

## DEMOGRAPHIC AND SOCIOCULTURAL CHARACTERISTICS OF SICKLE ANAEMIA CHILDREN WITH POSITIVE HEPATITIS B SURFACE ANTIGENAEMIA IN A TERTIARY HEALTH FACILITY IN ENUGU

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### ABSTRACT

**Background:** Hepatitis B virus infection is contracted through contact with body fluid of infected persons. Patients with sickle cell anaemia (SCA), a common haematological disorder in Nigeria, have tendencies to visit traditional healers who administer scarifications and ritual marks that may expose them to HBV infection.

**Objective:** To determine the demographic and socio-cultural characteristics of children with SCA infected with HBV at the University of Nigeria Teaching Hospital Enugu.

**Subjects and Method:** Two hundred and twenty one children aged 6 months to 17 years with SCA were recruited consecutively from October 2004 to April 2005. They were screened for HBsAg using ELISA method.

**Results:** There was no statistically difference in hepatitis B surface antigenaemia among different age group ( $P=0.907$ ). Social class did not significantly influence the prevalence of HBsAg among subjects ( $p=0.887$ ). Socio-cultural practices like circumcision and scarification did not influence the prevalence of HBsAg, ( $p=0.636$ ) ( $p=0.771$ ) respectively. Significantly higher number of people from lowest socioeconomic class practice scarification ( $p=0.0001$ ).

**Conclusion:** Demographic and sociocultural factors do not appear to influence the prevalence of HBsAg among children with SCA in Enugu, Nigeria.

**Key Words:** Sickle cell anaemia; Hepatitis B surface antigenaemia, Demographic, Sociocultural characteristics. *(Accepted 25 August 2009)*

### INTRODUCTION

Hepatitis B virus (HBV) infection is a pandemic with sub-Saharan Africa being a hyper endemic area.<sup>1</sup> Presence of HBsAg in the blood indicates infection with HBV.<sup>2</sup> Chronic HBV infection is associated with chronic liver diseases like cirrhosis and primary liver cell carcinoma.<sup>3</sup> The infection is transmitted when infected body fluid enters the body of a person who is not immuned.<sup>4</sup>

High prevalence of HBsAg is associated with low socioeconomic status, overcrowding, clustering, cultural practices like ritual marks/scarifications and ear piercing.<sup>5,6</sup> Center for Disease Control (CDC)<sup>4</sup> reported that body piercing/cutting for various reasons is a risk factor for HBV transmission. In Canada and South Africa it was reported that tattooing increased transmission of HBV.<sup>7,8</sup> But

Chukwuka et al,<sup>9</sup> studying school children in Nnewi and Angyo et al<sup>10</sup> studying children with SCD in Jos both found that cultural practices like ear piercing scarifications and circumcision did not influence the transmission of virus.

Sickle Cell Anaemia (SCA) is an autosomal recessive disorder in which inheritance of a structurally abnormal haemoglobin, haemoglobin S (Hb S), in haemzygous state leads to chronic haemolytic anaemia and to a variety of severe clinical manifestations.<sup>11</sup> There is reduction in the life span red blood cell to less than 25 days due to their premature destruction in the reticuloendothelial system.<sup>12</sup> The sickled red blood cells distorts microcirculation leading to ischaemia and tissue infarction, which clinically present as vaso-occlusive. Other complications like aplastic, sequestration and hyperhaemolytic crisis, lead to frequent ill health. Frequent ill health often leads to persons seeking unorthodox treatment from

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traditional healers who administer rituals marks and scarifications using unsterilized and contaminated instruments.<sup>13</sup> These practices have the potential to transmit the HBV.<sup>4,8</sup>

To the knowledge of the authors there are no published works on the relationship between demographic characteristics/cultural practices like scarification, circumcision and hepatitis B surface antigenaemia among children with SCA in Enugu. It hoped that the result of this study will help health planners in working out the ways to reduce the prevalence of HBV infection.

## SUBJECTS AND METHODS

The study was carried out at the University of Nigeria Teaching Hospital (UNTH) Enugu, Nigeria. The hospital has a well established and widely patronized sickle cell clinic that serves 5 states in the south-east Nigeria.

