

A Study on the Prevalence of Hepatitis B among Adult Population in South Kashmir

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ABSTRACT

Background: Hepatitis B virus is a small DNA virus that belongs to Hepadnaviridae family. Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus. It is a major global health problem. It can cause chronic liver disease and chronic infection and put people at high risk of death from cirrhosis of the liver and liver cancer. More than 400 million people have chronic (long-term) liver infections. About a million people die every year due to the acute or chronic consequences of hepatitis B. High rates of chronic infections are found in the Amazon and the southern parts of eastern and central Europe. In the Middle East and the Indian subcontinent, an estimated 25% of the general population is chronically infected. Not many community based studies are available from our country and none from the state of Jammu and Kashmir.

Objective: To estimate the prevalence of Hepatitis-B among adult population in South Kashmir.

Methods: This community based, cross sectional study was conducted in four districts of South Kashmir over a period of one and half years by using HEPACARD kit (immunochromatography method), product code HB010020, HB010100, manufactured by J. MITRA & CO. PVT. The HEPACARD kit has a sensitivity of 99% and specificity of 97.8%.

Results: Out of 5533 subjects screened for HBsAg, 2976 were males and 2557 were females. Out of total 5533 subjects, 133 tested positive for HBsAg, constituting a total prevalence of 2.40%. Out of 2976 males, 66(2.21%) tested positive for HBsAg and among 2557 females, 67(2.62%) tested positive for HBsAg.

Conclusion: Overall prevalence of Hepatitis B was 2.4% in this study from South Kashmir; 2.21% in males and 2.62% in females. JMS 2017; 20(2):82-89

Key words: Hepatitis B, Prevalence, community based study, Kashmir, India.

INTRODUCTION

Hepatitis B is a major global health problem. It is a leading cause of morbidity and mortality. More than 400 million people have chronic (long-term) liver infections¹. About one million people die every year due to the acute or chronic consequences of Hepatitis B¹. In the Middle East and the Indian subcontinent, an estimated 25% of the general population is chronically infected. Less than 1% of the population in Western Europe and North America is chronically infected¹. The prevalence of Hepatitis B varies markedly around the world. In highly endemic regions, such

as South-East Asia (excluding Japan), China, and much of Africa, 8% or more of the population are chronic HBV carriers, and the lifetime risk of infection ranges from 60% to 80%². In these areas, perinatal transmission and horizontal spread among children are the major sources of infection. Approximately 60% of the world's population resides in these areas where HBV is highly endemic.² Regions of intermediate risk include parts of Southern and Eastern Europe, the Middle East, Japan, the Indian subcontinent, much of the former Soviet Union and Northern Africa. In intermediate-risk areas, the life time risk of infection is between 20% and 60%. Persons of all age groups are infected, but as in high-risk areas, most infections occur during infancy or early childhood. Regions of low prevalence are North America, Western Europe, certain parts of South America and Australia. In these areas, the lifetime risk of HBV infection is less than 20%, and

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transmission is primarily horizontal (i.e. between young adults)². Prevalence of Hepatitis B surface antigen (HBsAg) in India varies from 1 to 13 percent, with an average of 4.7 percent.³⁻⁹ A high prevalence rate of HBsAg has been noted among the Indian tribal population.¹⁰⁻¹⁴ There are only a few community-based studies that have looked into the prevalence of Hepatitis B infection (HBsAg + Anti-HBc/Anti-HBs).^{15,16} and these studies have found a high frequency of exposure to HBV infection in the Indian general population with a higher positivity among the rural population¹⁷. Prevalence of Hepatitis B surface antigen in Kashmiri blood donors is 1.11% with a significant more positivity among rural donors¹⁸. So to throw more light on this global health problem and to add more information to the already existing data from other parts of India, the current study was conducted with the objectives to estimate the prevalence and to estimate the intra-district differences in the prevalence of the Hepatitis B in adult population of South Kashmir.

