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# SEROPREVALENCE OF HEPATITIS C VIRAL INFECTION AMONG PREGNANT WOMEN IN SOBI SPECIALIST HOSPITAL ILORIN, NIGERIA

**KOLAWOLE, O. M., ADEYEMI, J. O., ANIBIJUWON, I. A., MUSA A. S.[1]**

Infectious Diseases and Environmental Health Research Group, Department of Microbiology, University of Ilorin, Ilorin, P.M.B 1515 Kwara State, Nigeria.

[1]Department of Hematology and Blood Transfusion, Sobi Specialist Hospital, Ilorin, Kwara State, Nigeria.

**Corresponding Author: omk@unilorin.edu.ng, tomak7475@gmail.com**

## ABSTRACT

Hepatitis C virus infection (HCV) is an infection of the liver. This study aimed at determining the seroprevalence and associated risk factors of HCV among pregnant women in Sobi Specialist Hospital Ilorin, Nigeria. Sera samples were obtained from 200 pregnant women were tested for the presence of antibodies to HCV using serological diagnosis. The biodata of the respondents were obtained using questionnaires. Statistical analysis was done using SPSS version 16.0. Out of the 200 pregnant women tested, 5(2.5%) of them had anti-HCV antibodies positivity. Pregnant women in the age group 30-34 years had the highest HCV prevalence rate of 21.4% (p=0.651). Socio-demographic characteristics were not significant for family type (p=0.892), marital status (p=0.687), occupation (p=0.706) and education (p=0.355). The results by risk factors were not significant among those that reported circumcision (p=0.298), blood transfusion (p=0.079), and combination of factors (p=0.351), but significant among subjects who reported history of surgery (p=0.001). Measures such as counseling, implementation and routine screening of blood before transfusion should be considered in Sobi Specialist Hospital Ilorin, Nigeria. It is highly recommended that pregnant women should be screened for HCV infection as part of the antenatal care.

**Keywords:** Hepatitis C virus, prevalence, transmission, risk factors, pregnant women, Nigeria

## INTRODUCTION

Hepatitis is the inflammation of the liver produced by autoimmune diseases, alcohol or drug abuse, genetic disorder or microbial infection. It is one of the major global health problems (Udeze *et al*., 2011). The most efficient transmission of HCV is through large or repeated direct percutaneous exposures to blood (e.g., transfusion or transplantation from infectious donors, injecting drug use) (CDC, 1998). HCV is less efficiently transmitted by mucosal exposures to blood or serum-derived fluids (e.g., birth to an infected mother, sex with an infected partner) (Terrault, 2002).

HCV transmission by inapparent percutaneous exposures have been caused by cross-contamination from re-used needles and syringes, multiple-use medication vials, infusion bags, and injecting-drug use (IDU) (Williams et al., 2004). The epidemiologic data implicating transmission from environmental sources of HCV were supported by an experimental study that demonstrated the infectivity of HCV in blood after exposure to drying and storage at room temperature (Kamili *et al*., 2007).

Hepatitis C virus (HCV) is a globally prevalent pathogen and a leading cause of death and Morbidity (Cooke *et al*., 2013). The reported estimates of disease burden showed an increase in seroprevalence over the last 15 years to 2.8%, equating to >185 million infections worldwide (Mohd *et al*., 2013). Hepatitis C virus (HCV) infection is a major global health problem. The global burden of disease estimates reported by the World Health Organization (WHO) include only burden from acute HCV infection (Global burden of disease for hepatitis C, 2004).

The reported estimates indicate that 3 to 4 million persons are newly infected each year, 170 million people are chronically infected and at risk of developing liver disease including cirrhosis and liver cancer, and 350,000 deaths occur each year due to all HCV-related causes (Perz *et al*., 2006). The prevalence of anti-HCV from population-based studies was used to compare HCV infection levels globally. Historically, countries in Africa and Asia have the highest reported anti-HCV prevalence, meanwhile, industrialized countries in North America, Western Europe, and Australia are known to have lower prevalence (Shepard *et al*., 2005). Therefore, this study aimed at finding the seroprevalence of Hepatitis C virus and predisposing risk factors among Pregnant Women in Sobi Specialist Hospital Ilorin, Nigeria.

