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Incidence of Alpha (α) And Beta (β) Haemolysins and Their Titres among Pregnant Women in Ado-Ekiti, South-West, Nigeria

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Abstract: **Haemolysin is a type of antibody that has the ability of combining with its specific antigen on the red blood cells and together with complement cause destruction of the cells. This study was carried out to know the incidence of alpha and beta haemolysins among pregnant women in Ado-Ekiti. Three Hundred and Sixty subjects were recruited for this study, out of which Seventy-Nine were Blood Group A, Seventy-Four were Blood Group B and Two Hundred and Seven were Blood Group O.4ml of blood was collected into plain bottles from eachSubject. Cell grouping (tube method) and haemolysin screening test were carried out after clot retraction. Blood group O has the highest percentage incidence of beta (β) haemolysin (14.5%) followed by Blood group A (13.9%) while blood group B has higher percentage incidence of alpha haemolysin (10.8%) than Group O (8.2%), and Group O has 2.4% αβ haemolysin and all their titres were less than or equal to 16. This shows that despite the averagely high incidence of alpha and beta haemolysins among the pregnant women in this part of the country, there has been no report of Heamolytic Disease of New-born (HDN) and/or still birth due to ABO incompatibility between mother and fetus, which could be as a result of low titre of these haemolysins and a suggestion that most of the haemolysins are of IgM type. This study also suggests that pregnancy enhances the production of beta haemolysin than that of alpha haemolysin.**

Keywords: **incidence, alpha and beta haemolysins, pregnant women, Ado-Ekiti.**

I. INTRODUCTION

Haemolysins are proteins that cause the lysis of red blood cells by destroying their cell membrane. These are anti A and anti B haemolysins found after allogenic stimulation by red cell antigens. Sources of stimuli include allogenic stimuli from ABO incompatible blood donation, pregnancy with an ABO incompatible fetus and organ transplantation from a non ABO-matched donor [1, 2]. Haemolysin may be IgG or IgM type of immunoglobulin. Haemolysins that are of IgG type have the smallest molecular weight among all immunoglobulins which enables them to cross the placenta during pregnancy and also have the ability to activate complement, together with which bring about the lysis of red blood cell [3].

The clinical significance of anti-A and anti-B haemolysins is their ability to cause haemolytic disease of the new born (HDN) due to ABO incompatible pregnancy (the mother carrying a fetus with different ABO blood group from that of the mother). The incidence and severity of haemolytic disease of the newborn are significantly greater in Africans than Caucasians [4, 5]. It has been suggested that the greater incidence of HDN in Africans is due to the very high haemolytic activity of anti-A and anti anti-B in black group 'O' individuals [6, 7].

Pregnancy is scientifically referred to as gravidity while a pregnant woman is called gravida [8]. The process by which the mass of cells grow to become the infant is called embryogenesis and this usually takes place within the first 10 weeks of gestation. During this time, cells begin to differentiate to form the various body systems. The basis of the infant organ, body, and nervous systems are established. At the end of the embryogenesis, body parts such as fingers, eyes, mouth, and

ears become visible. Also during this time, other structures such as placenta and umbilical cord that are important to the support of the embryo also develop. The placenta connects the developing embryo to the uterine wall to allow nutrient uptake, waste elimination, and gas exchange via the mother's blood supply. The umbilical cord is the connecting cord from the embryo or fetus to the placenta [5].

The prevalence of alpha and beta haemolysins has been reported in group O blood donors to be in the range of 30 – 56% [9]. So this research work was carried out because there is no documented report on this topic or similar works in this part of the country and all over the country at large.

II. MATERIALS AND METHODS

Study site and Subjects

Three Hundred and Sixty Pregnant women who attended Antenatal clinic at Ekiti State University Teaching Hospital, Ado-Ekiti between the months of July to October, 2014 were recruited for this study. Ado-Ekiti is the capital of Ekiti State, situated in the tropical rain forest belt of Southwest of Nigeria and is about 450km from Abuja (the capital city of Nigeria).

