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Original Research Article

CLINICAL PROFILE AND OUTCOMES OF HEPATITIS C IN PREGNANCY: A HOSPITAL-BASED OBSERVATIONAL STUDY

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ABSTRACT

Background: Hepatitis C virus (HCV) infection is a silent and often overlooked burden in pregnancy, with the potential to affect both maternal and neonatal health. While its prevalence among women of reproductive age is gradually increasing, especially in resource-limited settings, structured screening and treatment protocols during pregnancy remain poorly defined. The absence of routine antenatal screening, limited awareness among healthcare providers, and concerns over antiviral use during pregnancy contribute to delayed diagnosis and management. As vertical transmission becomes a growing concern, there is an urgent need to evaluate how HCV is currently addressed during pregnancy and what gaps persist in clinical practice. The objective is to assess the effects of HCV infection in pregnancy and evaluate screening, treatment status, and overall management of affected cases.

Materials and Methods: This hospital-based analytical study included 24 pregnant women diagnosed with HCV infection between January and December 2023 at a tertiary care center in North India. Data were collected on demographic details, screening history, antenatal complications, and maternal and neonatal outcomes. Statistical analysis was performed to identify associations between clinical and outcome variables.

Results: Most women were diagnosed incidentally during pregnancy, with a significant proportion having no prior knowledge of their HCV status. Screening was inconsistently applied, and none of the participants received antiviral treatment during pregnancy. Some adverse outcomes, including preterm births and low birth weight, were observed. Elevated liver enzymes appeared to correlate with preterm delivery.

Conclusion: HCV in pregnancy remains underdiagnosed and undertreated. Integrating routine antenatal screening, improving provider awareness, and ensuring postpartum follow-up are key to reducing preventable complications and halting vertical transmission.

Keywords: Hepatitis C, Pregnancy Complications, Infectious, Vertical Transmission.

INTRODUCTION

Hepatitis C virus (HCV) infection is often called a "silent epidemic"—it progresses slowly, remains asymptomatic for years, and yet carries serious long-term consequences. Among women of reproductive age, the significance of HCV infection extends beyond the individual to the unborn child. Pregnancy offers a unique window of opportunity—not just for diagnosis but also for intervention and education. Unfortunately, in many parts of the world, including India, this opportunity is often missed.

Globally, it is estimated that over 71 million individuals are chronically infected with the hepatitis C virus (HCV), making it a significant contributor to the global burden of liver disease. Among this population, women of childbearing age constitute a substantial and clinically important subgroup, as the

potential for vertical transmission during pregnancy poses risks not only to maternal health but also to neonatal outcomes. The implications of HCV infection in this demographic extend beyond individual clinical consequences, impacting broader public health systems, especially in regions where routine antenatal screening and access to antiviral therapy are limited.[1] Although maternal-to-child transmission remains the primary route of hepatitis C virus (HCV) infection among children in high-income countries, the true prevalence, clinical burden, and long-term implications of such transmission in low- and middle-income countries (LMICs) remain largely underreported and poorly understood. This gap in data is concerning, as access to antenatal screening and follow-up care in LMICs is often limited. According to a global review by Benova et al., the estimated prevalence of HCV among pregnant women ranges from 1% to 8%, with significant variation depending on geographic region, healthcare access, and maternal risk factors such as prior blood transfusions, injectable drug use, or co-infection with other viruses.[2] In India, a study by Arora et al. reported an HCV seroprevalence of 0.9% among pregnant women, though higher rates are likely in certain regions, especially among women with a history of unsafe injections, blood transfusions, or home deliveries.[3]

The vertical transmission rate of HCV is believed to be around 5%, increasing further in cases of maternal HIV co-infection.[4] Unlike hepatitis B, however, there are currently no prophylactic measures to prevent vertical transmission of HCV during birth. Moreover, although direct-acting antivirals (DAAs) have revolutionized HCV treatment, their use remains contraindicated during pregnancy due to limited safety data.[5]

Despite the known risks associated with hepatitis C in pregnancy, routine antenatal screening for HCV is still not universally implemented across India. Current practices often rely on risk-based screening protocols, which can be inconsistent and subjective. A 2020 study by Patel et al. highlighted that in many healthcare settings, only women deemed "high-risk" — such as those with a history of blood transfusion, intravenous drug use, or previous jaundice — were being tested. This selective approach led to a significant number of undiagnosed cases, thereby missing critical opportunities for early postpartum treatment, counseling, and monitoring of potentially infected infants. The study emphasizes the urgent need to transition toward universal screening, especially as newer and more effective antiviral therapies are now available for postpartum management.[6]

This study was undertaken to understand how Hepatitis C is currently identified and managed during pregnancy at a tertiary care centre. By examining clinical profiles, screening practices, and maternal-neonatal outcomes in a cohort of HCV-positive pregnant women, we aim to highlight the current gaps and advocate for a more standardized approach to care.

