Original Research Article

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Seroprevalence of hepatitis B and hepatitis C in people who inject drugs and other high risk groups in a tertiary care hospital in Northeast India

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ABSTRACT

Background: Viral hepatitis is a serious public health problem affecting billions of people globally. The hepatitis B virus (HBV) and hepatitis C virus (HCV) are blood borne pathogens, frequently causing deaths among general and various high risk populations. This study was carried out with the aim to determine the seroprevalence of HBV and HCV in people who inject drugs (PWID) and other risk groups.

Methods: A cross-sectional study carried out in the Dept. of Microbiology, RIMS, Imphal from October 2014 to September 2016. 103 high risk individuals, including PWID, spouse of high risk people, unprotected sex with female sex worker (FSW), multiple partners (MP), men having sex with men (MSM) and needle prick injuries were included in this study. Serum samples were tested using enzyme linked immunosorbent assay (ELISA).

Results: Out of 103 cases, 87.4% were males and 12.6% females. PWID comprised of 49.5%. Seroprevalence of HBV was 17.4%, anti HBc IgG 16.5% and anti HBc IgM 0.9%. Seroprevalence of HCV was 41.7%, anti HCV IgG 39.8% and anti HCV IgM 1.9%. The rate of HBV and HCV coinfection was 9.7%. Among the PWID seroprevalence of HBV and HCV was 17.6% and 64.7% respectively.

Conclusions: This study determines the current status of acute and chronic infection with HBV and HCV in high risk populations. Anti HBc IgG & IgM and anti HCV IgG and IgM are sensitive epidemiological markers to determine the burden of the disease.

Keywords: HBV, HCV, PWID, Coinfection

INTRODUCTION

Viral hepatitis is a serious public health problem affecting billions of people globally. Infection with HBV and HCV affects the liver and results in a broad spectrum of disease outcomes.¹ Approximately one third of the world's population has been exposed to the HBV, and an estimated 350 million people are chronically infected.² Each year, an estimated 1 million persons die from chronic complications of the disease.³ The World Health Organization (WHO) estimated that 3% of the world's

populations are infected with HCV, resulting in a total of 120 to 170 million people.^{4,5}

With HBV carrier rate of 4% and approximate carrier pool of 40 million, India belongs to region of intermediate endemicity. 6,7 Antibodies against HCV are present in 1-1.5% of Indian population. 8

The Northeastern State of Manipur, bordering the countries considered to be the Golden Triangle of drug trafficking (Myanmar, Laos and Thailand), has a high population of people who inject drugs (PWID). Manipur

is one of the high prevalent state for HIV with adult HIV prevalence of 1.22%. ¹⁰ As HIV, HBV and HCV share a common route of transmission the prevalence of HBV and HCV is high among the PWID and other risk groups. Coinfection with HBV and HCV has more severe liver disease and are at increased risk of progression to hepatocellular carcinoma (HCC). ¹¹ The present study was carried out to determine the seroprevalence of Hepatitis B and Hepatitis C in PWID and other high risk groups and to compare their prevalence in different age groups, sex and high risk groups.

METHODS

A cross-sectional study was carried out from October 2014 to September 2016 in the Dept. of Microbiology, Regional Institute of Medical Sciences, Imphal, Manipur after obtaining permission from the Institutional Ethics Committee.

A total of 103 high risk individuals and equal number of age and sex matched controls were included in this study. The high risk groups comprised of PWID, unprotected sex with female sex worker (FSW), multiple partners (MP), spouse of high risk people, men having sex with men (MSM) and needle prick injuries. 5 ml of peripheral blood was collected from the high risk groups and controls under aseptic conditions after obtaining written informed consent. Serum was separated and tested using Enzyme linked immunosorbent assay (ELISA).

Viral markers tested were, anti-Hepatitis B core (anti HBc) antibodies IgM (DSI S.r.l. Saronno, Via A. Volonterio, 36a, 21047, Italy), anti HBc IgG (Bioassay Technology Laboratory, Shanghai Korain Biotech Co Ltd. Shanghai, China), anti-Hepatitis C virus (anti HCV) antibodies IgM (Bioassay Technology Laboratory, Shanghai Korain Biotech Co. Ltd. Shanghai, China) and anti HCV IgG (Qualisa, Qualpro Diagnostics, Verna, Goa-403722, India).

