40 (69.0)	58 (15.4)	8.3.**
AB	4 (40.0)	6 (60.0)	10 (2.7)	0.4*
O	42 (20.6)	162 (79.4)	204 (54.2)	70.6**
Total	94 (25.0)	282 (75.0)	376 (100)	94.0**
χ^2	33.2**	197.7*	218.6**	

**Significant *Non-Significant

Table2: Rhesus factor distribution of ABO blood groups in HIV positives

Blood Group	Rhesus Positive (%)	Rhesus Negative (%)	Total (%)	χ^2
A	100 (27.8)	4 (25.0)	104 (52.8)	88.6**
B	54 (15.0)	4 (25.0)	58 (40.0)	43.2**
AB	8 (2.2)	2 (12.5)	10 (14.7)	3.6*
O	198 (55.0)	6 (37.5)	204 (92.5)	180.7**
Total	360 (100)	16 (100)	376 (100)	314.7**
χ^2	209.8**	2.57*	218.6**	

**Significant *Non-Significant

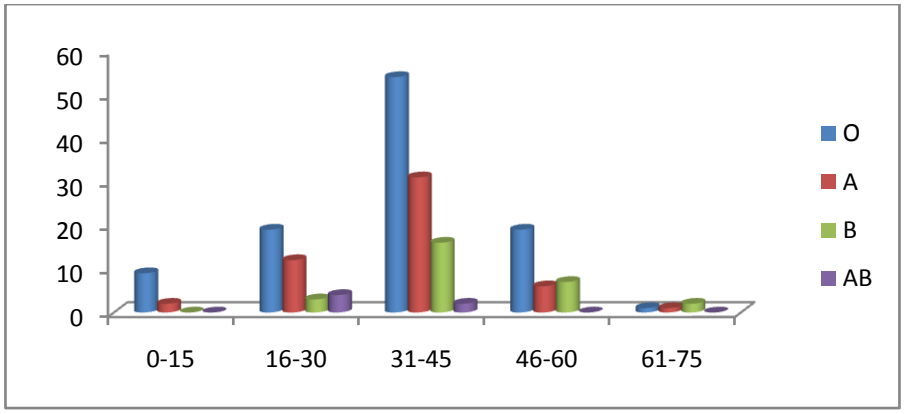

Figure 1: Age (Years) Range Distribution of ABO Blood Groups in HIV Positives Individuals.

DISCUSSION

The distribution of ABO blood group in different ethnic group or region in Nigeria has received much attention in recent times but few studies have been done on the distribution of HIV in ABO and Rhesus blood groups. Most research on HIV has focused on cells of the immune system to the exclusion of viral interactions with red blood cells in the pathogenesis of HIV as they enhance viral infectivity by binding free viruses[15] as well as viral immune complexes and through such binding transfect HIV susceptible cells.[16]

HIV has emerged as one of the major public health concerns of the 21st century. Some genetic factors have been cited as contributors to HIV susceptibility or resistance, among them blood groups such as ABO/Rh,[5,11] Duffy.[12] Our study shows a high prevalence of HIV in blood group O Rh-D positive, followed by A Rh-D positive, B Rh-D positive and AB Rh-D positive respectively. This is in accordance with Abdulazeez *et al.*[11] and Banu *et al.*[17], who did similar works in Adamawa, Nigeria and India respectively. Banu and his co-workers[17] also observed blood group O Rh-D as the commonest among the control groups. In a work done in Benin City, Nigeria by Enosolease and Bazuaye[18] and other studies done by Jeremiah [19] in Port Harcourt, Odokuma *et al.* [20] in Abraka Delta state, Pennap *et al.* [21] in Nasarawa, Esan *et al*.[22] in Ido/Osi Ekiti State, Chima *et al.* [23] in Kano and Olaniyan *et al.*[24] in Lokoja Kogi state observed that the most commonest ABO blood group in the Nigeria population was O Rh-D positive closely followed by A Rh-D positive and B Rh- D positive respectively. The AB Rh-D positive are the least common in Nigeria.[18, 20] Though Akhigbe *et al.*[25] observed that the commonest ABO and rhesus blood group is O Rh-D positive but found B Rh-D positive as against the A Rh-D positive observed in this study.

Based on these facts earlier established by previous authors, the authors of this study will like to establish that the distribution of HIV in ABO blood group in this region is not with particular characteristics but on the predominant blood group. Various research on this subject has canvass the presence of the histo-blood group carbohydrate moiety P^K as the basis of resistance to Human Immunodeficiency Virus but the mechanism underlying it and which blood group has this polysaccharide and how many quantity is available in each of these ABO blood groups is still elusive.[13] More research are encourage especially at the molecular level to unravel the dynamics of this association which will go a long way in finding the cure to this dreaded disease HIV.

CONCLUSION

The study has also created a database for sero-positive HIV individuals which will enhance and improve blood transfusion services to people living with HIV/AIDS.
This study has confirms that blood group O was the most common of the ABO blood groups among People Living with HIV in this locality. AB blood group was quite rare and Rhesus D positive was more common than Rhesus D negative phenotypes. Though ABO blood group has been found to have association to certain diseases but association of ABO blood groups with HIV cannot be ascertain.

