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Seroprevalence of Hepatitis A Infection among Young Adults in Ilorin

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Hepatitis A infection is predominantly caused by Hepatitis A virus which is transmitted by fecal-oral route through contaminated food or drinks. The virus's ability to cause hepatitis poses as a major hazard to public health. This study was done to discover the widespread presence of hepatitis A among young adults in Ilorin, Kwara State. A Cross sectional sampling technique was employed to select the study population. Semi-structured questionnaire was used to acquire demographic information of the cohorts. Four hundred (400) young adults residing in Ilorin were the participants in the study.

Five mls of venous blood sample were obtained from each of the participants through venipuncture technique. The blood samples were separated and the serum used for qualitative analysis of hepatitis A virus IgG using EIA and indirect ELISA technique (Abbexa Ltd, UK).

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Out of the four hundred (400) healthy young adult subjects, an overall distribution of 1.5% IgG Hepatitis A were found among participants in Ilorin. Fulminant stooling, location, gender, educational level, age and occupation were risk factors for acquiring Hepatitis A infection. There was significant difference between Hepatitis A infection and Fulminant stooling ($p<0.05$). Previous history of blood transfusion was not statistically associated as a potential risk factor for Hepatitis A infection among Inhabitants in Ilorin. High prevalence of anti-hepatitis A virus IgG levels of the antibody was reported among young adult in this study. Based on the findings of this study, screening of hepatitis A virus for blood transfusion and food vendors, personal hygiene are highly advocated.

Keywords: Blood transfusion; food vendors; personal hygiene; antibody; hepatitis A virus.

1. INTRODUCTION

Hepatitis A is a ribonucleic acid (RNA) virus that spreads through the fecal-oral route [1]. It has a global presence, with a higher occurrence in developing countries due to higher living standards and environmental conditions that promote infection in children [2]. Increased sanitation in developed countries has resulted in a decrease in hepatitis A infection, and the first time exposure occurs at an older age [3]. In contrast, in developing countries where sanitation is still a major issue, the majority of children are infected with HAV before the age of nine [4]. The Hepatitis A virus (HAV) is the most common cause of acute liver disease. Infection in young children can be asymptomatic, whereas in older children and adults, jaundice and severe illness can interfere with daily activities and lead to life failure and death. Unsanitary water supply and other poor living conditions are major causes of hepatitis A. A higher standard of living and the availability of clean water contribute to a reduction in hepatitis A outbreaks [5]. Age-specific seroprevalence shows a decrease in its outbreak, indicating that some children have developed active immunity and that adults are experiencing fewer new infections [6]. Every year, approximately 1.4 million cases and 200 million asymptomatic carriers are recorded globally [7]. There is a significantly low infection rate due to good sanitary infrastructure and an immunization schedule for citizens traveling to endemic regions [8]. HAV can be passed from person to person as well as through contaminated water and food. Because of their resistance to low PH, low temperature, moderate heating, and chemical agents, HAV can survive on environmental surfaces, human skin, and sewages [9]. A Nigerian study was conducted in an urban hospital, so the study was conducted on healthy children [10]. In North Central, the seroprevalence of HAV (2.94%) among subjects of an Abuja study is significantly lower than in previous Nigerian reports [11]. Aside from the fecal oral route, asymptomatic carriers of HAV can also be contacted sexually [12]. Hepatitis A pathogenesis occurs when the virus enters the intestinal tract and is transported to the liver following a viremic stage in which virus can be detected in the blood stream. Hepatocytes are thought to be the site of virus replication, and virus is thought to be shed via bile. HAV viral antigen and/or genomic material have been found in the spleen, kidney, tonsils and saliva in experimental infections in nonhuman primates, implying that other sites of replication may exist. The virus generally does not destroy cells *In vitro*, and the damage to liver epithelial cells *In vivo* is often limited [13]. Acute HAV infection can cause malaise, anorexia, nausea, vomiting, and elevated aminotransferase levels for several weeks. In more severe cases, jaundice develops. Hepatitis A has no specific treatment. Recovery from infection symptoms can be slow and take several weeks or months. The most important thing is to avoid taking unnecessary medications [14-16]. Acetaminophen/Paracetamol and anti-vomiting medication should not be administered. In the absence of acute liver failure, hospitalization is not required. The goal of therapy is to maintain comfort and adequate nutritional balance, including the replacement of fluids lost due to vomiting and diarrhea [17]. Serological tests to detect the specific antibody produced against the virus or directly detecting the antigen in body fluids using HAV kits include Enzyme Linked Immunosorbent Assay (ELISA), Radio Immunoassay (RIA), indirect immunofluorescence, and immunodiffusion tests [18].