## MATERIALS AND METHOD

**Study population**: The subjects included in this study were 200 apparently healthy, pregnant women that are between age 20-39years in Sobi Specialist Hospital Ilorin, Nigeria. The study was carried out between months of February and May, 2014. The sample size was determined using Fischer's formula (Araoye, 2003).

**Study site:** The samples were collected at the Ante-natal Clinic of Sobi Specialist Hospital Ilorin, Kwara State, Nigeria. The samples were analyzed in the Medical Microbiology and Parasitology Laboratory of University of Ilorin Teaching Hospital, Ilorin, Nigeria (UITH).

**Ethical consideration:** This research obtained an ethical clearance from the Ethical Review Committee (ERC) of the Sobi Specialist Hospital, Ilorin, from Kwara State Ministry of Health Ilorin, Nigeria, after it has met all necessary requirements of the Committee. In addition, informed consent was obtained from the participants after a clear explanation of the objectives and logistics.

**Sample collection and processing:** Five millimeter of the blood samples from each participant through the intravenous route was collected, using sterile syringes aseptically into plain bottles and allowed to clot for 1 hour, centrifuged at 3000 revolutions per minute (rpm) for 20 minutes, sera were pipette into cryovial bottles and kept in the freezer under -20$^0$C till the period of analysis. The presence of anti-HCV antibodies was determined using Enzyme Linked-Immunosorbent Assay (ELISA) kit (Rapid DIAGNOSTIC U.K). The procedures were described by the manufacturer of the kit.

**Data analysis:** Descriptive statistics such as mean, frequency, and percentage were used in the discussion of the results, in order to give a lucid representation of the data analyzed. The statistical analysis was done using SPSS (Statistical Package for the Social Sciences) software version 16.0. Otherwise non-parametric test was applied. P< 0.05 was considered significant.

**RESULTS AND DISCUSSION**

Out of the 200 pregnant women tested, 5(2.5%) had antibodies to HCV infection and on the other hand, 195(97.5%) were negative The highest prevalence of 2.8% of anti-HCV antibodies was recorded among subjects 30-34 years, followed by the subjects in the aged range 25-29 years with the prevalence of 2.7%, while subjects with the aged range 20-24 years and subjects among aged range 35-39 years had prevalence of zero percent respectively. The result showed no significant correlation with the HCV positivity (P=0.651) (Table 1).

Table 2 revealed that majority of the pregnant women tested for HCV were educated up to Secondary level with the prevalence of 2.4%. The subjects with Tertiary education had the lowest prevalence of 1.6%, subjects with primary education had prevalence of 3.1%. Meanwhile, subjects with the non-formal education had the highest prevalence of 5.0%.There was no significant association between level of education and HCV Positivity (P=0.355).

The results also showed the prevalence of 1.8% among subjects from self-employed, followed by the subjects who were civil servants with the prevalence of 1.5%. However, healthcare workers had the highest prevalence of 9.1%. The result was not significant (P=0.706) (Table 2).

The highest prevalence rate of 4.4% was observed among subjects from polygamous family and the lowest prevalence of 1.9% was found among subjects from monogamous family. The result was not significant (P=0.892) (Table 3).

Table 3 showed the prevalence of HCV infection by marital status. The highest prevalence of 5.0% was observed among subjects from divorced status, followed by the subjects with single status with the prevalence of 3.3% and the lowest prevalence of 2.0% was found among subjects from married status. Statistical analysis showed no significant association between marital status and HCV positivity (P=0.687).

Table 4 revealed the results based on the risk factors, prevalence of 5.0% was recorded among the subjects who reported blood transfusion only (P= 0.079), while 1.3% of the subjects who reported circumcision as the only risk factor tested positive to anti-HCV antibodies (P=0.298). Out of the 23 subjects that reported history of surgery, 1 tested positive to anti-HCV antibodies with the prevalence of 4.3% (P= 0.001). Out of 11 subjects who reported gravidity, 1 tested positive to anti- HCV antibodies, with the prevalence of 9.1% (P=0.249) and prevalence of 1.5% was recorded among the subjects that reported a combination of factors (P= 0.351).

