Original Article JOURNAL OF CLINICAL AND EXPERIMENTAL HEPATOLOGY

Knowledge, Awareness and Prevalence of Hepatitis B Among Urban Slum Dwellers and Residents of Social Welfare Home: A Cross sectional Study From Eastern India

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Background/aims: **In view of limited data on the knowledge and awareness of hepatitis B virus (HBV) and the available preventive strategies at the community level, it was aimed to analyse the knowledge and awareness of HBV in the community.** ***Methods:*** **A cross-sectional questionnaire-based survey was conducted among residents of an urban slum and a social welfare home in Bhubaneswar, Odisha, from October 2019 to April 2021. The prevalence of HBV infection was also measured by testing the serum positivity for hepatitis B surface antigen using rapid point-of-care test kits. The statistical analysis was done by using the software SPSS version 20.** ***Results:*** **A total of 370 individuals (mean age 38.7 ± 14.9 years, males: 55.1%) were assessed. Although 18.1% (67) had good knowledge, only 16.7% (62) had good awareness about HBV. Approximately 14.8% (55) knew that a vaccine is available in the country for HBV, and 6.2% (23) identified themselves as being vaccinated. Educational status was a significant independent predictor of knowledge and awareness such that people with education level of matriculation and above had odds of 11.05 (95% confidence interval: 5.3–22.7) and 14.7 (95% confidence interval: 6.5–33.1) for having good knowledge and awareness regarding HBV, respectively. A total of 10 participants tested positive for hepatitis B surface antigen contributing to a point prevalence rate of 2.7%. The proportion of individuals with an education status of matriculation and above was higher in the slum area when compared with the welfare home (67% vs 33%; $P < 0.001$), the knowledge (71.6% vs 28.4%; $P < 0.001$) and so was the awareness (71% vs 29%; $P < 0.001$) about HBV as well.** ***Conclusion:*** **The relatively low figures of knowledge and awareness identified in our study undermine the need for intensification of health education and promotion activities regarding the prevalence of hepatitis B infection on a large scale at the community level. (J Clin Exp Hepatol xxxx;xxx:xxx)**

Hepatitis B virus (HBV) infection is a significant global health burden of major concern. If not treated, HBV infection can lead to cirrhosis and hepatocellular carcinoma, causing significant morbidity and mortality. The long-term complications of HBV infection are life threatening and accounted for 96% of the deaths due to viral hepatitis in 2015 as per World Health Organization (WHO) data.[1] According to WHO estimates, the prevalence of HBV infection in the general population was 3.5% in 2015.[1] Based on the prevalence rates, countries are divided into various HBV endemicity regions. India belongs to the intermediate endemicity zone (prevalence rate of 2%–7%), with an estimated average prevalence of 3%–4%.[2–4] The National Viral Hepatitis Control Program launched by the government of India in 2018 aims to end viral hepatitis by the year 2030.[2] The main key objective of the programme is to enhance community awareness about the virus, the disease and the preventive measures for tackling the burden of hepatitis. As of 2016 WHO data, 10.5% of all people estimated to be living with HBV were aware of their infection, and only 16.7% of the people diagnosed with the disease were on treatment.[1] Knowledge and awareness rates about HBV range from 9.5% to 80% across various populations from Indian literature with higher percentages reported in studies involving health care workers and medical students.[5–8] Lack of knowledge and awareness regarding the disease, its modes of spread and the available preventive strategies would seriously limit in achieving the goal of reduction in burden and elimination of HBV. There are limited data on knowledge and awareness regarding HBV in the general population in India, and most of the studies assessed these parameters among those in the medical profession

Keywords: hepatitis B, hepatitis B surface antigen, knowledge, vaccine
Received: 19.8.2021; *Accepted:* 2.10.2022; *Available online:* xxx
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Abbreviations: HBV: hepatitis B virus; HBsAg: hepatitis B surface antigen; WHO: World Health Organisation; GHSS: Global Health Sector Strategy; BCC: Behaviour, Change, Communication
https://doi.org/10.1016/j.jceh.2022.10.003

Please cite this article as: Venkatesh et al., Knowledge, Awareness and Prevalence of Hepatitis B Among Urban Slum Dwellers and Residents of Social Welfare Home: A Cross sectional..., Journal of Clinical and Experimental Hepatology, https://doi.org/10.1016/j.jceh.2022.10.003

who are expected to have better knowledge and awareness.[5–7] In light of this, we conceptualised this study to assess the prevalence of hepatitis B infection in the community by surveying two different population groups—residents of an urban slum and a social welfare home.

