



## SEROPREVALENCE OF HEPATITIS-B VIRUS INFECTION IN SLUM POPULATION OF DHAKA CITY, BANGLADESH

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### ABSTRACT

**Background:** Hepatitis B virus (HBV) infection is a significant global health concern, particularly in developing countries. While previous studies in Bangladesh have reported varying HBV prevalence rates, data specific to urban slum populations is limited.

**Objective:** Aim of the study was determine the seroprevalence of HBV infection among slum dwellers in Dhaka City, a population potentially at high risk due to socioeconomic and environmental factors.

**Methods:** This cross-sectional study was conducted from July 2006 to June 2007, involving 2,000 adults randomly selected from slum clusters in Dhaka city, Bangladesh. Participants completed a structured questionnaire covering socio-demographic information was blood samples were collected and tested for HBsAg using test strips, with positive results confirmed by ELISA.

**Results:** The study revealed hepatitis-B virus infection seroprevalence of 5.40% among the 2,000 participants (mean age  $31.91 \pm 11.34$  years, 59% female). Knowledge about HBV was notably low, with only 7.06% aware that hepatitis could be caused by an infectious agent and 53.99% unaware of transmission modes. HBV vaccination coverage was extremely low at 2.33%. High-risk behaviors were identified, including

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receiving injections from unqualified providers (16.96%) and using disposable syringes (20.91%). Significantly, HBsAg positivity was associated with male gender ( $p=0.002$ ), younger age (mean  $28.78 \pm 10.78$  years,  $p=0.013$ ), and household water supply ( $p=0.0001$ ). None of the HBsAg-positive cases had received HBV vaccination ( $p<0.05$ ).

**Conclusion:** The study reveals a significant HBV seroprevalence in Dhaka's slum population, coupled with low levels of awareness and preventive behaviors. These findings underscore the urgent need for targeted public health interventions, including education campaigns, accessible vaccination programs, and improved healthcare services tailored to the unique challenges of urban slum communities.

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## INTRODUCTION

A major global health issue, hepatitis B virus (HBV) infection can cause both acute and chronic infection in men [1]. Hepatitis B virus infection is a major cause of death worldwide, with persistently infected persons developing hepatocellular cancer and liver failure. Around 350 to 450 million people worldwide carry the hepatitis B virus, and each year, approximately one million people may die from liver illness caused by HBV—prevalence rates of HBV infection vary throughout the world [2]. The Middle East, Africa, China, the Philippines, Indonesia, and Southeast Asia all have significant prevalence rates of South America, ranging from 8% to 15% [3,4]. Australia, Canada, Northern Europe, and the United States have the lowest prevalence rates (<2%). The low prevalence rate in affluent nations is caused by a number of factors, including behavior modification, preservation of sterility, safe sexual behavior in relation to HIV education, and an efficient HBV vaccine program [5].

There are small number of studies among general population in Bangladesh regarding seroprevalence of hepatitis B virus. In one study, the seroprevalence rate was 6.4% [6], while in another, it was 7.5% of cases [7]. Prevalence rate of HBV infection in rural populations was determined to be 1% in a population-based study [8]. In an additional investigation, HbsAg was detected in 8% of

parental drug addicts, 11% of prostitutes, and 20% of professional donors [9].

A cross-sectional study was carried out by Shahidullah *et al.* [10], and 5.6% of donors were found to be positive for HBsAg. A study conducted by H. Ashraf *et al.* among symptomatic subjects per urban area of Dhaka city revealed that 7.3% were positive for HbsAg [11]. A study was carried out by Gibney *et al.* to estimate the prevalence of hepatitis B infection and risk factors associated with infection in the Bangladeshi truck industry (driver and helper on truck), and 5.9% were positive for HbsAg [12]. A cross-sectional study was done by Shirin *et al.* among 266 drug abusers in Dhaka city [13]. Results showed the prevalence of HBV infection among intravenous abusers was 6.2% and 4.4% among non-drug abusers.