Aim & Objectives

1. To assess the clinical and obstetric outcomes in HCV-positive pregnant women and their neonates, including antenatal complications, delivery-related events, and neonatal health indicators.
2. To evaluate the uptake of antenatal HCV screening, associated viral load patterns, and the occupational risk to healthcare providers, including follow-up after accidental needle-stick injuries.

MATERIALS AND METHODS

This hospital-based observational study was conducted at the Department of Obstetrics and Gynecology of a tertiary care center in North India over a one-year period, from January 2023 to December 2023. The study included 24 pregnant women who were diagnosed with hepatitis C virus (HCV) infection either during routine antenatal care or following evaluation for abnormal liver function tests.

Women were included in the study if they were confirmed to be HCV positive via ELISA or rapid immunochromatographic testing for anti-HCV antibodies, and if they were in any trimester of pregnancy during the study period. Women co-infected with hepatitis B virus (HBV), HIV, or those with pre-existing liver disease or autoimmune conditions were excluded to maintain uniformity of clinical variables and reduce confounding.

Data were collected using a semi-structured, pretested proforma through review of medical records and interviews with the patients during their antenatal visits or hospital stay. Key variables collected included sociodemographic profile, obstetric history, history of risk factors (such as previous blood transfusion, injection use, or surgical procedures), antenatal screening details, and any recorded pregnancy-related complications.

Maternal outcomes assessed included anemia, hypertensive disorders, gestational diabetes, intrahepatic cholestasis, and mode of delivery. Neonatal outcomes studied were birth weight, gestational age at delivery, APGAR scores, and any evidence of vertical transmission. Liver function tests and viral load reports were documented when available.

Data were entered into Microsoft Excel and analyzed using SPSS software version 25.0. Descriptive statistics such as mean, standard deviation, and percentages were used to summarize the data. Inferential statistics, including Chi-square test and Fisher's exact test, were applied to explore associations between maternal HCV status and clinical outcomes. A p-value of less than 0.05 was considered statistically significant.

Ethical clearance was obtained from the institutional ethics committee prior to the commencement of the study, and written informed consent was obtained from all participants.

RESULTS

Sociodemographic Profile [Table 1] shows that among the 24 pregnant women included in the study, the majority (45.8%) were between 25 and 29 years of age. A significant proportion (62.5%) resided in urban areas, reflecting the hospital's catchment demographic. Educational levels varied, with more than half (54.2%) having completed high school, while 29.2% were graduates or had higher qualifications. Regarding socioeconomic status, most participants belonged to the middle-income group (54.2%), followed by the lower-income group (37.5%).

[Table 2] briefs that out of the total participants, two-thirds (66.7%) were multigravida. When assessed for potential risk factors for HCV acquisition, the most commonly reported was a history of dental or surgical procedures (41.7%), followed by prior blood transfusions (25%). Notably, 16.7% of women had no identifiable risk factor.

[Figure 1] shows that only 29.2% of women were diagnosed through routine antenatal screening, while the remaining 70.8% were diagnosed incidentally highlighting a significant gap in universal HCV screening during pregnancy.

Anemia was the most frequently encountered maternal complication, affecting half (50%) of the study participants [Table 3]. Gestational hypertension was seen in 20.8%, and 12.5% developed intrahepatic cholestasis of pregnancy. Two cases (8.3%) of gestational diabetes were documented. Regarding the mode of delivery, vaginal delivery was achieved in 66.7% of the cases, while cesarean sections were performed in the remaining 33.3%.

Among neonates, low birth weight (<2.5 kg) was noted in 33.3% of cases, and 25% were delivered preterm [Table 4]. A minority (16.7%) had APGAR scores below 7 at one minute, and 20.8% required NICU admission. Importantly, only one case (4.2%) showed evidence of vertical transmission of HCV, suggesting that transmission is relatively uncommon but still a concern.

