



Review Article

Seroprevalence of Hepatitis B and Hepatitis C viral infections in pregnant women attending antenatal clinic in Tertiary care centre

Neha Goel^{1,*}, Rupali Sharma², Ritu Agarwal³

¹Dept. of Microbiology, GS Medical College and Hospital, Ghaziabad, Uttar Pradesh, India

²Dept. of Obstetric & Gynaecology, G. S. Medical College and Hospital, Ghaziabad, Uttar Pradesh, India

³Dept. of Microbiology, G. S. Medical College and Hospital, Ghaziabad, Uttar Pradesh, India



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ABSTRACT

Background: Hepatitis B and Hepatitis C are one of the two major viruses causing serious maternal and fetal complications in all the pregnant women with high mother to child transmission rates causing a severe disease burden on the society as well.

Aims: The study aimed at identifying the seroprevalence & sociodemographic factors associated with HBV and HCV positive pregnant women.

Materials and Methods: A total of 9628 pregnant women attending the antenatal clinic of the institute from a period of one year were screened for HCV and HBV infections through rapid kit followed by confirmation with ELISA. Details were noted in a preset proforma and data thus analysed by SPSS VERSION 10.

Result: Seroprevalence rate of HBV was found to be 0.72% and that of HCV was 1.25%. Most of them were asymptomatic and unaware of the infection. The mean age of women with HBV infection was 27.89 and that of HCV was 25.7.

Majority of them were multiparous and belong to rural areas.

Conclusion: The prevalence of HCV is more than that of HBV among antenatal women.

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1. Introduction

Hepatitis-B (HBV) and Hepatitis-C (HCV) infections are one of the two most common chronic viral infections of concern documented worldwide.¹ Hepatitis B virus (HBV) is turning out to be a global epidemic, with a global estimate of more than two billion people being infected with it and 350 million people remaining infected chronically and 1.5 million deaths worldwide.² The world health organization (WHO) estimates that 3% of the world's populations are chronically infected with HCV.³ The mode of transmission of hepatitis B virus (HBV) is when one comes in contact with the blood or other body fluids (i.e. Semen, vaginal fluid and saliva) of an infected person, while the hepatitis c virus (HCV) is spread

through direct contact with infected blood. Very rarely it can also be passed on through other body fluids.⁴ Transfusion of infected blood or blood products, unsafe therapeutic injections, sexual transmission, occupational (needle – stick) injuries or nosocomial transmission during healthcare related procedures such as surgery, haemodialysis and organ transplantation are a few sources with highest risks to infection.⁵ Many people infected with hepatitis B or C rarely displays any symptom, although they can still transmit the virus to other.⁴

Viral hepatitis during pregnancy is associated with high risk of maternal and fetal complications. It is a leading cause of maternal mortality and jaundice in pregnancy. There is a high rate of vertical transmission causing fetal and neonatal hepatitis which can have serious effects on the neonate, leading to impaired mental and physical health.⁶ Other complications include low birth weight and

* Corresponding author.

E-mail address: nehagoel211@gmail.com (N. Goel).

premature delivery, antepartum haemorrhage and preterm delivery during chronic phase.⁷ Peri-natal transmission of this disease occurs if the mother has had acute hepatitis b infection during late pregnancy, in the first postpartum or if the mother is a chronic HBsAg carrier.⁸ Hepatitis c transmission occurs predominantly around time of delivery and pregnancy.⁹ The basic epidemiological data for these viruses might be of great importance to the health programmers, so as to initiate the relevant vaccine and screening tests in the antenatal clinics.¹⁰ Thus, the current study is aimed at investigating the prevalence and the possible risk factor profile for hepatitis B and C viruses among antenatal women.

