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Original Research Article

Seroprevalence of Hepatitis C virus infection in patients attending tertiary care hospital of southern Haryana, India

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ABSTRACT

To find the seroprevalence of the Hepatitis C virus infection in the patients attending SHKM GMC, Nalhar. **Material and Methods:** A retrospective study was conducted in Department of Microbiology, SHKM GMC, Nalhar. The samples were taken from 16th August 2021 to 20th July 2022. A total of 11,890 samples were taken for study and HCV infection was diagnosed using ELISA and Rapid card test.

Result: Out of 11,890 serum samples seroprevalence of HCV infection was found to be in 0.012% of the individuals.

Conclusion: It is concluded that Mewat has a low seroprevalence of HCV infection.

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1. Introduction

Hepatitis C causes can manifest themselves in both acute and chronic forms of the disease. The most common ways for HIV to spread are through intravenous drug use, blood transfusions, sexual contact, and transmission from mothers to their newborn children. The number of persons infected with HCV (Hepatitis C virus) is estimated to range from roughly 130 million to 150 million across the globe. If the patient receiving treatment for this condition receives that treatment, then the disease may remit in around 90 percent of people.^{1–3}

Cirrhosis can develop in around 20-30% of persons who are infected with the Hepatitis C virus, and approximately 2–7% of those who already have cirrhosis have a predisposition to develop primary hepatic cancer.² Every year, there are an additional 3–4 million people throughout the world who test positive for having the hepatitis C virus.

Pegylated interferon alpha and Ribavirin are two of the medications that are used in the treatment of hepatitis

C virus infection.³ An infection with the Hepatitis C Virus can result in hepatitis, as well as cirrhosis and Hepatocellular carcinoma.⁴ Enhancing the host's immunity by causing the Hepatitis C Virus-encoded NS3/4A protease to break down Mitochondrial Anti Viral Signal protein is the most important step in the treatment of Hepatitis C Virus infection. This can be accomplished for a number of different reasons.⁵ The goal of treatment for hepatitis C virus infection is to achieve a level of hepatitis C virus RNA (ribonucleic acid) that is undetectable 12 to 24 weeks after the conclusion of treatment. The viral load of the virus can be determined through an RNA test for the hepatitis C virus.

The illness caused by the Hepatitis C virus is not widely known to the general public.⁶ On a global scale, an infection with the Hepatitis C virus is responsible for 54,000 fatalities. In earlier times, the Hepatitis C virus was more often seen in Africa and Asia. Because there is now no vaccine available to prevent infection with the Hepatitis C virus, prevention can be challenging. Consequently, the measures used when administering injections constitute the approach for preventing the infection. Despite the availability of therapy, the obstacles include a lack of clinical skills among

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doctors and the high cost of the medications. In situations of chronic liver disease, prevention is possible through the avoidance of alcohol as well as screening.⁷

Infection with the Hepatitis C Virus almost never causes symptoms. Individuals who have been acutely infected with the Hepatitis C virus are at a risk of having chronic Hepatitis C virus infection at a rate that is close to 75%. There are many instances in which people who are infected with the Hepatitis C Virus are unaware that they have the infection. In most cases, an enzyme immunoassay, also known as an EIA, will be used to detect the Hepatitis C virus. Within the confines of a hospital with limited resources, rapid diagnostic tests are carried out.⁸ This research contributes to the development of health policies that aim to reduce the spread of the hepatitis C virus. It is helpful to do early screening in order to limit the number of people who are chronically infected with the Hepatitis C Virus.⁹

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.¹⁰ 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.¹¹

The hepatitis C virus can cause issues both within and outside of the liver. Fatigue is the symptom of chronic hepatitis C virus infection that is mentioned most commonly by patients. It is possible to lessen the likelihood of transmission by exercising caution during sexual activity, receiving blood transfusions, and adhering to best standards for injection. The enzyme-linked immunosorbent assay (ELISA), the reverse transcription polymerase chain reaction (RT-PCR), and the rapid diagnostic test (RDT) kits are the diagnostic procedures that are now accessible. The Hepatitis C virus has an infectious potential that is four times higher than that of the human immunodeficiency virus.¹² The Hepatitis C Virus is the most common cause of chronic liver illness in people who are receiving hemodialysis.¹³ When compared to those in other occupations, the prevalence of antibodies against the hepatitis C virus in those working in healthcare is three times greater.¹⁴

