

# PREVALENCE OF HEPATITIS B AND C INFECTIONS AMONG PREGNANT WOMEN AT DALHATU ARAF SPECIALIST HOSPITAL LAFIA, NASARAWA STATE NIGERIA

## Abstract

Hepatitis infections are global public health concern more especially hepatitis B virus (HBV) and hepatitis C virus (HCV) infections which can easily be transmitted from mothers to newborn babies through contact with body secretions. This research was conducted to investigate the prevalence of Viral Hepatitis B and C infections among pregnant women in Dalhatu Araf Specialist Hospital Lafia, Nasarawa State. Cross sectional study design was carried out from **January 2017 to December 2017** among 374 pregnant women. Blood sample was collected from each pregnant woman and screened using enzyme-linked immunosorbent assay (ELISA) kit produced by Nantong Diagnos Biotechnology Co., Ltd., China. Overall prevalence infections of viral hepatitis B and C among the participant was 35(9.4%) and 18(4.8%) respectively. Hepatitis B prevalence was higher than Hepatitis C ( $P>0.05$ ). Some of the pregnant women were found to be multi-gravida patients ranged from 20-29 years of age with prevalence of 9.6% HBV and 5.1% HCV ( $P>0.05$ ). The findings of this research suggest need to initiate public awareness to reduce disease load and transmission; immunization to all pregnant women and their newborn babies.

**Key words:** HBV, HCV, antenatal, pregnant women.

## Introduction

Hepatitis B viral infection has infected more than one-third of the global population. It has been estimated that up to 360 million people live with chronic HBV [7], while some of people who have been infected with HBV are unaware of the infection, they face the possibility of developing debilitating or fatal liver disease at some point in their life and unknowingly transmitting the infection to others.

Hepatitis B can be transmitted horizontal through intimate contact, blood transfusion[1, 24], transplantation and tattooing, nosocomial transmission [23] and can also transmitted vertically from mother to fetus newborn baby during pregnancy, labor or breastfeeding[1, 21]. Hepatitis B vertical transmission incident cases globally are about 35% - 40% [15]. Half of the people live with HBV have contacted the infection during perinatal and early childhood and the condition of chronicity of the virus greatly depends on the route of transmission and the age of acquisition and is high among newborn infants who contacted through vertically transmission [8, 15]. Acute hepatitis B viral infection in the early pregnancy is associated with risk of perinatal transmission [24], infection with the HBV close to delivery or during delivery may likely infect up to or more than 60% of newborn infant [17]. Neonatal hepatitis B infection usually occurs with increased risk of liver disease in later life and is often asymptomatic in early stage of infection. Vertically hepatitis B virus infected children are 200 times risk of developing liver cancer than that of general population [2,18].

Hepatitis C viral infection affected millions of people each year and is a global public health concern [4]. Chronic and acute hepatitis C viral infection usually leads to the development of liver cancer, cirrhosis and even death of infected patients [6].

The vertical transmission of hepatitis C infection prevalence during pregnancy ranged from 1 to 8% worldwide [3], therefore, vertical transmission (mother-to-infant) of hepatitis C infection prevention is very

important [14]. Hepatitis C virus can be transmitted during delivery and can also be transmitted through intravenous drug use or blood product transfusion and transmission during sexual intercourse [30, 31].

Maternal transmission of hepatitis C infection during pregnancy occurs usually with maternal complications such as premature delivery, separation of placenta, heavy vaginal bleeding, premature rupture of membranes and death [22, 23]. Maternal transmission of hepatitis C infection can also occur with high risk of neonatal hepatitis that can lead to serious liver conditions (liver cirrhosis and hepatocellular carcinoma) in young adults [4]. In addition, newborn baby to infected women with hepatitis C infection are at risk of poor weight, premature delivery, and congenital anomaly [9]. This study aims to investigate the prevalence of Hepatitis B and C infections among pregnant women in Dalhatu Araf Specialist Hospital Lafia, Nasarawa State. The findings of this study will aid concerned bodies to provide adequate estimate of the problem toward a better understanding of hepatitis B and C epidemiology, and screening of hepatitis B and C during antenatal care, and to initiate public awareness to reduce disease load and transmission, encourage free immunization of the pregnant women and their newborn infants should be included in their antenatal care.

## **Materials and Methods**

This study was carried out in Lafia, Nasarawa state capital among pregnant women attending antenatal care at Dalhatu Araf Specialist Hospital Lafia. Nasarawa state fondly called ‘Home of solid minerals.

### **Sample size**

A total of three hundred and seventy four (374) pregnant women were sampled as determined using the sample size calculator of Krejcie and Morgan [32].