The Statistical Package for the Social Sciences (SPSS) for windows version 16.0 (SPSS, Chicago, IL, USA) was used for data entry and statistical analysis. Chi-square test was used for analysis and p value of <0.05 was considered statistically significant

RESULTS

From a total of 103 high risk individuals male comprised of 90 (87.4%) cases, most belonged to the age group of 31-40 years 39 (37.8%). Among the risk groups PWID were maximum with 51 (49.5%) cases.

Among the high risk groups seroprevalence of HBV was 18 (17.4%) and HCV 43 (41.7%). The seroprevalence of anti HBc IgG and IgM in males was 15 (14.5%) and 1 (0.9%) respectively (Figure 1). The seroprevalence of HBV and HCV in control group was 0%.

	Age group	age group (years)					
Infection	<20	21-30	31-40	41-50	>50		
	(n=1)	(n=30)	(n=39)	(n=26)	(n=7)		
Anti-HBc IgG	0	6 (20.0%)	6 (15.4%)	4 (15.4%)	1 (14.3%)	0.969	
Anti-HBc IgM	0	0	1 (2.6%)	0	0	0.798	
Anti-HCV IgG	0	5 (16.7%)	20 (51.3%)	13 (50%)	3 (42.9%)	0.031	
Anti-HCV IgM	0	1 (3.3%)	0	0	1 (14.3%)	0.125	

Table 1: Age wise distribution of hepatitis B and hepatitis C infection.

Table 2: Seroprevalence of hepatitis B and C infection in different risk groups.

Infection	Risk groups						
	PWID (n=51) (%)	Unprotected sex with FSW (n=32) (%)	Spouse of high risk group (n=12) (%)	MSM (n=4) (%)	Needle prick (n=2) (%)	Sexual contact with MP (n=2) (%)	P value
Anti-HBc IgG	8 (15.7)	6 (18.8)	2 (16.7)	1 (25)	0	0	0.950
Anti-HBc IgM	1 (2.0)	0	0	0	0	0	0.960
Anti-HCV IgG	32 (62.7)	6 (18.8)	1 (8.3)	2 (50)	0	0	0.001
Anti-HCV IgM	1 (2.0)	1 (3.1)	0	0	0	0	0.987

Chronic infections with HBV and HCV were higher in the age group of 21-30 years (20%) and 31-40 years (51.3%) respectively. Anti-HCV IgG p value among different age groups was 0.031 (Table 1).

Among the high risk groups the seroprevalence of anti-HBc IgG and anti-HCV IgG in PWID was 8 (15.7%) and

32 (62.7%) respectively. Seroprevalence of anti-HBc IgM and anti-HCV IgM among PWID were 1 (2.0%) each. Among unprotected sex with FSW the seroprevalence of anti-HBc IgG and anti-HCV IgG was 6 (18.8%) each and anti-HCV IgM 1 (3.1%). The p value of anti-HCV IgG among various high risk groups was 0.001 (Table 2).

	Co-infection						
Risk group	Anti-HBc IgG+Anti HCV IgG (Chronic HBV & HCV infection)	Anti-HBc IgG+Anti HCV IgM (Chronic HBV with acute HCV infection)	Anti-HBc IgM+Anti HCV IgG (Chronic HCV with acute HBV infection)	Anti-HBc IgM+Anti HCV IgM (Acute HBV & HCV infection)			
Unprotected sex with FSW(n=32)	1 (3.1%)	1 (3.1%)	0	0			
PWID(n=51)	5 (9.8%)	1 (1.9%)	1 (1.9%)	0			
Spouse of high risk group(n=12)	1 (8.3%)	0	0	0			
MSM(n=4)	0	0	0	0			
Needle prick(n=2)	0	0	0	0			
Sexual contact with MP(n=2)	0	0	0	0			

Table 3: Hepatitis B and hepatitis C co-infection in different risk groups.

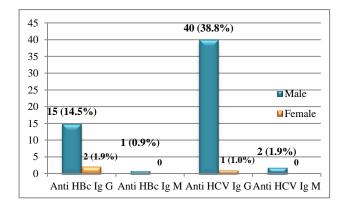


Figure 1: Seroprevalence of hepatitis B and hepatitis C infection in males and females.