Co-infection with hepatitis B and hepatitis C is rather prevalent since the two viruses share many of the same routes of transmission.¹⁵ Patients with type 2 diabetes mellitus have a higher seroprevalence of hepatitis C than non-diabetic people do, according to research carried out by Feutseu C. Non-diabetic people have a lower seroprevalence of the virus.¹⁶ Transmission of this illness through sexual contact is extremely uncommon.¹⁷ Mortuary employees

have a greater risk of contracting HCV because to their occupation.¹⁸ Patients suffering from thalassemia carry an increased chance of contracting hepatitis B and hepatitis C.¹⁹

This study has been done to estimate the seroprevalence of Hepatitis C virus infection and its gender distribution. These types of studies are helpful in making health policies and to estimate the burden of disease.

2. Materials and Methods

2.1. Study design

This is a Retrospective study hospital based study.

2.2. Study duration

This study was conducted on the available test results of Hepatitis C Virus based on the results of Hepatitis C Virus test of 11 months duration that is from 16th August 2021 to 16th July 2022 of Department of Microbiology, Shaheed Hasan Khan Mewati Government Medical College (SHKM GMC), Nalhar, Nuh, Haryana, India.

2.3. Study site

This study was conducted in the Virology section of the Department of Microbiology, SHKM GMC, Nalhar, Nuh, Haryana, India. This is a tertiary care hospital in Southern Haryana, India.

2.4. Total samples

For the purpose of the investigation, 11,890 samples of serum were collected. To collect the serum from the samples, a centrifuge was used, and the samples were processed as soon as the centrifuge had finished. This was done to verify that the procedure was effective. For both the collecting of samples and the centrifugation of them, every single recommended procedure and safety measure was carried out.

2.5. Study population

Patients who presented themselves to the SHKM, GMC, Nalhar were included in the research regardless of age, gender, profession, disease, risk factors, education level, economic standing, marital status, or ethnicity. Therefore, for the purpose of this study, all of the samples that were sent to the department of Microbiology from the outpatient department and the inpatient department of this medical college and hospital were utilized. These patients had been given the recommendation to undergo a Hepatitis C Virus test by one of the clinical departments. In the research, there were no criteria for participants to be disqualified. The SHKM General Medical College and Hospital in Nalhar is a tertiary care hospital unit that not only offers undergraduate

and postgraduate training for allopathic medical students but also delivers tertiary level health care services.

2.6. Testing method

Both the enzyme-linked immunosorbent assay (ELISA) and the rapid diagnostic test method were utilized in order to identify the presence of HCV antibodies anti-HCV. These two techniques were utilized in order to detect the Hepatitis C Virus. Meril diagnostics performed the ELISA (enzyme-linked immunosorbent assay), and a LisaScan EM was utilized to interpret the findings in accordance with the instructions provided by the manufacturer. Aspen kit was responsible for doing the quick diagnostic test. In order to carry out the ELISA and the Rapid diagnostic test, all of the recommended procedures and safety measures were adhered to. Covered on the plate is the HCV-specific recombinant protein known as Core, as well as NS3, NS4, and NS5. During the ELISA process, the serum samples and controls were dispensed in the appropriate quantities into the microwells, which were then placed in an incubator. If the sample has HCV, then there will be HCV antibodies present, and these antibodies will bind to the antigens that are on the surface of the microwell if the test is positive. The sample and antibodies will be washed once they have been untied. After that, the conjugate that will attach to the antigen-antibody combination is introduced. Afterwards, the process is complete. Because of this, the color will shift from blue to a bluish green. The color will continue to alter until it reaches either a yellow or an orange hue after the reaction has been stopped. The microwells will have no visible color if the antibodies against HCV are not present. The creation of a colored line may be seen in the fast diagnostic test if the sample tested positive for HCV. The serum samples that did not have an appropriate amount of the sample necessary to run ELISA or perform Rapid diagnostic test were discarded. An inadequate amount of the sample is defined as being less than the adequate amount of the sample.

3. Results

A total of 11,890 serum samples came to the department of Microbiology from all the departments in SHKM, GMC, Nalhar as a part of routine testing or diagnosis in symptomatic cases. Out of these 11,890 serum samples 143 were positive for Hepatitis C Viral infection by ELISA as well as Rapid diagnostic test to detect antibody to hepatitis C virus (anti-HCV).

Therefore, the seroprevalence of Hepatitis C Virus infection is 0.012% in SHKM GMC, Nalhar, Nuh. Hence, it depicts the seroprevalence of Hepatitis C Virus in Southern Haryana, India.