## MATERIALS AND METHODS

Study design, population, sampling and data collection

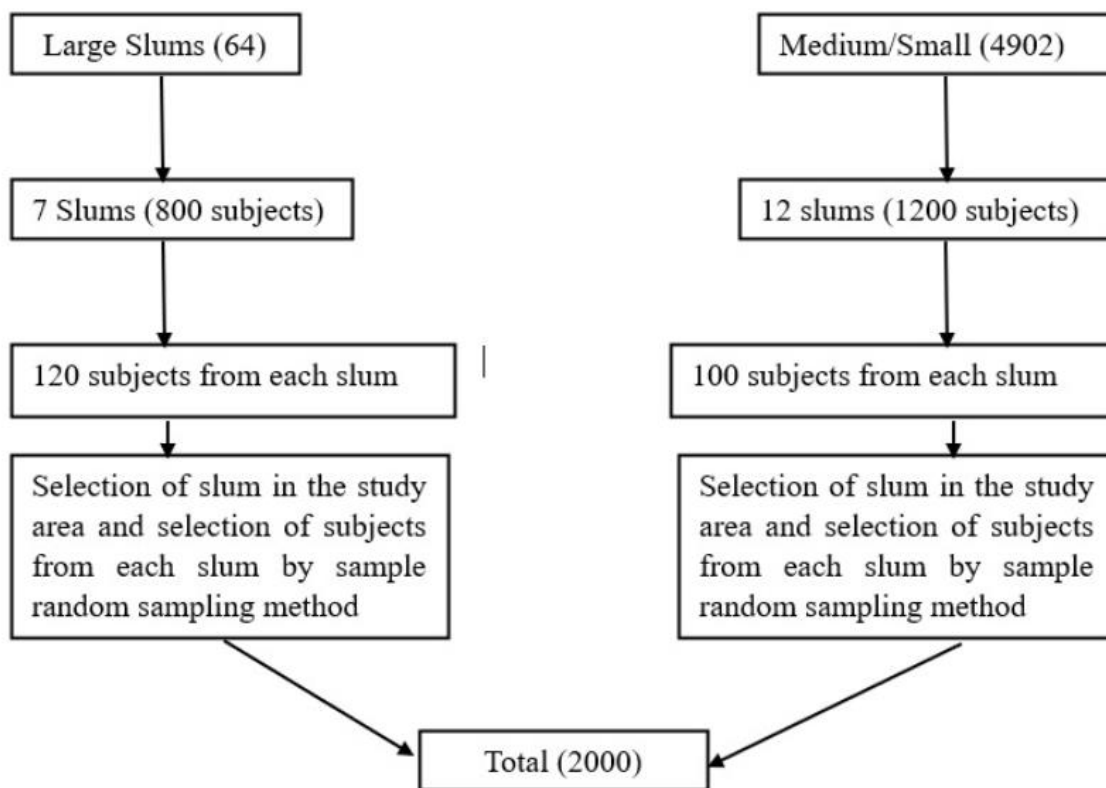
This cross-sectional study carried out among 2000 adults from Dhaka's slum population between July 2006 and June 2007. Subjects were selected from 4966 slum clusters using simple random sample technique. Data was collected via a structured questionnaire covering socio-demographic information, knowledge, practices, seroprevalence regarding viral hepatitis, medical history, and HBV vaccination status. The research team was trained on data collection procedures and ethical

considerations. A pilot study with 100 individuals was conducted to refine the questionnaire. Informed consent was obtained from all participants, ensuring confidentiality and privacy. Blood samples (3-5 ml) were collected from each participant and tested for HBsAg using test strips, with positive results confirmed by ELISA. Proper safety and waste disposal protocols were followed throughout

the study.

### Study criteria

The study included adults over 18 years living in slum areas without jaundice, excluding those under 18 and individuals who refused to participate.



**Fig 1:** Schema of Sampling from Urban slums of Dhaka

### RESULTS

This cross-sectional study conducted among 2,000 adults in Dhaka's slum population yielded significant insights into the demographics, knowledge, and health behaviors related to hepatitis B. The study population had a mean age of  $31.91 \pm 11.34$  years (range: 18-90 years), with a gender distribution of 59% female and 41% male.

Educational attainment was notably low, with 53.1% illiterate and 26.1% having

only primary education. Occupationally, housewives (30%) and day laborers (17%) formed the largest groups. Regarding hepatitis knowledge, while 82.57% had general awareness of the disease, specific understanding was limited. Only 7.06% knew hepatitis could be caused by an infectious agent, and 53.99% were unaware of transmission modes. Recognition of symptoms varied, with 51.72% identifying yellow urine and 26.86% recognizing anorexia. Prevention

knowledge was particularly poor, with 72.23% unaware of effective methods and only 5.50% mentioning vaccination.