Coinfection with HBV and HCV in high risk groups was 10 (9.7%) cases. Coinfection with chronic HBV and HCV among PWID was 5 (9.8%). Coinfection with chronic HBV and HCV among unprotected sex with FSW was 1 (3.1%). Coinfection was not seen in MSM, sex with MP and needle prick injuries (Table 3).

DISCUSSION

In this study 90 (87.4%) were males and 13 (12.6%) were females. The seroprevalence of HBV infection in males were 16 (15.4%) of which anti-HBc IgG 15 (14.5%) and anti-HBc IgM 1 (0.9%). In females seroprevalence of HBV infection was 2 (1.9%), both were chronic infections. In males the seroprevalence of HCV antibody was 42 (40.7%) of which anti-HCV IgG 40 (38.8%) and anti-HCV IgM 2 (1.9%). In females anti-HCV IgG was seen in 1(1.0%) patient only. Both HBV and HCV infection was higher among males. This male predominance was also seen in a study conducted by Saravanan et al in patients with chronic liver disease where males comprised of 74% and females were 26% and the seroprevalence of HBV among males was 72% and females 28%. The seroprevalence of HCV was 75% in males and 25% in females. 12 In a study by Maheswari et al males comprised of 92.29% and females 7.7% and the prevalence of anti-HBc (IgM and IgG) was 10.07% in

males and 9.27% in females.¹³ The sex difference in hepatitis B and hepatitis C prevalence may be due to a difference in viral exposure with men being more exposed as a result of more active lifestyle or behaviour.¹⁴

Age range of the patients was from 15-65 years. The maximum number of patients (37.9%) was in the age group of 31- 40 years. The seroprevalence of both HBV and HCV were higher in the age group of 31- 40 years, with 6.8% and 19.4% respectively. Anti-HCV IgG p value among different age groups was 0.031 which was statistically significant. Mahajan et al in their study reported a high prevalence of HCV (58%) in the age group of 25-34 years. Devi et al reported the seroprevalence of infections higher in the age group of 23-32 years, which was lower than this study. It

The seroprevalence of HBV in this study was found to be 18 (17.4%) of which anti-HBc IgG 17 (16.5%) and anti-HBc IgM 1(0.9%). The seroprevalence of HCV was 43 (41.7%) of which anti-HCV IgG 41(39.8%) and anti-HCV IgM 2 (1.9%). The seroprevalence of HBV among PWID were found to be 9 (17.6%) with anti-HBc IgG 8 (15.6%) and anti-HBc IgM 1 (1.9%). Prevalence of HCV among PWID was 33 (64.7%) with anti-HCV IgG 32 (62.7%) and anti-HCV IgM 1 (1.9%). The p value of anti-HCV IgG among various high risk groups was 0.001, which was statistically significant. Devi et al reported seroprevalence of HBV among PWID 10.8% which was lower than this study and the seroprevalence of anti-HCV 90.4%, which was higher. 11 In another study by Kermode et al the seroprevalence of anti-HCV among PWID was 74%, which was higher than this study. To Ray et al reported HBV and HCV among PWID 9.7% and 53.7% respectively.17

The rate of HBV and HCV co-infection in this study was 10 (9.7%) of which chronic infection with anti-HBc IgG and anti-HCV IgG was 7 (6.8%). Chronic HBV infection with acute HCV infection was 2 (1.9%) and chronic HCV infection with acute HBV infection was 1 (1.0%). In a study by Singh et al the HBV and HCV co-infection was 6%, which was lower than this study. Saravanan et al

showed co-infection rate of 5.9%. The rate of HBV and HCV co-infection among the PWID was 7 (13.7%). ¹² Javadi et al reported a co-infection rate of 12.1% among PWID, which was similar to this study. ¹⁹

CONCLUSION

In this study the current status of acute and chronic infection with HBV and HCV in high risk populations is determined. Seroprevalence of acute infections are less compared to chronic infections. The seroprevalence of HBV and HCV in PWID and other risk groups is higher in this part of the country which may be due to higher prevalence of PWID and other high risk groups. Anti HBc IgG and IgM and anti HCV IgG and IgM as viral markers are sensitive epidemiological markers to determine the burden of the disease.

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