

## Prevalence of Hepatitis C Virus in a Sample of Pregnant Women in Davangere: Survey by Antibody Detection

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Hepatitis C virus(HCV) infection is an emerging world wide public health problem. The predominant transmission route of HCV in children is changing with the mother-to-infant transmission type surpassing that through the transfusion of infected blood / blood products. The rate of mother- to- infant HCV transmission is critical to predicting the burden of HCV infection in future generations. The present study aim to determine the prevalence of HCV in pregnant women in Davangere by antibody detection. Blood samples were taken from 100 pregnant women in the age group 15 to 35 years attending a tertiary care hospital, during the period 2006 to 2007. Detection of antibody to HCV(anti-HCV) in the blood samples was carried out by the Immunochromatographic test and Enzyme Linked ImmunoSorbent Assay(ELISA). Out of 100 pregnant women tested, 4 pregnant women showed to be positive for anti HCVs – 2 each in the age groups 15-25 years (yrs) and 26-35 yrs, which is 3.51% and 4.65% respectively. Universal screening for HCV in pregnancy is not justified and that selective screening of high risk categories for HCV infection in pregnancy is rational. Future long term studies are needed to explore the mechanisms of vertical transmission of HCV for implementing manipulative procedures that could influence disease outcome both in the infected mother and the child.

**Key words:** Hepatitis C virus, pregnant women, screening, immunochromatography, ELISA, Davangere.

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During the early 1990s, with the introduction of anti-HCV screening(antibodies to HCV) of blood and it's products, blood-borne HCV acquisition has minimized leaving the vertical transmission as the predominant mode of infection in children<sup>1</sup>

The principle risk factors for HCV infection in pregnant women are Intravenous Drug Use (IDU) (43%), transfusion (13%), sexual exposure (9%), tattooing (4%). However, about 17% of women deny any risk factors for transmission<sup>2</sup>. Some of the HCV infected women are shown to be the positive for antibodies to Human Immunodeficiency Virus(anti-HIV) and Hepatitis B surface antigen (HBs Ag)<sup>3</sup>. Theoretically, mother-to-infant transmission of HCV may be intrauterine, intrapartum or postnatal<sup>4</sup>. Maternal HCV load is likely to be the predominant risk factor for mother-

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to-infant transmission of HCV. It is supported by consistent findings of increased risk among HCV/HIV-coinfected women who are thought to have higher HCV loads secondary to HIV-driven immunosuppression<sup>5</sup>. Conversely, HIV negative women are at low risk of vertical (perinatal) transmission of HCV, even in the presence of active hepatitis C virus replication<sup>6</sup>

Also, incidence of vertical transmission is higher from HIV negative acute hepatitis C mothers than from mothers with chronic HCV<sup>7</sup>. The risk for mother-to-infant transmission of HCV is low compared with the risk for vertical transmission of replicative Hepatitis B Virus<sup>8</sup>. HCV virions can be detected in amniotic fluid, but their presence may not contribute to vertical transmission. Breast feeding has not been associated with mother-to-infant transmission of HCV<sup>7,1</sup>.

Mothers positive for antibodies to HCV during routine blood tests in pregnancy and with no history of drug misuse or transfusions are at a low probability of infecting their babies. No further increase in the risk of transmission in subsequent pregnancies of HCV positive mothers is found who had infected their offsprings during previous pregnancies<sup>9 10</sup>.

Mother-to-child transmission of HCV is determined by comparative nucleotide sequence analysis of the viral cDNA and can be established the etiology in the successive generations by demonstrating the same viral subtype. Children with e<sup>+</sup> 2 positive HCV RNA PCR test results and/or anti-HCVs after 18 months of age were considered to be infected<sup>11,5</sup>.

Diagnostic tests for HCV infection are categorized into serologic assays for anti-HCVs and molecular techniques for viral particles. Enzyme immuno assays of consecutive versions and recombinant immuno blot assays are being used as the serologic assays to detect anti-HCVs. The primary serologic screening assay for HCV infection is ELISA exhibiting sensitivity upto 90-95%. The more sensitive molecular techniques are based on detection of HCV RNA, which may be qualitative or quantitative<sup>12,7</sup>.

No antiviral treatment is available for use in HCV infection during pregnancy. However, Highly Active Anti Retroviral Treatment (HAART) in HCV/HIV coinfecting women during pregnancy

may also have a beneficial effect on HCV vertical transmission<sup>5</sup>.

