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Prevalence of Anti-Hepatitis C Virus Antibodies among Inpatients and Outdoor Attendees of a Tertiary Care Institute

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ABSTRACT

Background: Hepatitis C represents a major public health problem worldwide. The burden of the disease is expected to increase throughout the world as the disease progresses in patients who have contracted infection decade's ago. Moreover there is considerable genetic heterogeneity among HCV isolates. **Materials and method:** The present study was undertaken on 4896 blood samples sent to Microbiology department of BPS, GMC for Women, Khanpur Kalan, Haryana (India) for testing anti-HCV antibodies. Subjects included both inpatients and outpatients in whom HCV testing was done on basis of demographic and underlying risk factors, clinical observations, socio economic status, as part of pre operative evaluation and antenatal cases. The sera were analyzed by 4th generation HCV TRI-DOT (Diagnostic Enterprises, H.P India). **Results:** The prevalence of anti- Hepatitis C virus antibodies in current study was found to be 4.62 % (226). Seroprevalence was observed to be higher among males 141 (4.96%) in comparison to females 85 (4.14%). Seropositive cases depicted maximum number within age group of 40-59 years (41.13%) followed by 20-39 years (35.46%) and 60-79 years (16.31%) in males whereas in females highest number of positive cases were found in age group of 20-39 years (40%) followed by 40-59 years (35.29%) and 60-79years (22.35%). **Conclusion:** HCV remains potential cause of substantial morbidity and mortality. The prevalence rate of HCV infection in the present study may be a warning sign about the rising profile of the virus in apparently healthy individuals .The underpinning of any effort to prevent and control HCV infection is accurate epidemiological data.

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Introduction

Hepatitis is an inflammation of the liver, most commonly caused by a viral infection. Of these viruses, hepatitis B virus (HBV) and hepatitis C virus (HCV) infections account for a substantial proportion of liver diseases worldwide. These viruses are responsible for liver damages ranging from minor disorders to liver cirrhosis and hepatocellular carcinoma (HCC). Approximately 7% of the world's population (350 million people) is infected with HBV and 3% (170 million people) with HCV¹. Since its discovery in 1989, hepatitis C virus (HCV) has been recognized as a major cause of chronic liver disease worldwide. Although HCV is endemic worldwide, there is a large degree of geographic variability in its distribution. Countries with the highest reported prevalence rates are located in Africa and Asia; areas with lower prevalence include the industrialized nations in North America, Northern and Western Europe, and Australia. Populous nations in the developed world with relatively low rates of HCV seroprevalence include Germany (0.6%), Canada (0.8%), France (1.1%), 4 and Australia (1.1%). Low, but slightly higher seroprevalence rates have been reported in the USA (1.8%), Japan (1.5–2.3%), and Italy (2.2%). China, whose citizens account for one fifth of the world's population, has a reported seroprevalence of 3.2%². According to the World Health Organization, there are 180 million people affected with HCV world-wide and about 12.5 million carriers in India³. Moreover, in many developing countries, supplies of sterile syringes may be inadequate or non-existent, non-professionals often give injections outside the medical setting, and injections are often given to deliver medications that could otherwise be delivered by the oral route. In this environment people may receive multiple contaminated injections over the course of a

lifetime, incurring a substantial cumulative risk of HCV infection⁴. Seroepidemiological studies show that the seroprevalence of HCV infection in India varies between 0.3 to 11.3%. In large percentage of HCV cases, transmission is by transfusion and other parenteral means such as sharing of needles, occupational exposure to blood, haemodialysis, intranasal cocaine use and body piercing. People having multiple sex partners are also at risk. However, in case of half of HCV infections, the route of transmission is unknown. HCV establishes a chronic infection in 50-80% of cases which is often asymptomatic even in the presence of liver damage discernible on biopsy. Early diagnosis of HCV can be made using reverse transcriptase polymerase chain reaction to detect HCV RNA in serum. The presence of HCV RNA appears to denote actual viremia. Unfortunately these methods of detection are limited to research laboratories and it is not possible to detect the viral particle or viral antigens by routine immunological methods⁵. The absence of an anti-HCV vaccine amplifies the risk of HCV transmission and explains why the incidence of HCV infection is still increasing all over the world. This is the reason why periodical reevaluation of epidemiologic data is necessary in all countries^{6,7}. The present study was undertaken to know the burden of HCV infection by knowing current prevalence of anti HCV antibodies in hospital based population of a tertiary care institute catering to large area of North West region of India, as primary prevention of HCV infection is to check transmission of virus unknowingly by apparently healthy individuals who are asymptomatic.

