

Sociodemographic Differences in the Distribution of Hepatitis C Virus Antibodies among Children with Sickle Cell Anaemia in Enugu, South East Nigeria

By

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SUMMARY

Background: Hepatitis C virus (HCV) has become an important cause of chronic liver disease and liver cancer worldwide. A study of the sociodemographic differences in the distribution of HCV antibodies (Anti-HCV) among those at risk will broaden knowledge of the problem among patients in this part of the country.

Objective: To determine the sociodemographic differences in the distribution of HCV antibodies among transfused children with sickle cell anaemia (SCA) in Enugu and compare it with their non-transfused counterparts.

Methodology: The study was conducted among two hundred and sixty-nine children with SCA attending the paediatrics sickle cell clinic at University of Nigeria Teaching Hospital (UNTH) Enugu, 136 transfused SCA patients as subjects and 133 age and sex matched non-transfused SCA as controls were studied.

Results: There was no statistically significant difference in the age and sex distribution of the anti-HCV positive subjects and controls $P > 0.05$. Majority of the subjects (66.7%) and control (71.4%) who tested positive were in lower socio-economic class.

Conclusion: HCV infection is not uncommon in children with SCA. There is no significant difference in the sociodemographic characteristics of the HCV positive subjects and controls.

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INTRODUCTION

The World Health Organisation (WHO) regards hepatitis C virus (HCV) as a global health problem, which is endemic in most parts of the world¹. HCV has world wide prevalence of 3.1% with Africa recording the highest prevalence of 5.3%¹. HCV has been found to lead to chronicity in 70-85% of cases. It is estimated that about 170 million people world wide are chronically infected with HCV and majority are in developing countries¹. About 30% of those infected will progress to liver cirrhosis and ultimately to end stage liver failure and hepatic carcinoma². HCV is transmitted mainly through parenteral route. The most common risk factor for HCV infection in developing countries is transfusion of unscreened blood and blood derived products³. Thus children at risk include those with SCA, those on haemodialysis or who receive blood clotting factor concentrates as in haemophiliacs. Others include those who receive transplants or exposed to unsafe medical practices like re-usage of syringes and unsterile surgical procedures as can be found in alternative medical practices.

Some studies have suggested that blood transfusion increases the risk of HCV infection in patients with SCA^{4, 5}. De Vault⁴ assayed 121 consecutive SCA patients in the United States of America (USA) for HCV antibodies and found 25(20.7%) to be anti-HCV positive. This suggests a relative high prevalence of HCV infection in the USA. However, few local studies exist. Lesi and Kehinde⁶ in Lagos Nigeria assayed 278 subjects with SCA age range 10-45 years and found 14 (5.0%) positive for HCV antibodies. However 141 (51%) of their subjects were male while 137 (49%) were female. Their social classes were not mentioned. To the knowledge of the

researchers no such study has been done in children with SCA in South Eastern part of Nigeria. This underscores the need for this study. Information from this study may give a clearer picture of the sociodemographic characteristics of SCA patients positive for HCV antibodies in south eastern Nigeria. Finally the results of the study will increase the knowledge on HCV infection in Nigeria SCA patients and may form basis for future research.

MATERIALS AND METHODS

This study was done at UNTH Enugu which is a referral tertiary health institution and serves mainly the South Eastern States of Nigeria. It is a 700-bed capacity hospital. It runs two well established sickle cell clinics which cater for paediatric and adult patients respectively. Approval was obtained from UNTH ethical committee before commencement of this study. Informed written consent was obtained from each parent, guardian and the older children where applicable. Questionnaires were used to collect data which covers areas such as, age, sex, occupation and educational level of the parents. The social classes of both subjects and controls were determined using classification of social class proposed by Oyedeji⁷. This classification used the parental occupation and educational attainment to determine social class. Each of the factors used in classifying a child socio-economically is graded I-V. Grade I represents the highest social class and grade V, the lowest. Each parent is scored separately by finding the average score of the two factors in the social classification. The mean of the four scores (two for father and mother) to the nearest whole number would be the social class assigned to the child. According to the scheme, situation where any of the parents is dead, the

social class of the child is determined by the occupation and educational attainment of the living spouse or guardian. The subjects were SCA patients who had been transfused with blood. SCA patients who had not been transfused with blood and matched for age and sex served as controls. The inclusion criteria were

