

# Sero-epidemiology of HBV Infection in Northern Sindh: A Population Based Study

JAVED AHMED PHULPOTO\*, ABDUL KHALIQ ABRO\*\*, ALTAF AHMED SHAIKH\*, JAHAN ZAIB ABRO\*\*\*, ZAHID IBRAHIM\*\*\*\*, MUHAMMAD FAROOQ\*\*\*\*

## ABSTRACT

**Study Design:** Prospective Observational Study.

**Place and duration of study:** Liver Clinics, Ghulam Muhammad Mahar Medical College hospitals, Sukkur & Khairpur. From January 2008 to December 2011.

**Methods:** Using random cluster sampling 3989 healthy subjects were selected from 7 northern districts of Sindh (i-e Sukkur, Khairpur, Ghotki, Shikarpur, Jacobabad, Kandh-koat, & Naushero Feroz) attending Liver clinics of Ghulam Muhammad Mahar Medical college hospitals Sukkur & Khairpur, for screening purpose were enrolled from January 2008 to December 2011. The subject's age ranged from 6 to 65 years. Serum samples initially tested for HBsAg by immune chromatographic method. The positive cases were confirmed by third generation of ELISA for HBcAb, HBsAg. Hepatitis Delta antibody was checked in Elisa positive cases. Various risk factors were recorded and multivariate analysis was performed.

**Results:** The prevalence of HBsAg and HBcAb in Northern Sindh was 3.38% (95% CI 2.85;3.98). We found 8 cases of positive anti-HDV antibody. Predictors of HBsAg or HBcAb in multivariate analysis were age, marital status and addiction.

**Conclusion:** The rate of HBV infection in Northern Sindh was higher than other parts of province and country. Approximately 25% of general population in this province had previous exposure to HBV and 3% were HBsAg carriers. Parenteral injections abuse, intra familial and addiction were major routes of HBV transmission in this part of province

**Keywords:** Epidemiology; Hepatitis; HBV; Northern Sindh

---

## INTRODUCTION

Hepatitis B virus (HBV) infection is a major cause of liver disease in the world. WHO has estimated that currently two billions people were infected with HBV and in more than 350 million people, acute infection has turned to chronic infection<sup>1</sup>. It is also estimated that more than 500,000 deaths occur as a consequence of cirrhosis and hepatocellular carcinoma caused by chronic HBV infection annually<sup>2</sup>. Hepatitis B is estimated to result in 563000 deaths annually<sup>3</sup>. Given its large population (165 million) and intermediate to high rates of infection, Pakistan is among the worst afflicted nations<sup>4</sup>. In developing countries 40-60% HBV infections in HCWs are attributed to sharp injuries<sup>5</sup>. There are two billion people worldwide who have been exposed to Hepatitis B virus; of these more than 350 million are chronically infected with this virus<sup>6</sup>. In Pakistan Hospital based serological testing has revealed that 48% of patients with chronic liver

disease (CLD) and up to 66% patients with Hepatocellular carcinoma (HCC) were positive for HBsAg<sup>7</sup>. The carrier rate of HBsAg is from 2.8% - 10% with variation in different groups in different areas of Pakistan. Pakistan has been categorized as having intermediate endemicity of HBV with 2-7 % HBsAg prevalence in general population<sup>8,9,10</sup>. The major known risk factors for transmission of HBV are HBsAg positive pregnancy, transfusion, hospitalization, tattooing, and intravenous drug abuse and high risk sexual behaviors<sup>11,12,13</sup>. The lack of information on HBV prevalence and distribution of risk factors among the general population is an obstacle for formulating effective policies to reduce the burden of HBV infection. This population based study was designed to determinate the accurate estimate of HBV infection epidemiology and associated risk factors in Northern Sindh, as the available data is very scarce.

## MATERIALS AND METHODS

The general population of 7 districts of Northern Sindh i.e., Sukkur, Khairpur, Ghotki, Shikarpur, Jacobabad, Kandh-koat, & Naushero Feroz) attending Liver clinics of Ghulam Mohammad Mahar

---

\*Liver clinic GMMMC Sukkur,\*\*Pathology Department GMMMC Sukkur,\*Liver clinic GMMMC Sukkur,\*\*\*Isra Medical University Hyderabad, \*\*\*\*Pathology Emergency Lab. SIMS/SHL, Lahore.

Correspondence to: Dr. Javed Ahmed Phulpoto, Liver Clinic Ghulam Muhammad Mahar Medical College Sukkur.

Medical college hospitals Sukkur & Khairpur, for screening purpose were enrolled from January 2008 to December 2011. Subjects between 6 and 65 years of age were included. The demographic characteristics of these districts are presented in Table 1.