METHODS

The present community based, cross sectional study was conducted in four selected Districts of south Kashmir (Figure 2) over a period of one and half years commencing from April 2014 to September 2015. The study population included only native residents of South Kashmir having age of ≥ 18 years while the people not belonging to South Kashmir and native South Kashmiris having age of ≤ 18 years were excluded from the study. The sample was selected from the area chosen by adopting a Sampling technique called as multistage sampling in which four districts of South Kashmir were chosen, from each selected District, two tehsils were randomly selected after line listing all tehsils. However, from district Kulgam, three tehsils were selected as this district has more population and lies at far end of the valley. From each tehsil, three blocks were randomly selected after line listing them. From each block, minimum two villages were randomly selected after line listing them and from each village, population sample size was calculated using formula $n = 4 pq/l^2$ with expected prevalence of 2% and absolute error of 1% where n = sample size, p= prevalence, q= (1-p) and l= error. The sample selected was screened by using immunochromatography method of detecting HBsAg. The population under study was informed about the study one to two weeks before the sample collection. The information was sent to the study

population through village heads, religious leaders and catering health centres. Sunday was kept as the day of sample collection to ensure the maximum participation as Sunday is the national holiday. The sample collection was performed at the catering health centres and also by door to door collection. Before collecting the sample, the people were informed about the nature and advantages of the study in their local language and an informed written consent was taken from those agreed to participate. Each Sunday, about 200 persons were studied. After the consent was signed by the study population and after all aseptic precautions, 2 ml of blood were obtained from antecubital vein using 2ml disposable syringes. The blood samples collected were immediately tested. If positive, the sample was stored for ELISA and if negative the sample was discarded as per Helsinki Guidelines.

STATISTICAL ANALYSIS

Data was entered in Microsoft Excel spreadsheet. Categorical variables were summarized as frequency and percentage. Continuous variables were summarized as mean and standard deviation. HbsAg prevalence was reported in percentage. Chi-square test was used to analyze the relationship between categorical variables and HbsAg status. A p-value of <0.05 was considered statistically significant. Data was analyzed using SPSS version 20.0.

RESULTS

The total number of studied subjected (5533) included males and females in the ratio of 1.16:1 with the prevalence of Hepatitis B among males as 2.21% and in females as 2.62% with an overall prevalence of Hepatitis B in South Kashmir being 2.40% [Table 1]. The majority (64.6%) of studied population belonged to the age group of 21-40 years though the infection under study was found to be more prevalent (3.3%) in the age group of 41-50 years followed by 3.0% prevalence in case of persons in the age group of 31-40 years [Table 2&3] but the difference in the prevalence in different age groups was of no statistical significance. We also tried to find out if there existed any relationship between various other sociodemographic characteristics like sex, occupation, socioeconomic and marital status with the HBSAg positivity and it was found that a statistically significant difference ($p=0.0008$) in the prevalence was found to only with respect to the occupation wherein the infection was found to be more prevalent among the shop keepers and farmers and there no such relationship could be

Table 1: Prevalence of HBSAg positivity and Socio demographic profile of patients.

Socio demographic variable	Total enrolled (n)	HBSAg positive (n) (%)	P value
Sex	Males 2976	662.21	P=0.375
	Females 2557	672.62	
Occupation	Clerk/Shop keeper/Farmer 1924	653.37	P=0.00086
	Skilled worker 18	18 1.25	
	Semi-Skilled worker 0	00.00	
	Unemployed 50	502.32	
Socioeconomic status	Upper Middle 5280	1212.29	P=0.012
	Lower Middle 253	124.74	
Marital status	Married 3995	1022.55	P=0.243
	Unmarried 1538	312.01	

ascertained between HBSAg positivity and other demographic characteristics [Table 1]. Coming to the district wise prevalence of HBSAg, all the four districts falling in South Kashmir show a comparable prevalence. The estimated prevalence of districts, Anantnag, Kulgam, Shopian and Pulwama being is 2.25%, 2.50%, 2.61% and 2.19% and as such there is no statistically significant difference in the prevalence rates of different districts of South Kashmir [Table 4].