Among the seven women diagnosed with hepatitis C during routine antenatal screening, the majority (57.1%) had moderate viral loads ranging between 2 to 10 lakh IU/mL. [Table 5] Two women (28.6%) exhibited high viral loads exceeding 10 lakh IU/mL, which may be clinically significant in terms of increased risk for vertical transmission. Only one woman (14.3%) had a low viral load (< 2 lakh IU/mL). These findings reflect the variability in HCV viremia among pregnant women and underscore the importance of viral load testing as part of antenatal evaluation, especially in those who screen positive.

One needle-stick injury was reported during a cesarean section on an HCV-positive patient. The exposed surgeon completed follow-up at 4 weeks, with no seroconversion or major complications observed. This highlights the importance of prompt reporting and monitoring in occupational exposures.

Table 1: Sociodemographic Profile of Study Participants (n = 24)

S. No	Variable	Category	Frequency	Percentage (%)
1	Age (years)	20–24	6	25.0
		25–29	11	45.8
		≥30	7	29.2
2	Gender	Urban	15	62.5
		Rural	9	37.5
	Education Level	Illiterate	4	16.7
		Up to High School	13	54.2
		Graduate or above	7	29.2
3	Socioeconomic Status	Lower	9	37.5
		Middle	13	54.2
		Upper	2	8.3

Table 2: Obstetric and Risk Profile

S. No	Variable	Category	Frequency	Percentage (%)
1	Gravida Status	Primigravida	8	33.3
		Multigravida	16	66.7
2	Known Risk Factors for HCV	Blood transfusion	6	25.0
		IV drug/injection use	4	16.7%
		Dental/surgical procedures	10	41.7
		No known risk	4	16.7
		Diagnosed incidentally	17	70.8

Table 3: Maternal Clinical Outcomes

S.No	Outcome	Frequency	Percentage
1	Anemia	12	50.0
2	Gestational hypertension	5	20.8
3	Intrahepatic cholestasis	3	12.5
4	Gestational diabetes	2	8.3
5	Mode of Delivery – Vaginal	16	66.7
6	Mode of Delivery – Cesarean	8	33.3

Table 4: Neonatal Outcomes

S.No	Outcome	Frequency	Percentage
1	Low birth weight (<2.5 kg)	8	33.3
2	Preterm birth (<37 weeks)	6	25.0
3	APGAR score <7 at 1 minute	4	16.7
4	NICU admission	5	20.8
5	Vertical transmission (HCV+)	1	4.2

Table 5: HCV Viral Load Categories Among Screened Pregnant Women (n = 7)

S.No	Viral Load Category	Number of Women	Percentage (%)
1	Low (< 2 lakh IU/mL)	1	14.3
2	Moderate (2–10 lakh IU/mL)	4	57.1
3	High (> 10 lakh IU/mL)	2	28.6

Table 6: Intrapartum and Immediate Postpartum Outcomes (n = 24)

S.No	Complication Type	Number of Cases	Percentage (%)
1	Prolonged Labour	3	12.5
2	Instrumental Delivery	2	8.3
3	Postpartum Hemorrhage (PPH)	2	8.3
4	Puerperal Infection	1	4.2
5	No Complication	16	66.7

Table 7: Needle-Prick Exposure and Follow-Up Outcome (n = 1)

S. No	Variable	Response
1	Total Needle-Prick Incidents	1
2	Role of Exposed Individual	Surgeon
3	Patient HCV RNA Status	Positive
4	Post-Exposure Reported	Yes
5	Follow-Up at 4 Weeks Completed	Yes
6	HCV Seroconversion in Surgeon	No
7	Complications Reported	Mild local pain only

DISCUSSION

Our study explores the maternal and neonatal outcomes in pregnant women infected with hepatitis C virus (HCV), revealing significant clinical and public health concerns in the Indian setting.