The aim of this study is to estimate the prevalence and associated socio-demographic factors of serological markers of Hepatitis A among healthy individuals in Ilorin, Kwara State.

2. MATERIALS AND METHODS

2.1 Study Area

The study was carried out in three Local Government Areas within Ilorin METROPOLIS. In collaboration with the primary health care in the environment so as to sensitize the communities. Samples were collected from Ilorin West Local Government (Adewole cottage), Ilorin South Local Government (Ajikobi primary health care) and (Ogidi healthcare).

2.2 Study Design

This was a cross-sectional study and epidemiological survey among young apparently healthy individuals in Ilorin, Kwara State. The prospective voluntary donors were given consent to participate in this study and selected as the respondents. Four hundred subjects participated in the study. The participation of the respondents was voluntary and informed consents were obtained from each participant.

2.3 Specimen Collection

This was done by asceptically collecting 5mls of Blood, using 5mls sterile syringe to aspirate blood sample by using a tourniquet to tie the upper arm, using methylated spirit to swab the cubital fossa and collecting blood sample from the prominent vein (from ante-cubital vein) of a prospective blood donor at the donor bay. The blood samples were dispensed into sterile, labelled non-anticoagulated bottles and transported to the laboratory. The blood samples were spun at 3000 rpm for 2 minutes and the serum extracted. the separated serum samples from each participant was used for the immunocheomatographic anti HAV testing using commercially available rapid test kits for Hepatitis virus followed by Enzyme linked immunosorbent assay (Abbexa Ltd, UK) for the detection of HAV IgG antibodies.

2.4 Inclusion and Exclusion Criteria

Inclusion Criteria:

1. Individuals who consented to participate.
2. Young adults residing in Ilorin.
3. Participants above the age of 18.

Exclusion Criteria:

1. Individuals under 18 years were not included

3. RESULTS

3.1 Socio-Demographic Characteristics

A total number of 400 young adult individuals from three local government within Ilorin town, of the age group of 18-40years were enrolled into this study. The mean age of the participants was 28 years with most of the respondents being married 270(67.5%) with divorced rate at 22(5.5%), widow at 4(1.0%) and single are 104(26%). More than third (48.0%) of the participant were literate and either in business 140(35%), housewives 80(20%), civil servant 34(8.5%), farmers 10(5.0%), students 44(22.0%),or unemployed 38(9.5%). 130(32.5) of the respondents were males and 270(67.5%) were females.

Table 1 shows that out of the 400 participants studied, 6 of them had positive (IgG) results for hepatitis A infection by the IMMUNOCHROMATOGRAPHIC assay and confirming with ELISA, giving a prevalence value of 1.5%, while 394 (98.5%) were negative.

Table 2 showed the age groups of the participants with Hepatitis A antigen. age group 36-40 years (66.7%) had the highest prevalence of Hepatitis A infection, this is followed by the age group 30-35 years (33.3%) which has the lowest prevalence.

There was statistical significance association of age groups ($p=0.000$) with seroprevalence of Hepatitis A infection among young adult in Ilorin Kwara State at $p<0.05$.

Table 3 shows that female had the highest prevalence for Hepatitis A with 66.7%, while male has the lowest prevalence of 33.3%.

There was a statistical significance association of Gender ($p=0.000$) with seroprevalence of hepatitis A among young adult in Ilorin Kwara State at $p<0.05$.

