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BARRIERS BEYOND BIOLOGY: EXPLORING SOCIAL DETERMINANTS OF HEALTHCARE ACCESS AND ADHERENCE AMONG HEPATITIS B PATIENTS IN RAJASTHAN

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Abstract:

Hepatitis B (HBV) is a major worldwide public health concern, with an likely 254 million people chronically infected as of 2022. In India, where the disease is of intermediate endemicity, the burden remains high due to limited awareness, inconsistent treatment adherence, and significant social disparities. Rajasthan, with its varied geographic and socio-cultural landscape, provides a unique setting to study the influence of social determinants of health (SDoH) on HBV care outcomes.

This study aimed to explore how SDoH such as education, occupation, geographic location, and economic status impact healthcare access and treatment adherence among HBV patients lost to follow-up under the National Viral Hepatitis Control Program (NVHCP). A cross-sectional exploratory design was adopted. Data were collected from 935 HBV patients identified through the NVHCP database (April 2019 – September 2024), using structured telephonic interviews and secondary data from the state portal. Quantitative data were analyzed using SPSS, while qualitative responses were subjected to thematic analysis.

Of the 935 patients, 684 (73.2%) gave consent to participate, with 346 completing full interviews. Key findings highlighted high rates of missed follow-up appointments (~65%) and limited medicine availability, especially in rural areas. Education and place of residence significantly influenced ease of access to care, while gender and caste also showed associations with treatment barriers. Despite high self-reported adherence, structural constraints like geographic distance, economic hardship, and inadequate public healthcare responsiveness were major barriers to sustained care. The study emphasizes the need to integrate SDoH into HBV control strategies. Strengthening outreach, enhancing public health infrastructure, and tailoring interventions to community-specific barriers are critical for re-engaging patients and improving long-term outcomes. Addressing these factors is essential to meet India's goals under the WHO's 2030 hepatitis elimination agenda.

Keywords: *Social Determinants of Health (SDoH), Access to Care, Treatment Adherence, Lost to Follow-Up, Hepatitis B*

I. INTRODUCTION

Hepatitis B (HBV) is a major worldwide public health concern, with an likely 254 million people chronically infected as of 2022 (World Health Organization [WHO], 2022). Poor treatment adherence is a major problem in the management of HBV since it leads to consequences including cirrhosis and hepatocellular carcinoma (HCC). Many people are still ignorant of their illness status, which contributes to ongoing transmission and jeopardises international control efforts even in the face of a successful vaccine. By 2030, the WHO wants to eradicate HBV as a danger to public health, with an emphasis on closing gaps in diagnosis, prevention, and long-term treatment compliance (WHO, 2016). 42% of cirrhosis cases worldwide are caused by HBV, with the largest burdens reported in the Western Pacific (59%) and African (41%) regions (Alberts et al., 2022). Up to 68% of individuals with cirrhosis in Asia, especially in nations like China, have HBV. Early childhood is frequently the site of transmission, especially in high-endemic nations where vertical (mother-to-child) transfer is common (Gust, 1996). HBV prevalence has significantly decreased as a result of the successful introduction of universal childhood vaccination in nations like Taiwan and Nauru, while coverage variations and enduring gaps in the healthcare system still provide major obstacles.

HBV is becoming more widely acknowledged as a public health concern in India. The nation is categorised as having moderate endemicity due to an average hepatitis B surface antigen (HBsAg) positivity rate of 3–4% (Ministry of Health and Family Welfare [MoHFW], 2019). India is projected to have 40 million carriers, contributing between 10 and 15 percent of the global HBV burden. 15–25% of them have the likely to develop serious liver problems, such as liver cancer and cirrhosis (MoHFW, 2019). 40–50% of