MATERIALS AND METHODS

A cross-sectional questionnaire-based survey was conducted between October 2019 and April 2021 in two different areas of Bhubaneswar, Odisha: an urban slum area and a social welfare home for the elderly, destitute and the homeless. A social welfare home was specifically chosen in the study, as Social Welfare Organizations usually provide shelters, basic health care, awareness, rehabilitation care and orientation programmes to the subjects with physical disabilities, older homeless communities and destitute, and they can potentially transmit HBV infection in the community if they had insufficient knowledge about HBV infection.

The urban slum dwellers were different from subjects residing in social welfare homes as they lived in overcrowded, polluted, unhealthy conditions and also they have poor sanitary and waste disposal facilities and also they usually become deprived of basic health care facility, basic education and awareness and regular clean water and power supply.

As per the census 2011 estimates, about one-fifth of urban population of the state of Odisha live in slums. Also, the percentage of slum households in proportion to total urban household is higher in Bhubaneswar with 20.8%.[9] So, this specific population was chosen because of their vulnerability to poverty, compromised sanitation and living conditions as well as the limited access to health care. The survey was undertaken as a part of the HBV health camp organised by our department at these areas. After explaining about the agenda of the health camp, all the individuals aged ≥18 years were invited to participate in the questionnaire-based survey, and only those who gave a written consent were included in the study. The participants received no compensation. The participants' identity was kept confidential, and the survey did not collect any identifiable data. The demographic details such as age, gender, and education status were noted. Two research assistants administered the predefined questionnaire (prepared in English and later translated into the local language), which was used for assessing knowledge and awareness of HBV infection (Supplementary Table 1). The knowledge domain consisted of a total of 18 questions regarding the factual data about HBV, such as virus-related facts, modes of transmission, affected organs and related complications. The answers were recorded either as 'yes' or 'no', and a reply of 'not sure' was considered as 'no'. Correct and incorrect responses were given a score of 1 and 0 each, respectively, and a final score was calculated. The knowledge domain was categorised into 'good' and 'poor' knowledge groups using a cutoff of 75% (≥75%, good; and <75%, poor) on the final knowledge domain score as was used in previous survey studies.[10,11] Similarly, the awareness domain consisted of five questions regarding self and family HBV status and awareness of the vaccination. A total score of 3 and above was considered 'good' awareness. Those who returned the incomplete questionnaire were excluded. The study was approved by the Ethics committee of the institute.

Hepatitis B Surface Antigen Testing

Screening for hepatitis B surface antigen (HBsAg) positivity was also done at the same setting. After obtaining written informed consent, the test was performed with whole blood obtained from finger prick sample using the point-of-care, rapid lateral flow chromatographic immunoassay, HBsAg test kits (Abon Biopharm Co., Ltd, Hangzhou, China), which has sensitivity and specificity of >99%.

Sample Size and Statistical Analysis

The sample size was estimated using a single population proportion formula with the following assumptions: the prevalence of individuals who have good knowledge and awareness about HBV of 35%, a confidence interval (CI) of 95% and a margin of error of 5%. The sample size was calculated to be 350. After factoring in an assumed nonresponse rate of 10%, the final sample size was calculated to be 385. The data were recorded in excel spreadsheets and were analysed using SPSS version 20 (Armonk, NY; IBM Corp). Descriptive statistics, mean, standard deviation and proportions, were used to summarise the variables. Frequencies of various findings, such as education status, knowledge and awareness about HBV were calculated as percentages. Comparison of continuous and categorical variables between two groups (good and poor) was done using the Fisher exact test. A binary logistic regression was done to assess which variables among age, gender, education status etc would independently predict good knowledge and awareness. All tests were two tailed, and a P value of <0.05 was considered statistically significant.