Material and Method

The present study was conducted at BPS, GMC for Women, Khanpur Kalan, Haryana (India) on 4896 routine blood

samples sent to Microbiology laboratory for testing anti-HCV antibodies. Subjects included both inpatients and outpatients in whom HCV testing was done on basis of demographic and underlying risk factors, clinical observations, socio economic status, as part of pre operative evaluation and antenatal cases. As per the standard operating guidelines, blood sample (2-3ml) was collected by standard procedure and transported to the lab for testing. In case delay was inevitable, serum sample was separated & stored in refrigerator at 2-8°C till further testing. Blood was allowed to clot & after centrifugation, clean clear serum samples were separated in clean test tubes. The sera were analyzed by 4th generation HCV TRI-DOT (Diagnostic Enterprises, H.P, India) that utilizes a unique combination of modified HCV antigens from putative core, NS3, NS4 & NS5 regions of virus to selectively identify all subtypes of Hepatitis C virus in human serum/plasma with a high degree of sensitivity and specificity. All the sera which were positive for antibodies to HCV were retested second time using same kit and method. Samples which were repeatedly reactive were considered to be positive.

Results

Overall prevalence of anti-HCV antibodies in hospital based population

In the present study, 4896 blood samples were tested for presence of antibodies to Hepatitis C virus, out of which 226 samples tested positive. Prevalence of anti- Hepatitis C virus antibodies in current hospital based population was found to be 4.62% as shown in table 1.

Gender specific prevalence of anti HCV antibodies

Out of 4896 samples tested, 2841 (58.03%) were received from male and 2055 (41.97%) from female patients attending and

admitted in various clinical departments. Gender wise distribution depicted 141 (4.96%) and 85 (4.14%) seropositive cases among male and female respectively as shown in table 1.

Age specific prevalence of anti-HCV antibodies

As regards seroprevalence of anti-HCV antibodies in males, maximum number was observed among age group of 40-59 years (41.13%) followed by 20-39 years (35.46%) and 60-79 years (16.31%) with lowest number of cases in age group <10 years. In females highest number of seropositive cases were seen in age group of 20-39 years (40%) followed by 40-59 years (35.29%) and 60-79 years (22.35%), with only 2 cases (2.36%) in 10-19 years age group and no case below 10 years of age as shown in table 2.

Department specific prevalence of anti HCV antibodies

Among outpatient attendees, the predominance of anti HCV antibodies positive cases were from patients visiting General Surgery (91) followed by general medicine (60) & otorhinolaryngology (25) departments. As regards indoor patients in whom blood samples were sent for routine screening for anti-HCV antibodies highlighted maximum cases from general medicine (08) followed by general surgery (07) and orthopedics (02) department. (As mentioned in table 3.)

Discussion

Since the discovery of HCV more than 20 years ago, epidemiological studies have described complex patterns of infection concerning not only the worldwide prevalence of this virus but also its clinical presentation and its therapeutic response⁸. Although HCV is endemic worldwide; there is a large degree of geographic variability in

its distribution. Countries with the highest reported prevalence rates are located in Africa and Asia; areas with lower prevalence include the industrialized nations². The overall prevalence of Anti HCV antibodies among hospital based population in current study remained 4.62% (226) which is in agreement with studies conducted in Northern India by Sood A *et al* 2012 and Pondicherry by Bhattacharya S *et al* 2003 who reported prevalence of HCV infection as 5.2% and 4.8% respectively^{9,10}. The observed seroprevalence (4.62%) of HCV infection was high in the present study when compared with other studies done in Tamil Nadu by B. Vallab Ganesh Bharadwaj *et al* 2014 and West Bengal by Chowdhury A *et al* 2003 who reported seroprevalence as 0.68% and 0.87% respectively^{11,12}. The prevalence may vary even within different regions in the country due to various social practices and customs which can influence the transmission of HCV. The difference in prevalence may be outcome of prevailing health resources, educational status of the population and paucity of health education programmes. Two 2003 studies among populations in different regions of India found substantial associations between prevalent HCV infection and frequent visits to “freelance” or unlicensed practitioners of medicine, as well as a history of therapeutic injections using reusable syringes^{12,13}. Similarly, a case control study in a community in Pakistan found that HCV-infected cases were more likely to report five or more injections per year from a health-care provider in the past 10 years than were controls¹⁴. Blood transfusion is an effective mode of transmission of hepatitis C infection as it allows a large quantum of infective virions into the susceptible patient. In developed countries numerous corrective measures have reduced the spread of infection through this route. This has been documented in Japan where HCV