HCC and 20–30% of cirrhosis cases in India are caused by HBV, whereas 12–32% and 12–20% are caused by hepatitis C virus (HCV), respectively (MoHFW, 2019). The National Viral Hepatitis Control Program (NVHCP), Launched in 2018, seeks to lower the disease burden by providing free treatment and diagnostics at all levels of care, improving blood and injection safety, and vaccinating a large number of infants. There are still issues, though, especially in unfledged regions where dangerous medical practices continue and vaccination coverage at birth is insufficient. Rajasthan offers a advantageous setting for researching how socioeconomic determinants of health (SDoH) affect the treatment of HBV. Disparities in healthcare access, education, and socioeconomic circumstances are experienced by the state's diverse population, which includes urban, rural, and aboriginal groups. Access to treatment, adherence practices, and health outcomes are all greatly impacted by these social variables (Patnaik et al., 2021). Improving HBV control and attaining health equity in India need addressing these concerns.

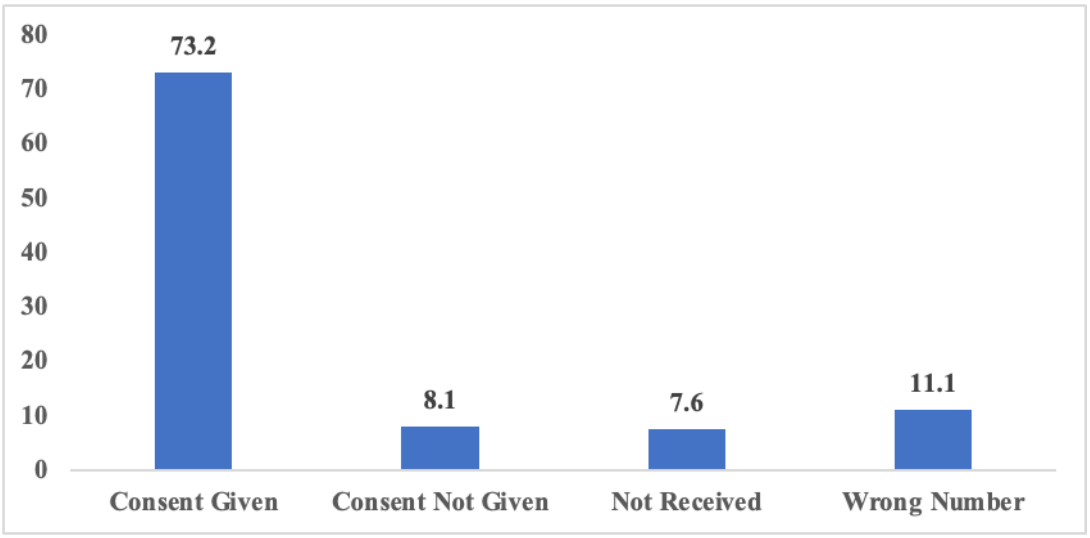
II. RESEARCH MEDOLOGY

The effect of social determinants of health (SDoH) on healthcare access among hepatitis B patients in Rajasthan, specifically those who were lost to follow-up under the National Viral Hepatitis Control Program (NVHCP), was examined in this study using a cross-sectional exploratory methodology. 935 patients from both rural and urban public health facilities who were identified between April 2019 and September 2024 were included in the target population. Structured telephone interviews were used to gather primary data, and a pre-tested questionnaire was used. To help with contact tracing and follow-up, secondary data, such as demographic and treatment details, was obtained from the NVHCP state portal. Variables pertaining to socioeconomic status, education, health literacy, and care obstacles were recorded using a standardized data collecting method. SPSS software was utilized to find statistical correlations. During the study, all ethical guidelines, such as informed consent and confidentiality, were closely followed.

III. RESULTS

Nine hundred and thirty-five eligible cases were found in the program database between April 1, 2019, and September 30, 2024. A substantial proportion of the patients 684 (73.2%) successfully provided informed consent to participate in the study. It suggests that, despite prior disengagement from treatment, many individuals are still reachable and interested in sharing their experiences highlighting the importance of targeted re-engagement efforts. About 76 (8.1%) of contacted individuals refused to participate due to Fear of stigma or confidentiality breaches. 71 (7.6%) represents those for whom calls were made but never successfully connected, possibly due to Calls going unanswered despite repeated attempts. A notable 104 (**11.1%)** of the listed contacts were found to be incorrect, outdated, or invalid.