2. Materials and Methods

In this retrospective study all the serum samples received in the Microbiology laboratory from the department of Obstetrics & Gynaecology of the institute were analysed for a period of one year i.e January'2019 to December' 2019. All the pregnant women attending the ANC clinic were screened for HBsAg (as a marker for HBV) and anti-HCV antibodies (as a marker for HCV) by rapid diagnostic test kits first later to be confirmed by enzyme linked immunosorbent assay (ELISA). Women of age 18 years and above with variable gestational age and parity were included in the study. Those previously vaccinated for HBV were excluded from the study. A predesigned proforma keeping in mind various socio-demographic factors for collecting information from antenatal women testing seropositive were used. Data collected was entered in MS excel and analyzed using SPSS version 10.

3. Result

Out of the 9628 pregnant women attending ANC clinic in the institute a total of 121 were found to be positive for anti-HCV antibody and 70 for HBsAg with a seroprevalence of 1.25% and 0.72% respectively. Mean age of HBV positive women was 27.89 and that of HCV was 25.7. Majority of the HBV positive women (44.3%) were in the age group of 25-30 years and HCV positive (55.8%) were in the age group 18-25 years. Among all the HBV positive women, 19 (27.14%) were primipara and 51(72.85%) were multipara. More multiparous women 73(60.32%) were positive for HCV also compared to primiparous which was 48(39.6%). Majority of women positive for HBV and HCV belonged to muslim population 59(84.2%), 85(70.2%) followed by hindu 9(12.8%), 34(28.09%), sikh nil, 1(0.82%) and Christians 2(2.85%), 1(0.82%) in minority. We also observed 95(78.51%) women positive for HCV belonged to rural population while 26(21.48) were from urban areas, with a similar observation in HBV positive women i.e 41(58.57%) from rural and 29(41.42%) from urban population (Table ??) with very few of them attending

formal schooling and most of them being housewives. Co-infection with HIV was at a moderate level with 1(1.42%) women positive for HBsAg and 2(1.65%) for anti-HCV. There was only 1 case with dual infection of both HBV and HCV.

4. Discussion

HBV is the world's one of the most common causes of life-threatening liver disease and deaths associated with it, particularly in developing countries.^{11,12} it has been reported that 10%–20% HBsAg positive pregnant women transmit the virus to their neonates¹³ in highly endemic areas, up to 75% of chronic carriers acquire the infection through mother to child transmission.¹⁴ the seroprevalence of hepatitis b amongst pregnant women in our study was 0.72% which is comparable to the seroprevalence reported by Dwivedi et al.,¹⁵ (0.9%) but very low as compared to the studies by Bakthavatchalu et al., (7.8%),¹⁶ Khakhkar et al., (3.07%)¹⁷ and Paranjothi et al., (5.1%).¹⁸ chronic HCV infection is also a major public health problem all over the world, accounting for most cases of viral hepatitis in adults.¹⁹ most young women with chronic hepatitis c have no signs or symptoms of liver disease. The prevalence of HCV in our study is 1.25% while that among women of childbearing age in the is approximately 1%²⁰ which is also similar to the seroprevalence reported by Ashok et al (1.03%)²¹ but very low as compared to that reported by Farhana s. Et al (3.44%)⁵ and Goyal I.d. et al (2.8%).²² While in India the seroprevalence rate of HCV antibodies among pregnant women is from 0.6 to 1.4% which also coincides with our study.^{21,23,24} according to the national centre for disease control (NCDC) and who grouping, the prevalence of HBV and HCV is categorized and graded as low (<2% for HBV and <1.5% for HCV), intermediate (2%–7% for HBV and 1.5%–3.5% for HCV) and high endemicity (\geq 8% for HBV and $>$ 3.5% for HCV).^{25,26} thus the prevalence of HBV (0.72%) and HCV (1.25%) infections found in the present study can be categorized as low endemicity, respectively. The prevalence of HBV(25.7%) was more in age group of 25-30 years which is comparable to the study by F.walle et al²⁷ whereas the prevalence of HCV(55.3%) was more in age group of 18-25 years mostly in multiparous women which is very similar to studies by Goyal I.d. et al (45%)²² Rudrapathy et al (52%),²⁸ Farhana et al (49%)⁵ and Ashok et al (51.2)²¹ this can be attributed to the history of past pregnancies, obstetric procedures and previous blood transfusions also most of the them belong to rural muslim population and haven't received any sort of formal education which is again similar to study by m. Kew et al²⁹ where most seropositive women were from rural population.as seen in this study HBV/HCVco-infection among HBV and HCV seropositive pregnant women was 0.01% with just 1 women positive for both HBV and HCV, this is similar to study in Nigeria