**Table 1: Prevalence of HCV by ages of the respondents**

| (%) | Number tested | Positive (%) | Negative (%) | P value |
|---|---|---|---|---|
| **Age (Years)** | | | | |
| 20-24 | 8(4.0) | 0(0) | 8(4.0) | 0.651 |
| 25-29 | 110(55.0) | 3(2.7) | 107(53.5) | |
| 30-34 | 70(35.0) | 2(2.8) | 68(34.0) | |
| 35-39 | 12(6.0) | 0(0) | 12(6.0) | |
| TOTAL | 200(100.0) | 5(2.5) | 195(97.5) | |

P<0.05 is statistically significant

**Table 2: Prevalence of HCV by Level of Education and occupation of the subjects**

| | Number tested (%) | Positive (%) | Negative (%) | P values |
|---|---|---|---|---|
| **Level of Education** | | | | |
| Tertiary | 63(31.5) | 1(1.6) | 62(31.0) | 0.355 |
| Secondary | 85(42.5) | 2(2.4) | 83(41.5) | |
| Primary | 32(16.0) | 1(3.1) | 31(15.5) | |
| None | 20(10.0) | 1(5.0) | 19(9.5) | |
| **Total** | **200(100.0)** | **5(2.5)** | **195 (97.5)** | |
| **Occupation** | | | | |
| Self Employed | 110(55.0) | 2(1.8) | 108(54.0) | 0.706 |
| Civil Servants | 68(34.0) | 1(1.5) | 67(33.5) | |
| Healthcare Workers | 22(11.0) | 2(9.1) | 20(10.0) | |
| Total | 200(100.0) | 5(2.5 | 195(97.5) | |

P<0.05 is statistically significant

**Table 3: Prevalence of HCV by Family type and Marital status of the respondents**

| (%) | Number tested (%) | Positive (%) | Negative | P values |
|---|---|---|---|---|
| **Family type** | | | | 0.892 |
| Polygamous | 45(22.5) | 2(4.4) | 43(21.5) | |
| Monogamous | 155(77.5) | 3(1.9) | 152(76.0) | |
| Total | 200(100.0) | 5(2.5) | 195(97.5) | |
| **Marital status** | | | | 0.687 |
| Single | 30(15.0) | 1(3.3) | 29(14.5) | |
| Married | 150(75.0) | 3(2.0) | 147(73.5) | |
| Divorced | 20(10.0) | 1(5.0) | 19(9.5) | |
| Total | 200(100.0) | 5(2.5) | 195(97.5) | |

P<0.05 is statistically significant

**Table 4: Relationship between risk factors and HCV seropositivity in the subjects**

| Risk factors (%) | Number tested | Positive (%) | Negative | P values |
|---|---|---|---|---|
| Blood transfusion only | 20(10.0) | 1(5.0) | 19(9.5) | 0.079 |
| Circumcision only | 78(39.0) | 1(1.3) | 77(38.5) | 0.298 |
| History of surgery | 23(11.5) | 1(4.3) | 22(11.0) | 0.001 |
| Gravidity | 11(5.5) | 1(9.1) | 10(5.0) | 0.249 |
| Combination of factors | 68(34.0) | 1(1.5) | 67(33.5) | 0.351 |
| Total | 200(100.0) | 5(2.5) | 195(97.5) | 0.978 |

P<0.05 is statistically Significant

## DISCUSSION

This study on the seroprevalence of HCV infection among the pregnant women in Sobi Specialist Hospital Ilorin, Nigeria, revealed that out of the 200 pregnant women tested, 5(2.5%) had antibodies to HCV infection and 195(97.5%) were negative. The overall prevalence rate of HCV infection in sub-Saharan Africa is 3.0%. The Central African region has the highest prevalence rate of 6%, West Africa has prevalence rate of 2.4%, and Southern and East Africa with the lowest estimated prevalence rate of 1.6% (Madhava *et al*., 2002).

The seroprevalence rate of 2.5% obtained in this study is also lower to the 5.3% reported for the whole African region by W.H.O, (1999). The prevalence of 2.5% obtained in this study is also lower to the 8.0% reported for the students of the University of Ilorin (Udeze *et al*., 2011). The prevalence of 2.5% obtained for HCV in this study is higher than the prevalence of 2.0% among general population in Nigeria reported by Oni and Harrison (Oni and Harrison, 1996) and 1.39% by Esan *et al*. (2014).