- a. SCA patients aged 1 to 18 years (completed age) with genotype confirmed by the Haemoglobin electrophoresis.
- b. Patients who were transfused at least 3 months before collection of blood sample.

After informed consent, patients (subjects and controls) were recruited from the paediatric sickle cell clinic of UNTH from February to September 2005 and were recruited consecutively. Blood samples were obtained under aseptic condition for HCV antibody assay. The blood samples were centrifuged within 3 hours of collection and quantity of serum obtained was immediately assayed for HCV antibodies with newer (third) generation HCV one step hepatitis C virus test strip (serum/plasma from Acumen Diagnostic Incorporated USA) which is a rapid chromatographic enzyme immunoassay

for the qualitative detection of antibody to hepatitis C virus in serum or plasma^{8, 9}. The sensitivity of the test strip is > 99%, while its specificity is 98.6%^{8, 9}. Parents and guardians whose children tested positive were counselled on the nature of HCV infection and the need for follow up.

Data Analysis

Data analysis was done using statistical package for social science (SPSS) version 11.5 software. The chi-square was used where appropriate. A P-Value of <0.05 was considered significant.

RESULTS

Of a total of 328 persons to whom questionnaire forms were distributed 27 declined consent giving a response rate of 91.8%. Of the 301 that responded 4 could not be matched for age and sex. Nineteen questionnaires were rejected due to incomplete data and 9 patients declined blood letting. Ultimately 269 children with SCA aged 1 to 18 years were studied with 136 serving as subjects and 133 as controls. The mean age for the subjects and controls were 10.19±5.31 years and 10.11±3.11 years respectively (P > 0.05). Table 1 shows sociodemographic characteristics of study population.

Table 1
Sociodemographic characteristics of subjects and controls

Age group (Years)	Subjects No (%)	Controls No (%)	Total No (%)
1 – 6	39(28.69)	37(27.82)	76(28.25)
7 – 12	47(34.51)	46(34.59)	93(34.57)
13 – 18	50(36.80)	50(37.59)	100(37.18)
Total	136(100.00)	133(100.00)	169(100.00) (P>0.05)
Sex			
Male	71(52.21)	70(52.63)	141(52.42)
Female	65(47.79)	63(47.37)	128(47.58)
Total	136(100.00)	133(100.00)	169(100.00) (P>0.05)
Social class			
Upper I	4(2.94)	4(3.00)	8(2.97)
II	9(6.62)	11(8.30)	20(7.44)
Middle III	41(30.15)	37(27.80)	78(29.00)
Lower IV	65(47.79)	62(46.60)	127(47.21)
V	17(12.50)	19(14.30)	36(13.38)
Total	136(100.00)	133(100.00)	169(100.00) (P > 0.05)

Majority of the study population were between 13-18 years accounting for 36.8% of the subjects and 37.6% of controls. The subjects comprises of 71 males and 65 females while the controls comprises 70 males and 63 females. The male to female ratio for the subjects and controls were 1.09:1 and 1.11:1 respectively. There were no significant age or sex differences between the subjects and controls (P>0.05). Majority of the subjects and controls were in

lower socio-economic groups (Class IV-V). This comprises of 60.29% of the subjects and 60.9% of the controls. The socio-economic spread of subjects compared to the controls showed no statistically significant difference (P > 0.05).

Table 2 highlights sociodemographic characteristics of Anti-HCV Positive subjects and controls.

