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RESEARCH ARTICLE

SEROPREVALENCE OF HEPATITIS B AND C VIRUS INFECTION IN PATIENTS ATTENDING TERTIARY CARE HOSPITAL, NEW DELHI

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ABSTRACT

Background: Hepatitis is a serious public health problem worldwide and major causes of chronic hepatitis, liver cirrhosis and hepatocellular carcinoma. Chronic hepatitis B virus (HBV) infection accounts for 40-50% of HCC and 20-30% cases of cirrhosis in India. Chronic hepatitis C virus (HCV) infection accounts for 12-32% of hepatocellular carcinoma (HCC) and 12-20% of cirrhosis. ***Materials and method:*** It is a prospective study conducted in the department of Microbiology at tertiary care hospital, New Delhi over a period of one year from January 2018 to December 2018.About 5ml of blood was aseptically collected by venepuncture from each subject. All serum samples were tested for HBsAg and IgM anti-HCV by chemiluminescence immunoassay (CLIA).Those samples which were reactive by CLIA were again tested by rapid card test principle of which is immunochromatography. ***Results:*** Out of 3566 patients screened for HBsAg,126 patients were reactive to HBsAg, this includes 80 (3.58%) males and 46 (3.46%) females. Out of3524 patients were screened for anti-HCV, 157 patients were reactive to anti-HCV, this includes 96 (4.33%) males and 61 (4.67%) females. The distribution of HBsAg according to age showed that those between 21-30 years had higher prevalence of 7.39% followed by 11-20 years 5.38%, 70-81 years 3.82%, 41-50 years 3.11%, 31-40 years 3.06%, 51-60 years 2.57%, 61-70 years 1.74%, 1-10 years 0%, 81-90 years 0% and 91-100 years 0%.The distribution of anti-HCV according to age showed that those between81-90 years had highest prevalence of 7.41% followed by 31-40 years 4.95%, 51-60 years 5.30%,41-50 years 5.16%, 31-40 years 4.95%, 61-70 years 4.09%,21-30 years 3.75%, 11-20 years 2.16%, 71-80 years 1.57%, 1-10 years 0% and 91-100 years 0%. ***Conclusion:*** Keeping in view, the increasing burden of this disease, there is need to increase the public awareness as to how the infection can be prevented by taking simple precautions.

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INTRODUCTION

Viral hepatitis is increasingly being recognised as a noticeable public health problem in India. In general population seroprevalence of hepatitis B surface antigen ranges from 1.1% to12.2% with an average prevalence of 3-4% and that of anti-hepatitis C virus (HCV) Ab is estimated to be 0.09-15%. Chronic infection due to hepatitis B accounts for 40-50% of HCC (hepatocellular carcinoma) and 20-30% cases of cirrhosis in India while chronic HCV infection accounts for 12-32% of HCC and 12-20% of cirrhosis (National guidelines for diagnosis and management of viral hepatitis 2018). HBV is a double stranded DNA virus, that belongs to the family of hepandaviruses. Incubation period for HBV varies from 30-180 days. In high prevalence area most common routes of transmission are perinatal, horizontal, sexual and percutaneous transmission (Arti Kapil; Apurba Sankar Sastry, Sandhya Bhat; Surinder Kumar). Humans are the only reservoir of infection and remain infectious as long as HBsAg is present in the blood and becomes non-infectious once HBsAg disappears and is replaced by anti-HBs antibody (Arti Kapil; Apurba Sankar Sastry and Sandhya Bhat; Surinder Kumar). Approximately 70 percent of patients with acute HBV infection have subclinical or anicteric hepatitis, while 30 percent develop icteric hepatitis. Hepatic complications of hepatitis B infection include fulminant hepatitis, cirrhosis and hepatocellular carcinoma. Diagnosis of hepatitis B depends on serological demonstration of viral markers and the viral DNA can be detected by PCR. Antiviral drugs like pegylated interferon, nucleoside/nucleotide analogues are recommended for treatment of fulminant hepatitis or severe chronic hepatitis. Active immunization with hepatitis B vaccine and passive immunization with hepatitis B immunoglobulin is also available for hepatitis B infection (Arti Kapil; Apurba Sankar Sastry and Sandhya Bhat; Surinder Kumar). Hepatitis C virus previously known as 'Non A Non B hepatitis virus' is a single stranded enveloped RNA virus and it

belongs to flavivirus family. Hepatitis C infection is most commonly transmitted through infected syringes and needles, and transfusion of infected blood. Vertical transmission accounts for 4.8% of births to women with HCV infection. Sexual transmission is rare (Arti Kapil; Apurba Sankar Sastry and Sandhya Bhat; Surinder Kumar). HCV causes both acute and chronic hepatitis. Chronic HCV infection can cause liver cirrhosis, liver failure and HCC if left untreated. Of those with chronic HCV infection, the risk of cirrhosis of the liver is 15–30% within 20 years. The risk of HCC in persons with cirrhosis is approximately 2–4% per year. Laboratory diagnosis of hepatitis C infection include detection of serum antibodies through third generation ELISA and HCV RNA can be detected by PCR. Treatment of hepatitis C infection includes combined therapy with pegylated interferon and ribavirin. There is no effective vaccine available for hepatitis C infection (Arti Kapil; Apurba Sankar Sastry and Sandhya Bhat; Surinder Kumar).