RESULTS

Demographic Characteristics

A total of 393 individuals (231 from an urban slum and 162 from the social welfare home) participated in the survey. After excluding 23 individuals due to incomplete questionnaire responses, a total of 370 were included in the final analysis. The baseline characteristics are summarised in Table 1. The mean age of the study population was 38.7 ± 14.9 years, and those belonging to 35–54 years age group predominated. Males constituted the majority

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Table 1 Baseline Demographic Characteristics of the Study Population (n = 370).

Characteristic	Frequency, n (%)
Age	
18–24	58 (15.7)
25–34	109 (29.5)
35–54	140 (37.8)
≥55	63 (17)
Gender	
Male	204 (55.1)
Female	166 (44.9)
Marital status	
Married	313 (84.6)
Unmarried	57 (15.4)
Education status	
Illiterate/primary	212 (57.3)
Matriculation	92 (24.8)
Undergraduate	38 (10.3)
Graduate and above	28 (7.6)

(55.1%) of the study population, and 84.6% were married. Approximately 6.4% of the subjects never went to school, and 50.9% had formal education only up to the primary level.

Knowledge and Awareness

The mean knowledge score was 4.4 ± 5.2, and only 67 respondents (18.1%) had good knowledge. There was a statistically significant difference between the good and poor knowledge groups with respect to age, gender and education status. Similarly, the mean awareness score was 1.2 ± 1.0, and about 62 (16.7%) had good awareness. The good and poor awareness groups also differed significantly in terms of age, gender, and education status (part I Table 2). About 15.4% (57) knew that HBV infection could be prevented by vaccination. While 14.8% (55) knew that a vaccine is available in the country for HBV, only 6.2% (23) identified themselves as being vaccinated. Most of the individuals were not aware that hepatitis B vaccine is provided to all infants free of cost under the National Immunization Program. Males and those aged between 25 and 54 years appeared to have good knowledge as well as awareness (part I Table 2). The knowledge and awareness scores had significant positive correlation (r = 0.63, 95% CI: 0.57–0.69, $P < 0.001$), indicating that those with good knowledge tend to have good awareness. On logistic regression, only education status was an independent predictor of good knowledge and awareness. Any education level of matriculation and above was associated with an odds of 11.05 (95% CI: 5.3–22.7; $P < 0.001$) for having good knowledge and an odds of 14.7 (95% CI: 6.5–33.1; $P < 0.001$) for having good awareness about HBV. Interarea comparisons were done between the participants from the welfare home and the slum, and there were no significant differences in mean age (37.9 ± 14.5 vs 39.3 ± 15.1 years; $P = 0.3$) and gender distribution (males: 43% vs 57%; $P = 0.4$). However, the proportion of individuals with an education status of matriculation and above was higher in the slum area when compared with the welfare home (67% vs 33%; $P < 0.001$) and so did the knowledge (71.6%

Table 2 Comparison of Characteristics Associated With Knowledge and Awareness and the Comparative Analysis Among Slum Dwellers and Social Welfare Homes.

Part I overall comparison of knowledge and awareness

Part I	Knowledge			Awareness		
Characteristic	Good ($n_1 = 67$)	Poor ($n_0 = 303$)	*P* value	Good ($n_1 = 62$)	Poor ($n_0 = 308$)	*P* value
Age						
18–24	8 (11.9%)	50 (16.5%)	**0.001**	8 (12.9%)	50 (16.2%)	**0.001**
25–34	29 (43.3%)	80 (26.4%)		25 (40.3%)	84 (27.3%)	
35–54	29 (43.3%)	111 (36.6%)		29 (46.7%)	111 (36%)	
≥55	1 (1.5%)	62 (20.5%)		0	63 (20.5%)	
Gender						
Male	48 (71.6%)	156 (51.5%)	**0.003**	44 (71%)	160 (52%)	**0.006**
Female	19 (28.3%)	147 (48.5%)		18 (29%)	148 (48%)	
Marital status						
Unmarried	11 (16.4%)	46 (15.2%)	0.8	11 (17.7%)	46 (15%)	0.57
Married	56 (83.6%)	257 (84.8%)		51 (82.3%)	262 (85%)	
Education status						
Illiterate/primary	11 (16.4%)	201 (66.3%)	**0.001**	8 (13%)	204 (66.2%)	**0.001**