REFERENCES

1. Deshpande R H and Wadde S K .Distribution of Blood Groups in Blood Donors in Blood Banks of Latur. Scholars Journal of Applied Medical Sciences 2013;1:276-279.
2. Landsteiner K. Zur Kenntnis der antifermentativien, lytischenund agglulinierendenwirkungen des Blutserums und der lymphe. Zentralblatt Bacteriologic 1990;27:357-362.
3. Mollison P L. The genetic basis of the Rh blood group system. Transfusion 1994;34:539-541.
4. Hoffband A V and Pettit J E. Blood Transfusion in Essential Haematology (5th edn), Oxford UK, Blackwell Scientific Publications, 2006;307-309.
5. Neil S J, Magre S, Mcknight A and Weiss R.A. A-B-O blood groups and HIV-1 infection. Antiviral Therapy 2003;8:134.
6. Anstee D.J. The relationship between blood groups and disease. Blood 2010;115:4635-4643.
7. Le Pendu J, Ruvoen- Clouet N, Kindberg E and Svensson I. Mendalian resistance to human norovirus infections. Seminars in Haematology 2006;18:375-386.
8. Aird I, Bentall H H, Mchigan J A and Fraser R J A. The blood groups in relation to peptic ulceration and carcinoma of the colon, rectum, breast and bronchus. British Medical Journal 1954;2:315- 321.
9. Cameroon J M. Blood Group in tumours of salivary tissues. Lancet 1958;1:239-240.

10. Buckwalter J A, Wohlwend E B, Colter D C, Tidrick R T and Knowler LA. ABO blood groups and disease. JAMA 1956;162;1210-2015.
11. Abdulazeez AA, Alo E, Rebecca SN. Carriage rate of human immunodeficiency virus (HIV) infection among different ABO and Rhesus blood groups in Adamawa state, Nigeria. Biomedical Research 2008;19:41-44.
12. Bolton M J and Garry R F. Sequence similarity between the erythrocyte binding domains of the Plasmodium vivax. Duffy binding protein and the V3 loop of HIV-1 strain MN reveals a functional heparin binding motif involved in binding to the Duffy antigen receptor for chemokines. Virology Journal 2011;8:523.
13. Lund N, Olsson M L, Ramkumar S, Sakac D, Yehalom V, Levene C, Hellberg A, Ma X, Binnington B, Jung D , Lingwood C A and Branch D R. The Human P^{k} histo-blood group antigen provides protection against HIV-1 infection. Transfusion Medicine 2009;113:4980-4991.
14. Waters A H and Lloyd E E. Laboratory aspects of blood transfusion. In Dacie J V and Lewis S M (eds). Practical Haematology (7th edn). Churchill Livingstone, London, 1991. 455-476.
15. Arendrup M, Hansen J E S, Clausen H, Nielsen C, Mathiesen I R and Nielsen J O. Antibody to histo-blood group A antigen neutralizes HIV produced by lymphocytes from blood group A donors but not from blood group B or O donors. AIDS 1991;1:441-444.
16. Motswaledi M S, Kasvosve I and Oguntibeju O O. The role of red blood cells in enhancing or preventing HIV infection and other diseases. Biomed Research International 2013; http://dx.doi.org/10.1155/2013/758682.
17. Banu A, Ahmed S M and Shastri S. Distribution of ABO and Rhesus blood groups in HIV Seropositives at an integrated Counseling and Testing centre in Karnataka, India. SAARC Journal of Tuberculosis, Lung Diseases & HIV/AIDS 2011;8:42-45.
18. Enosolease M E and Bazuaye G N. Distribution of ABO and RH-D blood groups in the Benin area of Niger- Delta: Implication for regional blood transfusion. Asian Journal of Transfusion Science 2008;2: 3-5.
19. Jeremiah Z A. Abnormal haemoglobin variants, ABO and Rh blood groups among students of African descent in Port Harcourt, Nigeria. African Health Sciences 2006;6:177-181.
20. Odokuma EI, Okolo AC and Aloamaka PC. Distribution of ABO and Rhesus blood groups in Abraka, Delta state. Nigerian Journal of Physiological Sciences 2007;22:89-91.
21. Pennap G R, Envoh E and Igbawua I. Frequency distribution of haemoglobin variants, ABO and Rhesus blood groups among students of African descent. British Microbiology Research Journal 2011;1:33-44.
22. Esan AJ, Omisakin CT and Okhuakhua O. Frequency distribution of haemoglobin variants, ABO and Rhesus blood groups among Children in Ido/Osi local Government, Ekiti State, Nigeria. Journal of Medical Laboratory Science 2012;21:10-18.
23. Chima OK, Mohammed TB, Aisha K, Alhaji SA, Mohammad BM and Kwaru AH. ABO and Rhesus blood groups among blood donors in Kano, North-Western Nigeria. Nigeria Journal of Basic Clinical Science 2012;9:11-13.
24. Olaniyan O, Meraiyebu A, Musa O, Dare J, Atsukwei D and Adelaiye A. Blood group distribution pattern among adult who attended Federal Medical Centre, Lokoja, Kogi State, Nigeria. American Journal of Health Research 2013;1:95-98.
25. Akhigbe RE, Ige SF, Afolabi AO, Azeez OM, Adegunlola JG and Bamidele JO. Prevalence of Haemoglobin Variants, ABO and Rhesus Blood Groups in Ladoke Akintola University of Technology, Ogbomoso, Nigeria. Trends in Medical Research 2009;4:24-29.

How to cite this article: Adu E.M, Ezie E, Onyekpe J.O, Oseodion J. Distribution of ABO and rhesus blood groups among HIV seropositives patients in Agbor, Delta state, Nigeria. Int J Infect Trop Dis 2014;1(1):13-17.
Conflict of Interest: None declared