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Prevalence of Hepatitis C Virus among Children Attending University of Maiduguri Teaching Hospital, Nigeria

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ABSTRACT

Hepatitis C virus infection is an infectious disease affecting primarily the liver, caused by the hepatitis C virus (HCV). Thus, this study was aimed to determine the prevalence of HCV among children attending University of Maiduguri Teaching Hospital, Nigeria, using one step immunochromatographic rapid screening test. Out of one hundred (100) serum samples tested, only 10 (10.0%) were positive, these include 8 (11.4%) were males while 2 (6.7%) were females. The prevalence of HCV among male outweighs their female counterpart, although, no statistical significant difference was observed between the prevalence of the virus and the gender (X-squared = 0.1323, df = 1, p-value = 0.7161). Also, the distribution of HCV based on educational status and aged were considered in this study, although, none of them showed statistical significant difference (P > 0.05). Therefore, there is an urgent need to develop early detection methods for HCV in children as well as treatment measures to reduce the incidence of the disease. Prompt action should be taken to reduce the incidence of HCV infection in both parents and children by educating them on good health practices such as avoiding the use or sharing of personal items like razors, pins, and other sharp objects. Screening of blood and blood products must be performed before being used on any patient.

INTRODUCTION

Hepatitis C is an infectious disease infecting primarily the liver, caused by the hepatitis C virus (HCV) (Ryan and Ray, 2004). The infection is often asymptomatic, but chronic infection can lead to scarring of the liver and ultimately to cirrhosis, which is generally apparent after many years. In some cases, those with cirrhosis will go on to develop liver failure or liver cancer (Ryan and Ray, 2004). HCV is a member of the family Flaviviridae and is classified into multiple genotypes (Prescott, 2011). Each genotype shows more than 20% difference at the nucleotide level and more than 15% difference at the amino acid level compared with any of the other genotypes (Simmonds, 2004). The existence of hepatitis C (originally identifiable only as non-A-non-B hepatitis) was suggested in the 1970s and proven in 1989 (Houghton, 2009). Hepatitis C infects only humans and chimpanzees. It is one of the five known hepatitis viruses: A, B, C, D, and E. HCV together with Hepatitis B virus (HBV) is the predominant cause of chronic viral hepatitis in children and adults (Williams, 2006). In industrialized countries, since the start of HBV vaccination program, HCV has become the most significant cause of chronic liver disease of infectious etiology in children (Slowik and Jhaveri, 2005).

Children represent only a small proportion of the HCV-infected population. According to Gower *et al.* (2014), there are approximately 115 million infected persons in the world, 11 million are younger than 15 years of age. It has been estimated that the global health care costs for HCV-infected children and their families are hundreds of millions of dollars annually (El-Shabrawi and Kamal, 2013). HCV is spread primarily by blood-to-blood contact associated with intravenous drug use, poorly sterilized medical equipment and transfusions (associated with intravenous drug use, poorly sterilized medical equipment, and transfusions (Gravitz, 2011). Vertical transmission from mother to child is becoming the major source of infection in children (Bortolotti *et al.*, 2007).

The virus persists in the liver is about 85% of those infected. This chronic infection can be treated with medication; the standard therapy is a combination of peginterferon and ribavirin, with either boceprevir or telaprevir added in some cases. Overall, 50%-80% of people treated are cured. Those who develop cirrhosis or liver cancer may require a liver transplant. Hepatitis C is the leading reason for liver transplantation though the virus usually recurs after transplantation. Before 1992, the mode of acquisition of HCV infection in children was predominant via

transfusion of blood or blood products. After implementation of universal testing of blood and blood products, transmission of virus from the mother to child became the leading source of HCV infection in children (Bortolotti *et al.*, 1998: Bortolotti *et al.*, 2007). Delivery by caesarean section is not recommended for pregnant women infected with HCV. Infected mothers can safely breastfeed their infants if the nipples are not damaged (Resti *et al*., 2003). No vaccine against hepatitis C virus is available. Thus, this study was aimed to determine the prevalence of HCV among children attending UMTH, Nigeria.

MATERIALS AND METHODS

Study Area

This study was carried out at the University of Maiduguri Teaching Hospital (UMTH), Maiduguri, Borno State. Borno State is situated in the North-Eastern part of Nigeria and lies in latitude 10^{o}N and 13^{o}E. The state was formed in 1976 from the split of the North-Eastern State. Until 1991, it contained today's known Yobe State. It occupies the greater part of the Chad Basin in the North- Eastern part of the country and shares international borders with the Republic of Niger to the North, Chad to the North-East and Cameroun to the East. Most important to the country is the state's strategic location as a gateway to East and Central Africa. Internally, the state shares borders with the neighbouring states of Adamawa to the South, Yobe to the West and Kano to the North-West and Gombe to the South-West. The state has an area of 69,435 square kilometers, about 7.69% of the total land area of the country.

The University of Maiduguri Teaching Hospital is a Federal Government designated Center of Excellence in medicine. It is used by the college of Medical Science (established in 1977) for the clinical components of its training. Teaching Hospital caters the health needs in Nigeria's expansive North-East, as well as in the adjoining countries of Chad, Niger and Cameroun.

Questionnaire

Questionnaire was used in this study to obtain information about the patients age, sex, and educational status, which was considered as risk factors for acquiring HCV infection.

Collection of Sample

About 5 ml of blood sample was aseptically collected by venipuncture from each subject and transfer into EDTA bottles. The blood samples were left to cloth after which plasma samples were separated from the cloth by centrifuging at 2000 rpm for 10 minutes. Plasma was then being separated from the clots and stored at room temperature in labeled bottles until assay.

