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Knowledge of Rh (Rhesus) D Blood Group, Risk Factors and Burden of Rh D Alloimmunisation among Female Secondary School Students in Ikorodu, Lagos, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors OAA and OOO conceived the study. Authors OAA, OA and OOO designed the study protocol, performed literature searches and executed the study procedures. Authors OAA and AAS analyzed the results and wrote the first draft. All authors read and approved the final manuscript.

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ABSTRACT

Background: Rh (Rhesus) blood group antigen especially D antigen plays a pivotal role in provision of safe blood and safe pregnancy. Antigen mismatch between blood donor and recipient or pregnant woman and the foetus sets the stage for immunohaematological complication such as haemolytic transfusion reaction and haemolytic disease of the foetus and newborn. Individual knowledge of the Rh blood group status among females of reproductive age group is a contributory measure for effective control and prevention of untoward complications of antigen mismatch.
Objective: This study assessed the level of awareness of own Rh D blood group status among female secondary school students, their risk for alloimmunisation, the distribution of Rh D antigen

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and the burden of alloimmunisation.
Materials and Methods: A cross sectional study of 927 female secondary school students in Ikorodu, Lagos, South-West Nigeria was performed. A multistage sampling technique was used. Ethical approval was granted by Lagos University Teaching Hospital's (LUTH) Health Research and Ethics Committee and permission granted by Lagos State Ministry of Health. Parental/guardian and student informed assent consent were obtained. Relevant data on socio demographics, knowledge of Rh D blood group, and risk factors for alloimmunisation were collected using a structured interviewer-administered questionnaire. Blood specimen was collected from all participants and tested for Rh D blood group and alloantibody (Anti D) status using standard protocols. Results are presented in frequency tables.
Results: Sixty-eight (7.3%) have heard about Rh blood group system. About 6.7% of the participants described Rh system as an independent system, while 6.5% described the Rh system as a part of ABO antigen system. Of the 122 students who knew their blood group, only 106 (86.9%) were correct about their Rh D status after being tested. Known risk factors for Rh D alloimmunisation such as pregnancy and blood transfusion were observed in 53 (5.7%) of the participants. About 96.7% of the participants were Rh D positive. None of the Rh D negative female students was allo-immunised.
Conclusion: This study observed poor awareness/knowledge regarding the Rh (rhesus) blood group system among secondary school females in Ikorodu Local Government Area of Lagos State, Nigeria. Though, none of the participant was alloimmunised to the Rh D antigen, 5.7% had significant risk factors. Efforts should be directed at improving the awareness/knowledge of the rhesus blood group system and its reproductive implications particularly among female secondary students in Ikorodu, Lagos and other parts of Nigeria.

Keywords: Awareness; knowledge; Rh D; rhesus; risk factors; alloimmunisation; Lagos; Nigeria.

1. INTRODUCTION

The Rhesus (Rh) blood group system is the next most clinically significant Blood Group (BG) system, following ABO BG system [1,2]. Generally, the clinical significance of any BG system is related to its ability to induce clinically significant allo-antibodies and the frequency of their allo-antibodies in the population [3,4]. Currently, 35 BG systems are recognized by the International Society of Blood Transfusion (ISBT) and Rh BG system is the fourth [5]. Rh antigens are encoded by two closely linked genes on the short arm of chromosome 1 at locus 1p36.1 [6].

The Rh BG system is highly polymorphic and over 50 different antigens have been described. [5,6] In terms of their clinical significance, the five major Rh antigens include D, C, c, E and e. However, the D antigen is the most immunogenic. As such, in routine pre-transfusion compatibility testing, only ABO and Rh D antigens are typed and matched in the recipient and donor [4,7,8]. Extended red cell phenotyping for Rh, Kell and other BG systems is often restricted/limited to patients at risk of alloimmunisation from multiple transfusions, multiple gestations and chronic transfusions as in sickle cell disease [8].

The distribution of Rh D antigen significantly varies with race. About 85% of the Caucasian population is positive for the Rh D antigen [9]. The prevalence of the D antigen is higher in Africans and appears to be lower in Asians [9]. In Nigeria, various studies have been reported on the frequency of Rh D antigen in different parts of the country; studies from different localities show D antigen negative prevalence of 6% in Lagos [10], 2.9% in Kano [11], 5% in Ilorin [12], 1.2% in Gusau, Zamfara [13], 6.12% in Benin City [14], 3.3% in Ogbomosho [15], 5% in Port Harcourt [16], 5.56% in Calabar [17], 4.3% in Abuja [18], 3.32% in Uyo [19] and 2% in Bayelsa [20].

Rh D negative individuals are at risk of alloimmunisation following exposure to potentially sensitizing events such as allogeneic blood transfusion and transplacental exposure. This is particularly of interest in Rh D negative women of childbearing age due to the possibility of exposure to paternally acquired Rh D positive foetal red cells during cyesis. Rh D allo-immunisation in females of childbearing age is associated with adverse foeto-maternal outcomes resulting from haemolytic disease of the foetus and the newborn (HDFN) and haemolytic transfusion reaction (HTR) [4,21].