DISCUSSION

The prevalence rates of Hepatitis B infection vary from country to country around globe. The prevalence rates are low in developed countries while they are higher in under developed and developing countries. Throughout the globe, as per the prevalence rates there are three prevalence zones namely low prevalence zone (HBV prevalence up to 2%), intermediate prevalence zone (HBV prevalence 2 to 8%) and high prevalence zones (HBV prevalence >8%).¹⁹

The majority of the developed countries fall in low prevalence zone (USA, HBV prevalence 0.5%; UK 0.1-0.5%; Australia 1%) while as out of the total of 6 billion world's population, majority of the patients are seen in Asia with China having an HBV infected population of 120 million (30% of the total of 400 million carriers around the world). The second highly populous country i.e. India has 4 million HBV infected people with overall prevalence rate of 2-4%.¹⁹

The HBV prevalence rates of Indian population have been

assessed to be between 2 to 4% i.e. India is falling in intermediate prevalence zone¹⁹.

In Kashmir till date regarding HBV prevalence, there are no studies regarding HBV prevalence in general population. This has prompted us to conduct a community based study of HBV prevalence in natives of Kashmir valley. The present study was cross-sectional, community based study conducted in South Kashmir which includes 4 districts i.e. District Anantnag, District Kulgam, District Pulwama and District Shopian.

The total number of studied subjected (5533) in our study included males and females in the ratio of 1.16:1 with the prevalence of Hepatitis B among males as 2.21% and in females as 2.62% with an overall prevalence of Hepatitis B in South Kashmir being 2.40%. Our results are in accordance with the studies which are available in the literature from Indian sub-continent. Chowdhary et al¹⁵ in 2005 conducted a community based epidemiological study in West Bengal. A similar study conducted by Kurien T et al³ in 2005 from Tamil Nadu has estimated HBsAg positivity of 5.7%. The results of this study show slightly higher HBsAg positivity, the reason for this could be a small sample size i.e. 1981 samples. Tandon BN et al⁹ conducted an epidemiological study in 1990 in which the average estimated carrier rate of HBV infection was 4%. Patil SS et al²⁰ in 2011 from India conducted a study on 767 volunteers (male 470 and 297 females), aged 5-55 years estimated HBsAg carrier rate of 1.82% among males and 1.17%

Table 2: Age and Sex Distribution

Age groups (in years)	Female	Male	Total
11-20	210	268	478
	8.2%	9.0%	8.6%
21-30	836	995	1831
	32.7%	33.4%	33.1%
31-40	846	897	1743
	33.1%	30.1%	31.5%
41-50	441	539	980
	17.2%	18.1%	17.7%
51-60	172	219	391
	6.7%	7.4%	7.1%
61-70	47	51	98
	1.8%	1.7%	1.8%
71-80	5	7	12
	0.2%	0.2%	0.2%
Total	2557	2976	5533
	100.0%	100.0%	100.0%

Table – 3: HBsAg in relation with age

Age group	HBsAg		Total	p value
	Negative	Positive		
11-20	473	5	478	0.036
	99.0%	1.0%	100.0%	
21-30	1797	34	1831	
	98.1%	1.9%	100.0%	
31-40	1690	53	1743	
	97.0%	3.0%	100.0%	
41-50	948	32	980	
	96.7%	3.3%	100.0%	
51-60	383	8	391	
	98.0%	2.0%	100.0%	
61-70	97	1	98	
	99.0%	1.0%	100.0%	
71-80	12	0	12	
	100.0%	0.0%	100.0%	
Total	5400	133	5533	
	97.6%	2.4%	100.0%	

Table – 4: District wise sex distribution of HBsAg

District	Female			Male			Total			
	HBsAg			HBsAg			HBsAg			
	-ve	+ve	Total	-ve	+ve	Total	-ve	+ve	Total	
Shopain	765	28	793	946	18	964	1711	46	1757	2.61%
Kulgam	506	10	516	544	17	561	1050	27	1077	2.50%
Pulwama	594	15	609	745	15	760	1339	30	1369	2.19%
Anantnag	625	14	639	675	16	691	1300	30	1330	2.25%
Total	2490	67	2557	2910	66	2976	5400	133	5533	2.40%