Determination of Anti-HCV

Anti-HCV antibodies were determined in plasma using CICPharm® HCV TEST STRIP (Manufactured by NEB CO., LTD). This is one step immunochromatographic Rapid Screening Test. Two purified recombinant antigens of HCV are used in test band as capture materials and gold conjugates. If the antibody of Anti-HCV is present in the sample in concentration above the labelled regions, complex was formed. This complex is then captured by antigen immobilized in the Test Zone of the membrane, producing a visible pink-rose color band on the membrane. The color intensity depended on the concentration of the anti-HCV present in the sample.

Data Analysis

The data was subjected to statistical analysis (the $\chi 2$-test, with the level of significance set at $p < 0.05$) using statistical package (R version 2.13.1) to determine any significant relationship between sex, age and educational status and the prevalence of HCV.

RESULTS

The prevalence of Hepatitis C virus among children attending University of Maiduguri Teaching Hospital showed that out of one hundred serum samples, only 10 (10.0%) were positive, this includes 8 (11.4%) were males while 2 (6.7%) were females. The prevalence of HCV among male outweighs their female counterpart, although, no statistical significant difference was observed between the prevalence of the virus and the gender (X-squared = 0.1323, df = 1, p-value = 0.7161).

Table 1: Distribution of HCV among Children attending UMTH based on Sex

Education	Total	Positive	Positive (%)
Male	70.0	8.0	11.4
Female	30.0	2.0	6.7
Total	100.0	10.0	10.0

(X-squared = 0.1323, df = 1, p-value = 0.7161)

The distribution of HCV based on educational status showed that only 6 (8.8%) were found positive among children enrolled formal education out of 68 samples tested while 4 (12.5%) positive were found among children having non-formal education, although, no statistical significant difference was observed between the prevalence of the virus and the educational status of the studied population (X-squared = 0.046, df = 1, p-value = 0.8303) (Table 2).

Table 2: Distribution of HCV among Children attending UMTH based on Educational Status

Education	Total	Positive	Positive (%)
Formal	68.0	6.0	8.8
Non-formal	32.0	4.0	12.5
Total	100	10.0	10.0

(X-squared = 0.046, df = 1, p-value = 0.8303)

The distribution of HCV according to age showed that those between 5–8 years had the highest prevalence of 9.5%, followed by 9–12 years (8.3%), and <1–4 years (5.9%). However, no statistical significant difference was observed between the prevalence of the virus and the different age group (X-squared = 0.3433, df = 2, p-value = 0.8423) (Table 3).

Table 3: Distribution of HCV among Children attending UMTH based on Age

Age	Total	Positive	Positive (%)
<1-4	34.0	2.0	5.9
5-8	42.0	4.0	9.5
9-12	24.0	2.0	8.3
Total	100	10.0	10.0

(X-squared = 0.3433, df = 2, p-value = 0.8423)

DISCUSSION

The seroprevalence of Hepatitis C virus among paediatric patients attending University of Maiduguri Teaching Hospital was analyzed and the result was presented. The overall prevalence of 10.0% was observed in this study which is within the range of 5.8%-12.3% prevalence reported by Halim and Ajayi (2000). It is, greater than 0.0% reported by Isa *et al.,* (2014) as well as greater than the seroprevalence for HCV co-infection with HIV (5.0%) reported in Jos by Emeka *et al.,* (2014).

The distribution of HCV according to sex found that males had higher prevalence of 11.4% when compared with female (6.7%). This observation is contrary to Sule *et al.,* (2009) who reported that female (4.6%) had higher prevalence of HCV antibodies than male (2.3%). But agrees with the finding of Inyama *et al.,* (2005) who reported that male had higher prevalence than female.
In this study, patients aged between 5 – 8 years old (9.5%) had the highest HCV antibody. This is contrary to results reported by Isa *et al.,* (2014), who reported a higher prevalence in children aged 11-20 years, and it also disagrees with report by Emeka *et al.,* (2014) who recorded high prevalence in children aged 1 – 5 years old.

In this study, children engaged in formal education showed lower prevalence (8.8%) than those with informal education (12.5%). The low prevalence in the children with formal education may be as a result of the awareness created by teachers of Nursery and Primary schools attended by these children. This seroprevalence agrees with that reported by Isa *et al.,* (2014) based on educational status. Statistical analysis however, showed no significant difference (X-squared =

0.1323, df = 1, p-value = 0.7161) between the prevalence rate of the male and female children (Table 1). Inyama *et al.*, (2005), Mustapha *et al.*, (2007) and Isa *et al.*, (2014) made similar observations between male and female genders in Nigerian population. In the same manner, no statistical differences were observed between the male and female educational statuses (X-squared = 0.046, df = 1, p-value = 0.8303), and ages (X-squared = 0.3433, df = 2, p-value = 0.8423) as shown by the reports of Isa *et al.*, (2014).

CONCLUSION

Hepatitis C virus infection prevalence rate of 10.0% was observed in this study. Higher prevalence rates were observed in male children, those engaged in informal education and those aged 5 – 8 years old. Therefore, there is an urgent need to develop early detection methods for HCV in children as well as treatment measures to reduce the incidence of the disease. Prompt action should be taken to reduce the incidence of HCV infection in both parents and children by educating them on good health practices such as avoiding the use or sharing of personal items like razors, pins, and other sharp objects. Screening of blood and blood products must be performed before being used on any patient.

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