### **Sample Collection**

5mL of blood sample was collected from each pregnant woman through venipuncture, dispensed into serum separator tubes, allowed to clot and centrifuge at a relative centrifugal force (RCF) of 1,500 revolutions per minutes (rpm) for 5 minutes to obtain serum.

### **Laboratory Analysis**

Hepatitis B surface antigen (HBsAg) and hepatitis C virus (HCV) was detected using an enzyme-linked immunosorbent assay (ELISA) kit produced by **Nantong Diagnos Biotechnology Co., Ltd.**, China which has relative sensitivity and relative specificity of 99.9 and 99.0% respectively. The 99.9 and 99.0% for sensitivity and specificity are declared figures of the company which are equivalent to commercial figures. The enzyme-linked immunosorbent assay (ELISA) kit used has in-built controls. The manufacturer’s instruction was highly observed accordingly. The positive results were reported as positive.

### **Statistical Analysis**

Data was subjected to descriptive and inferential statistical analysis using SPSS version 20. The prevalence of each viral infection (HBV and HCV) was determined from the proportion of the reactive individuals in the total population under consideration and was express as a percentage. A comparison of the frequency was analyzed using the Chi- square test and at ( $P > 0.05$ ) was considered statistically not significant

## Results

**Table 1: The overall prevalence of Viral Hepatitis B and C in Pregnant Women**

HCV had 4.8% and HBV 9.4% prevalence rate, HCV infection prevalence is lower than HBV in this study as reported in Table 1.

Hepatitis	Number Tested	Number Positive (%)
HBsAg	374	35(9.4)
Anti- HCV	374	18(4.8)

$$\chi^2 = 1.58,$$

**Table 2: Hepatitis B and C in pregnant women based on age**

The age-related prevalence of HBV and HCV showed that age group 20-29 years had highest prevalence of 9.6% HBV and 5.1% HCV. Pregnant women >19 years had 9.2% HBV and 4.6% HCV; 30-39 years had 9.1% HBV and 5.1% HCV. The least prevalence of 8.3% HBV and 5.1% HCV was observed among pregnant women aged 40-49 years as shown in Table 2.

Age	Number tested	HBsAg Positive (%)	Anti-HCV Positive (%)
>-19	65	6(9.2)	3(4.6)
20 – 29	198	19(9.6)	10(5.1)
30 – 39	99	9(9.1)	5(5.1)
40 – 49	12	1(8.3)	0(0)
Total	374	35(9.4)	18(4.8)

**Table 3: Hepatitis B and C Based on Family Background**

The prevalence of HBV and HCV based on family background shown that monogamous women had higher prevalence of HBV and HCV, 9.5% HBV and 5.2% HCV than their polygamous counterpart 9.2% HBV and 4.8% HCV.

Family background	Number tested	HBsAg Positive (%)	Anti-HCV Positive (%)
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Monogamy	211	20(9.5)	11(5.2)
Polygamy	163	15(9.2)	7(4.3)
Total	374	35(9.4)	18(4.8)

**Table 4: Some of the Risk Factors of hepatitis B and C among pregnant women**

Hepatitis B and C among pregnant women based on associated risk factors shown that blood transfusion had 11.1% HBsAg and 8.8% HCV out of employed 45 pregnant women tested and, history of surgery had 9.8% HBsAg and 14.6% HCV with 41 pregnant women tested and, contraceptive use had 11.5% HBsAg and 8.9% HCV out of 78 pregnant women tested, Previous history of hepatitis had 33.3% HBsAg and 22.2% HCV with 9 pregnant women tested, herbal medicine use had 9.8% HBsAg and 9.3% HCV with 214 pregnant women tested, alcoholic consumption had 14.3% HBsAg and 0% HCV with 14 pregnant women tested. No significant difference between the risk factors.

Risk factors	Number Tested		HBsAg Positive (%)		Anti-HCV Positive (%)	
	Yes	No	Yes	No	Yes	No
Blood transfusion	45	329	5(11.1)	30(9.1)	4(8.8)	31(9.4)
History of surgery	41	333	4(9.8)	31(9.3)	6(14.6)	29(8.7)
Contraceptive use	78	296	9(11.5)	26(8.8)	7(8.9)	28(9.5)
Previous history of hepatitis	9	365	3(33.3)	32(8.8)	2(22.2)	33(9.0)
Herbal medicine use	214	160	21(9.8)	14(8.8)	20(9.3)	15(9.4)
Alcoholic consumption	14	360	2(14.3)	33(9.2)	0(0)	35(9.7)

$$\chi^2 = 2.0767, 8.211$$

## Discussion

Prevalence of viral hepatitis B and C infections varies in different parts of the world. There are regional and population specific variations within the same country. This study revealed 9.4% HBV and 4.8% HCV prevalence among pregnant women attending antenatal care at Dalhatu Araf Specialist Hospital Lafia, Nasarawa State. This finding implies that pregnant women are at high risk of HBV and HCV infection, thus the need for HBV and HCV screening during antenatal care services. The result agreed with the report

that Nigeria as highly endemic area with prevalence greater than 8% HBV [29] and is in agreement with prevalence of 6–25% in the WHO African region.