Our sample size (n=4536) by using  $[DEFF * Np(1-p)] / [(d^2 / Z^2_{1-\alpha/2} * (N-1) + p * (1-p))]$  equation, when N was population size (1,440,518), P was hypothesized as % of frequency of outcome factor in the population (5%), d was confidence limits as % of 100 (absolute +/- %, here 2%) and DEFF was design effect for cluster surveys that was set to 1 had 99.99% confidence level. Clustered random sampling was used. Blood samples were obtained from each subject and a questionnaire was completed by a trained interviewer. The questionnaire included demographic and anthropometric data and risk factors for hepatitis. The blood samples were initially screened by rapid immune chromatographic method. The positive samples were transferred to the hospital laboratory for confirmation by ELISA method. Positive HBsAg cases were checked for anti-HDV antibody. HBsAg, HBcAb and anti-HDV antibody were evaluated using Enzygnost HBsAg, 5.0 kit (Dade Behring, Germany), Hepanostica anti-HBc Uni-Form kit (Biomerieux, France), and DiaSorin ELISA kit

(Italy) respectively. The study was approved by the Institutional ethics committee. Written informed consent was obtained from all subjects before data collection.

## RESULTS

A total of 4526 subjects were interviewed from 7 districts of Northern Sindh. 537 subjects that refused to give blood samples or had inadequate samples or with missed laboratory data were excluded. A total of 3989 participants were analyzed. The demographic characteristics of study population are shown in Table 2. Totally, 941; 23.60% (95% CI 22.30; 24.93) and 135; 3.40% (95% CI 2.85; 3.98) subjects from 3989 participants were HBcAb and HBsAg positive respectively. In addition, we found 8 cases of positive anti-HDV antibody. In univariate analysis, there was a significant heterogeneity in the rate of HBsAg ( $p=0.003$ ) and HBcAb ( $p=0.003$ ) among various districts. Age, marital status, transfusion, addiction, history of dental procedures and hospitalization had significant  $p$  value in univariate analyses but only age, marital status and addiction were significant risk factors of HBsAg or HBeAb positivity in multivariate analysis.

Table 1: Demographic data of study population

	Sukkur	Khairpur	Shikarpur	Ghotki	N. Feroz	J.Abad	K.Koat
Subjects interviewed	1615	469	630	648	375	619	170
Samples collected	1551	353	438	593	369	564	117
Male	45%	48%	43%	44%	48%	42%	50%
Age	9±0.4	27±0.7	28±0.6	28±0.6	28±0.8	29±0.6	28±1.5
Rural	15%	66%	59%	57%	92%	66%	58%
Currently married	55%	55%	57%	64%	63%	68%	56%
H/o Blood transfusion	5.2%	4.1%	3%	5.6%	2.4%	2.7%	3.5%
Addiction	2.2%	1.9%	4%	6%	5.9%	4.2%	2.4%
IV addiction	0.1%	0.0%	0.0%	0.2%	0.0%	0.2%	0.0%
Others	13.3%	9.4%	9.2%	16%	0.5%	1.5%	1.8%

Table 2: Sero prevalence of HBcAb in male and female subjects in different age groups.

Age group	Male%	Female%
6-29 years	13	13.8
30-45 years	26.2	25.7
46-65 years	54	38

## DISCUSSION

Our study indicates that sero-epidemiology of HBV infection in general population of Northern Sindh was higher as compared to the studies of Bhatti et al(1996)<sup>14</sup>, Bukhari et al(1999)<sup>15</sup>, Ahmed et al(2000)<sup>16</sup>, Mumtaz et al(2002)<sup>17</sup>, Mehmood et al(2004)<sup>18</sup>. Chronic HBsAg carriers are living in this

province and can be reservoir for transmission of HBV infection through close contacts, sharing needles or nosocomial interventions. Furthermore, these patients are at great risk of hepatocellular carcinoma, cirrhosis and liver failure that their management would pose a heavy burden on the local public health system. In addition, individuals who had positive HBcAb are a threat to the public health, since a proportion of them could have occult HBV infection with very low level of HBV-DNA in the serum and liver tissue but be negative for serum HBsAg<sup>19</sup>. Patients with occult HBV infection can transmit the infection and have higher incidence of liver cirrhosis and hepatocellular carcinoma<sup>20</sup>. Unfortunately, there were no prior data available from this part of province

to help to monitor changing epidemiology of HBV through time.

In multivariate analysis age, addiction, and marital status were independent risk factors for HBV seropositivity. Older subjects and married individuals had higher probability of HBV seropositivity. Age is a common risk factor that almost is reported in all of seroepidemiologic studies of HBV infection<sup>21,22</sup>. The reason is that the risk and cumulative frequency of high risk behaviors increase with age and consequently increase the likelihood of HBV infection.

