International Journal of Research in Medical Sciences
Jahan G et al. Int J Res Med Sci. 2020 May;8(5):1718-1723
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20201916

Original Research Article

Seroprevalence and risk factors of hepatitis B and C infections among pregnant women

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Received: 12 February 2020
Revised: 14 February 2020
Accepted: 04 March 2020

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ABSTRACT

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are serious public health problem affecting billions of people globally with maternal-fetaltransmission on the rise. This study sought to determine the prevalence and factors associated with hepatitis B virus (HBV) and hepatitis C virus (HCV) infections among pregnant women attending integral institute of medical sciences and research hospital, Lucknow, Uttar Pradesh.
Methods: In this cross-sectional study 345 pregnant women were recruited from the integral institute of medical sciences and research hospital, Lucknow, Uttar Pradesh. Blood samples were collected for the detection of Hepatitis B Surface Antigen (HBsAg) and anti-HCV antibodies. A pretested questionnaire was used to obtain demographic data and identify the risk factors associated with the two infections. Ethical clearances were taken from the institution. Data tabulated and subjected to statistical analysis.
Results: Out of total 345 samples of pregnant females examined during the study. In which, 20(5.8%) were seropositive for hepatitis B and 6(1.7%) positive for hepatitis C among pregnant women.8.8% positive for hepatitis B among pregnant females in their age group 15-25. Maximum non-reactive patients of hepatitis C (99.9%) belongs to age group (15-25). 33.3% hepatitis B positive out of total blood transfusion cases. Patients having previous history surgery, in which 24.2% positive with hepatitis B. Hepatitis B and C positive patients having abdominal pain were 9.3% and 3.1% respectively. Patients were having history of jaundice, in which 55.6% and 33.3% suffering with hepatitis B and C.
Conclusions: The need to institute public health measures to reduce disease burden and transmission, including routine screening of all pregnant mothers for HBV and HCV infections Factors associated with higher rate of HBV and HCV infections include advancing age, low level of education, tattooing, blood transfusion, and history of jaundice.

Keywords: Hepatitis B, Hepatitis C, Pregnant women, Risk factors, Seroprevalence

INTRODUCTION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are serious public health issues with different prevalence rates worldwide. About one fifth of the 2billion people infected with HBV across the globe have chronic infection.[1,2] World Health Organization (WHO) estimates indicate that about 200 million people have HCV infection across the globe.[3,4] HBV and HCV are contagious diseases that can be transmitted vertically from mothers to their neonates or horizontally through blood products and body secretions.[5] Mother to child

transmission remains one of the commonest routes by which HBV infection is contracted worldwide.[6] The World Health Organization (WHO) estimates that 3% of the world's population has chronic hepatitis C infection. Between 1999 and 2002, an estimated 4.1 million people in the United States were infected with HCV, and of these, 3.2 million had chronic infection.[7] Acute HBV infection during pregnancy is less severe and is not directly associated with increased mortality or teratogenicity.[8,9]

Most of the available data is based on blood bank screening which can have its inherent biases and may not truly reflect the national prevalence. The overall rate of HBsAg positivity has been reported to range between 2% and 8% in most studies.[10] The widely quoted figure of a carrier rate in India of 4.7% with an estimated carrier population of 56.5 million may be an exacerbation. This estimate, which was based on the results of studies, has some flaws that may result in overestimation. In India, the prevalence of HCV is 1-2%.[11]

However, increased incidences of low birth weight and prematurity in infants born to mothers with acute HBV infection have been recorded. Furthermore, acute HBV infection in early pregnancy has been associated with a 10% perinatal transmission rate.[12] Transmission rates (as high as 60%) have been reported to increase significantly if acute infection occurs at or near the time of delivery.[9] In light of the aforementioned this study sought to determine the prevalence and factors associated with HBV and HCV infections among pregnant women at attending integral institute of medical sciences and research hospital, Lucknow, Uttar Pradesh.