Hepatitis B infection prevalence was higher in this study compared to 7.3% prevalence reported in Kano among pregnant women [10]. In contrast it was less compared to 21.3% reported in Ibadan [21], 23.9% and 15.1% in two studies reported in Jos [13, 28]. The HCV infection prevalence of 4.8% in this study was found to be lower compared with other studies in Nigeria such as Enugu, Jos and Kaduna with 14.9% [11], 5.2% and 11.9% [26]. The deviation in findings with others studies may be due to different methods for detection of the viral infections.

Majority of the women attending antenatal care fall within the 20–29 years followed by 30–39 age groups because this was the majority age group admitted to the antenatal clinic of the hospital. Hepatitis B and C viral infections prevalence was highly recorded in monogamous family and this may be because of multiple sexual life of monogamous likely to acquire the viral infections than polygamous. This finding correlate high prevalence in commercial sex workers as published in other studies [20]. In this study some of the pregnant women were found to be multi gravida patients and this might be at increased risk because of their past pregnancies experience, blood transfusion and/or any surgical procedure in the past. The findings in this study agreed with other studies published by Awan *et al* in 2006 and Ali and Memon in 2007.

Enzyme-linked immunosorbent assay (ELISA) kit produced by **Nantong Diagnos Biotechnology Co., Ltd.**, China is designed for the qualitative and quantitative determination of HbsAg and HCV in human serum or plasma in accordance with manufacturer's instruction, this was used for detection of HBV and HCV infection among participants because is rapid and not expensive. It has been reported by so many authors that ELISA Kit is a best alternative to be used for screening of HBV and HCV in countries where there is low income [16, 28]. Hepatitis B and C viral infections prevalence reported in this study is of great concern. Effective screening for pregnant women who are childbearing and treatment service, kept clear of transfusion of contaminated blood and create awareness are all required to improve their health status.

## Conclusion

Hepatitis B and C prevalence of 9.4% and 4.8% was recorded. Hepatitis C infection is less than hepatitis B infection. **Pregnant women are at high risk of HBV and HCV infection,** hence there is need to initiate public awareness to reduce disease load and transmission, encourage free immunization of the pregnant women and their newborn infants should be included in their antenatal care in the hospital to prevent vertical transmission (mother to child) infection by their infected mothers.

## DISCLAIMER:

**Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.**

## Ethical approval And Consent:

Ethical clearance was obtained from Dalhatu Araf Specialist Hospital Lafia prior to the commencement of the study. Informed consent was also obtained from each participant.

## References

1. Alavian S.M, Hajarizadeh B, Ahmadzad- ASL M, Kabir A, and Bagheri-Lankarani K (2008) Hepatitis B virus infection in Iran: A Systematic Review *Hepat Mon* 8(4): 281-94.
2. Ali, H.S., Memon, M.A. (2007). Prevalence of Hepatitis B infection in pregnant women in a tertiary care hospital. *Journal of Infectious Disease Pakistan*.2:35–38.
3. Arshad M. Elkamary S.S and Jhaveri (2011). Hepatitis C virus infection during pregnancy and the newborn period. *J of Viral Hepatitis* 18(4) 229-236.
4. Averhoff, F.N., Glass N, and Holtzman D (2012). Global Burden of Hepatitis C: Considerations for Healthcare Providers in the United State, *Clinical Infectious Diseases*. 55(1): 10-15.
5. Awan, S.N., Nayyar,S., and Ashraf, N. (2006).Obstetrics and perinatal outcome; Risk factors for Hepatitis B and C transmission. *Professional Medical Journal*, (13)511–516.
6. Blach S, Zenzem S, and Manus M (2017). Global Prevalence and genotype distribution of hepatitis C virus infection. *The Lancet Gastroenterology and Hepatology*. 2(3) 161-176.
7. Black A.P, Nouanthong P, Nauthavong N, Sauvannaso C, Vilivong K, and Jutavijittum P (2014). Hepatitis B virus in the Lao People’s Democratic Republic: a cross-sectional serosurvey in different cohorts (14) 457.
8. Bzowej N.H (2010). Hepatitis B Therapy in pregnancy *Curr Hepat Rep*. 9(4) 197-204.
9. Connell L.E, Salihu H. M, Salemi, J. L, August, E. A., Weldeselasse, H. and Mbah, A. K (2011) “Maternal hepatitis B and hepatitis C carrier status and perinatal outcomes”. *Liver International* 31(8) 1163-1170.
10. Dawaki, S. S and Kawo, A.H. (2006). Seroprevalence of Hepatitis B surface antigen (HBsAg) in pregnant women attending an urban maternity hospital in Kano, Nigeria. *Nig J Microbiol*.20:Pp705–709.
11. Ebie, J.C. and Pela, O.A. (2006). Some socio-cultural aspects of the problem of drug abuse in Nigeria. *Drug Alc Dep*.8: 301–306.
12. Egah, D.Z., Banwat, E.B and Audu, E.S. (2007). Hepatitis B surface antigen, Hepatitis C and HIV antibodies in a low risk blood donor group, Nigeria. *East Med Health J*.13: 211–215.
13. Ejele, Q. and Ojulu, A. (2004). The prevalence of Hepatitis B surface antigen among prospective blood donors and patients in Portharcourt, Nigeria. *Niger Med*. (13) 336–338.
14. Essan A.J, Omisakin C.T, Ojo-bola T., Owoseni M.F, Fasakin K.A and Ogunleye A.A (2014). Seroprevalence of Hepatitis B and C Virus Co-infection Among Pregnant Women in Nigeria. *American Journal of Biomedical Research*. 2(1) 11-15.
15. Fernandes C.N, Alves Mde M, de Souta ML, Machado GA, Couto G and Evangelista RA (2014) prevalence of seropositivity for Hepatitis B and C in pregnant women. *Rev Esc Enferm USP*. 48(1):91-8
16. Hayder, I., Ahmed, W. and Alam, S.E. (2012) Comparison of Different ICT Kits for HBsAg and Anti HCV Using Gold Standard ELISA. *Pakistan Medical Journal*, 51(3),72–6.
17. Jonas M.M. (2009). Hepatitis B and pregnancy: an underestimated issue *Liver Int* 29: 133-9.