Hepatitis B vaccination coverage was alarmingly low at 2.33%. Some high-risk behaviors were present, including 16.96% receiving injections from unqualified providers, 20.91% using disposable syringes, and 0.78% having multiple blood transfusions. Dental procedures from unqualified providers were reported by 4.60% of participants. Regarding addictions, tobacco chewing (28.48%) and smoking (18.96%) were most common, while intravenous drug use was rare (0.19%). Mean age the positive cases were 28.78±10.78 yrs (P=0.013) in our study. It is observed that HbsAg Positive rate is significantly more among male subjects (P=0.002). Among the positive groups 22.4% were housewives and 15.8% were businessman (P=0.009). HbsAg rate was also

significantly related with the source of drinking water and it was significantly more among that drinking water supplied from inside the house (p=0.0001). None of the positive cases received HBV vaccine (p=<0.05). Among the HbsAg positive subjects 26% had history of receiving EPI vaccine in childhood (p=0.04). In HbsAg positive male persons, 36.80% had history of shaving at Barber shop (P=0.005). Among the positive cases mean household population was 5.3±2.6 (P=0.070).

Critically, the study revealed a hepatitis B virus seroprevalence of 5.40% in this population. This significant finding, combined with the low levels of specific knowledge and preventive behaviors, underscores the urgent need for targeted public health interventions in urban slum areas to address hepatitis B awareness, prevention, and vaccination.

**Table 1:** Baseline characteristics of the study subjects (N=2000)

Variable	n	%
Age (yrs)		
Mean±SD	31.91±11.34	
Median	30	
Max-Min	18-90	
Gender Distribution		
Male	828	41
Female	1172	59
Educational background		
Illiterate	1062	53.1
Primary	522	26.1
SSC	318	15.9
HSC	54	2.7
Graduate or above	44	2.2
Occupation		
Transport worker	183	9
Industry worker	190	10
Day laborer	340	17
Service holder	252	13

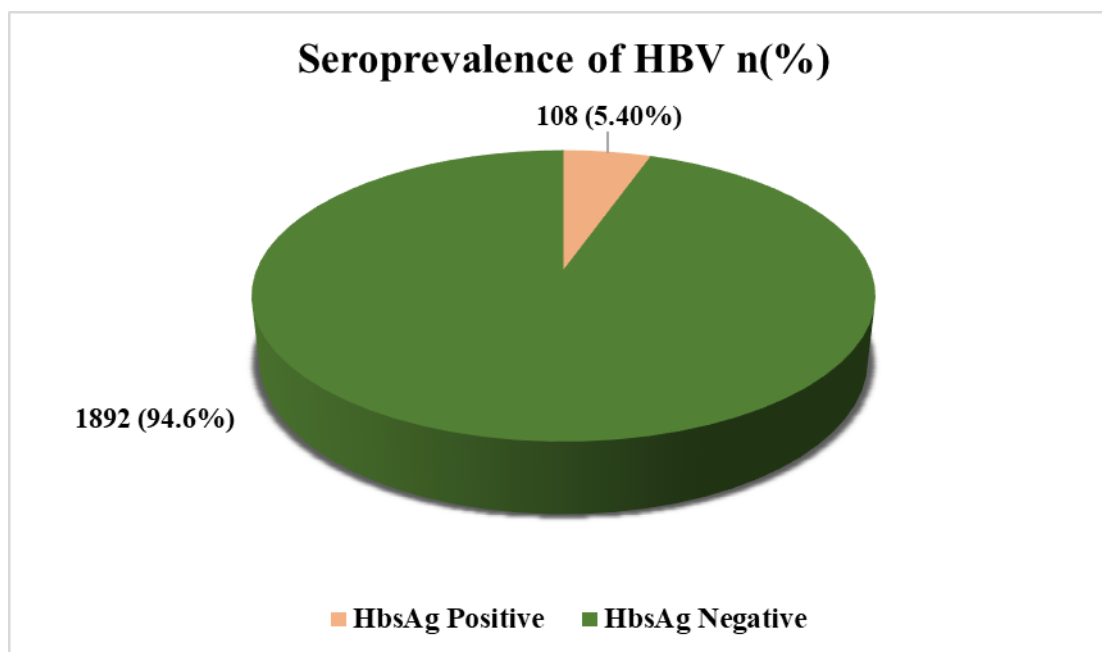
Businessman	178	9
Domestic help	110	6
Housewife	602	30
Hawker	37	2
Student	56	3
Others	51	3
Household		
Mean±SD	4.91±2.13	
Min-Max	1-20	
Source of drinking water		
Supply inside house	1319	65.95
Supply outside house	445	22.27
Tube well	230	11.52
Others	5	0.26
Sanitation status		
Pit	111	5.57
Slab	1472	73.59
Open	4	0.19
Hanging	39	1.94
Septic tank	372	18.58
Others	3	0.13

