THE PREVALENCE OF HEPATITIS B SURFACE ANTIGEN AND HUMAN IMMUNODEFICIENCY VIRUS ANTIBODIES AMONG PERSONS WITH SICKLE CELL ANAEMIA IN ZARIA.

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AIMS: To determine the prevalence of Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) infection among persons with sickle cell anaemia.
METHODS: Serum samples of 47 non- transfused persons with sickle cell anaemia (controls) and 73 transfused (subjects) were sreened for HIV antibody or the Hepatitis B surface antigen using ELISA based kits and methods.
RESULTS: Non of the 47(0%) control persons were positive for either HIV antibody or the Hepatitis B surface antigen. Three out of 73 transfused persons were positive for the HIV antibody. Of these, one was positive for HIV-1, another was positive for HIV-2 and a third was positive for both HIV-1 and HIV-2 antibodies. Another three out of 73bv transfused persons were positive for the Hepatitis B surface antigen (HbsAg). None of the participants was co-infected with both HIV and HBV.
CONCLUSION: Blood transfusion increases the risk of both HIV and HBV by at least a factor of 4.

KEY WORDS. Blood Transfusion; Sickle cell Anaemia; HIV-1; HIV-2; HBV.

INTRODUCTION.

Sickle cell Anaemia (SCA) is a substitution haemoglobinopathy due to the replacement of glutamic acid by valine in position 6 of the B chain of the haeglobin molecule' Tactoid formation and erythrocyte sickling in hypoxia due to haemoglobin S manifests as a lifelong haemolytic anaemia [1,2] for which blood transfusion is often indicated [3]. Patients with SCA require repeated transfusions and are therefore at the risk of contracting HBV an d HIV [3,4] infections. Reports from similar studies carried out in southern Nigeria [4]. and Kenya [5]. show that the prevalence rates of infection with both Viruses are not increased in transfused persons. This study seeks to assess the role of blood transfusion in the spread of HIV and HBV.

Blood transfusion is indicated to correct anaemia or to lower the concentration of haemoglobin S containing erythrocytes [1]. The average annual blood transfusion requirement is 0.5 units [2]. Whole blood transfusion is for the management of hypovolaemia due to sequestration and for exchange transfusion [2]. Exchange transfusion reduces the concentration of haemoglobin S containing erythrocytes. Red cell concentrates raise the haemoglobin level [2].

Infective complication of blood transfusion include malaria, cytomegalovirus, Hepatitis B, C, E, F, G viruses, and the Human Immunodeficiency Virus (HIV) [6,7,8]. The Transfusion Transmissible Virus (TTV) and viral prions that cause Creutzfeld-Jakob disease have recently been added [8].

Post-transfusion Hepatitis (PTH) and transfusion associated AIDS (TAA) have increasingly acquired public health significance. Multiply transfused persons with Thallassaemia, haemophilia, and sickle cell anaemia are at risk of being infected with both viruses [7].

In Nigeria, the most widely used markers of infection are HIV antibodies and the Hepatitis B surface antigen (HbsAg). HIV are detected using Enzyme Linked Immunosorbent Assay (ELISA) based methods and kits [3,4].

In the United States of America, the prevalence of HIV antibodies is 0.08% [10] while the infectivity rates for Hepatitis B and HIV is1 in 493000 [9] respectively. The prevalence of HIV antibodies and Hepatitis B surface Antigen is 3.75% and 20% respectively among transfused sicklers in lagos, Nigeria.[4] In Zambia, the prevalenceof both viral markers is 14.3% in the case of HIV-1.6 and 5.8% for the Hepatitis B surface Antigen among transfused sicklers.6. In the case of Cote d'Ivoire, Ouattara et al reported an HIV prevalence of 22.4% in transfused sicklers 11. These varying results prompted the need to determine the rate of HIV and HBV in sickle cell patients in the Savannah region of Nigeria.

PATIENTS AND METHODS.