prevalence dropped from 4.9% to 1.9% after mandatory screening was introduced in 1990 and in the US where the prevalence dropped from 3.84% to 0.57% after the same year. In India, mandatory screening for HCV was introduced as late as 2002. The studies from all over India suggest that despite testing of blood units, hepatitis C infection is still a significant problem in the multiple transfused groups of patients¹⁵. Among 4896 samples tested, 2841 (58.03%) were males and remaining 2055(41.97%) females. The seroprevalence was higher among male 141 (4.963%) as compared to female 85 (4.136%) which is comparable to findings of B. Vallab Ganesh Bharadwaj *et al* 2014 who also observed higher prevalence of HCV in male (0.7%) as compared to female(0.66%)¹¹. This male preponderance is explained by high exposure level pertaining to various risk factors of HCV transmission due to their lifestyle. These findings are not consistent with other studies where prevalence of anti-HCV antibody was higher among female as compared to male^{16,17}. A major determinant of the future burden of disease is the past and present incidence of infection¹⁸. However, establishing the incidence of HCV infection is difficult because most infections are initially asymptomatic and available assays do not distinguish acute from chronic or resolved infection. Acute disease reporting systems can underestimate the incidence of HCV infection, even in countries with well-established surveillance systems¹⁹. The seropositive cases in current study remained highest in 40-59 years followed by 20-39 years in males whereas in females predominant cases were in 20-39 years followed by 40-59 years. Various other studies have also demonstrated high seroprevalence of anti-HCV antibody among adult population^{11,20,21}. The high prevalence rate seen in young adults is due to cumulative risk of exposure in these age

groups. HCV is one of the major etiological agents of parenterally acquired hepatitis and is responsible for most cases of transfusion associated hepatitis. HCV is usually transmitted by sharing infected needles, unsafe transfusion practices and accidental exposures²². Some people acquire infection through sexual transmission. All blood donations are still not compulsorily screened for HCV in India. In past few years contaminated needles and syringes have resulted in numerous outbreaks across the country¹⁵. Adults are at higher exposure risk due to unsafe practices²³. Tattooing could be an added risk factor²⁴. In context of department, preponderance of Anti HCV positive cases was observed from patients attending general surgery (91), general medicine (60) and otorhinolaryngology (25) outdoors whereas from inpatients predominance of seropositive cases was seen among those admitted in general medicine (08), followed by general surgery (07) and orthopedics (02) departments. In our hospital setting blood samples for routine screening of HCV infection are received mainly from general surgery, general medicine, orthopedics & otorhinolaryngology. The risk factors most frequently cited as accounting for the bulk of HCV transmission worldwide are blood transfusions from unscreened donors, injection drug use, unsafe therapeutic injections, and other health-care related procedures. Most developed countries have accumulated evidence that the predominant source of new HCV infections within their borders over the past few decades is injection drug use. In the developing world, unsafe therapeutic injections and transfusions are likely to be the major modes of transmission, especially in countries where age-specific seroprevalence rates suggest ongoing increased risk of HCV infection²⁵. Contaminated injection equipment appears to be the major risk

factor for HCV infection in several countries, including several of the most populous nations in the world².

Conclusion

Hepatitis C is an emerging infection whose long term implications will be felt in the decades to come throughout the world. In the present study seropositivity remained high in young adults and middle aged patients. Since there is no available vaccine till date, so the focus of prevention remains stringent blood banking laws and safe injection practices. To increase public awareness, risk modifying educational programmes along with prevention messages for people with high risk drug using practices should be widely disseminated.

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Table 1. Gender wise distribution of anti- HCV positive cases

Gender	Total number tested (%age)	Anti-HCV positive cases (%age)
Male	2841(58.03%)	141(4.96%)
Female	2055(41.97%)	85 (4.14%)
Total	4896	226(4.62%)

Table 2. Age- wise distribution of Anti- HCV positive cases

Age in years	Male (n=141) Total positive (%age)	Female (n=85) Total positive (%age)
<10	2(1.42%)	00
10-19	7(4.96%)	2(2.36%)
20-39	50(35.46%)	34(40%)
40-59	58(41.13%)	30(35.29%)
60-79	23(16.31%)	19(22.35%)
>80	1(0.89%)	00
Total	141	85

Table 3. Distribution of anti-HCV positive cases among inpatients and outpatients

Department	Outpatients	Inpatients
General Surgery	91	07
Orthopedics	12	02
Gynecology/ obstetrics	16	01
Pediatrics	2	00
General Medicine	60	08
Otorhinolaryngology	25	00
Ophthalmology	00	01
Medical ICU	01	-
Total	207	19