Distribution of ABO, Rhesus Factor Blood Phenotype and Haemoglobin Genotype among Antenatal Clinic Attendees in Anyigba, North Central Nigeria

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ABSTRACT

Background: In the practice of obstetrics and gynecology, the ABO and Rhesus factor (Rh) blood type are important. Blood typing for blood transfusion of compatible blood is very common in emergency and routine care. There is a scanty literature on the distribution of ABO and Rhesus blood types in Anyigba, (North central) Nigeria.

Objective: This study aims to determine the distribution of ABO blood and Rhesus blood group phenotypes and Hemoglobin genotypes among antenatal clinic attendees in a teaching hospital.

Methods: Antenatal records of attendees (October 2017 to September 2020) at the Kogi State University Teaching Hospital were retrieved and results of antenatal hematological investigations were collected using a structured tool. Bio data, ABO blood group, Rhesus group phenotype and Hemoglobin genotype were collected, inputted and analyzed using SPSS version 20.

Results: The mean age was 26 +/- 7 years, blood group O is most prevalent, 561 (53.6%) then A 276 (26.4%), B 189 (18.1%) and AB, 21 (2%). 1014 (96.4%) were Rhesus D positive, 33 (3.1%) were Rhesus D negative. For hemoglobin genotype, 786 (75.1%) were AA, 258 (24.6%) were AS, AC were 3 (0.3%).

Conclusion: The distribution of the ABO, the Rhesus (D) blood groups and hemoglobin genotypes are in concurrence with the findings of previous studies; Blood group O is the most prevalent and AB the least prevalent, Rhesus (D) positive in the population is high and the hemoglobin genotype AA is the most prevalent. There is no association between blood group phenotypes studied and the hemoglobin genotypes.

Keywords: ABO, antenatal clinic, attendees, Anyigba, genotype, Nigeria, rhesus factor.

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I. INTRODUCTION

The most frequently studied genetic markers in a large population of humans are ABO blood group and Rhesus factor antigens [1],[3],[4].

The most Immunogenetic red cell antigen discovered is the Rhesus blood groups while the ABO blood groups are the first notable red cell antigens. Their expressions are important as histocompatibility genes in blood transfusion and pregnancy. These expressions show variations across populations [4].

Anyigba town is in Dekina local government area in Kogi state, located between latitudes

7°15'N-7°29'N and longitude 7°11'E-7°32'E. The town has an altitude of 385m above sea level. It has an estimated population of 189,976 persons.

In clinical practice and especially in obstetrics and gynecological practice, the ABO blood and Rhesus factor (Rhesus blood type) and genotypes of individual are very important considerations in medical care, procreation, blood banking and transfusion. There is scanty literature on the distribution of ABO and Rhesus factor blood type and hemoglobin genotype in the Anyigba Population.

This study aims to determine the distribution of ABO blood groups and Rhesus blood phenotypes

and Hemoglobin genotypes among antenatal clinic attendees at the Kogi state university teaching hospital in Anyigba, North central Nigeria. This will generate data and information for practitioners and blood transfusion managers to enhance clinical practice and management. Generated information will also enrich the data base of the scientific community.

II. MATERIALS AND METHODS

Antenatal clinic records of attendees (October, 2017 to September, 2020) at the antenatal clinic of the Kogi state university teaching hospital were retrieved and reports of routine hematological assessment were collected using a structured questionnaire. The data collected included bio data, ABO blood group and Rhesus group phenotype and the hemoglobin genotype. These were inputted into SPSS 20 and analyzed. Prevalence was reported as absolute numbers and percentage of the studied population.

Ethical Clearance was obtained from the Research and Ethics committee of the Institution for this study.

III. RESULTS

The mean age of the studied population was 26 +/- 7 years.

Table I shows the ABO blood group distribution: 275 (26%) of them were blood group A, 189 (18.1%) were blood group B, 21 (2.0%) were blood group AB, while 561 (53.6%) were blood group O.

A total of 1014 (96.4 %) of the studied population were Rhesus D positive, while 33 (3.1%) were Rhesus D negative as shown in Table II.