## MATERIAL AND METHODS

From May 2006 to April 2007, blood samples were collected from 100 pregnant women in the age group 15-35 years attending out patient section and inpatients of Obstetrics and Gynaecology (OBG) department from Bapuji Hospital (BH) and Chigateri General Hospital (CGH) attached to JJM Medical College, Davangere.

Serological testing for anti-HCV was performed with the SD HCV One Step anti-HCV Test (SD Biostandard Diagnostics Pvt. Ltd., India). The SD HCV One Step anti-HCV Test is an immunochromatographic (rapid) test for the qualitative detection of antibodies specific to HCV. The test procedure was carried out as per the manufacturer's instructions. Samples tested positive were retested using SD HCV ELISA 3.0 test system (SD Biostandard Diagnostics Pvt. Ltd., India).

The SD HCV ELISA 3.0 is indirect sandwich ELISA for the qualitative detection of antibodies against HCV. The test contains a microplate, which is pre-coated with recombinant HCV antigens [Core, NS3, NS4 and NS5] on well. The test was carried out as per the standard test procedure mentioned by the manufacturer. Colorimetric reading was performed using a spectrophotometer at 450nm. The serological tests were performed in the Department of Microbiology, JJM Medical College, Davangere.

Thirty age matched samples from females without any past or present history of risk for Hepatitis C disease were included as normal healthy controls and their serum samples simultaneously screened for anti-HCVs.

## RESULTS

The study found an overall prevalence of anti-HCVs of 4% (4/100) among pregnant women. The age range of the pregnant women attended was 15-35 yrs. Out of 4 anti-HCV positive pregnant women, 2 (3.51%) were in the age group 15-25 yrs and 2 (4.65%) were in the age group 26-35 yrs.

**Table 1.** Age wise distribution of HCV positivity in pregnant women

S. No.	Age group (yrs)	Pregnant women (100)		
		No.	+ve	Percentage
1	15-25	57	2	3.51
2	26-35	43	2	4.65

All the 30 control samples were found to be seronegative for anti -HCVs.

## DISCUSSION

This study reports here an anti-HCV seroprevalence of 4% in a sample of 100 pregnant women in Davangere between May 2006 to April 2007. Similar studies conducted by Zwahlen M et al<sup>13</sup>, Hillemann's P et al<sup>14</sup>, Conte D et al<sup>3</sup>, Abd EL-Shaheed et al<sup>15</sup> reported a prevalence rates of 0.71%, 0.94%, 2.4% and 15.3% respectively. Specifically, within India, Irshad M et al<sup>16</sup> during his study of prevalence of anti-HCV in the general population of Delhi found a prevalence rate of 1.5% among pregnant women. On the other hand, no pregnant women were reported to be seropositive for HCV in a study by Beniwal M et al<sup>17</sup>. Such discrepancies may be related to the sociodemographic characteristics which influences HCV transmission.<sup>13</sup>

The epidemiology of HCV and in particular the risk factors for transmission are only partly understood. HCV infection normally leads to long term viraemia. In addition to this, it is becoming increasingly clear that many infections identified clinically or by antibodies screening cannot be explained by either of the known routes of transmission<sup>18</sup>

The present study had limitation in that it could not provide an insight into known risk factors for HCV infection such as IDU, or history of blood transfusion, sexual exposure and hence it was not possible to draw any direct inference about why pregnant women in our study had such a higher prevalence for HCV.

HCV infection is a major worldwide public health problem. The pathogenesis of vertically acquired HCV infection including its

timing remains largely unknown. However, children born to infected mothers are at lifetime risk of developing some form of chronic liver dysfunction.

As there is insufficient knowledge of the magnitude of this health problem from our region, the present study aim to determine the prevalence of HCV in pregnant women by antibody detection to it. HCV infected mothers identified during antenatal HCV testing are more receptive for further followup and treatment than patients with HCV diagnosed in other settings. Moreover, psychological harm from the screening is likely to be very small and benefits outweigh it.

## CONCLUSION

From the fact that there are no effective measures to prevent the vertical transmission of HCV and to treat the infection during pregnancy, the present study concludes that Universal screening for HCV in pregnancy is not justified and that selective screening based on perceived high risk group is rational. Also, the study believe that future long term studies are needed to explore the mechanism of vertical transmission for implementing manipulative procedures that could influence disease outcome both in the infected mother and the child.

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