Table 2
Sociodemographic characteristics of Anti – HCV Positive Subjects and Controls

	Subjects		Controls		Total		P-Values
	Positive No (%)	Negative No (%)	Positive No (%)	Negative No (%)	Positive No (%)	Negative No (%)	
Age Group (Years)							
1-6	4(44.4)	36(28.2)	3(42.8)	39(30.9)	7(43.8)	75(29.7)	>0.05
7-12	1(11.2)	43(33.9)	2(28.6)	37(29.4)	3(18.7)	80(31.6)	>0.05
13-18	4(44.4)	48(37.7)	2(28.6)	50(39.7)	6(37.5)	98(38.7)	>0.05
Total	9	127	7	126	16	253	
Sex							
Male	6(66.7)	65(51.2)	3(42.9)	66(52.4)	9(56.3)	131(51.8)	>0.05
Female	3(33.3)	62(48.8)	4(57.1)	60(47.6)	7(43.7)	122(48.2)	>0.05
Total	9	127	7	126	16	253	
Social Class							
Upper I	0	4(3.2)	0	4(3.2)	0	8(3.2)	
II	0	9(7.1)	0	11(8.7)	0	20(7.9)	
Middle III	3(33.3)	38(29.9)	2(28.6)	35(27.8)	5(31.3)	73(28.9)	>0.05
Lower IV	4(44.5)	61(48.0)	4(57.1)	58(46.0)	8(50.0)	119(47.0)	
V	2(22.2)	51(11.8)	1(14.3)	18(14.3)	3(18.7)	33(13.0)	>0.05
Total	9	127	7	126	16	253	

Among the subjects studied age group 1-6 and 13-18 years had the highest number of children that were anti-HCV positive. While 7-12 years age group had the least number. In the controls, aged group 1 – 6 years had the highest anti- HCV positivity. The differences were not statistically significant $P>0.05$. Among the subjects, males were more than females, while the controls had more females than males with anti-HCV positivity. The difference in gender distribution between the subjects and controls was not statistically significant $P>0.05$. Majority of the subjects (66.7%) and controls (71.4%) who tested positive were in lower socio-economic class (class IV-V). However, when those who tested positive among the subjects in different socio-economic classes were compared with controls there were no

statistically significant differences $P>0.05$.

DISCUSSION

In this study, the highest frequency of positivity among the subjects was in the 1-6 years and 13 – 18 years age groups, though the difference was not statistically significant. This was similar to studies by EL Kamary et al¹⁰ in United States, and Lesi and Kehinde⁶ in Lagos which showed highest frequency of positivity among the subjects studied for HCV antibodies in 1 – 6 years and 13 – 18 respectively. They also noted that there differences were not statistically significant. The age group 1 – 6 years is known for greater morbidity, and is at higher risk of being infected. Subjects in the 13-18 years group being adolescents are more active and adventurous and may acquire HCV infection through

other routes such as sexual intercourse and intravenous drug use.

Also in the subjects studied, there was a slightly higher percentage of HCV positivity among males than females, though the difference was not statistically significant. This agreed with studies of patients with sickle cell disease as documented by Billet and Richard¹¹ in USA, and Ansar and Kooloobandi¹² among thalassaemia patients in Iran. None of the other reviewed studies^{13,14} mentioned any gender differences in the prevalence of anti-HCV. This may suggest a chance finding and larger studies may be required to confirm this observation.

Eighty two (60.29%) subjects in the present study were in the lower social group (class IV-V). Oyedeji⁷ in a study of the socio economic and cultural background of hospitalized children in Ilesha, Nigeria reported that 65% of them were in the lower social class(IV-V). The preponderance of the subjects from the lower socio-economic class in the present study therefore appears to be in agreement with the pattern observed in Ilesha. Among those positive for anti-HCV, the lower socio-economic class is also in the majority (66.7%). This shows that children from lower social class patronize public health institutions like UNTH Enugu.

Conclusions

HCV infection is not uncommon in children with SCA. There is no significant difference in the sociodemographic characteristics of the HCV antibody positive subjects and controls.

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