Seroprevalence of Hepatitis A among some residents of Maiduguri Borno State Nigeria

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Abstract: Seroprevalence of Hepatitis A virus among inhabitants of some parts of Maiduguri metropolis, Borno State Nigeria, was carried out using competitive ELISA. Out of 187 serum samples tested, 44 (23.5%) were positive. The gender distribution of the positive samples showed a prevalence rate of 40% among the males and 18.7% among the females. There was a significant difference ($p<0.05$) noted between the sexes. No significant difference ($p>0.05$) was however observed in the age distribution of the hepatitis A virus among the study group. This study has shown a low activity of hepatitis A virus among the study group.
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Introduction

Hepatitis A, formally called infectious hepatitis or epidemic hepatitis, is a self limiting disease and one of the oldest diseases known to mankind. It is a significant cause of morbidity and socio economic losses in many parts of the world (Shapiro and Margolis, 1993) and a leading cause of viral hepatitis (Escobedo-Melendez *et al*., 2012). This disease is typically transmitted by the faecal-oral route (Robertson, 1993; Cianciara, 2000). Infection occurs early in life in areas where sanitation and living conditions are poor. With improved sanitation and hygiene, infections are delayed and consequently the number of persons susceptible to the disease increased (Robertson, 1993). Under these conditions explosive epidemic can arise from faecal contamination on single sources (Robertson, 1993). Hepatitis A is caused by hepatitis A virus (HAV), a noneveloped, positive stranded RNA virus. First identified in 1973 and classified within the genus hepatovirus of the picornaviridae family (Cianciara, 2000). As HAV is abundantly excreted in faeces-contaminated food or water, direct person to person spread is common under poor hygienic condition (Robertson, 1993). People who have never contracted HAV and who are not vaccinated against hepatitis A are at risk of infection. The risk factors for HAV infection are related to resistance of HAV to environment, poor sanitation in large area of the world, and abundant HAV strudding in faece (Tufenkeji, 2000; Ceyhan *et al*., 2008). In areas where HAV is highly endemic, most HAV infections occur during early childhood. The aim of this study was therefore to investigate the seroprevalence of Hepatitis A virus infection among some inhabitants of Maiduguri, Nigeria.

Materials and Methods

Study area

This study was conducted in 2013 in Maiduguri the capital of Borno state, Nigeria, located between latitude 11° 5' and 12° N and longitude 13° 5' and 14° E at about 354m above sea level with mean ambient temperature of 13-41°C, annual rainfall of 9-198 mm, sunshine of 7-9 hours/day and relative humidity of 19-79%.

Sample collection

A total number of one hundred and eighty seven (187), human sera were sampled. The human serum samples were obtained from Gwange and London chiki within Maiduguri metropolitan. A 5ml syringe and 22 gauge needle was used to collect about 4 – 5 ml of blood from the brachial artery in humans and put into plain vacutainer tubes and labeled accordingly. The blood samples were collected and transported on ice pack in slanting position inside a cooler to the University of Maiduguri teaching hospital, where the blood samples were allowed to clot and sera separated using centrifuge at 3,000 revolutions per minute for 20 minutes. The harvested sera were then transported on Ice Park to the virology laboratory, Faculty of Veterinary Medicine, University of Maiduguri where it was stored at -20^0C until tested.

Source of and type of ELISA used

Hepatitis A virus, competitive ELISA coated plates, produced by Bio-X-Diagnostics S.D. E/F; Calabasas CA 91302 California USA was used for this study.

Principle of the ELISA test

The HAV IgG ELISA is a solid phase assay that features one step incubation competitive principles. When HAV IgG antibody is present in the test sample, it competes with enzyme conjugated monoclonal HAV

IgG antibodies for a fixed amount of purified HAV antigen that was pre-coated in the wells of a microtitre plate. In the absence of HAV IgG in the test sample, the enzyme conjugated monoclonal HAV IgG antibodies will bind to the coated antigen and give a blue colour on reacting with the substrate. Th presence of antibodies to HAV in a sample is indicated by a low or no colour at all.

