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RESEARCH ARTICLE
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AN OBSERVATIONAL STUDY OF HEPATITIS C INFECTION IN PREGNANT WOMEN BY USING SEROLOGICAL DIAGNOSTIC METHOD.

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Abstract and objective:
Background: Hepatitis C virus infection remains a significant public health problem worldwide. Over 71 million people's deaths result from complications of untreated chronic HCV infection. A major barrier to HCV elimination still results from the fact that a substantial proportion of patients with chronic HCV infection are unaware of their infection, with large variations across different regions, countries and risk populations. Pregnant women constitute a vulnerable population due to the risk of vertical transmission. This study aims to determine the seroprevalence of HCV infection among pregnant women attending the Antenatal care in Index medical college, department of microbiology.
Objective: To Assess the demographic and risk factors associated with HCV positivity and highlight the importance of routine HCV screening in antenatal care. Seropositive cases with gestational diabetes and risk factors associated with acquisition of HCV infection & to estimate the HCV infection by detecting antibody and/ or antigen by ELISA/Rapid test.
Method: An observational study design was used. Pregnant women attending the ANC clinic during the study period were screened for HCV antibodies using Standard ELISA technique. Demographic and clinical data were collected using a structured questionnaire in our ANC department clinic of Index medical college & hospital Indore.
Result: Out of the 109 pregnant women attending ANC clinic in institute a total of 3 were found to be positive for anti-HCV antibody & confirm by ELISA test where 2.7% seropositive rate were found to be in this study.
Conclusion: In our study were concluded that insignificant seroprevalence of HCV in pregnant women those who attend the ANC department of index medical college. Early detection enables counseling and monitoring. Direct-acting antiviral (DAA) therapy can be planned postpartum. Infants born to HCV-positive mothers can be followed up for timely diagnosis.

Keywords: Hepatitis C virus, Antenatal care, Enzyme linked immunosorbent assay, Pregnancy.

Introduction

The Hepatitis C virus (HCV) infection is increasing in different regions of the world at the rate of 58 million infections per year and has become one of the main reasons of mortality due to liver infections.[1-7] Every year almost 6-12.5 million people in India get infected due to the HCV infection.[8] Out of this, around 27% are reported cases of cirrhosis and 25% of patients are reported cases of Hepatocellular Carcinoma (HCC).[9] There is inflammation of the liver initially and then the patients eventually end up with the development of chronic liver cirrhosis, i.e. scarring of the whole liver and other complications related to it. Studies have reported that it takes almost sixteen years to develop fibrosis after acquiring HCV infection. [10]

The prevalence of HCV varies epidemiologically with reported prevalence of less than 1% in western countries and greater than 2% in African & Asian countries. [11] A recent review of available data from Pakistan revealed HCV prevalence as 3% in the general population. A wide frequency of HCV seroprevalence was reported in the pregnant population, ranging from 3.3% to 29.1% with overall frequency of 7.3%.[12]

Worldwide, the well-established risk factors for acquisition of HCV infection among pregnant population include intravenous (I/V) drug abuse, history of blood transfusion, hepatitis B virus (HBV) and human immunodeficiency virus (HIV) infection, history of multiple sexually transmitted infections (STIs), multiple sexual partners and sexual contacts with I/V drug users. [13] In Pakistan, there is a paucity of data on this important public health problem particularly in pregnant women. We routinely screen all pregnant women for HCV infection. We therefore carried out this study to determine the seroprevalence of HCV infection as well as to analyze the risk factors for acquisition of this infection among the obstetric population. The data will help policy makers to establish the burden of disease in the pregnant population and will assist in the planning and prioritizing of preventive strategies particularly in rural areas. [14]

In western nations, the Hepatitis C Virus is most typically disseminated through the use of dirty needles, intravenous drug misuse, transfusions of blood or blood products without the appropriate screening for the Hepatitis C Virus, and intravenous drug usage.[15] Because the infection with the Hepatitis C virus does not cause any symptoms, it is possible for it to go untreated for a number of years. It is estimated that the seroprevalence of Hepatitis C virus infection is 5.4% in the Central Asian region. Additionally, advances have been made in the treatment of the Hepatitis C virus. [16]

Material and Methods

Venue of Study- Department of Microbiology, Index Medical College Indore, MP

Selection of Samples- 109 Samples were included in this study.

Sample Collection- Consecutive pregnant women attending ANC clinics of the hospital. As per national guidelines, blood samples were obtained during antenatal checkups to screen for HCV explained about the purpose of the study and informed consent was taken. Following standard precautions, 10 ml of venous blood was collected in two gel based/ plain vacutainers. All samples stored at 2-8°C were screened for HCV infection by detecting antibody/antigen by ELISA/Rapid test. The detailed history of HCV positive pregnant women was taken as per pre-structured questionnaire that was include demographic details, clinical history, high risk behaviours and potential exposure to blood and body fluids.

Result: A total of 109 samples were included in our study. After consecutive pregnant women attending ANC clinics of the hospitals. In out of 109 samples were as 3 was found HCV antibody positive in pregnant women and 2.7% seroprevalence were confirmed. In which highest infectivity rate of HCV was seen in 30-40 years of age group and lowest in 20-30 years of age group of pregnant women. Highest seroprevalence of HCV were seen in non-working pregnant women than working female. The history of previous blood transfusion and invasive procedures show significant association with HCV infection detection by ELISA/Rapid test were as test give 03 clearly positive out of total 109 positive individuals and then further confirm by ELISA technique 03 samples were given HCV positive result. Among the risk factors that are associated with acquiring HCV infection,

history of piercing was found in all the women. History of dental procedures both invasive (root canal treatment, tooth extraction) and relatively non-invasive (tooth whitening, plague removal, minimal invasive cavity filling) procedures was in 33.33% of women. As per earlier reports, the hepatitis C virus may lead to beta-cell dysfunction. Resulting insulin resistance. Based on these observations, it is hypothesized that HCV could act as a cofactor for GDM.