As shown in Table 3, divorced young adult had the highest prevalence of Hepatitis A (66.7%), while the married young adult had the lowest prevalence (33.3%). There was statistical significance association of marital status (0.000) with seroprevalence of hepatitis A among young adult in Ilorin at $p<0.05$.

Table 4 showed that 33.3% of the positive participants had no previous history of fulminant stooling, while 66.6% of the positive participants had previous history of fulminant stooling.

There was no statistical significance association of previous history of fulminant stooling (p=0.001) with seroprevalence of hepatitis A infection among young adult in Ilorin Kwara State at p<0.05.

Table 5 shows that participants with blood transfusion history that had the highest prevalence are 66.7%, while 33.3% for those with no blood transfusion history which is the lowest prevalence.

There was no statistical significance association of blood transfusion history (p=0.392) with seroprevalence of hepatitis A among young adult in Kwara State University at p>0.05.

Table 6 shows that participant that resides in each of the stated residence in Ilorin has equal prevalence of 33.3%.

There was statistical significance association of residence (p=0.000) with seroprevalence of hepatitis A among young adult in Ilorin Kwara State at p<0.05.

Table 7 shows that the rate of hepatitis A in Ilorin based on education level has equal prevalence which is 33.3%. There was no statistical significance association of Faculty (p=0.000) with seroprevalence of hepatitis A among young adult in Ilorin Kwara State University at p<0.05.

4. DISCUSSION

Hepatitis A is a ribonucleic acid (RNA) virus that is not enveloped and spreads faecally. It is found all over the world, with the highest prevalence in developing countries where the environment and socioeconomic conditions favor nearly universal exposure in childhood. Improvements in public health sanitation have resulted in a decrease in the incidence of hepatitis A infections in developed countries, as well as a shift in the age of first exposure. This is not the case in developing countries, where

Table 1. Result distribution of hepatitis a among young adult in Ilorin

Serology	Frequency	Percentage (%)
Positive	6	1.5%
Negative	394	98.5%
Total	400	100%

Table 2. Age distribution of hepatitis a infection among young adults in Ilorin Kwara State

Age groups	Number positive	Number negative	Percentage (%)
18-23	0	100	0
24-29	0	100	0
30-35	2	98	2
36-40	4	96	4
Total	6	394	1.5

Table 3. Gender distribution of hepatitis a infection among young adult in Ilorin Kwara state

Gender	Number of participants	Number positive
Male	173(43.25)	2(33.3)
Female	227(56.75)	4(66.7)
Total	400(100)	6(100)

Table 4. Distribution of hepatitis a infection among young adult based on previous history of fulminant stooling

History of fulminant stools	Number of participants	Number positive	P-value
Positive	143(35.75)	4(66.7)	0.001
Negative	257(64.25)	2(33.3)	
Total	400(100)	6(100)	

Table 5. Blood transfusion history distribution of hepatitis a infection among young adult in ilorin

History of blood transfusion	Number of participants	Number positive	P-value
Positive	61(15.25)	6(100)	0.392
Negative	339(84.75)	0(0)	
Total	400(100)	6(100)	

Table 6. Distribution of hepatitis a infection among young adult in ilorin Kwara State University based on residence

Location of residence	Number of participants	Number positive	Percentage prevalence (%)
Ilorin South	120(30%)	2(1.67%)	2(33.3%)
Ilorin West	136(34%)	2(1.47%)	2(33.3%)
Ilorin East	144(36%)	2(1.38%)	2(33.3%)
Total	400(100%)	6(1.5%)	6(33.3%)

Table 7. Distribution of hepatitis a infection among young adult in Ilorin Kwara state based on education level

Educational Level	Number of participants	Total positive	Percentage prevalence	P-value
Primary School	50(12.5%)	2(4%)	2(33.3%)	0.000
Secondary School	158(39.5%)	2(1.27%)	2(33.3%)	
Tertiary	192(48%)	2(1.04%)	2(33.3%)	
Total	400(100%)	6(1.5%)	6(1.5%)	

sanitation is still a major public health concern and nearly all children are infected with HAV before reaching the age of nine. Endangered HAV transmission is unlikely in most developed countries. In developing countries, poor sanitation leads to the continuous transmission of HAV infection in children and young people. An attempt was made to determine the prevalence of HAV among young adults in Ilorin Metropolis.