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Table 2 (*Continued*)

Part I overall comparison of knowledge and awareness				
Part I		**Knowledge**	**Awareness**	
Matriculation	6 (9%)	79 (26%)	7 (11.3%)	78 (25.3%)
Undergraduate	22 (32.8%)	19 (6.2%)	19 (30.6%)	22 (7.1%)
Graduate and above	28 (41.8%)	4 (1.3%)	28 (45.1%)	4 (1.3%)

Part II comparative analysis of HBV knowledge and awareness among slum dwellers and social welfare homes					
	Slum dwellers (n_1 = 198)	**Social welfare families (n_0 = 172)**	**OR (95% CI)**	**z value**	***P* value**
M	108	96	0.9500 (0.6299–1.4327)	0.245	0.403
F	90	76			
Age distribution					
18–24	32	26	1.067 (0.608–1.8767)	0.227	0.409
25–34	54	55	0.838 (0.537–1.310)	0.773	0.219
35–54	73	67	0.9152 (0.6007–1.3944)	0.412	0.680
≥55	39	24	1.5126 (0.8678–2.6364)	1.46	0.144
Knowledge					
Good	45	20	2.235 (1.261–3.963)	2.753	**0.002**
Poor	153	152			
Awareness					
Good	48	30	1.685 (1.014–2.801)	2.01	**0.022**

CI = confidence interval; F = female; M = male; OR = odds ratio.
n_1 = total number of samples in slum dwellers group.
n_0 = total number of samples in social welfare family's group.
Gender (male and female), a two-sided χ^2 test; for the comparison between cases and control using χ^2 tests.
P-value < 0.05 is significance.

vs 28.4%; $P < 0.001$) and awareness (71% vs 29%; $P < 0.001$) about HBV as well.

There was no significant difference between the group belonged to slum dwellers and the group belonged to social welfare homes. However, the awareness about the infection of HBV was significantly better among slum dwellers compared with social welfare homes (Part II Table 2).

Prevalence of HBV

HBsAg testing was done simultaneously with the survey. A total of seven individuals in the urban slum and three individuals in the social welfare home tested HBsAg positive, contributing to a total point prevalence rate of 2.7%.

DISCUSSION

Owing to its huge population, India has a significant burden of HBV. It accounts for 10%–15% of the entire pool of global HBV carriers and an estimated 40 million HBV carriers in the country.[3] In 2016, the WHO adopted the first Global Health Sector Strategy 2016–2021 on viral hepatitis, with a goal to eliminate viral hepatitis as a major public health threat by 2030.[2] The Government of India launched the much-awaited National Viral Hepatitis Control Program in July 2018 aligning to the aims and objectives of the Global Health Sector Strategy and the sustainable development goals. To achieve this goal, a target of reduction in new viral hepatitis infections by 90% and deaths due to viral hepatitis by 65% has been envisaged. Lack of proper knowledge and ignorance regarding HBV forms a major hurdle in tackling the disease burden.

There are limited data on population-based prevalence estimates about HBV in India. HBsAg prevalence among general population ranges from 0.1% to 11.7% (2%–8% in many studies) as per the WHO estimates.[2–4] We observed a point prevalence of HBsAg positivity to be 2.7%. There is a wide geographical variation in the prevalence rates within the country. One of the first community-based studies from West Bengal[12] reported an HBsAg positivity rate of 2.9%, whereas a study from Tamil Nadu reported a rate of 5.7%.[13] The prevalence rates are higher in tribal populations, ranging from 4.4% in Madhya Pradesh to 21.2% in Arunachal Pradesh.[14,15]

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Reports from other HBV endemic countries show that poor knowledge and awareness contributed to high prevalence of HBV.[16,17] The knowledge and awareness rates ranged from 14% to 50% and 20% to 70%, respectively, across various studies in the general population from different regions of the world.[10,16,18,19] However, the majority of the knowledge and awareness studies from India included people form the medical field such as medical students and nurses, who by the nature of their profession tend to have better knowledge and awareness regarding HBV.[5–7] Few researchers studied the knowledge and awareness of HBV and hepatitis C as an occupational hazard among community barbers and identified low level of awareness.[8,20,21] In a community-based cross-sectional survey from Gujarat, only one-third of the population in study districts were aware about HBV, and less than one-fifth were vaccinated for HBV.[22] Another study among women of childbearing age residing in slums of Mumbai reported a low level of awareness about HBV indicating a need for educational interventions.[23] We observed that only 18% of the surveyed individuals had good knowledge, whereas nearly 17% had good awareness about HBV. These proportions are quite low and call for more and better awareness generating activities in the community.

