

# Prevalence of Hepatitis C Virus Among Pregnant Women at Tertiary Care Hospital

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DOI: <https://doi.org/10.52403/gijash.20221005>

## ABSTRACT

**Backgrounds:** The prevalence study of HCV infection among pregnant women is limited in central India. Vertical transmission (Mother-to-child) has become the major cause of pediatric hepatitis C virus (HCV) infection. Thus, the present study aimed to evaluate the prevalence of hepatitis C among pregnant females attending antenatal clinics.

**Material and Methods:** The cross-sectional study done at Malwanchal University, Indore Madhya Pradesh, from March 2019 to September 2022. The confirm diagnosis of HCV infection made by anti-HCV Enzyme-linked immunosorbent assay (ELISA) among enrolled pregnant women.

**Results:** Out of 3254 pregnant women tested, 26 were found positive for HCV infection. The prevalence of 0.79% was observed. The majority of infection were found in age groups 21-25 years 11/26 (42.3%) and in 26-30 years 09/26 (34.6%). The study also concluded to the most positive pregnant women belonged to low-income groups and rural areas.

**Conclusion:** Screening of pregnant women during each pregnancy, and testing infants born to mothers with HCV infection highly recommend to for the timely prevention of its transmission to infants.

**Keywords:** Vertical transmission, pregnant women, HCV infection

## INTRODUCTION

Hepatitis C virus (HCV) infection is a worldwide health problem in developed and developing countries including India. World Health Organization (WHO) estimated that every year 4 million people are newly infected and about 170 million are chronically infected with HCV [1]. Although HCV is highly infectious, it remains underdiagnosed and underreported in most developing countries.[2] The clinical manifestations of HCV infection varied person to person from self-limited to asymptomatic of chronic infection, which can progress to cirrhosis and hepatocellular carcinoma within several years. [3-4] The virus is mainly transmitted through exposure to infected blood like a transfusion of infected blood products, use of injectable substances, dental and surgical procedures, piercings and tattoos, sexual contact, and vertical transmission. [5-6]

The major cause of pediatric HCV infection is vertical transmission (Mother-to-child).[7] The vertical transmission of HCV is directly associated with maternal viral load. A high viral load of the mother increases the risk of infection in the offspring. [8,9]

The Centre for communicable disease (CDC) and WHO recommends screening pregnant women during each pregnancy, and testing infants born to mothers with HCV infection. The screening of infants

consists of HCV RNA testing at or after age 2 months or anti-HCV testing at or after age 18 months strongly recommended.<sup>[10,11]</sup>

Although the high maternal viral load is an important factor for the perinatal transmission of HCV, this risk factor is not preventable, as no anti-HCV treatment can currently be prescribed to pregnant women to prevent HCV from replicating.<sup>[9]</sup> Caution is essential in adopting delivery methods, amniocentesis, or internal fetal monitoring that can increase the fetus' exposure to HCV through infected maternal blood.<sup>[8]</sup> Universal HCV screening during pregnancy is recommended to provide the best pregnancy management interventions to reduce the risk of perinatal HCV transmission.<sup>[12]</sup>

The epidemiology of HCV infection among pregnant women varied 0.6% - 2.4%, with overall mother to infant transmission varying from 8% to 15% in India.<sup>[13]</sup> The estimation of HCV infection is important during pregnancy.

Therefore, this study is aimed to determining the prevalence of HCV among pregnant women residents in the central Indian.

## MATERIAL AND METHODS

**Study Setting and Population:** A cross-sectional hospital-based study was done in the Department of Microbiology and Biotechnology, from March 2019 to September 2022, to determine the prevalence of Hepatitis C among pregnant women attending the antenatal clinic of tertiary care hospital in Indore Madhya Pradesh. Ethical approval was taken before the study started by Institutional Ethical Committee. MU/Research/ EC/PhD/ 2019/ 53(a).

**Sample Collection:** The questionnaire and patient consent were filled by trained laboratory technologists or nursing officers. A total 2-3 mL of blood was collected in pre-labelled sterile vials from each patient. The sera were separated with help of a centrifuge machine at 3000 rpm for 15 min. Half portion of the sera used in the

serological diagnosis and half aliquots were stored at  $-20^{\circ}\text{C}$  for further research.

**Serological diagnosis:** The HCV serological screening is done by lateral flow assays as per case requirement or as per the prescription of the treating physician (Polymed<sup>®</sup> HCV Antibody kit and Standard Q HCV Antibody "SD Biosensor"). Although all samples either positive or negative via screening test, subjected to an anti-HCV Enzyme-linked immunosorbent assay (ELISA) to made a confirm diagnosis. Among all samples, the anti-HCV ELISA was performed, and results interpretations were done as per the manufacturer's instructions. The absorbance was read at 450 nm in an ELISA reader.

**Statistical Analysis:** All data were entered and maintained in Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and afterward, data were imported into Statistical Package for the Social Sciences (SPSS) Version 22.0 (IBM Corp., Armonk, NY, USA) for statistical analysis.

## RESULTS

During the study period, a total of 3254 pregnant women were included from the antenatal clinic (ANC) unit. Of these 26 pregnant women were found seropositive/seroreactive for anti-HCV ELISA. Thus, the 0.79% (26/3254) prevalence of HCV positive among pregnant women was calculated as shown in table no. 1.