MATERIALS AND METHODS

This prospective study was conducted in the department of Microbiology at tertiary care hospital, New Delhi over a period of one year from January 2018 to December 2018. About 5ml of blood was aseptically collected by venepuncture from each subject and transfer into plain vials. The blood samples were left to clot after which serum samples were separated from the clot by centrifuging at 2000 rpm for 15 minutes. All serum samples were tested for HBsAg and IgM anti-HCV by chemiluminescence immunoassay (CLIA).In CLIA, immunometric technique is used which involves simultaneous reaction of antigen or antibody in the sample with mouse monoclonal antibody or antigen coated onto the wells and a horseradish peroxidase (HRP) labelled mouse monoclonal antibody in the conjugate. The bound HRP conjugate is measured by a luminescent reaction. The amount of HRP conjugate bound is directly proportional to the concentration of antigen or antibody present in the sample. Those samples which were reactive by CLIA were again tested by rapid card test principle of which is immunochromatography. For HBsAg virucheck is used. It is a one step test which utilizes the principle of agglutination of antibody/antisera with respective antigen in immunochromatography format along with use of nanogold particles as agglutination revealing agent. It detects the presence of HBsAg in serum/plasma specimens qualitatively at concentration as low as 0.5 ng/dl. Anti-HCV test device is a qualitative membrane -based immunoassay for the detection of antibody to HCV inserum or plasma.

RESULTS

Total 3566 patients were screened for HBsAg attending OPD at tertiary care hospital. Out of 3566 patients 2237(62.73%) were males and 1329 (37.27%) were females. 126 patients were reactive to HBsAg, this includes 80 (3.58%) males and 46 (3.46%) females. 3524 patients were screened for anti-HCV attending OPD attertiary care hospital. Out of 3524 patients2219 (62.97%) were males and 1305(37.03%) were females. 157 patients were reactive to anti-HCV, this includes 96 (4.33%) males and 61 (4.67%) females. Patients attending OPD at tertiary care hospital were divided age-wise into 1-10 years, 11-20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years, 61-70 years, 71-80 years, 81-90 years and 91-100 years. The distribution of HBsAg according to age showed that those between 21-30 years had higher prevalence of 7.39% followed by 11-20 years 5.38%, 70-81 years 3.82%, 41-50 years 3.11%, 31-40 years 3.06%, 51-60 years 2.57%, 61-70 years 1.74%, 1-10 years 0%, 81-90 years 0% and 91-100 years 0%. The distribution of anti-HCV according to age showed that those between 81-90 years had highest prevalence of 7.41% followed by 31-40 years 4.95%, 51-60 years 5.30%,41-50 years 5.16%, 31-40 years 4.95%, 61-70 years 4.09%,21-30 years 3.75%, 11-20 years 2.16%, 71-80 years 1.57%, 1-10 years 0% and 91-100 years 0%.

Table 1. Distribution of HBsAg among patients attending tertiary care hospital, New Delhi based on sex

Sex	Total no. of patients	Total (%)	HBsAg Positive	HBsAg Positive (%)
Male	2237	62.73	80	3.58
Female	1329	37.27	46	3.46
Total	3566	100	126	7.04

Table 2. Distribution of anti-HCV among patients attending tertiary care hospital, New Delhi based on sex

Sex	Total no. of patients	Total (%)	HBsAg Positive	HBsAg Positive (%)
Male	2219	62.97	96	4.33
Female	1305	37.03	61	4.67
Total	3524	100	150	8.59

Table 3. Distribution of HBsAg among patients attending tertiary care hospital, New Delhi based on age

Age (years)	Total no. of patients	HBsAg positive	HBsAg positive (%)
1-10	10	0	0%
11-20	186	10	5.38%
21-30	555	41	7.39%
31-40	654	20	3.06%
41-50	708	22	3.11%
51-60	662	17	2.57%
61-70	633	11	1.74%
71-80	131	5	3.82%
81-90	26	0	0%
91-100	1	0	0%

Table 4. Distribution of anti-HCV among patients attending tertiary care hospital, New Delhibased on age

Age (years)	Total no. of patients	HCV positive	HCV positive (%)
1-10	9	0	0%
11-20	185	4	2.16%
21-30	533	20	3.75%
31-40	647	32	4.95%
41-50	698	36	5.16%
51-60	661	35	5.30%
61-70	636	26	4.09%
71-80	127	2	1.57%
81-90	27	2	7.41%
91-100	1	0	0%