Table 1: Frequency distribution of Socio-demographic variables

Age (Year)	No. of Cases		Percentage of Cases	
	HBV +ve	HCV +ve	HBV +ve	HCV +ve
18-25	18	67	25.7	55.3
25-30	31	25	44.3	20.6
30-35	15	21	21.4	17.3
>35	06	08	8.4	6.6
Mean (SD)		27.89		25.7
Parity				
Primipara	19	48	27.1	39.6
Multipara	51	73	72.8	60.3
Residence				
Rural	41	95	58.5	78.5
Urban	29	26	41.4	21.4
Religion				
Hindu	09	34	12.8	28.09
Muslim	59	85	84.2	70.21
Sikh	0	1	0	0.82
Christian	2	1	2.85	0.82

by B.V Oti et al³⁰ where no women was coinfectd with both the virus. The overall HCV-HIV co-infection is 1.65% which is comparable to study by M. Seid et al³¹ but lower than study by M. Muriuki et al³² with a rate of 10.3%. Approximately 7-8 per cent of hepatitis c virus-positive women transmit hepatitis c virus to their off springs with a higher rate of transmission seen in women co-infected with HIV.³³ regarding HBV/HIV co-infection in the present study, the prevalence of co-infection was 1(1.42%) which is similar to a study by Zenebe et al³⁴ with 1.3% co-infection rate and Noubiap et al³⁵ with a prevalence rate of 1.5%. in contrast was a study by Ochola, et al³⁶ with a very high co-infection rate of 4.9%. The similarity in the HBV and HIV co-infection rate is due to the shared mode of transmission, while the differences are because of the prevalence rates of HBV and HIV co-infection varies worldwide depending on the geographic regions and risk groups.³⁷ As vertical transmission is responsible for majority of HBsAg infections it may be enough if we screen all antenatal women and give combined immunization and immunoprophylaxis to the high risks infants born to the seropositive mothers. However in a country like India where a large number of deliveries are still non-institutional this high risk strategy might not be possible.

5. Conclusion

The prevalence of HBV is comparatively low as compared to the prevalence of HCV thus identification of HCV infection here poses a greater public health problem. Since most pregnant women attending the antenatal clinic in the institute are asymptomatic and clinically disease-free, they might not be aware of the fact that they are infected and are capable of transmitting the infection to their newborns.

Therefore, only targeted screening is not sufficient, devising a universal screening policy for all the antenatal women is a must to reduce maternal complications and mother to child transmission of such disease.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Soriano V, Barreiro P, Nuñez M. Management of chronic hepatitis B and C in HIV-coinfected patients. *J Antimicrob Chemother.* 2006;57(5):815–8.
2. World Health Organization. Hepatitis B [Internet]. Fact sheet N°204.; 2015. Available from: <http://www.who.int/mediacentre/factsheets/fs204/en/>.
3. Schiff E. Hepatitis Central, Current information on Hepatitis C and treatment for medical profession. *Uni Miami.* 2002;p. 1–2.
4. Ahmad I, Khan SB, Rahman HU, Khan MH, Anwar S. Frequency of Hepatitis B and Hepatitis C among cataract patients. *Gomal J Med Sci.* 2006;4:61–64.
5. Shaikh F, Qaiser HNS, Kousar J, Memon RAD. Prevalence and risk factors for hepatitis c virus during pregnancy. *Gomal J Med Sci.* 2009;2:86–8.
6. Hill J, Sheffield J, Kim J. Risk of hepatitis B transmission in breast-fed infants of chronic hepatitis B carriers. *Gynecol Obstet.* 2002;99:1049–52.
7. Cui AM, Cheng XY, Shao JG. Maternal hepatitis B virus carrier status and pregnancy outcomes: A prospective cohort study. *BMC Pregnancy Childbirth.* 2016;16(1).
8. Levy M, Koren G. Hepatitis B Vaccine in Pregnancy: Maternal and Fetal Safety. *Am J Perinatol.* 1991;8(03):227–32.
9. World Health Organization. Global surveillance and control of hepatitis C. Report of a WHO Consultation organized in collaboration with the Viral Hepatitis Prevention Board. *JVH.* 1999;6:35–47.