-ve = negative; +ve = positive

Table 5: Comparison of prevalence in different states of India

State	Study Design	Study population	Set up	Prevalence	Reference
Haryana	Cross sectional observational	Blood Donors	Hospital Based	1.7%	Arora et al ²¹ (2010)
Punjab	Cross sectional	Blood Donors	Hospital Based	0.66%	Gupta N. et al ²² (2004)
Dehli	Cross sectional	Blood Donors	Hospital Based	2.23%	Sangeeta Pahuja et al ²³ (2007)
Utter Pradesh	Cross sectional	Blood Donors (voluntary and replacement)	Hospital based	1.96%	Chandra T et.al ²⁴ (2009)
Tamil Nadu	Cross sectional	Antenatal Women and Children Born to them	Community Based	1.58%	Anu Mary Alexander et al ²⁵ (2013)
Tamil Nadu	Cross sectional	General Population	Community Based	5.7%	T. Kurein et al ³ (2005)
Karnatka	Cross sectional	Voluntary Blood Donors	Hospital Based	1.86%	Srikrishna A et al ²⁶ (1999)
West Bengal	Cross sectional	Preoperative Patients	Hospital based	2.64%	Atreyi Chakraborty et al ²⁷ (2015)
West Bangal	Cross sectional	General Population	Community Based	2.97%	Abhijit Chowdhury ¹⁵ (2005)
West Bangal	Cross sectional	Blood Donors	Community Based	1.46%	Bhattacharya P et al ²⁸ (2007)
Rajasthan	Cross sectional	General Patients	Hospital Based	0.87%	Smita Sood et al ²⁹ (2010)
Ahmedabad	Cross sectional	Blood Donors (voluntary and replacement)	Hospital Based	0.98%	Nirali shah et Al ³⁰ (2013)
Maharashtra	Cross sectional	General Population	Community Based	1.58%	Patil SS et al ²⁰ (2011)
Jammu & Kashmir (Replacement donors)	Cross sectional	Replacement Blood Donors	Hospital Based	0.48%	Parveen et al ³¹ (2015)
Jammu & Kashmir (Central Kashmir)	Cross sectional	General population	Community Based	1.2%	IrfaNakhsbandi et al ³² (2015)
Jammu & Kashmir (South Kashmir)	Cross sectional	General population	Community Based	2.40%	Current study(2015)

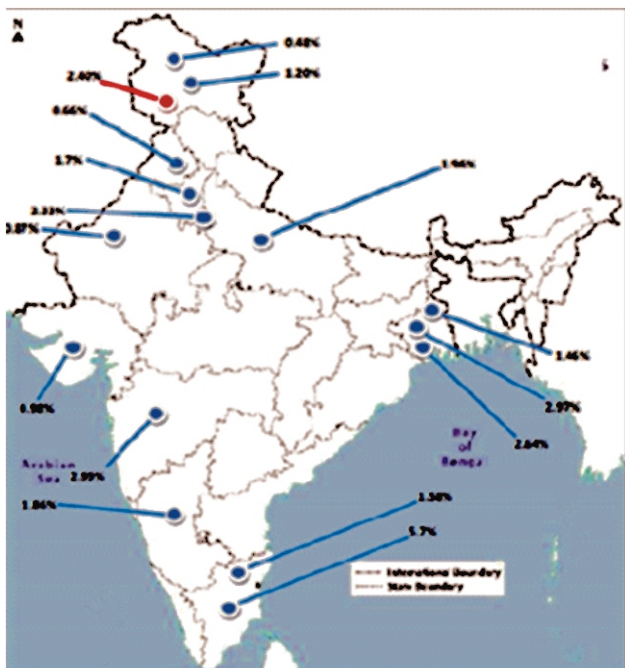


Figure 1: Prevalence of Hepatitis B all over India.