Discussion: HCV in the worlds one of the most common causes of life-threatening liver disease & death associated with it, particularly in developing countries. It has been reported that 10%-20% HCV positive pregnant women transmit to the virus to their neonates in highly endemic areas up to 75% of chronic carriers acquire the infection through mother to child transmission. Early detection enables counseling and monitoring. Direct-acting antiviral (DAA) therapy can be planned postpartum. Infants born to HCV-positive mothers can be followed up for timely diagnosis. In our study shows that the seroprevalence of HCV antibody was 109/2.7% and were as similar study was done by Jindal et al. 4.8% and same as Goyal et al. 2.8%.[17-18]

Seroprevalence of HCV infection in pregnant women by Serodiagnosis

In this current study, pregnant women attending ANC clinics at the tertiary care Index hospital Indore screened for HCV infection. This study included 109 pregnant women and 3 were positive for HCV antibodies, several were done in various parts of India to estimate the seroprevalence of HCV infection in pregnant women and are summarized in table.

Table: Research findings on the seroprevalence of HCV infection among pregnant women in India.

Study	Year	Location	Sample size	Seroprevalence (%)
Mehta et al.[19]	2013	Gujarat	1038	0.19%
Yadav et al.[20]	Dec2018- Dec2019	Uttar Pradesh	4037	0.52%
Jahan G et al. [21]	Dec2017-May2018	Uttar Pradesh	345	1.7%
Malhotra et al. [22]	Jan2015-Jan 2016	Haryana	10,000	0.30%
Jindal et al.[17]	Feb 2014- Dec 2014	Punjab	717	4.8%
Parthiban et al. [23]	Jun2020- Sep2002	Chennai	3115	0.6%
Kumar et al. [24]	May2004- Aug2006	Delhi	8130	1.03%
Jahan N et al. [25]	Jun2019- Jun2019	Uttar Pradesh	550	0.5%
Pyadala et al. [26]	Jan 2015- Dec 2015	Telangana	1381	0.21%
Goyal et al.[18]	Jan 2010- Jan2013	Punjab	1412	2.8%
Marwah et al. [27]	Apr 2011-Jun 2014	Punjab	2031	0.3%

The factors contributing to the acquisition of HCV infection in pregnant women

Table enumerates the diverse risk factors linked to the acquisition of HCV infection in pregnant women.

Table: Risk factors associated with acquiring HCV infection in pregnant women

Variable	Categories	Frequency (n=3)	Percentage
History of blood transfusion	yes	1	33.33%
History of invasive procedures/ surgery	yes	0	0
History of dental procedure	Yes	1	33.33%
History of tattooing	Yes	1	33.33%
History of piercing	yes	3	100
History of HCV	yes	1	33.33%
	no	2	66.66%
	Do not know	0	0
History of HCV in family member	yes	0	0

	Do not know	3	100

Among the risk factors that are associated with acquiring HCV infection, history of piercing was found in all the women. History of dental procedures both invasive (root canal treatment, tooth extraction) and relatively non-invasive (tooth whitening, plague removal, minimal invasive cavity filling) procedures was in 33.33% of women. However, most of the women were not aware of the HCV status of their spouse, only 1 spouse had a negative HCV antibody test, and 2 spouses had a positive HCV antibody test. were reported by Jahan G et al., 133 out of 6 seropositive women,16.66% (1/6) had a history of blood transfusion, 33.3% (2/6) had a history of surgery, 33.3% (2/6) had tattoo and no history of miscarriage.[21]In this study, women were not aware of HCV infection status in family members or their spouse. The poor literacy level of the current study group as well as lack of sensitization regarding transmission and prevention of HCV may be an associated risk factor. The primary care physicians and other medical worker can address this issue by generating awareness while the pregnant women attend the primary health centers for antenatal check-ups, by arranging skit/ drama for attracting the attention of other non- pregnant adults and by poster/slogans for young school/college going children. Also, pregnant women missing their ANC can be targeted through campaigns involving frontline workers. This approach can help in reducing the burden of hepatitis C not only in pregnant women, but in all age groups.

As per earlier reports, the hepatitis C virus may lead to beta-cell dysfunction. Resulting insulin resistance. Based on these observations, it is hypothesized that HCV could act as a cofactor for GDM. This may not always be clinically significant in causing glucose metabolic abnormalities (GMA) during pregnancy but could play a role in the presence of other concurrent comorbid conditions, which may vary within different populations at different times and locations. A study conducted by pergam et al. [28] demonstrated that women diagnosis with HCV were at a higher risk of developing gestational diabetes mellitus (GDM) compared to those without HCV (OR=1.53,95% CI: 0.85-2.27). However, among experiencing excessive weight gain during pregnancy, HCV infection showed a stronger association with GDM (OR=2.51,95% CI:1.04-6.03). which was not observed among with insufficient or normal weight gain during pregnancy. In our study, on seropositive pregnant women had plasma glucose >140mg/dl. However, studies done on HCV seropositive pregnant women by Oamar et al. showed 35.5% (70/197) and 25.6% by pinetti C et al. 125 had GDM. [29-30]

Conclusion: In our study were concluded that 2.7% seroprevalence out of 109 HCV pregnant women, those who attend the ANC department of index medical college. ELISA-based detection helps identify active infections that pose a risk of vertical transmission. Incorporating routine HCV screening into antenatal care programs at tertiary hospitals can enhance early diagnosis and improve maternal and neonatal outcomes.

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