This study includes 400 participants from Ilorin, Kwara State, Nigeria. This study found that 6 (1.5%) of 400 participants (subjects) tested positive for Hepatitis A, which is similar to the (2.4%) result obtained by Okara et al in Abuja, 0.67% was obtained as a prevalence rate from outpatients of some selected hospitals in Kaduna metropolis [19], and 55% was obtained from healthy individuals in Calabar [20].

44.1% was also reported among South African children [21]. These observed differences in prevalence rates could be attributed to study populations, geographic areas, and laboratory identification methods.

Female samples had a slightly higher prevalence of Hepatitis A than male samples. Gender and hepatitis A infection had a statistically significant relationship. 6(1.5%) were positive for Hepatitis A compared to 0(0%) for males. This gender specific prevalence may be due to the fact that females in the study area have more contact with open water than males due to agricultural and domestic activities. The prevalence of HAV in this study could be attributed to Hepatitis A's ability to cause asymptomatic infections that are cleared by the immune system (self limiting) [22].

The distribution of Hepatitis A among age groups 36-40 years has the highest prevalence rate of 4 (66.7%), while 30-35 years has a prevalence rate of 33.3%, which is consistent with work done at University College Hospital, Ibadan, Nigeria, which has the highest prevalence on the 21-30years age group [23]. Hepatitis A is frequently asymptomatic in childhood, and its morbidity and mortality rates rise with age [24]. Age and Hepatitis A infection had statistically significant associations.

In this study, socio-demographic factors such as age were related and associated with Hepatitis A, but it was discovered that most of the participants aged 36-40 years fell within primary school educational levels, which explained that due to their illiteracy, they may ingest contaminated food products without adequate sanitation [25]. It is possible that the prevalence of HAV among the elderly is due to low

immunity, which declines with chronological age.

The location of residence was also thought to be an important demographic factor that could influence disease transmission. Residents of Ilorin's three local governments were more likely to become infected due to poor hygiene and a lack of environmental sanitation. There was statistically significant association between location and Hepatitis A (p=0.000).

The distribution of Hepatitis A based on educational level may be due to Nigeria's high susceptibility to HAV infection and the prevailing unsanitary conditions in Ilorin, as documented by Ramazani et al. The relationship between educational level and Hepatitis A was statistically significant (p=0.000).

Previous history of blood transfusion was considered as a possible factor, and 66.7% of seropositive individuals had a positive history of blood transfusion, while 33.7% had not received blood transfusion. Unsafe blood screening can result in HAV infection, necessitating education and the inclusion of HAV screening as part of blood transfusion screening. Despite the fact that there was no statistically significant link between blood transfusion and Hepatitis A infection (p=0.392).

A history of fulminant stooling was also important in the case that some people with HAV infection are asymptomatic and can easily spread the disease to others. 66.7% of seropositive people had a history of fulminant diarrhea. The association between fulminant stooling and Hepatitis A was statistically significant (p=0.001).

5. CONCLUSION

The 1.5% prevalence rate for HAV infections recorded in this study revealed low endemicity for the Virus within the metropolis. This confirms previous reports of the downward trend in the global seroprevalence of HAV infections. Young adult (30-40 years, $P \leq 0.05$), fulminant stooling ($P<0.05$) and blood transfusion ($P \leq 0.05$) still stand out as potential risks for HAV contraction within the metropolis. There is evidence of improvement in sanitation and Health safety of public eateries within the metropolis.

CONSENT AND ETHICAL APPROVAL

Ethical approval was obtained from Kwara State Ministry of Health Ilorin (MOH/KS/EU/777/216), Informed consents, guideline and monitoring of underaged participants were taken from the parents/ guardian of same.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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