Many factors have been attributed to be the cause of poor knowledge and awareness regarding HBV. In a population-based study from China, socioeconomic and demographic factors contributed to the inequalities in knowledge and awareness of HBV across different regions studied.[24] In our study, males and those aged between 25 and 54 years appeared to have good knowledge and awareness. A similar relationship with age and gender has been demonstrated in previous studies.[10,25] However, on logistic regression, these factors did not independently predict good knowledge and awareness. In a Malaysian household survey study, low level of education was the strongest predictor of poor knowledge and awareness about HBV.[10] We also found that education status of matriculation and above was significant predictor of having good knowledge as well as awareness about HBV. This can be explained on the basis that the ease of accessibility of information and level of understanding about the nature of the disease, its transmission and prevention could be more in the educated individuals compared with those that did not have any formal education. Similar results were also observed by researchers in their interview-based studies across different regions.[26–28] So, in communities with low level of education, health education and disease awareness programmes should aim at simplifying the disease-related facts for the generation of better knowledge and awareness regarding HBV. A systematic review by Shah *et al.*[29] identified that educational interventions have significant beneficial effects on persons with HBV.

The educational status matriculation and above was higher in the slum area when compared with the welfare home (67% vs 33%; $P < 0.001$) and so did the knowledge (71.6% vs 28.4%; $P < 0.001$) and awareness (71% vs 29%; $P < 0.001$) about HBV as well. It was quite speculative and probable that subjects with better education status should have better knowledge and awareness about HBV infection compared with poorly educated one, which justify our study findings. We hypothesise that subjects residing in welfare homes should have better awareness about HBV infection because of regular rehabilitation and awareness programmes conducted by social welfare organisations, which were seldom provided to the slum dwellers, whereas our study results contradict our hypothesis, which might be because of better education among slum dwellers compared with subjects residing in welfare homes, which tells that education status is the most important deciding factor for better knowledge and awareness about HBV infection.

Although our study has a limitation of being a specific geographical area cross-sectional survey among selected population groups, it gives vital information regarding the prevalence as well as knowledge and awareness about HBV in these communities so that necessary actions to tackle the disease burden can be taken. Multimodal community-wide educational activities should target various things such as improving patient knowledge about the disease, altering patient behaviours such as abstaining from high-risk behaviours that increase the transmission risk, having a positive attitude towards getting tested and getting vaccinated for HBV and improving the overall well-being of the infected individuals by providing access to treatment and follow-up.

To conclude, we observed a 2.7%-point prevalence rate of HBsAg positivity in the community we studied. Awareness generation and Behaviour Change Communication forms the key component in tackling the burden of HBV infection. The goals of limiting the new infection rate and reducing morbidity and mortality due to chronic HBV infection can only be successfully achieved by creating tailor-made awareness campaigns at the community level and in targeted populations. The relatively low figures of knowledge and awareness identified in our study undermine the need for intensification of health education and promotion on a large scale.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

VV, GKP, KU, MKS: Conceptualized the study design and prepared the manuscript. **PM, JN, DM**: Collected the data, analysed the data. **KU, GKP, MKS**: Writing review, and Editing. **MKS and GKP**: Supervised the study, arranged the resources, supervised the study and administered the project.

CONFLICTS OF INTEREST

All authors have none to declare.

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FUNDING

None.

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APPENDIX A

SUPPLEMENTARY DATA

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jceh.2022.10.003.

Please cite this article as: Venkatesh et al., Knowledge, Awareness and Prevalence of Hepatitis B Among Urban Slum Dwellers and Residents of Social Welfare Home: A Cross sectional..., Journal of Clinical and Experimental Hepatology, https://doi.org/10.1016/j.jceh.2022.10.003