METHODS

This cross-sectional hospital-based study was conducted at department of microbiology, integral institute of medical sciences and research hospital, Lucknow, Uttar Pradesh with the blood sample from female patients clinically suspected of hepatitis B and C virus attending the inpatient and outpatient of obstetrics and gynaecology department of same institute from December 2017 to May 2018.

All mothers who came for antenatal booking were counselled for hepatitis B screening in addition to the routine screening. Confidentiality was maintained by assigning consent enrolment to each participant. Structured interviews were conducted at first contact with the pregnant women to collect information on demographic characteristics. Modified Prasad's classification was applied to measure the individual's socioeconomic status.[13]

Inclusion criteria

- Female patients of reproductive age group (15-45 years) attending outpatient department as well as those admitted in ward of Obstetrics and Gynecology department for whom screening for hepatitis B and C virus is requested will be included in the study.

Exclusion criteria

- Patient who refuse to give their consent were excluded from the study.

Ethical consideration

Ethical consent was sought from the Institute. Informed and written consent was obtained from each pregnant female patient prior to commencement of the study.

Collection of samples

Blood sample was collected in a clean clot activator vacutainer and left undisturbed for 30 minutes So that it may clot. The serum was then separated by centrifugation at room temperature. It is recommended that fresh sample should be used if the serum was not assayed immediately it was stored at 2-8℃. Haemolysed specimen or specimen with microbial contamination was discarded and fresh aliquot was collected.

Statistical analysis

Data was entered into Excel worksheet and analysed using SPSS version 16 (Statistical Package for Social Sciences). Chi square test and fishers exact was used for categorical variable. $p<0.05$ was considered as significant.

RESULTS

Out of total 345 samples of pregnant females examined during the study. In which, 20(5.8%) were seropositive for hepatitis B and 6(1.7%) positive for hepatitis C among pregnant women.

Table 1 shows association between socio demographic factors with hepatitis B and C seropositivity among pregnant women. Out of 345 pregnant females majority of 312(90.4%) pregnant females belongs to middle class, in which 6.1% and 1.9% were positive for hepatitis B and C respectively. Followed by 24(6.95%) pregnant females belongs to lower class and 9(2.60%) pregnant females belongs to upper class. Out of 345 pregnant females, 16(8.8%) positive for hepatitis B among pregnant females in their age group 15-25. Followed by 4(2.60%) positive for hepatitis B among pregnant females in their age group 26-35. Maximum non-reactive patients of hepatitis C (99.9%) belongs to age group (15-25) and reactive of hepatitis C 3(2.0%) belongs to age (26-35) year. It was found that the zero miscarriages showed higher the chances of developing hepatitis B and C. Almost majority of female patients were married. Only one study variable among single category was found to be positive with hepatitis B. It was found that higher percentage of

hepatitis B and C seropositivity were belongs to rural areas. Majority of 333(96.5%) house wife and merely 12 (3.5%) were working pregnant women. Age group showed significant differences with hepatitis B. Figure 1 illustrates that the frequency distribution of sign shown in hepatitis B and C seropositivity pregnant women. In which arthralgia sign showed by almost every patient suffering with hepatitis B. Followed by signs myalgia and weight loss i.e., 17 and 15 respectively. Merely 9 patients having seropositivity of hepatitis B were mild fever and itching (pruritus). Each and every individual positive with hepatitis C having myalgia and weight loss. Followed by signs itching (pruritus) and arthralgia i.e., 5 and 4 respectively. Only 3 patients having seropositivity of hepatitis C were mild fever.

Table 1: Association between socio demographic factors with hepatitis B and C seropositivity among pregnant women.