Sex distribution of Hepatitis C Virus seroprevalence:- There were 72% males and 28% females who were Hepatitis

C Virus seropositive. So, there is significant difference in positivity of Hepatitis C Virus in males and females. So, this data shows that Hepatitis C Virus seroprevalence is significantly higher in males as compared to females in the Southern Haryana. In the studies from the past it is seen that Males have a higher seroprevalence of Hepatitis C Virus as compared to females. So, our study matches with their findings.

Table 1: Seroprevalence of Hepatitis C Virus in percentage

Hepatitis C positive individuals	Hepatitis C negative individuals
0.012%	99.988%

Table 2: Gender wise distribution of Hepatitis C in percentage

Hepatitis C positive females	Hepatitis C positive males
28%	72%

4. Discussion

Although the Hepatitis C virus affects people all around the world, it is mostly a problem in poor nations because of a lack of effective measures to prevent and manage the infection. According to the findings of a number of research, the Hepatitis C Virus is most prevalent in parts of Asia and sub-Saharan Africa.¹² It has been shown that the prevalence of HCV in Europe ranges anywhere from 0.1 to 6%.²⁰ There has been a recent rise in the incidence of HCV infection in India. It has been observed that different geographical places in India have distinct patterns of seroprevalence.¹³ The seroprevalence of the Hepatitis C virus, which is one of the most significant health problems facing people throughout the world, was investigated in this study. The incidence of the Hepatitis C virus is close to 2.5% across the world.² In a great number of nations, the statistics on the seroprevalence of the Hepatitis C Virus are insufficient.⁸ Research on the Hepatitis C Virus is very essential since it contributes to the development of methods for preventing infection with the Hepatitis C Virus.² Patients who test positive for the Hepatitis C virus are often subjected to a certain amount of social stigma.³ When compared to a research of the same nature that Kumar M. et al. carried out in Western Uttar Pradesh, India, the seroprevalence of the Hepatitis C Virus was much lower. The seroprevalence of HCV was reported to be 2.3% in the study that was performed by Kumar M et al. However, in our study, the seroprevalence of Hepatitis C Virus was found to be 0.012% in 11 months at the tertiary care Hospital in South Haryana, India.¹³ Positive tests for the Hepatitis C virus were conducted on 72% of the males and 28% of the females. Therefore, the prevalence was substantially greater in males. There may be a higher frequency of intravenous

drug misuse among guys, as well as a higher rate of hazardous sexual behavior among males, which contributes to the high seroprevalence in males.⁹

In addition, the results of our study demonstrate that the seroprevalence of the Hepatitis C Virus infection in Southern Haryana is significantly lower than that of the global seroprevalence. This demonstrates that Hepatitis C infection is under much better control in the southern part of the state of Haryana, and this should be maintained in the future by using standard precautions while injecting drugs to patients, screening patients during blood transfusions, general precautions taken by health care workers to prevent needle stick injuries, and avoiding having multiple sexual partners. In order to reduce the prevalence of infectious illnesses like hepatitis C in India, it is necessary to oppose the dangerous delivery of injections by unqualified quacks. We did not measure HCV seroprevalence depending on age, occupation, ethnic group, socioeconomic position, education, or high risk groups, and we did not diagnose any chronic instances of Hepatitis C Virus infection. These are some of the limitations of our study.

Despite the limitations that were discussed before, the sorts of research that are being discussed here serve to provide an estimate of the seroprevalence of communicable illnesses such as the infection caused by the Hepatitis C virus. In order to facilitate the formulation of health policies and the estimation of disease burdens.

5. Conclusion

Our research sheds light on the infection rate caused by the Hepatitis C Virus in this region of Haryana and will serve as a point of reference for further research on the epidemiology of Hepatitis C Virus infection. Based on the findings of this study, the seroprevalence of the Hepatitis C Virus in Southern Haryana, India, appears to be rather low. It is of assistance to us in comprehending and evaluating the severity of the sickness throughout the community and the region. Therefore, these kinds of research are beneficial to epidemiologists in that they assist them gain understanding regarding communicable illnesses. Screening for the Hepatitis C virus should be done on a regular basis, with a particular focus on high-risk populations such as health care professionals, persons who have had several sexual partners, people who misuse intravenous drugs, guys who have had intercourse with other males, etc.

6. Source of Funding

None.

7. Conflict of Interest

None.

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