## REFERENCES

- Previsani N, Lavanchy D. WHO/CDS/CSR/LYO/2002.2: Hepatitis B. Geneva: World Health Organization; 2002. Hepatitis B.
- Farzadegan H, Shamszad M, Noori Arya K. Epidemiology of viral hepatitis among Iranian Population-- a viral marker study. *Ann Acad Med Singapore* 1980;9:144-8.
- Alavian SM, Fallahian F, Lankarani KB. The Changing Epidemiology of Viral Hepatitis B in Iran. *J Gastrointest Liver dis* 2007;16:403-6.
- Perz JF, Armstrong GL, Farrington LA, Hutin YJ, Bell BP. The contributions of hepatitis B virus and hepatitis C virus infections to cirrhosis and primary liver cancer worldwide. *J Hepatol.* 2006;45:529-38.
- Estimated Annual number of U.S. occupational percutaneous injuries and mucocutaneous exposures to blood or at risk biological substances. International Healthcare worker safety center. *Adv Expo Prev.* 1998; 4(1):3
- Hepatitis B Fact sheet WHO /204.Revised October 2000.Available from: URL:<http://www.who.int/inffs/en/fact204.html>.
- Tong CY ,Khan R ,Beeching NJ,et al. The occurrence of Hepatitis B and C virus in Pakistani patients with Chronic Liver disease and Hepatocellular Carcinoma *Epidemiol infect*1996; 117: 327-32
- Kekepoto GN, Bhally HS, Khaliq G, Kayani N, Burney IA, Siddique T, Khurshid M. Epidemiology of blood borne viruses; A study of Healthy Blood donors in Southern Pakistan southeast Asian. *J Trop Med Public Health* 1996;27: 703-6.
- Khadim MI . Prevalence of Hepatitis B surface antigen in various population groups of NWFP. *J Pakistan Med Assoc*1982; 32: 122-3.
- Kazmi K ,Ghafoor A,Burney MI. Prevalence of Hepatitis B Surface antigen among Blood donors of Islamabad. *J Pakistan Med Asc.*1985; 5: 19-21.
- Mir-Naseeri MM, Mohammadkhani A, Tavakkoli H, Ansari E, Poustchi H. Incarceration is a major risk factor for blood-borne infection among intravenous drug users. *Hepat Mon* 2011;11:19-22.[22087111]
- Sali SH, Bashtar R, Alavian SM. Risk Factors in Chronic Hepatitis B Infection: A Case-control Study. *Hepat Mon* 2005;5:109-15.
- Alavian SM, Fallahian F, Lankarani KB. Comparison of Seroepidemiology and Transmission Modes of Viral Hepatitis B in Iran and Pakistan. *Hepat Mon* 2007;7:233-8.
- Bhatti FA, Shaheen N, Uz Zaman Tariq W, Amin M, Saleem M. Epidemiology of hepatitis C virus in blood donors in Northern Pakistan. *Pak Armed Forces Med J.* 1996;46:91-2.
- Bukhari SM, Khatoon N, Iqbal A, Naeem S, Shafqat S, Lone A, et al. Prevalence of hepatitis B antigenaemia in Mayo Hospital Lahore. *Biomedica.* 1999;15:88-91.
- Ahmed F, Shah SH, Tariq M, Khan JA. Prevalence of hepatitis B carrier and HIV in healthy blood donors at Ayub Teaching Hospital. *Pak J Med Res.* 2000;39:91-2.
- Mumtaz S, Ur Rehman M, Muzaffar M, Ul Hassan M, Iqbal W. Frequency of seropositive blood donors for hepatitis B, C and HIV viruses in railway hospital Rawalpindi. *Pak J Med Res.* 2002;41:51-3.
- Mahmood MA, Khawar S, Anjum AH, Ahmed SM, Rafiq S, Nazir I, et al. Prevalence of hepatitis B, C and HIV infection in blood donors of Multan region. *Ann King Edward Med Coll.* 2004;10:459-61.
- Hollinger FB, Habibollahi P, Danishmand A, Alavian SM, Occult Hepatitis B Infection in chronic Hemodialysis Patients: Current Concepts and strategy. *Hepat Mon* 2010;10:199-204.
- Mostaghni AA, Soltanian A, Mokhtari E, Japoni S, Mehrabani D, Seroprevalence of Hepatitis B virus among hemodialysis patients in Bushehr Province, Southern Iran. *Hepat Mon*2011;11:200-202.
- Ozer A, Yakupogullari Y, Beytur A, Beytur L, Koroglu M, Salman F, Aydogan F, Risk Factors for Hepatitis B Virus Infection in Turkey: A Population Based, Case-Control Study. *Hepat Mon* 2011;11:263-8.
- Hajiani E, Hashemi S, Masjedizadeh A. Seroepidemiology of Hepatitis B Virus Infection in Khuzestan Province. Southwest of Iran. *Hepat Mon* 2009;9:34-8.