Variables	Hepatitis B			Hepatitis C		
	Sero Positive	Sero Negative	p-value	Sero Positive	Sero Negative	p-value
Age group						
15-25	16 (8.8%)	164(91.2%)	0.035	2 (1.1%)	178(99.9%)	0.173
26-35	4(2.6%)	149 (97.4%)		3(2.0%)	150(98.0%)	
36-45	0(0%)	12 (100%)		1(8.3%)	11(91.7%)	
Marital status						
Married	19(5.7%)	314(94.3%)	0.702	6(1.8%)	327(98.2%)	0.639
Single/separated	1(8.3%)	11(91.7%)		0(0%)	12 (100%)	
Place of residence						
Rural	11(5.9%)	175(94.1%)	0.920	4(2.2%)	182(97.8%)	0.527
Urban	9(5.6%)	150(9%)		2(1.3%)	157(98.7%)	
Miscarriage						
0	19 (6.1%)	293 (93.9%)	0.698	6(1.9%)	306(98.1%)	0.724
1	1 (4.2%)	23 (95.8%)		0(0%)	24 (100%)	
>2	0(0%)	9 (100%)		0(0%)	9 (100%)	
Occupation						
House wife	20 (6.0%)	313(94.0%)	0.382	6(1.8%)	327(98.2%)	0.639
Working	0(0%)	12 (100%)		0(0%)	12 (100%)	
Socio economic status						
Lower	1 (4.2%)	23 (95.8%)	0.698	0(0%)	24 (100%)	0.724
Middle	19 (6.1%)	293 (93.9%)		6(1.9%)	306(98.1%)	
Upper	0(0%)	9 (100%)		0(0%)	9 (100%)	

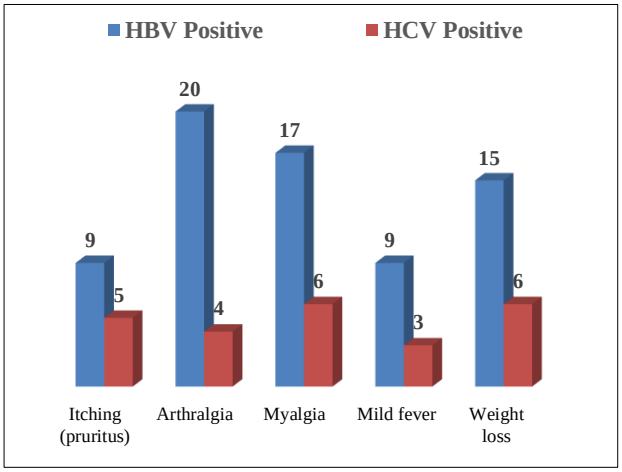

Figure 1: Frequency distribution of sign shown in hepatitis B and C seropositivity pregnant women.

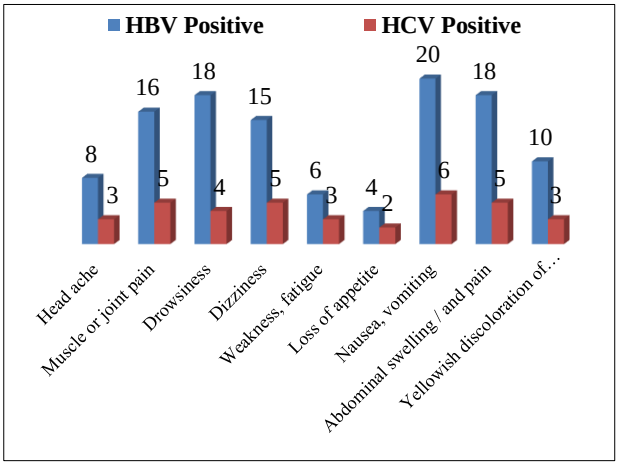

Figure 2: Frequency distribution of symptom shown in hepatitis B and C seropositivity pregnant women.

Figure 2 depicts that the frequency distribution of symptom shown in hepatitis B and C seropositivity pregnant women. In which nausea, vomiting symptom showed by effectively all patient suffering with hepatitis B. Followed by symptoms abdominal swelling and pain, drowsiness and muscle or joint pain i.e., 18, 18 and 16 respectively. Least number of patients were belonging to weakness, fatigue (6) and loss of appetite (4) with hepatitis B positive. Every individual positive with hepatitis C having nausea, vomiting symptom. Only 2 patients having seropositivity of hepatitis C were loss of appetite.