Methodology

4ml of blood was aseptically collected from each subject into plain bottles. Each blood sample was incubated for one hour at room temperature (25º) for clotting and clot retraction. It was spun and sera separated into plain khan tubes labeled appropriately. Cells harvested from the clotted blood was used to carry out blood grouping by tube method using commercially prepared antisera supplied by Atlas Medicals Ltd UK. The corresponding serum from each subject was used to carry out haemolysin screening test with the aid of washed standard cells A and B.

III. RESULTS

The results of this study are presented in the table below.

Three Hundred and Sixty pregnant women were screened, out of which Seventy-nine were blood group A, Seventy-Four were blood group B while Two Hundred and Seven were blood group O. In the table below, out of the Seventy-Nine blood group A screened, Eleven of them were positive to beta haemolysin giving rise to 13.9%. Out of the Seventy-Four group B, Eight of them were positive to alpha haemolysin which is equivalent to 10.8%. Two Hundred and Seven group O were screened, Seventeen were positive to alpha haemolysin equivalent to 8.2%, thirty were positive to beta haemolysin which is 14.5% while Five were positive to both alpha and beta haemolysins giving rise to 2.4%.

Table 1: Incidence of alpha and beta haemolysins among pregnant women in Ado-Ekiti

	Total	α (%)	β (%)	αβ (%)
Blood Group A	79	--	11(13.9)	--
Blood Group B	74	08(10.8)	--	--
Blood Group O	207	17(8.2)	30(14.5)	05(2.4)

KEY: α - alpha
β -beta
% - percentage

IV. DISCUSSION AND CONCLUSION

In this study, pregnant women in Ado-Ekiti were screened for the presence of alpha and beta haemolysins in their sera.

The results of this study show a higher incidence of beta haemolysin (14.5%) in blood group O than alpha haemolysin (8.2%) and this correlates with the report of Kagu and colleagues who reported that the Prevalence of alpha- and beta-haemolysins only in blood group O donors were 10.3% and 12.6%, respectively [10]. While it is against the reports of Ugah and colleagues who reported that alpha haemolysin was found in 33 (39.76%), 26 (31.335) had beta haemolysin while 24 (28.91%) had both alpha and beta haemolysins [11], and Anyawu and his colleagues who worked on Sickle cell Anaemic subjects and gave the reports of the distribution of haemolysins in the Sickle Cell Anaemic patients to be alpha(16.7%), beta(11.1%) and alpha & beta(16.7%), the occurrence of alpha haemolysin among the O group was 15.2%, while beta haemolysin was 12.1% and alpha & beta haemolysin was 30.3% [12].

The occurrence of anti – A (alpha haemolysin) and anti – B (beta haemolysin) in group O donors was reported to be high in African population. As such, some laboratories still spend time and resources screening for these lytic haemolysins using the labour – intensive technique due to the non – availability of any automated method at present [13]

Blood group O has the highest percentage incidence of beta (β) haemolysin (14.5%) followed by Blood group A (13.9%) while blood group B has higher incidence of alpha haemolysin (10.8%) than Blood Group O (8.2%). Group O has 2.4% αβ haemolysin with all their titres less than or equal to 16 as against the report that approximately 10 – 20 percent of group O donors have high titre of anti – A or anti – B haemolysins [14].

Conclusively, this shows that despite the averagely high incidence of alpha and beta haemolysins among the pregnant women in this part of the country, there has been no report of Heamolytic Disease of New-born (HDN) and/or still birth due to ABO incompatibility between mother and fetus, which could be as a result of low titre of these haemolysins and a suggestion that most of the haemolysins are of IgM type because haemolysins of IgM type cannot cross the placenta due to their large molecular size. This study also suggests that pregnancy enhances the production of beta haemolysin than that of alpha haemolysin. It is therefore advisable to always screen all pregnant women for the presence of alpha and beta haemolysins and also determine the titre of the haemolysin if present, irrespective of their ABO blood groups and not only the Rhesus negative women, in order to prevent complications of haemolysins during pregnancy and after birth.

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