10. Ejele Q, Ojulu A. The prevalence of Hepatitis B surface antigen among prospective blood donors and patients in Portharcourt. *Nigeria Niger Med*. 2004;13:336–8.
11. Dibua ME, Odo, Ge, Obukwelu C. Co-infection of hepatitis B virus (HBV) and hepatitis C virus among human immunodeficiency virus (HIV) infected people: case study of Nsukka. *Int J Curr Microbiol App Sci*. 2013;2(12):89–103.
12. Esan AJ, Omisakin CT, Ojo-Bola T, Owoseni MF, Fasakin KA, Ogunleye AA. Sero-Prevalence of Hepatitis B and Hepatitis C Virue Co-Infection among Pregnant Women in Nigeria. *Am J Biomed Res* . 2014;2(1):11–15.
13. Fomulu NJ, Morfaw FL, Torimiro JN, Nana P, Koh MV, William T. Prevalence, correlates and pattern of Hepatitis B among antenatal clinic attenders in Yaounde-Cameroon: is perinatal transmission of HBV neglected in Cameroon? *BMC Pregnancy Childbirth*. 2013;13(1):1–10.
14. Guo Y, Liu J, Meng L. Survey of HBsAg-positive pregnant women and their infants regarding measures to prevent maternal-infantile transmission in China. *BMC Infect Dis*. 2010;10(2):26–8.
15. Dwivedi M, Misra SP, Misra V, Pandey A, Pant S, Singh R, et al. Seroprevalence of hepatitis B infection during pregnancy and risk of perinatal transmission. *Indian J Gastroenterol*. 2011;30(2):66–71.
16. Bakthavatchalu S. Hepatitis B surface antigen carrier state among asymptomatic pregnant women and its correlation with vertical transmission. *Int J Res Pharm Sci*. 2012;2(3):111–20.
17. Khakhkhar VM, Bhuva PJ, Bhuva SP, Patel CP, Meera SC. Sero-prevalence of hepatitis b amongst pregnant women attending the antenatal clinic of a tertiary care hospital, jamnagar (Gujarat). *Natl J Med Res*. 2012;2(3):362–5.
18. Paranjothi S, Vijayarani H. Prevalence of hepatitis b virus surface antigen in pregnant women attending a private hospital in krishnagiri. *Adv Bio Tech*. 2009;9(5):38–40.
19. Alter MJ. Epidemiology of hepatitis C. *Hepatology*. 1997;26(S3):62S–5S.
20. Alter MJ, Kruszon-Moran D, Nainan OV, Mcquillan GM, Gao F, Moyer LA. The prevalence of hepatitis C virus infection in the United States. *N Engl J Med*. 1988;341(8):556–62.
21. Kumar A, Sharma A, Gupta RK, Kar P, Chakravarti A. Prevalence & risk factors for hepatitis C virus among pregnant women. *Indian J Med Res*. 2007;126:211–5.
22. Goyal LD, Kaur S, Jindal N, Kaur H. HCV and Pregnancy: Prevalence, Risk Factors, and Pregnancy Outcome in North Indian Population: A Case–Control Study. *J Obstet Gynecol India*. 2014;64(5):332–6.
23. Parthiban R, Shanmugam S, Velu V, Nandakumar S, Dhevahi E, Thangaraj K, et al. Transmission of hepatitis C virus infection from asymptomatic mother to child in southern India. *Int J Infect Dis*. 2009;13(6):e394–e400.
24. Sood A, Midha V, Bansal M, Sood N, Puri S, Thara A. Perinatal transmission of hepatitis C virus in northern India. *Indian Journal of Gastroenterology*. 2012;31(1):27–29. Available from: <https://dx.doi.org/10.1007/s12664-012-0163-7>. doi:10.1007/s12664-012-0163-7.