Table 2: Association between risk factors with hepatitis B and C seropositivity among pregnant women.

Risk Factors	Hepatitis B		p-value	Hepatitis C		p-value
	Sero Positive	Sero Negative		Sero Positive	Sero Negative	
Blood transfusion						
Yes	3(33.3%)	6(66.7%)	0.000	1(11.1%)	8(88.9%)	0.029
No	17(5.1%)	319(94.9%)		5(1.5%)	331(98.5%)	
Surgery						
Yes	8(24.2%)	25(75.8%)	0.000	2(6.1%)	31(93.9%)	0.046
No	12(3.8%)	300(96.2%)		4(1.3%)	308(98.7%)	
Inject drug abuse						
Yes	5(27.8%)	13(72.2%)	0.000	2(11.1%)	16(88.9%)	0.002
No	15(4.6%)	312(95.4%)		4(1.2%)	323(98.8%)	
Tattooing						
Yes	0(0.0%)	9(100.0%)	0.348	1(11.1%)	8(88.9%)	0.029
No	30(100%)	306(97.1%)		5(1.5%)	331(98.5%)	
Abdominal pain						
Yes	12(9.3%)	117(90.7%)	0.031	4(3.1%)	125(96.9%)	0.134
No	8(3.7%)	208(96.3%)		2(0.9%)	214(99.1%)	
History of jaundice						
Yes	5(55.6%)	4(44.4%)	0.000	3(33.3%)	6(66.7%)	0.000
No	15(4.5%)	321(95.5%)		3(0.9%)	333(99.9%)	

Table 3: Association between pregnancy status with hepatitis B and C seropositivity among pregnant women.

Duration of pregnancy	Hepatitis B		p-value	Hepatitis C		p-value
	Sero Positive	Sero Negative		Sero Positive	Sero Negative	
1st Trimester	12(10.8%)	99(89.2%)	0.015	3(2.7%)	108(97.3%)	0.595
2nd Trimester	6(4.8%)	120(95.2%)		2(1.6%)	124(98.4%)	
3rd Trimester	2(1.9%)	106(98.1%)		1(0.9%)	107(99.1%)	

Table 2 shows that the association between risk factors with hepatitis B and C seropositivity among pregnant women. There were multiple risk factors: Hepatitis B positive in 3(33.3%) out of 9 blood transfusion cases and only one patient found positive with hepatitis C. Total 33 patients having previous history surgery in which 8(24.2%) positive with hepatitis B and out of total only 2 (6.1%) with hepatitis C positive.

Hepatitis B positive in 5(27.8%) out of 18 inject drug abuse patients and only two patients found positive with hepatitis C out of 18inject drug abuse category. Hepatitis B and C positive patients having abdominal pain were 12(9.3%) and 4(3.1%) respectively. Total 9 patients were having history of jaundice, in which 5(55.6%) and 3(33.3%) suffering with hepatitis B and C. There were significant differences between risk factors and hepatitis B and C seropositivity.

Table 3 represents that the association between pregnancy status with hepatitis B and C seropositivity among pregnant women. Out of 345 samples collected, in which majority of patients were belongs to 2nd trimester i.e., 126 study subjects. In which 95.2% were non-reactive with hepatitis B whereas 4.8% study subjects were reactive with hepatitis B. On the other hand, only 1.6% study subjects were reactive and 98.4% were non-reactive with hepatitis C. Followed by 1st trimester, 111 study subjects were belonging to first trimester. In this category 10.8% and 2.7% study subjects were reactive

with hepatitis B and C respectively. Significant difference was found between trimester and hepatitis B seropositivity.