Consenting patients suffering from sickle cell anaemia attending Haematology clinics of Ahmadu Bello University Teaching Hospital in Kaduna and Zaria were recruited for the study. Other haemoglobin disorders and non- consent were exclusion criteria. Personal data, Social and medical information were obtained using questionnaires.

Non-transfused persons served as Controls.

Those with a history of Blood transfusion formed the Subjects of the study.

Blood samples collected from all participants were subjected to the following test:

1. Solubility test.
2. Haemoglobin Electrophoresis.
3. Screening for Hepatitis B surface Antigen(HBsAg) by latex Agglutination Test.
4. Screening for Human Immunodeficiency Virus Antibodies(HIV)by ELISA.

Patients were not followed up.

STATISTICALANALYSIS.

SPSS® 7.5 FOR Windows (11/96) Graduate Support Pack document software and EPI Info 6 software. P value of 0.05 was considered to be statistically significant.The attributable and relative risks of infection were 4 and infinity respectively.

RESULTS.

A total of 120 persons suffering from sickle cell anaemia participated in the study. Of this, 47(39.2%) were controls (Table1). Subjects were 73(60.8%). Females constituted 67.5% while males formed 32.5% (Table1). The male: female ratio was 39:81(0.48). The age ranged from 6 to 38 years.

CONTROLS.

The male: female ratio was 17:30(0.6). Mean age was 18:5 years, and the mean age at diagnosis was 3.6 years. Average number of hospital admissions 4.0.

TRANSFUSED GROUP

The male: female ratio was 22:51(0.43). Mean age was 20.7years, and the mean age at diagnosis was 3.8years. Average number of hospital admissions 3.5.

Average number of transfusion-2 units.

Nobody in the control group was positive for either the Hepatitis B surface Antigen (HBsAg) OR Human Immunodeficiency Virus(HIV) Antibodies. Three persons were positive for Hepatitis B surface Antigen(HBsAg) In the Transfused group. Three persons of the transfused group were also positive HIV antibodies(Table4). The ages of those infected ranged from 16 to 23 years. Of the three that had HIV antibodies, one participant had both HIV-1 and HIV-2 antibodies as shown in Table 4.

Table1: Age-Sex Distribution of Participants.

	Controls		Transfused		
Age(Years)	Males	Females	Males	Females	Total
0-4	-	-	-	-	-
5-9	2	1	3	6	12
10-14	5	7	4	4	20
15	10	22	15	41	88
Total	17	30	22	51	120

Table2: Means(S.D) OF Clinical Parameters in both groups.

	Controls(47)			Transfused			Outcome	
	Mean	S.D	(S.D2)	Mean	S.D	(S.D2)	p value	Remark
Age (yr)	18.5	5.7	32.8	20.7	8.1	65.9	0.109	N.S.
Age	3.6	4.4	19.8	3.8	4.2	17.2	0.803	N.S.
No.Of Admission	4.0	4.6	21.2	3.5	3.12	9.7	0.887	N.S.

Key Age @ ^-Age at Diagnosis.

Table3: Sero Reactivity Pattern for HbsAg and HIV for both groups.

	HbsAg					
	Positive	Negative	Total	Positive	Negative	Total
Control	0(0%)	47(100%)	47(100%)	0(0%)	47(100%)	47
Transfused	3(4.1%)	70(95.9%)	73(100%)	3(4.1%)	70(95.9%)	73.
Total	3	117	120	3	117	120

Table4: Demographic Characteristics of Positive Persons.

Age	Sex	HBsAg	HIV-1	HIV-2	Annual transfusion demand
18	F	Pos			
16	M			Pos	1
23	F	Pos			1
16	F	Pos			2
27	F		Pos		1
16	M		Pos	Pos	3

Key.: Pos-Positive.

DISCUSSION.