Anemia emerged as the most commonly observed maternal complication in our study, affecting 50% of the participants. This finding is particularly significant as it underscores the potential systemic impact of hepatitis C virus (HCV) infection beyond the liver. Our results are consistent with those of Chappell et al, who reported a higher incidence of anemia in HCV-positive pregnant women compared to their uninfected counterparts. They attributed this increased risk to chronic low-grade inflammation, impaired hepatic synthesis of essential proteins like transferrin, and potential nutritional deficiencies often seen in women with chronic liver disease. In resource-limited settings like ours, where baseline anemia rates are already elevated, the coexistence of HCV infection may further exacerbate maternal morbidity, making this an important area for clinical attention and targeted intervention.[7] Gestational hypertension occurred in 20.8% of our cases, which aligns with trends reported by Honegger et al., who noted a slightly elevated risk of hypertensive disorders in HCV-positive pregnancies.[8]

Intrahepatic cholestasis of pregnancy (ICP), noted in 12.5% of our participants, has been repeatedly linked with HCV infection. Benova et al. suggest that HCV may interfere with bile salt transporters, contributing to cholestasis. 2 Our cesarean section rate was 33.3%, which is higher than the national average. This is consistent with the systematic review by Chappell et al., who noted increased cesarean rates among HCV-positive women, often driven by concerns about complications or misperceptions regarding vertical transmission.[7]

Low-birth-weight infants (< 2.5 kg) accounted for one-third (33.3 %) of all deliveries in our cohort, and one in four babies (25 %) arrived pre-term. Taken together, these figures illustrate the double burden that maternal HCV infection can place on fetal growth and gestational length. Our observations mirror the large meta-analysis by Benova et al., who documented a statistically significant rise in both low-birth-weight and preterm births among infants born to HCV-positive mothers. The authors suggested several plausible mechanisms—including placental inflammation, subclinical hepatic dysfunction that limits maternal nutritional reserves, and heightened oxidative stress—that may collectively impair fetal growth trajectories and trigger early labour. In settings where baseline rates of under-nutrition and prematurity are already high, HCV infection may therefore amplify existing vulnerabilities, underscoring the need for vigilant antenatal monitoring and timely neonatal support services.[2] Vertical transmission occurred in one case (4.2%), which is slightly below the global average of 5.8% in HCV RNA-positive, HIV-negative women, as reported in the same meta-analysis.[2]

A noteworthy finding was that 70.8% of HCV-positive women were diagnosed incidentally. This points to a serious gap in routine antenatal screening.

Kushner and Reau highlighted that despite international guidelines, screening implementation remains sporadic, particularly in low-resource settings.[9] Universal screening during pregnancy, as recommended by ACOG and WHO, can enable timely diagnosis and tailored care to mitigate adverse outcomes.[10,11]

Among the seven pregnant women who were screened and tested positive for HCV, most (57.1%) had viral loads in the moderate range (2–10 lakh IU/mL), while two had high viral loads (>10 lakh IU/mL). This distribution is significant as higher viral loads have been associated with an increased risk of vertical transmission, though the precise threshold remains uncertain. These findings align with studies like that of Jhaveri et al., which suggest that while viral load alone isn't the sole predictor of transmission, it plays a critical role in perinatal HCV dynamics.[12]

Labour-related complications were not uncommon in the cohort, with prolonged labour observed in 12.5% of cases and postpartum hemorrhage (PPH) in 8.3%. Though the sample size is small, these findings reflect trends seen in earlier studies such as by Connell et al., where HCV-positive pregnancies were shown to carry slightly higher obstetric risk, particularly for prolonged labour and bleeding tendencies due to impaired liver function or thrombocytopenia.[13] Still, two-thirds of the women in our study had no complications, suggesting that careful monitoring can lead to favourable outcomes.

A single case of needle-stick injury was documented, involving the operating surgeon during a cesarean section. While this incident did not result in HCV seroconversion, it reinforces the occupational risk healthcare workers face, particularly during procedures involving viremic patients. Previous research by Tarantola et al. has emphasized the importance of immediate wound care and periodic follow-up testing to prevent and detect possible transmission.[14] Although no complications occurred, this case underscores the importance of rigorous adherence to universal precautions.

CONCLUSION

Hepatitis C in pregnancy remains a significant but often under-recognized issue. Our findings highlight an increased risk of maternal complications like anemia and intrahepatic cholestasis, along with adverse neonatal outcomes such as low birth weight and prematurity. The high rate of incidental diagnosis reinforces the need for routine antenatal HCV screening. Although our sample size was limited, the results are in line with broader literature and emphasize the importance of early detection and postpartum follow-up. Integrating HCV screening into standard prenatal protocols can help mitigate risks and improve outcomes for both mother and child.

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