DISCUSSION

In the present study 3566 patients were screened for HBsAg out of which 126 were reactive to HBsAg. Among 126 reactive patients, 80 (3.58%) were males and 46 (3.46%) were females. Meda *et al.* reviewed 14886 patients and recorded seroprevalence of HBsAg in males to be 10.5% and 7.8% in females (Meda *et al.,* 2018). Gebreegziabher *et al.* (2016) reviewed 482 patients among which seroprevalence in males was 19.2% and in females was 11.6% (Gebreegziabher *et al.,* 2016). Patil *et al.* (2016) studied 7373 patients and reported seropositivity in 2.63% of males and 1.96% of females (Patil *et al.,* 2016). Tripathi *et al.* (2015) reviewed 4396 patients and recorded seroprevalence of 1.97% in males and 1.28% in

females (Tripathi *et al.,* 2015). In a study carried out by Ingale *et al.* (2017) in 21,782 patients seropositivity among males was 70.3% and in females it was 29.6%. The reason for high prevalence in males may be due to habits like multiple sexual partners, unprotected sexual activities, sharing of needles in IV drug abusers and tattooing. However, in females, high immune response helps in clearing of HBV more rapidly and efficiently (Ingale *et al.,* 2017). Sharma *et al.* (2017) reviewed 3891 patients and reported seroprevalence of 2.65% in males and 2.03% in females (Sharma *et al.,* 2017). Jadeja *et al.* (2017) studied 5670 patients and recorded 1.35% seroprevalence in males and 0.48% in females (Jadeja *et al.,* 2017). In our study total 3524 patients were tested for anti-HCV antibody in which 157 came reactive to it. Among 157 reactive patients 96 (4.33%) were males and 61 (4.67%) were females. Isa Alhaji *et al.* (2014) reviewed 100 patients, overall prevalence was 6% among which 4.3% were male and 7.5% were female (Isa Alhaji *et al.,* 2014). Ghezeldasht Ahmadi *et al.* (2017) studied 1654 patients and reported overall prevalence of HBsAg to be 0.67% out of which 0.80% were males and 0.11% were females (Ghezeldasht Ahmadi *et al.,* 2017). In a study carried out by Meda. N et.al in 14886 patients seroprevalence in males was 3-9% and in females it was 3.2% (Meda *et al.,* 2018). Mindolli Preeti *et al.* (2015) reported seroprevalence of 2.8% in males and 2.5% in females among 600 patients (Mindolli Preeti *et al.,* 2015). Ali *et al.* (2010) studied 400 patients among which 4% males were reactive and 2% of females were reactive to anti-HCV (Ali *et al.,* 2010). Sujatha *et al.* (2016) reviewed 21451 patients among which 0.28 % males were seropositive and no female came reactive to anti-HCV (Sujatha *et al.,* 2016). Tripathi *et al.* (2015) studied 736 patients and concluded that 0.42% males were seropositive and 0.37% of females were reactive to anti-HCV (Tripathi *et al.,* 2015).

In the present study seroprevalence of HBsAg was found to be highest in the age group 21-30 years which was 7.39%. This was in favour to observation of Gebrugziabher *et al.* (2016) who reported that high prevalence was found in age group 15-45 years which was 69.2% (Gebrugziabher *et al.,* 2016). Rokade *et al.* (2017) found highest prevalence in age group 15-45 years which was 51.97% (Rokade *et al.,* 2017). Khatoon *et al.* (2016) reported seroprevalence of 37.7% in age group of 28-37 years. However, findings of this study were contrary to observations of Gogos *et al.* (2003) who reported highest seroprevalence of 69.3% in 30-59 years. Patil *et al.* (2016) found highest seroprevalence of 5.24% in 51-60 years age group. Tripathi *et al.* (2015) recorded highest seroprevalence of 7.01% in 11-20 years. Ingale *et al.* (2017) reported highest seroprevalence in 31-45 years which was 37%. Sharma *et al.* (2017) found highest prevalence of 4% in age group 61-70 years. Highest prevalence of anti-HCV was found to be 7.41% in age group 81-90 years in the present study. This was in favour to observations of Ali *et al.* (2010) who reported highest seroprevalence of 7.69% in patients who were >50 years of age. However, findings of this study were contrary to observations of Isa *et al.* (2014) who reported highest seroprevalence of 13.6% in 11-20 years age group. Rajani *et al.* (2014) found highest seroprevalence in age group 11-20 years which was 9%. Ghezeldasht *et al.* (2017) found highest seroprevalence of 11.5% in age group 35-44 years. Tripathi P.C et.al (2015) recorded highest seroprevalence of 0.95% in 41-50 years of age group. Mindolli *et al.* (2015) reported highest seroprevalence of 1.16% in 40-49 years of age group. Sood *et al.* (2018) reported highest seroprevalence of 6.2% in age group 40-49 years.

Conclusion

Present study reported seroprevalence of HBsAg and anti-HCV as well as its age and sex wise distribution. Hepatitis still remains a burden on the healthcare system worldwide, therefore it is important to carry out larger number of studies to provide reference to future studies on epidemiology of hepatitis, to identify high prevalence area for its control and prevention. Attempts should be made to reduce the incidence of hepatitis C and hepatitis B infection and their unregulated spread which can be done by increasing public awareness of simple preventive measures.

Conflicts of interest: The authors declare that they have no conflict of interest.

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