The age of all positive pregnant women ranged from 18 to 41 years. The means and standard deviation were calculated as (mean  $\pm$ SD) 26.27  $\pm$ 5.1 years. The age group of 21-25 years was most represented 11/26 (42.3%) followed by the age group of 26 - 30 years 09/26 (34.6%). [Table no. 2]

Although, all of the participants were married 25/26 (96.15%) except one female. In this study, the majority of pregnant women belonged to rural settings 15/26 (57.69%) followed by urban settings 11/26 (42.30%). The immensity of pregnant women belonged to the lower socio-economic class 12/26 (46.15%), followed by belonging to the middle class were 09/26

(34.61%) and least from the upper class 5/26 (19.23%).

S. No.	ELISA Results	No of pregnant women	Percentage
1	Non-reactive	3228	99.21%
2	Reactive	26	0.79%
		3254	100%

**Table 1: Distribution of pregnant women according to the results of HCV ELISA (N = 26).**

S.No.	Age groups	No of anti HCV reactive	Percentage
1	18-20	02	7.7%
2	21-25	11	42.3%
3	26-30	09	34.6%
4	31-35	03	11.5%
5	≥ 35	01	3.8%
	Total	26	100%

**Table 2: Age group distribution of pregnant women and reactivity to HCV**

## DISCUSSION

Globally, HCV has been recognized as one of the major causes of acute and chronic liver disease as cirrhosis or hepatocellular carcinoma. The burden of disease significantly varied in different regions over the globe, on the basis of geographic variability, socioeconomic conditions, and various cultural practices. It has been estimated that prevalence ranges from up to 5% in developing countries.<sup>[14]</sup> Most of the studies are hospital-based including blood donors, hemodialysis, intravenous drug users, human immunodeficiency virus (HIV) infection patients, general population, and community-based studies in different regions of our country. In contrast to the above studies, a limited study done on pregnant woman's special developing countries.

A meta-analysis review included 327 studies and estimated seroprevalence of HCV in India. As projected in community-based studies 0.85%, asymptomatic blood donors 0.44%, and 0.88% of pregnant women.<sup>[15]</sup> In the present study, a total of 3254 pregnant women were included, of these, 26 women were found seropositive for HCV, the prevalence was 0.79% (26/3254) observed. [Table no. 1] Similarly, Upreti P *et. al.*<sup>[16]</sup> calculated the seroprevalence of HCV to be 0.89% among pregnant women. A south Indian study reported the prevalence of HCV among

pregnant women was 0.6%.<sup>[17]</sup> Likewise, studies from New Delhi and Punjab reported a high prevalence of HCV among pregnant women to 1.03% and 2.8% respectively.<sup>[18,19]</sup> The difference could be attributed to geographical variation, relatively smaller sample size, and adequacy and efficacy of the laboratory tests employed.

The current study observed a high frequency of HCV positive among the age group of 21-25 (42.3%) followed by 26-30 (34.6%) years. [Table no. 2] The reason behind that in our country, the legal age of marriage for women is 18 years and 21 years for men. Hence, the most married female get pregnant in the age group 20-30 years. Our results reflected these groups as the maximum positivity rate of infection and the least positive fall down in the age group of more the 35 years old. A recent study done by Jahan *et. al.*<sup>[13]</sup> showed the majority of positive HCV pregnant females belonged to the age group 15-25 years 45.3%, followed by the age group 26-35 years (43.3%). Similarly, another study from Goyal LD *et. al.*<sup>[19]</sup> also reported higher seropositivity among pregnant women belonging to the age group 21-25 years (45%) and 26-30 years (30%). A study from Telangana state reported that the majority of seropositivity was seen among pregnant women belonging to age group 21-30 years (66.7%).<sup>[20]</sup> These findings were similarly attributed to the present study.

The present study disclosed the majority of seropositive pregnant women belonging to rural settings (57%, 15/26) slightly higher number of reactive patients belonged to urban settings (42.3%, 11/26). The study conducted at the tertiary care hospital Indore Madhya Pradesh, here most of the patients attended from a rural area. In rural areas, piercings and tattoos for ancient time and now a days started fashion in the urban area, might be one risk factor. The study also observed lower income group has the majority of positive with HCV 46.2% (12/26), both above conditions were reflected higher positive due to the rural

population with a low-illiteracy rate and also the unhygienic lifestyle of the group.

## CONCLUSION

The WHO target of HCV elimination by 2030 requires that 90% of People living with HCVs need to be diagnosed and monitored. Although the Indian government also initiated and launched a program to prevent and treat viral hepatitis (hepatitis A, B, C, and E) and provide screening, diagnosis, treatment, and counseling services free of cost to all, under the National Viral Hepatitis Control Program (NVHCP). The screening of pregnant women during each pregnancy and testing infants born to mothers with HCV infection will lead to better utilization of resources, promote screening and early treatment, and prevent attrition.

**Conflict of Interest:** None

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- How to cite this article: Naveen Kumar Shrivastava, Jaya Jain. Prevalence of hepatitis C virus among pregnant women at tertiary care hospital. *Galore International Journal of Applied Sciences & Humanities.* 2022; 6(4): 25-29.  
DOI: <https://doi.org/10.52403/gijash.20221005>

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