Figure 2 Map of South Kashmir

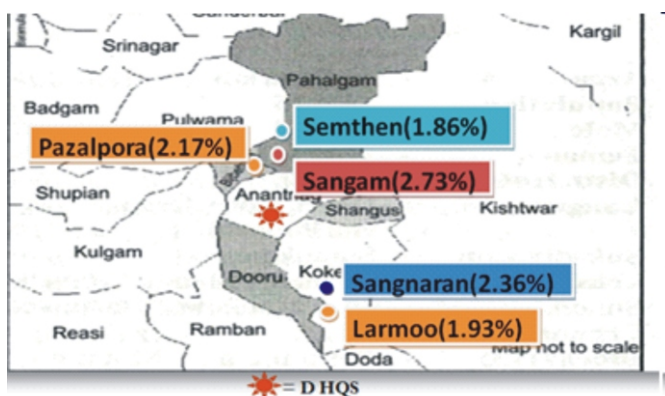


Figure 3: Prevalence of Hepatitis B in District Anantnag

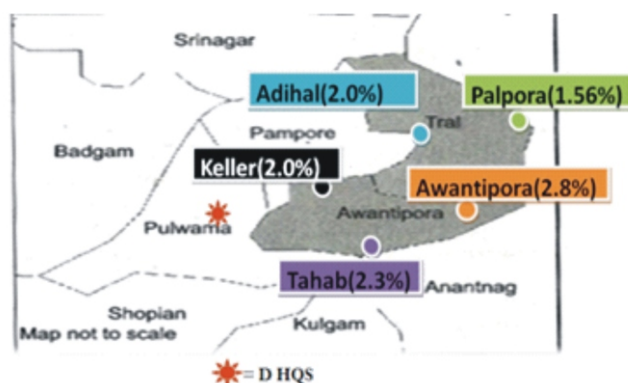


Figure 5: Prevalence of Hepatitis B in district Pulwama

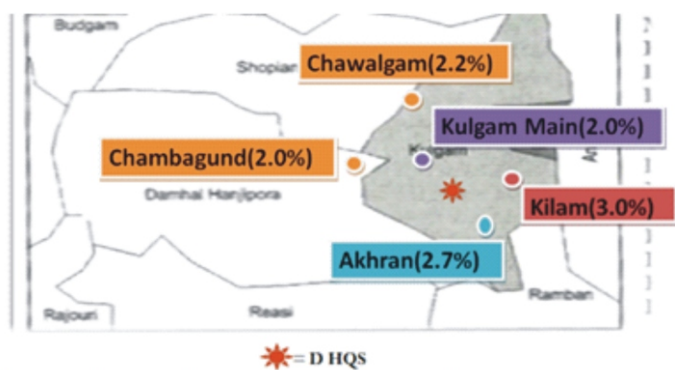


Figure 4: Prevalence of Hepatitis B in district Kulgam

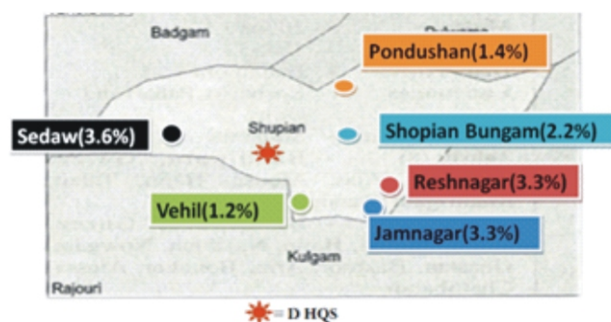


Figure 6: Prevalence of Hepatitis B in district Shopian

among females using third generation ELISA (enzyme linked immunosorbant assay) kit. The results of the present study have been compared with other studies done across different parts of the Country and are given in the Table 5 and Figure 1.

In our study, overall HBV positivity with respect to district revealed that all districts had almost similar seropositivity i.e. 2.25%, 2.50%, 2.19% and 2.61% for Anantnag, Kulgam, Pulwama and Shopian districts respectively (Figure 3 to 6). The differences are statistically not significant with slight increased HBV positivity rate in Kulgam and Shopian districts, may be due to the fact that these districts are falling at the periphery of the Kashmir valley with meagre and less developed health care and immunization, HBV awareness programmes. From our study one thing that has come to the light is that south Kashmir falls in the intermediate zone, we believe that we need to have a continued and robust health care, and immunization and educational awareness programmes to the pockets of the districts/tehsils where HBV prevalence is more so that HBV prevalence be decreased in these area to an acceptable level.

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