DISCUSSION

Infections due to Hepatitis B and Hepatitis C viruses are significant health problems around the globe. Worldwide, viral hepatitis is the commonest cause of hepatic dysfunction in pregnancy. Prevalence of HBV infection shows great variability in different parts of the world. In this study, the prevalence of Hepatitis B and Hepatitis C infections among pregnant women were 5.8% and 1.7% respectively while none of the pregnant women was recorded for both HBV and Anti HCV. The World Health Organization (WHO) has classified HBV prevalence into high endemicity (>8%), intermediate (2-7%) and low endemicity (<2%). HBV prevalence in India is in intermediate range. Every year 100,000 Indians die due to HBV infection related illnesses.[14] Hepatitis C is a global health problem and affects 2-3% of the world population.[15] The prevalence of anti-HCV in pregnant women in developed countries ranges from 0.14 to 4.4%.[16,17] The seroprevalence of anti-HCV antibody in pregnancy in Indian population is 1.03%.[18] Present study supports these figures. Ugbebor et al, found that most of the patients fell within the 32-36 years age group followed by 27-31 years age group because this was the majority age group admitted to the antenatal clinic of the hospital.[19] In present study majority of patients of hepatitis B and C belongs to age group 15-25 and 26-35 year. These findings were similar to the studies conducted by Awan et al, and Ali et al.[20,21] Moreover, Fernandes et al, reported that the seropositivity in young pregnant women, aged between 21 and 30 years.[22] Another study by Ribeirao Preto in which 5,191 patients were evaluated, with a mean age of 24.6 years with a range of variation 12-51 years, of whom 30% were young women with up to 20 years and 78,5%, up to 29 years.[23] Not only does a pregnant woman face the risks of hepatitis herself, she also can pass the viruses to her baby. Many pregnant women may not even know that they are infected because infection sometimes causes no signs or symptoms.

In present study, nausea, vomiting symptom, abdominal swelling/ and pain, drowsiness and muscle or joint pain are the common most symptoms, arthralgia sign showed by almost every patient suffering with hepatitis B and C. Followed by myalgia and weight loss. Furthermore, Symptomatic disease in the mother with acute hepatitis B includes nausea, vomiting, abdominal pain, fatigue, and jaundice.[24] For the new born, there is increased risk of low birth weight and prematurity.[12] Elsheikh et al, reported that more than one third, 289(40%) of these women had less than secondary level education. 141(19.3%), 63(8.8%) women gave history of jaundice and blood transfusion, respectively. 69(9%) and 21(3%) had traditional scares and tattooing, respectively.[25] In correspond to this, present study showed 33.3% hepatitis B positive out of total blood transfusion cases. Patients having previous history surgery, in which 24.2% positive with hepatitis B. Hepatitis B and C positive patients having abdominal pain were 9.3% and 3.1% respectively. Patients were having history of jaundice, in which 55.6% and 33.3% suffering with hepatitis B and C. The major causes of HCV infection worldwide are use of unscreened blood transfusions, and re-use of needles and syringes that have not been adequately sterilized.[26] It might be at increased risk because of their past pregnancies, hospital admission blood transfusion and/ or any surgical procedure in the past. These findings were similar to the studies conducted by Awan et al, and Ali et al.[20,21] The identification of the etiologic agent by means of serologic test allows the adoption of appropriate measures for prevention and control. Therefore, it is necessary that people regularly do examine with primary care health teams, which have an significant role in the prevention, diagnosis, screening and monitoring of people with the disease. The explanations for such observations need to be explored in the future.

CONCLUSION

The need to institute public health measures to reduce disease burden and transmission, including routine screening of all pregnant mothers for HBV and HCV infections. In order to increase the quality of services provided to the health of pregnant women, early diagnosis and timely treatment to prevent vertical transmission of infectious diseases such as hepatitis B and C. Factors associated with higher rate of HBV and HCV infections include advancing age, low level of education, tattooing, blood transfusion, and history of jaundice. There is also the need for inclusion of hepatitis B immune globulin in addition to hepatitis B vaccine given to infants of HBV-positive mothers within 12 h of birth. This will go a long way in reducing HBV transmission from mother to child.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Jahan G, Jahan N, Rungta S, Ahmad A. Seroprevalence and risk factors of hepatitis B and C infections among pregnant women. Int J Res Med Sci 2020;8:1718-23.