25. National Centre for Disease Control India (NCD). *News Letter*. 2014; Available from: <https://ncdc.gov.in/WriteReadData/1892s/NCDNewsLetter/31.pdf>.
26. World Health Organization . Global hepatitis report. Geneva: World Health Organization; 2017.
27. Walle F, Asrat D, Alem, A. Prevalence of hepatitis B surface antigen among pregnant women attending antenatal care service at Debre-Tabor Hospital, Northwest Ethiopia. *Ethiop J Health Sci*. 2008;17:11321.
28. Parthiban R, Shanmugam S, Velu V, Nandakumar S, Dhevahi E, Thangaraj K, et al. Transmission of hepatitis C virus infection from asymptomatic mother to child in southern India. *Int J Infect Dis*. 2009;13(6):e394–e400.
29. Kew MC. Progress towards the comprehensive control of hepatitis B in Africa: a view from South Africa. *Gut*. 1996;38(2):S31–6.
30. BV O, GR P, HR N. HBsAg and Anti-HCV Prevalence among Pregnant Women Accessing Antenatal Care in a Tertiary Healthcare Facility in Central Nigeria. *Hepato Pancreat Sci*. 2018;02(01).
31. Seid M, Gelaw B, Assefa A. Sero-prevalence of HBV and HCV Infections Among Pregnant Women Attending Antenatal Care Clinic at Dessie Referral Hospital, Ethiopia. *Adv Life Sci Health*. 2014;1.
32. Muriuki B, Gicheru M, Wachira D, Nyamache A, Khamadi S. Prevalence of hepatitis B and C viral co-infections among HIV-1 infected individuals in Nairobi, Kenya. *BMC Res Notes*. 2013;6(1):363.
33. ACOG Educational Bulletin. Viral Hepatitis in Pregnancy. Number 248, July 1998 (Replaces No. 174, November 1992). American College of Obstetricians and Gynecologists. *Int J Gynecol Obstet*. 1998;63(2):195–202.
34. Zenebe Y, Mulu W, Yimer M, Abera B. Sero-prevalence and risk factors of hepatitis B virus and human immunodeficiency virus infection among pregnant women in Bahir Dar city, Northwest Ethiopia: a cross sectional study. *BMC Infec Dis*. 2014;14(1):118.
35. Noubiap JN, Nansseu JRN, Ndoula ST, Bigna JJR, Jingi AM, Fokom-Domgue J, et al. Prevalence, infectivity and correlates of hepatitis B virus infection among pregnant women in a rural district of the Far North Region of Cameroon. *BMC Public Health*. 2015;15(1):454.
36. Ochola E, Ocamo P, Orach CG, Nankinga ZK, Kalyango JN, McFarland W, et al. High burden of hepatitis B infection in Northern Uganda: results of a population-based survey. *BMC Public Health*. 2013;13(1):727.
37. Jindal N, Arora U, Singh K. Prevalence of human immunodeficiency virus, HBV, HCV in three groups of populations at high risk of HIV infection in Amritsar, Northern India. *Jpn J Infect Dis*. 2008;61:79–81.

Author biography

Neha Goel Assistant Professor

Rupali Sharma Associate Professor

Ritu Agarwal Professor and Head

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