18. Luka, S.A., Ibrahim, M.B, and Iliya, S. (2008). Seroprevalence of Hepatitis B surface antigen among pregnant women attending antenatal clinic in Ahmadu Bello University Teaching Hospital Zaria. *Nig J Paras.*29:38–41.
19. Maurenen Jonal M. (2009). Hepatitis B Pregnancy: Underestimated Issue. *Liv Int.* (1) 33-139
20. Otegbayo, J.A., Fasola F. O., and Abaja, A. (2003).Prevalence of Hepatitis B surfaceantigen (HBsAg) and Hepatitis B envelope antigens (HBeAg), risk factors of viral acquisition and transminase among blood donors in Ibadan, Nigeria. *Tropical Gastroenterology*, (24), 217–226.
21. Poro Lujaj J and Majdtadeh R (2009). Prevalence of chronic Hepatitis B infection in Iran. *Iran J. Epidemiology* 4(3): 1-8.
22. Reddick K. L. B, Jhaveri R, Gandhi M, James A. H and Swamy G. K (2011). Pregnancy outcomes associated with viral hepatitis, *journal of viral hepatitis* 18 (7) 394-398.
23. Safir A., Levy A., Sikuler, E and Sheiner E. (2010). “Maternal hepatitis B virus on hepatitis C carrier status as an independent risk factor for adverse perinatal outcome”. *Liver International.* 30(5). 765-770.
24. Saraswathi K.S and Aljabri F (2012). The study of prevalence of Hepatitis B surface antigen during pregnancy in tertiary care hospital, South India. *Der Pharmacial Lettre.* 4(3): 983-5.
25. Sookoian S (2006). Liver disease during pregnancy: acute viral hepatitis. *Ann Hepatol* 5(3): 231-6.
26. Strickland, G.T. (2002). Hepatitis C in developing countries. *Postgrad Doc (Africa).*24:18–20.
27. Tomar, S., Chourey, P., Urhekar, A.D.,and Kore, A. (2012). Study of Incidence of Hepatitis B and A Comparative Study to Check the Specificity and Sensitivity of Immunochromatographic Technique CT with Enzyme Linked Immunosorbant Assay (ELISA) for Hepatitis B Infection, 341-346.
28. Uneke, C.J., Ogbu, O.and Iyama, P.U. (2005). Prevalence of HBsAg among blood donors and HIV-infected patients in Jos, Nigeria. *Afr Health;* 5:58–59.
29. World Health Organization (2012). Prevention and control of viral hepatitis infection; framework for global action, World Health Organization, Geneva, Switzerland.
30. World Health Organization (2015). Hepatitis C: Fact Sheet No. 164.
31. World Health Organization (2017). Organization Hepatitis B Factsheet, World Health Organization, Geneva, Switzerland.
32. Krejcie and Morgan (1970). Determining sample size for research activities. *Educational and Psychological Measurement*,30:607-610