**Table 2:** Knowledge and practice of the respondents about the disease

Variable	n	%
Knowledge about the disease		
Yes	1651	82.57
No	349	17.43
Knowledge Symptom of Jaundice/Hepatitis		
Yellow coloration of urine	1034	51.72
Yellow coloration of eyes	276	13.79
Anorexia	537	26.86
Others	7	0.32
Unknown	146	7.31
Knowledge regarding infective cause of jaundice		
Yes	141	7.06
No	1859	92.94
History of vaccination for Hepatitis B virus		
Yes	47	2.33
No	1953	97.67
History of EPI/BCG vaccination in childhood		
Yes	537	26.86

No	1186	59.29
N/A	277	13.85
History of vaccination for Tetanus among females		
Yes	747	37.35
No	590	29.51
N/A	663	33.14
History of needle prick /use of injectable other than vaccination		
Quack	339	16.96
D/syringe	418	20.91
Iv saline	463	23.17
Blood ex	50	2.52
Never	729	36.44
History of blood transfusion		
>Or=2	16	0.78
Once	48	2.39
Never	1937	96.83
History of surgical operation		
Yes	180	9.00
No	1820	91.00
Shaving habit of the male subjects		
Barber shop	377	18.83
Self	107	5.37
Both	287	14.37
Do not need	41	2.07
N/A	1187	59.35
History of dental surgery		
Hospital	43	2.14
Clinic	54	2.72
Quack	92	4.60
N/A	1811	90.55
History of extra-/pre-marital sex		
>2	30	1.49
2	21	1.04
1	44	2.20
Previous history	21	1.04
Nil	1885	94.24
History of addiction		
Smoking	379	18.96
Tobacco chewing	570	28.48
Iv indictable	4	0.19
Smoking plus indictable	3	0.13

Smoking & chewing tobacco	67	3.37
None	977	48.87



**Fig 2:** Seroprevalence of Hepatitis B Virus infection (serum HbsAg)

## DISCUSSION

The Hepatitis B virus is a significant global health issue and is the primary cause of hepatocellular carcinoma, liver failure, and mortality [1,2]. 5% of the adult population worldwide is infected with HBV, and one million individuals perish each year as a result of hepatitis B-related liver disease [2]. The prevalence rate of HBV infection varies across countries. prevalence rate in the Far East ranges from 8 to 15%. prevalence rate in Japan, a region of South America, East Europe, and Southern Europe is intermediate (2-7%),

while it is the lowest (0-2%) in the United States, Canada, and Northern Europe [5]. The seroprevalence of hepatitis B virus infection in Bangladesh has been the subject of a limited number of population-based studies.

In this study mean age of the participants in this study was  $31.91 \pm SD11.32$ , with 828 (41% male) and 1172 (59%) being female. Mean household population was

$4.1 \pm 2.1$ . The research population was composed of 30% housewives, 17%-day laborers, 13% class four service holders, 10% industry workers, and 9% transport workers. Fifty three percent of the people were illiterate.

Among the study's participants, the seroprevalence rate of HBV infection is 5.4%. Mean age of the positive cases were  $28.78 \pm 10.78$  yrs ( $P=0.013$ ) in our study. It is observed that Hbs Ag positive rate is significantly more among male subjects ( $P=0.002$ ). Among the positive groups 22.4% were housewives and 15.8% were businessman ( $P=0.009$ ). HbsAg rate was also significantly related with the source of drinking water and it was significantly more among that drinking water supplied from inside the house ( $p=0.0001$ ). None of the positive cases received HBV vaccine ( $p<0.05$ ). Among the HbsAg positive subjects 26% had history of receiving EPI vaccine in childhood ( $p=0.04$ ). In HbsAg positive male persons, 36.80% had

history of shaving at Barber shop ( $P=0.005$ ). Among the positive cases mean household population was  $5.3 \pm 2.6$  ( $P=0.070$ ) and 37% female have history of vaccination for tetanus. About 3% had history of blood transfusion.

According to this survey, 92.94% of the participants lack awareness regarding HBV infection. However, 9.34%, 24.81%, 6.28%, and 3.8% believe that jaundice can be communicated through blood transfusion, food intake, both blood transfusion and food intake and the use of syringes, respectively. Furthermore, a mere 1.15% of individuals possess knowledge of the transmission of jaundice through sexual intercourse. A study conducted by Chowdhury *et al.* found that 59% of nurses were knowledgeable about the transmission of Hepatitis B virus (HBV) by needle exposure, but only 8% were aware of the sexual mode of transmission [14]. Just 22% of the participants possess knowledge regarding the prevention of jaundice, and a mere 2.33% have received vaccination for HBV.