Two hundred and twenty one children aged (6 months to 17 years) with SCA attending the sickle cell clinic were recruited consecutively from October 2004 to April 2005 for the study. Their ages as at their last birthday or full completed months in case of infants were taken as their age in this study. Their genotype had been determined previously by haemoglobin electrophoresis on cellulose acetate paper at PH of 8.4 in the haematology department of UNTH Enugu.

A pretested questionnaire was used to obtain information on the age, history of circumcision, scarification and social class was obtained using Olusanya et al<sup>14</sup> method for social classification. This method considers the father's occupation and mother's educational attainment and places families in upper, middle and lower class. This is done using two tables.

Table A grades the father's occupation into three categories while B grades the mother's academic attainment into three categories.

### A

#### Scores Father's Occupation

- 1 Professionals, Top Civil Servants, Business Executives and Politicians.
- 2 Middle level Bureaucrats, Technicians, Skilled Artisans and well to do traders.
- 3 Unskilled workers and those whose income is at or below the national minimum wage.

### B

#### Scores Mother's Level of Education

- 0 Education up to University level
- 1 Secondary or Tertiary below University (eg College of Education, School of Nursing)
- 2 No schooling or up to primary level only.

Adding scores from Table A and B gave the social class.

Social class 1 or upper class: Scores of 1 or 2 represent the elite.

Social class 2 or middle class: Scores 3 represents the middle class.

Social class 3 or lower class: Scores 4 or 5 occupies the lowest socioeconomic ladder.

Ethical clearance was obtained from UNTH ethical committee. Informed written consent was obtained from parents and caregivers.

Five milliliter of venous blood was collected from each subject after obtaining consent from subjects or care givers. The blood was transported to the laboratory where the serum were separated and stored at minus 20 degree centigrade till assayed for HBsAg by ELISA method using Monolisa Diagnostic Kit, Tokyo Japan.

Statistical analysis was done using SPSS statistical package. Percentages were used to describe qualitative and quantitative data respectively. Where appropriate. Proportions were tested using the chi-square test. A P value of less than 0.05 was taken as significant.

## RESULT

Two hundred and twenty one children with SCA participated in the study. Their ages ranged from 6 months to 18 years, mean  $10 \pm 4.9$  years. Twenty four out 221 subjects were immunized against HBV; only 6 had evidence of complete immunization. One of the subjects who had no evidence of complete immunization was positive for HBsAg. This number is too small for meaningful statistically analysis.

Out of two hundred and twenty one children with SCA studied, 18 were positive for HBsAg giving a prevalence rate of 8.1%. The prevalence of HBsAg increased with age among the subjects. Children aged 0-1 year have HBsAg prevalence rate of 0%, while those aged 6-12 years have prevalence rate of 9.1%. However the variation is not statistically significant ( $p > 0.05$ ; Table 1).

Forty six (20.8%) of subjects were from upper class families while 91 (41.2%) and 84 (38%) were from middle class and lower classes respectively. Their HBsAg prevalence are 6.5%, 7.8% and 9.5% respectively. The decreasing prevalence with increasing higher socioeconomic status was not statistically significant ( $p > 0.05$ ; Table 2).

One hundred and twenty three children with SCA had circumcision, which 10 (8.1%) were positive for HBsAg while 8 (8.2%) of 98 children who were uncircumcised were positive. The difference is not statistically significant ( $p > 0.05$ ). However it was noted that all male were circumcised and none of the females was circumcised.

Sixty seven (30.3%) of 221 children with SCA had

Scarification done by traditional healers, 6 were positive giving a prevalence rate of 8.9%. One hundred and fifty four subjects did not have scarification; of these 12 were positive giving a prevalence rate of 7.8%. ( $P > 0.05$ , table III) However it was observed that significantly higher number of people of low socioeconomic class practice scarification.

**Table 1: Effect of Age on the Prevalence of HBsAg among Children with SCA in Enugu.**

Age	No Examined	HBsAg + ve
	SCA	N (%)
0-1 yrs	8	0(0%)
1-2yrs	25	1(4%)
3-5yrs	34	2(5.9%)
6-12yrs	77	7(9.1%)
>12yrs	77	8(10.4%)
<b>Total</b>	<b>221</b>	<b>18(8.1%)</b>