Figure 1: Percentage of Participants Who Gave Consent to Participate in the Study



Contact and Follow up Outcomes of Respondents

As previously mentioned, 684 patients (73.2%) gave consent and were eligible for inclusion in the primary analysis. The remaining 251 were either unreachable or declined participation (26.8%). Among the 684 consenting participants, 346 (38.4%) individuals successfully completed the full structured interview. Tragically, 41 (4.6%) of the contacted individuals had passed away. 297 (33.0%) respondents were on medication.

Socio-Demographic Profile of Respondents

The below table 1 shows that a total of 346 respondents participated in the study, representing a relatively diverse cross-section of the population. The gender distribution revealed a predominance of male respondents (65.9%) compared to females (34.1%) . The mean age of the respondents was 37.95 years (SD ±13.81), suggesting a predominance of adults in their economically productive years, a relevant demographic for understanding barriers to disease care. The educational status of the participants ranged widely: while 15.3% were illiterate, a significant 43.9% had attained graduate-level education or higher. This high proportion of educated respondents may suggest potential for high health literacy, although the subsequent findings challenge this assumption, particularly in terms of awareness and adherence to hepatitis B treatment.

In terms of occupational distribution, the largest proportion was engaged in labour work (46.5%), indicating a predominance of daily wage earners and potentially economically vulnerable individuals. Formal employment in the government or private sector was reported by 26.9%, and 13.6% were engaged in agriculture or allied activities.

This occupational profile aligns with the socioeconomic background of a semi-urban or peri-rural population. Regarding religious affiliation, 87% identified as Hindu, followed by 11.6% Muslim and a small minority of 1.4% Jain, reflecting the religious composition of the general population in the study regions. The caste distribution highlighted a significant representation of OBCs (47.4%), followed by SCs (23.4%), STs (14.7%), and General category respondents (14.5%). Such caste-based data is crucial in the Indian context, as caste continues to shape access to health and social services. An overwhelming 93.1% of respondents were married, reinforcing the relevance of family structures in health decision-making. Urban residents constituted 56.9% of the sample, with the remaining 43.1% residing in rural areas, offering a reasonable balance to assess urban-rural disparities in hepatitis B care access.

Table 1: Socio-Demographic Profile of Respondent

Variables	No (%)	Mean± SD
Gender		
Female	118 (34.1)	
Male	228 (65.9)	
Age		37.95± 13.81
Education		
Illiterate	53 (15.3)	
Up to Middle schooling	82 (23.7)	
up to senior secondary	59 (17.1)	
Graduate and above	152 (43.9)	
Occupation		
Agriculture/fish breeding/poultry farming/Animal Rearing	47 (13.6)	
Labour Work	161 (46.5)	
Private & Govt	93 (26.9)	
Self-employed / Business	34 (9.8)	
others (Students)	11 (3.2)	
Religion		
Hindu	301 (87.0)	
Islam	40 (11.6)	
Jain	5 (1.4)	
Caste		
General	50 (14.5)	
OBC	164 (47.4)	
SC	81 (23.4)	
ST	51 (14.7)	
Marital Status		
Married	322 (93.1)	
Single	24 (6.9)	
Place of residence		
Rural	149 (43.1)	
Urban	197 (56.9)	

Socioeconomic and Household Characteristics

The below table 2 shows that only 17.3% of respondents reported possessing a BPL card, while 78.6% stated they did not have one, and 4% were unsure. This discrepancy may reflect under-enrolment in social protection schemes or lack of awareness. Access to basic amenities appeared satisfactory in several areas. Tap water was the primary source of drinking water for 89.3% of the respondents, and 91.6% reported having their own toilet facility, indicative of a reasonably high level of household sanitation. However, 16.4% of the respondents still relied on biomass fuels (dung cakes, wood, crop waste) for cooking, which poses a health risk, especially for individuals with chronic liver conditions like hepatitis B. Household structure data revealed that 65.3% lived in nuclear families, which may impact the availability of social support during illness. The median household income was reported as INR 15,000 with an interquartile range of INR 6,500, and the median monthly expenditure was INR 12,000 (IQR 3,500). These figures indicate a narrow economic buffer for many households, potentially influencing health-seeking behavior and adherence to chronic treatment regimens.