The prevalence rate in the study conducted by M. Rahman *et al.* in a village of Rangpur during 1994 to 1995 on a population of 1000 was 6.4% [6]. Another population based serological study conducted recently by Ashraf *et al.* in 1250 asymptomatic subjects of peri-urban area of Dhaka City showed a prevalence rate of 7.3% [11]. The prevalence rate in this study is lower than that of M Rahman *et al.* [6], H Ashraf *et al.* [11] and higher than that of Safiullah *et al.* in Bangladesh [8]. The study design by H Ashraf and M Rahman *et al.* may differ. In this study subjects were selected in random basis of sample from slum area, and age of subjects were 18 years and above. In study by M Rahman *et al.* method of subject selection is not clearly mentioned [12]. In study of H Ashraf *et al.* age of subjects was from 0-60 years, but in our only adult were included [11]. It is conceivable that some of the participants in this study may have been infected at an

earlier age and subsequently recovered from the virus.

As Anti-HBc IgG was not seen it cannot be claimed that HbsAg negative subjects have never been exposed to HBV. Since the presence of Anti-HBc IgG was not detected, it is not possible to assert that individuals who are negative for HbsAg had never been exposed to the Hepatitis B virus (HBV).

#### CONCLUSIONS:

This study reveals a high seroprevalence of Hepatitis B Virus among Dhaka's slum population, coupled with low awareness and vaccination rates. Significant associations with gender, age, and specific risk behaviors were observed. These findings underscore the urgent need for targeted interventions, including awareness campaigns and expanded vaccination programs, to reduce HBV prevalence in this vulnerable population. Further research into environmental transmission routes is recommended to develop comprehensive prevention strategies.

#### REFERENCES:

1. Madrey WE. Hepatitis B. An important public health issue. *J Med Virol*, 2000; 61: 362-6.
2. Lee WM. Hepatitis B virus infection. *N Engl J Med*, 1997; 337: 1733.
3. Beasley RP, Hwang LY, Lin CC, Leu ML, Stevens CE, Szmuness W, *et al.* Incidence of hepatitis B virus infection in preschool children in Taiwan. *J Infect Dis* 1982; 146: 198-304.
4. McMahon B, Rhoades E, Heyward W, *et al.* A comprehensive program to reduce the incidence of hepatitis B virus infection and its sequelae in Alaska natives. *Lancet* 1987; 2:1134.
5. Alter M, Hadler S, Margolis H. *et al.* The changing epidemiology of hepatitis in the United States. Need for alternative vaccination strategies *JAMA* 1990, 263: 1218.



6. Rahman M., Amanullah, H Sattar, M Rahman, HA Rashid, AS Mollah. Seroepidemiology of HBV infection in village. BMRC: Counsel Bull 1997; 38-41.
  7. Khan Mobin, N Ahmed. Seroepidemiology of HBV and HVC in Bangladesh. International Communication of Hepatology 1996; 5: 27-29.
  8. Safiullah ABM. Seroprevalence of hepatitis B virus and hepatitis C virus infection and clinical signs of chronic liver disease in rural adult population. MD Thesis 2007. BSMMU, Dhaka.p.67.
  9. Mustofa M, N Islam, M. Rahman. Journal of preventive and social medicine. June 1991; 10: 22-26.
  10. Shahidullah M, Hafez MA, Rahman MM, Hossain MM. JOPSOM, 1998; vol. 17(2) : 116-120.
  11. H Ashraf, Rothermundt C, Alam NH, Bardhn PK, Hossain I, Brooks A. Prevalence and risk factors for hepatitis B and hepatitis C virus infections in a selected community of Dhaka City, Bangladesh. Gut 2006; 55 (Suppl V) A 147.
  12. Laura Gibney, Saquib N, Metzger J, Chowdhury P, Siddiqui MA, Hassan MS. Human immunodeficiency virus, hepatitis B, C and D in Bangladesh's trucking industry: prevalence and risk factors. International Journal of Epidemiology 2001; 30: 878-884.
  13. Shirin T, Ahmed T, Iqbal A, Islam M, Islam MN. Health Population Nutr. 2000; 18(3): 145-50.
  14. Chowdhury AW, Karim MZ, Ahmad Q, Hossain MZ, Chowdhury SGM. Study of knowledge, attitude, behaviors and practice of junior doctors and nurses regarding Hepatitis B virus. BMRC no. 1436.
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