**P > 0.05**                      **Statistically not significant**

**Table 2: Effect of Social Class on Prevalence of HbsAg in SCA.**

Social Class	No. of patient	HBsAg+ve n (%)
Upper	46 (20.8%)	3(6.5%)
Middle	91 (41.2%)	7(7.8%)
Lower	84 (38%)	8(9.5%)
<b>Total</b>	<b>221</b>	<b>18(8.1%)</b>

**P > 0.05**                      **Statistically not significant**

**Table 3: Effect of Scarification on Prevalence of HBsAg among Children with SCA in Enugu.**

Scarification	No of Patient	HBsAg +Ve n (%)
No	154	12(7.8)
Yes	67	6(8.5)
<b>Total</b>	<b>221</b>	<b>18</b>

**P > 0.05**                      **Statistically not significant**

## DISCUSSION

This study showed that the prevalence rate of HBsAg was 8.1% among children with SCA in Enugu. The HBsAg prevalence rate of 8.1% has been described as hyperendemic.<sup>1,15</sup> This large pool of children infected with HBV, can easily transmit the infection to other children, makes the disease a major public health problem in Enugu.

This study found a HBsAg prevalence rate of 0% among infants and 4% among toddlers (1-2yrs) this compares to low prevalence found by other workers in infants and children below 2 years.<sup>16,17</sup> The low prevalence of HBsAg among infants and toddlers suggest that vertical transmission of HBV was probably not common. The reason for this is not obvious considering the high prevalence rate of HBsAg in adult population in Nigeria.<sup>5,18</sup> However, it was observed that HBsAg prevalence increased with age. Other workers in Nigeria have observed similar pattern.<sup>6,16,17</sup> The low prevalence of HBsAg among children below 2 years and increasing prevalence with age suggests that the predominant mode of transmission may be horizontal. This agrees with Multimer et al<sup>19</sup> that most infections in Africa is horizontal occurring during childhood. Early childhood immunization might be adequate to prevent childhood infection.

Social class was not significantly associated with increased HBsAg prevalence in this study. This is similar to findings of Chukwuka et al<sup>9</sup> in Nnewi. Ezegebudo et al<sup>5</sup> in Awka found that among pregnant women the prevalence of HBsAg decreases with increasing social status. People from lower socio economic class are more likely to seek Medicare from traditional healers and quacks who are more likely to use contaminated instruments. They are also more likely to live in overcrowded neighbourhood that encourages clustering. Amazigo et al<sup>6</sup> documented that these factors may be responsible for higher HBsAg prevalence found among rural dwellers. The reason for the current findings is not obvious but it may be due to equal exposure to yet to be identified risk factors for HBV infection among various social classes.

Circumcision did not increase the risk of acquiring HBV infection. There was a prevalence rate of 8.1% in circumcised group and 8.2% in non circumcised group. The difference was not statistically significant. This finding agrees with other studies in Nigeria.<sup>9,10</sup> In the current study apart from 2 children who were circumcised by traditional healers, the remaining 121 children were circumcised either in a maternity or hospital where sterile instrument may have been used thereby reducing the risk of HBV infection. It is also noted in this study that all males were circumcised and none of the females did, therefore conclusions from this data should be partly be attributed to gender and circumcision respectively.

There is no difference in the prevalence of HBV among children who had scarification and those who did not. The findings in this study compared with that of Angyo et al<sup>10</sup> studying children with SCD in Jos and Chukwuka et al<sup>9</sup> studying school children in Nnewi both found that cultural practices like

scarification among others did not influence the transmission of HBV. However it contrasts findings in Cape Town, South Africa<sup>7</sup> and Ontario, Canada<sup>8</sup> where it was reported that tattooing significantly increased the prevalence of HBsAg.

The reason why scarification did not influence the prevalence of HBsAg in this study is not obvious considering that they were done by traditional healers who often use unsterilized and contaminated instruments. It may be that in a highly endemic area like Enugu, most susceptible children due to early exposure, either have an established HBV infection or are immuned from previous infection thereby obscuring the additional risk from this procedure.

In conclusion demographic and socio-cultural factors do not seem to influence the prevalence of HBsAg among children with SCA in Enugu. However there is need for further studies to determine the factors responsible for high prevalence of HBsAg in Enugu.

#### Limitations of this study

At the time of this study there was scarcity of ELISA HBsAg test kits which made it difficult for the authors to do a double ELISA assay. This may have affected the sensitivity of the results. The researchers may have to conduct further study, with double ELISA screening in future.

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