Table 2: Socioeconomic and Household Characteristics

Variables	No (%)	Median (IQR)
BPL Card		
Yes	60 (17.3)	
No	272 (78.6)	
Don't know	14 (4.0)	
Source of drinking water		
Tap Water	309 (89.3)	
Well covered	37 (10.7)	
Toilet facility		
No	5 (1.4)	
Own flush/pit toilet	317 (91.6)	
Shared Toilet	24 (6.9)	
Fuel used for cooking		
Dung cakes /wood/grass/crop waste	57 (16.4)	
Electricity	26 (7.5)	
LPG/Natural gas	263 (76.0)	
Type of family		
Joint family	120 (34.7)	
Nuclear family	226 (65.3)	
Expenditure (Rs.)		12000 (3500)
Income (Rs.)		15000 (6500)

Association Between Access to Healthcare And Social Determinants of Health (SDoH*)*

Patterns of Access to Care across Gender

The below table 3 represents a comparative analysis of access to healthcare services between male and female Hepatitis B patients in Rajasthan. The data reveal that the majority of both female (50.8%) and male (47.8%) patients reside within a distance of 5–10 kilometers from the nearest healthcare facility, with no statistically significant difference between the two groups ($\chi^2 = 1.50$, $p = 0.680$). This indicates that geographical proximity to treatment centers does not differ notably by gender. Similarly, the type of nearby health facility whether public or private also shows no significant gender-based disparity, with the majority of both females (79.7%) and males (78.1%) relying on public healthcare services ($\chi^2 = 0.117$, $p = 0.732$).

In terms of the availability of medicines at nearby facilities, 69.5% of female respondents reported that medicines were always available, compared to 60.5% of males. However, this difference is not statistically significant ($\chi^2 = 3.58$, $p = 0.310$), suggesting that perceived access to essential medicines is relatively similar across genders. The ease of getting an appointment for Hepatitis B treatment showed a more noticeable variation, with 57.6% of females reporting the process as "somewhat easy" compared to 46.1% of males. A larger proportion of males (28.5%) reported the process as either "somewhat difficult" or "very difficult," which contrasts with 16.1% of females expressing similar difficulties. Adherence to follow-up appointments showed poor outcomes across both groups, with 64.4% of females and 67.5% of males reporting that they had missed at least one follow-up visit ($\chi^2 = 0.343$, $p = 0.558$).

Table 3: Patterns of Access to Care Across Gender

Access to Health care	Gender		Chi sq (p Value)
	Female (N=118)	Male (N=228)	
Distance to Nearest Healthcare Facility for Hepatitis B Treatment			
< 5 Km	41 (34.7%)	76 (33.3%)	1.50 (0.680)
5–10 Km	60 (50.8%)	109 (47.8%)	
10–20 Km	13 (11.0%)	29 (12.7%)	
> 20 Km	4 (3.4%)	14 (6.1%)	
Type of nearby health facility			
Private	24 (20.3%)	50 (21.9%)	0.117 (0.732)
Public	94 (79.7%)	178 (78.1%)	