Blood transfusion is an important component of therapeutic management of sickle cell Anaemia (SCA) Seventy-three(60.8%) had transfusion at least once. This is comparable with the observation made by Olatunji (4). Females formed the majority being 81(67.5%) while males formed 32.5% of the study population similar to that reported by Konotey-Ahulu.(1).` This may be due to high default rate among males while female are more likely to report in clinic for diseases of the reproductive system. (1) .The age of the participants ranged form 6 to 38years. This is agreement with results of life expectancy studies that show that the life expectancy of male SCA sufferers is 42years and 48years for femal+es (12).

The average age at diagnosis is 3.6years for the controls and 3.8years for the transfused group with a p value of 0.803. This is higher than the age anticipated age of Haemoglobin switch from foetal haemoglobin (Hb F) to Adult haemoglobin (Hb A) of 6 months, which prompts the diagnosis of SCA 1. The delay in the diagosis is due to ignorance and superstitious beliefs in which SCA is linked to the "Abiku" phenomenon. Abiku concept is linked to early childhood deaths as a result of spiritual illness in majority of West African communities. 1,13. The absence of statistically significant difference suggests the identical social background of the participants.

The mean number of Hospital admissions was 4.0 and 3.5 for the control and transfused group respectively this did not vary significantly.

The Hepatitis B surface Antigen (HBsAg) was not detected in all members of the control group (0%) while 3 (4.1%) persons in the transfused group reacted positively for HIV antibodies (4.1%) while no member of the control group reacted positively. This shows that Hepatitis B virus (HBV) and the Human Immunodeficiency Virus (HIV) are transmissible by blood transfusion.(3,4,5,6,7,8,9,10).

The rate obtained in this study are lower than the sero-pevalence rates for both viruses in the general population, which is 6% for HBV, and 9% for HIV (14). Although no participant in the study group was co-infected with the HIV, one person was infected had both HIV-1 and HIV-2 antibodies.The HIV antibody rates lower than those reported by

Olatunji 6%. Mbewe 14.3%5 and Outtara 22.4% 11. The rate of Hepatitis B surface antigenaemia of 4.1% obtained in this study is lower than 20% reported by Olatunji 5 and 5.8% by Mbewe 6. The results obtained are lower than rates obtained in Saudi Arabia in which the prevalence of HbsAg in multiply transfused sickle cell disease patients ranged from 9.4% to 27.5%(15). Patients with Thalassaemia had an antigenaemia rate of between 14.7% and 31.6%. Only 5 Thalassaemics out of 173(2.9%) sickle cell disease and Thalassaemia patients were positive for HIV antibodies 15. An HIV antibody prevalence rate of 4.1% shows that the risk of infection with the HIV is not higher in Sickle Cell Disease than in the general population. The HIV-2 antibodies found more commonly among West Africans (4) were detected in one person who was also positive for HIV-1 antibodies. Although evidence of viral infection was found in only the transfused group, the relative risk of infection is infinity.

The attributable risk of infection due to blood transfusion is 4. Those who reacted positively for either virus were older than 15years. Mbewe also reported that those found positive for HIV antibodies had received blood and were older than 14 years 6. All participants denied intravenous drug abuse. Urbanisation as a factor in the spread of viruses is shown in the higher rates of HbsAg and HIV antibodiesobserved in the Lagos study being 20% and 6% respectively (4). This contrasts with 4.1% for both viruses obtained in this study. The Hepatitis B virus, which is endemic in Nigeria (3) is not increased in persons with Sickle Cell Diseases. The lower values obtained in this study suggests an increased awareness of the spread of HIV and HBV by blood transfusion, thus making patients request for only screened blood using highly sensitive test kits. This shows a temporal trend in pattern of viral infection following blood transfusion. This may be due to adoption of policies that enforce the use of only screened blood and blood products 14. A drop in transfusion infectively rates followed the adoption of a similar policy in the United States of America from 3 in 100,000 (10) for the HIV to 1 in 500,000 (9). Values obtained at the onset of the HIV pandemic were highest but formulation of transfusion policies is associated with drops in seroprevalence rates for both viruses. In as much as the prevalence of viral infections is lower in transfused persons than the general population, there is a need to identify other factors that predispose to infection.

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