Also, a lower prevalence of 1.2% was recorded among general population in Tanzania (Tess *et al*., 2000). This is also lower than the prevalence of 9.0% reported among Brazilian street youths (Regina et al, 1995) and prevalence of 11.0% reported among the healthy Doctors and Dentists in University College Hospital Ibadan, Nigeria (Olubuyide *et al*., 1997).

In this study, the highest prevalence of 2.8% of antibodies to HCV was observed among the subjects 30-34 years, followed by 25-29 years (2.7%). The lowest prevalence rates were found among participants with age 20-24 years and 35-39 years with prevalence of zero percent respectively. The higher prevalence rates observed among age groups 25-29 years and 30-34 years might be as a result of their sexual activity and fertility in these age groups (25-34 years).The result was not statistically significant (p=0.651). This agrees with the work of Osmond, (1994).

A large number of respondents in this study 85(42.5%) tested for HCV infection had secondary education with prevalence of 2.4%, followed by tertiary education with the prevalence of 1.6% and subjects from primary education had prevalence of 3.1%. The highest prevalence rate was observed among subjects from non-formal education 5.0%.This was not significant (p=0.355).This is in agreement with the work reported by Oladeinde *et al*. (2013). This may be due to their lack of knowledge about the possible modes of transmission of the infection.

Most of the participants in this study 155(77.5%) fell among monogamous family and had prevalence of 1.9%. However, subjects with the polygamous family had the highest prevalence of 4.4% of antibodies to HCV infection. The result was not significant (p=0.892).This is in contrast to the work done by Udeze *et al*. (2011). The reason for higher prevalence among subjects with the polygamous family may be due to extra-marital affairs, sharing of razors, toothbrush, and clippers that might have been infected with the virus.

Majority of the respondents tested 150(75.0%) for HCV infection were married and had prevalence rate of 2.0%. The subjects that are singles had prevalence of 3.3%. However, the subjects from divorced status had the highest prevalence rate of 5.0%, but not significant (p=0.687).This agrees with the work done by Oladeinde *et al.* (2013). The higher prevalence rates might be as a result of practicing manicure and pedicure or heterosexual partner.

The results by occupation showed prevalence of 1.8% among subjects from self-employed, while the subjects who were civil servants had prevalence of 1.5% and subjects from healthcare workers had the highest prevalence of 9.1%. This was not statistically significant (p=0.706). The higher prevalence rates observed may be due to the fact that self-employed women and civil servants are expose and interact with different opposite sex that can lead to having heterosexual partners, while healthcare workers are liable to have contact with unsterilized instruments and blood. This supports the work done by Olubuyide *et al*. (1997).

In this study, the results by risk factors showed that 1.3% of those who reported history of circumcision only tested positive to antibodies to HCV, but not significant (p=0.298). This is emphasizing the importance of this mode of transmission. This correlates with the work by Egah *et al*. (2004). However, prevalence rates of 5.0% and 4.3% were observed among the subjects who reported history of blood transfusion and history of surgery respectively. The result was not significant for history of blood transfusion, but significant for the history of surgery (p=0.079, p=0.001 respectively). These findings therefore underscore the appropriate need for proper and adequate sterilization of surgical instruments before use on the patients as well as routine screening of blood before transfusion. Meanwhile, the highest prevalence of 9.1% was observed among subjects who reported gravidity. This was not significant (p=0.249). This concurs with the work done by Khattak et al. (2009). However, the prevalence of 1.5% was observed among subjects who reported multiple risk factors of HCV transmission (p=0.351). This may indicate that there is increased rate of transmission with multiple risk factors of transmission.

## CONCLUSION

Conclusively, the study confirmed the presence of Hepatitis C virus infection in Ilorin, Nigeria and specifically among pregnant women in Sobi Specialist Hospital Ilorin, Nigeria. Adequate management of maternal hepatitis during the pre-natal stage ensures better results in the infants; therefore screening of pregnant women for hepatitis C virus is highly important in order to identify those neonates at risk of transmission.

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