Statistical analysis

Chi square statistical method at p value of 0.05 using 95% confidence interval was used to determine the statistical relationship between Hepatitis A virus antibodies among human, age distribution between young and adults in the human.

Results

Out of the 187 blood samples from humans that were analysed for hepatitis A antibodies, 23.5% (44/187) were positive. The gender distribution of the positive samples showed a prevalence rate of 30% among males and 18.7% among females (Table 4.1). No significant difference (P > 0.05) in anti-Hepatitis A virus seroprevalence between the sexes. The age distribution of hepatitis A antibodies among humans of different age groups in the study area is presented in table 4.2. There was no significant differences (P > 0.05) observed among the age groups. The 15 to < 20 years old had higher (44.4%) prevalence rate as compared to other age groups. No positives were noted among the greater than 35 years age group.

Discussion

The result of this study indicated a low seroprevalence (23.5%) of hepatitis A virus among the study subjects. This result tallies with the seroprevalence reports of 28.7% among school aged children in Saudi Arabia (Jaber, 2006), 28.8% in Kuwait (Alkhalidi *et al*., 2009) and 26.96% in North India (Jain *et al*., 2013). The HAV antibodies detected in this study could be due to natural infection as the population under study has never been vaccinated against hepatitis A. Most people who get Hepatitis A fall sick for several months, but they usually recover completely and do not have lasting liver damage. The present study however, contradicts the report of 50% seroprevalence among migrant population in the USA (Dentinger *et al*., 2001), 64.4% in Turkey (Ceyhan *et al*., 2008) and 99.5% seroprevalence among recyclable waste pickers in Brazil (Soare *et al*., 2013). Its observed in this study that the prevalence rate among males is higher (30%) than in females (18.7%). This differs from the report of Alkhalidi *et al.* (2009) in Kuwait where 59% and 41% seroprevalence among male and females was observed. Although any one can get hepatitis A, some people are at greater risk, such as travelers to or living in Hepatitis A endemic countries or those who have sexual contact with Hepatitis A infected individuals (Franco *et al*., 2012). The result of the present study showed an increasing seroprevalence with increase in age with the 15 to < 20 year old having higher (44.4%) prevalence rate as compared to other age groups. Mathur and Arora (2008) have earlier reported the shifting in peak age of seroprevalence from the first decade of life to the second or third decades. The lack of HAV antibodies in individuals older than 35 years of age observed in this study is an indication that such individuals are uninfected and unprotected. This disagrees with the findings of Alkhalidi *et al.* (2009) where individuals of 41 to 60 years of age were HAV seropositive. Young children with an acute hepatitis A viral infection are usually asymptomatic or non specific and not diagnosed as hepatitis A because of the lack of jaundice (Hollinger, 1996).

Conclusion

From the finding of this study, it could be concluded that the activity of hepatitis A virus was found to be low among the subjects studied.

Table 1. Gender distribution of Hepatitis A virus seroprevalence among some inhabitants of Maiduguri, Nigeria

Gender	No. tested	No. (%) positive
Male	80	24 (30.0)
Females	107	20 (18.7)
Total	187	44 (23.5)

Table 2. Age distribution of Hepatitis A virus seroprevalence among some inhabitants of Maiduguri, Nigeria

Age group	No. tested	No. (%) positive
0 - < 5	21	4 (19.1)
5 - < 10	30	5 (16.7)
10 - < 15	62	17 (27.4)
15 - < 20	18	8 (44.4)
20 - < 25	30	7 (23.3)
25 - 30	5	1 (20.0)
30 - < 35	8	2 (25.0)
≥ 35	13	0 (0)

Recommendation

We therefore recommend the promotion of childhood vaccination and consider catch up vaccination for adolescent and young adults.

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