As shown in Table III, the prevalence of Rhesus antigen was highest in blood group O, 561 (53.6%) and lowest in blood group AB 21(2%).

The Hemoglobin genotypes distribution is shown in Table IV; 786 (75.1%) were AA, 258 (24.5%) were AS, while AC were 3 (0.3%). No SS genotype was seen in the studied population.

A correlation analysis shows that there is no significant association between a particular blood group and Rhesus factor phenotypes and hemoglobin genotype of the individual ($p = 0.66$).

TABLE I: ABO BLOOD GROUP PHENOTYPES AMONG ANTENATAL CLINIC ATTENDEES AT KOGI STATE UNIVERSITY TEACHING HOSPITAL ANYIGBA

Blood Groups	N	%
A	276	26.4
B	189	18.1
AB	21	2.0
O	561	53.6
Total	1047	100

TABLE II: RHESUS D FACTOR PHENOTYPES AMONG ANTENATAL CLINIC ATTENDEES AT KOGI STATE UNIVERSITY TEACHING HOSPITAL ANYIGBA

Rhesus D	N	%
Rh Positive	1014	96.4
Rh Negative	33	3.1
Total	1047	100
Total	1047	100

TABLE III: RHESUS D PHENOTYPES IN THE ABO GROUPS AMONG ANTENATAL CLINIC ATTENDEES AT KOGI STATE UNIVERSITY TEACHING HOSPITAL ANYIGBA

Blood Group	N	%	Rhesus Positive	%	Rhesus Negative	%
A	276	26.4	267	25.4	9	0.9
B	189	18.1	186	17.7	3	0.3
AB	21	2.0	21	2.0	0	0
O	561	53.6	540	51.3	21	2.0
Total	1047	100	1014	96.4	33	3.1

TABLE IV: DISTRIBUTION OF HEMOGLOBIN GENOTYPES AMONG ANTENATAL CLINIC ATTENDEES AT KOGI STATE UNIVERSITY TEACHING HOSPITAL ANYIGBA

Genotypes	N	%
AA	786	75.1
AS	258	24.6
AC	3	0.3
Total	1047	100

IV. DISCUSSION

In this present study, the blood group O (53.6%) has the highest prevalence in the studied population. This finding is similar to the findings of [2], in the study of ABO and rhesus blood groups among blood donors in Kano, North Western Nigeria. It is also similar to the findings of [12] (52.3%) and results from other parts of Nigeria like Jos (47.1%) and Portharcourt (56.3%) [1],[13].

The next most prevalent blood group in this study is the blood group A (26.4%) followed by B (18.1%) and the least prevalent is AB (2%). These findings are in concurrence with previous studies with variation that may be accounted for by the sex and sample sizes of the participants in the studies [2],[5]-[8],[10].

The study showed that Rhesus (D) positivity in the population is 96.4%. This is similar to the study of Jahapour et al [12] (97.7%). However, Arwa *et al* found 89.3% [12], [13],[14].

Rhesus D negative was found to have a low

frequency of 3.2% which is close to that observed among the Yorubas (5.46%) and also close to previous literature of 7.26%, 6.85% and 1.6%. [4], [9], [12], [13], [14], [15].

These findings generally agree with previous work of [1] showing low Rhesus negativity among blacks in diaspora as compared to the 15% among the Caucasians.

In this study, the hemoglobin genotype AA is the most prevalent in the population (75.1%). This is similar to the findings of [14] in Jos (73.9%), [15] (75.7%) and also within the range previously noted for the African population (50 -75%).

A test of association of the results of this study showed that there is no significant association between the ABO and Rhesus (D) blood groups and the hemoglobin genotypes. ($p = 0.66$). Reference [14] had similar findings in their study.

V. CONCLUSION

The distribution of the ABO, the Rhesus (D) blood groups and hemoglobin genotypes are in concurrence with the findings of previous studies; Blood group O is the most prevalent and AB the least prevalent, there is high Rhesus (D) positivity in the population and the hemoglobin genotype AA is the most prevalent. There is no association between blood group phenotypes studied and the hemoglobin genotypes.

These findings justify further need for blood typing and proper documentation for antenatal care and patient management in general.

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