Availability of Medicines at Nearby Health Facility			
Always	82 (69.5%)	138 (60.5%)	3.58 (0.310)
Most of the time	7 (5.9%)	25 (11.0%)	
Never	20 (16.9%)	46 (20.2%)	
Rarely	9 (7.6%)	19 (8.3%)	
Ease of Getting Appointment for Hepatitis B Treatment			
Neutral	26 (22.0%)	42 (18.4%)	9.03 (0.060)
Somewhat Difficult	16 (13.6%)	49 (21.5%)	
Somewhat Easy	68 (57.6%)	105 (46.1%)	
Very Difficult	3 (2.5%)	16 (7.0%)	
Very Easy	5 (4.2%)	16 (7.0%)	
Missed Follow-Up Appointments for Hepatitis B			
No	42 (35.6%)	74 (32.5%)	0.343 (0.558)
Yes	76 (64.4%)	154 (67.5%)	

Patterns of Access to Care Across Education

The below table 4 provides a comparative analysis of access to healthcare services for Hepatitis B patients based on their educational attainment. The findings demonstrate that education level is significantly associated with certain dimensions of healthcare access. Regarding the distance to the nearest healthcare facility, a statistically significant relationship was observed (χ^2 = 17.2, p = 0.039; Cramer's V = 0.129, indicating a weak association). Notably, illiterate patients (54.7%) were more likely to live within 5 kilometers of a health facility, while a smaller proportion of educated individuals, particularly those up to senior secondary (27.1%) and graduates and above (30.3%), reported similar proximity.

A significant difference was also found in the type of nearby healthcare facility utilized across educational groups (χ^2 = 8.18, p = 0.042; Cramer's V = 0.15). While reliance on public facilities was common across all groups, it was highest among those with up to senior secondary education (89.8%) and lowest among the illiterate (67.9%), who showed a greater tendency (32.1%) to utilize private facilities.

Regarding the availability of medicines, there is no statistically significant association across education levels (χ^2 = 10.2, p = 0.406), although a slightly higher proportion of those up to senior secondary education (72.9%) reported that medicines were "always" available. The ease of getting an appointment for Hepatitis B treatment varied significantly with educational attainment (χ^2 = 30.6, p = 0.002; Cramer's V = 0.172), indicating a weak but meaningful association. Those with up to senior secondary education (42.4%) were most likely to find the process "somewhat difficult," whereas a larger share of graduates and above (51.3%) and illiterate individuals (62.3%) reported finding it "somewhat easy." Lastly, the pattern of missed follow-up appointments showed no significant variation by education (χ^2 = 0.653, p = 0.884), with a generally high rate of missed appointments observed across all groups (ranging from 62.7% to 69.8%).

Table 4: Patterns of Access to Care Across Education

Access to Health care	Illiterate (N=53)	Up to Middle schooling (N=82)	up to senior secondary (N=59)	Graduate and above (N=152)	Chi sq (p Value) if sig.-Cramer's V
Distance to Nearest Healthcare Facility for Hepatitis B Treatment					
< 5 Km	29 (54.7%)	26 (31.7%)	16 (27.1%)	46 (30.3%)	17.2 (0.039*) 0.129#
5–10 Km	15 (28.3%)	40 (48.8%)	31 (52.5%)	83 (54.6%)	
10–20 Km	5 (9.4%)	10 (12.2%)	9 (15.3%)	18 (11.8%)	
> 20 Km	4 (7.5%)	6 (7.3%)	3 (5.1%)	5 (3.3%)	
Type of nearby health facility					
Private	17 (32.1%)	19 (23.2%)	6 (10.2%)	32 (21.1%)	8.18 (0.042*) 0.15#
Public	36 (67.9%)	63 (76.8%)	53 (89.8%)	120 (78.9%)	
Availability of Medicines at Nearby Health Facility					
Always	33 (62.3%)	50 (61.0%)	43 (72.9%)	94 (61.8%)	10.2 (0.406)
Most of the time	4 (7.5%)	13 (15.9%)	4 (6.8%)	11 (7.2%)	
Never	13(24.5%)	13 (15.9%)	7 (11.9%)	33 (21.7%)	
Rarely	3 (5.7%)	6 (7.3%)	5 (8.5%)	14 (9.2%)	

Ease of Getting Appointment for Hepatitis B Treatment					
Neutral	3 (5.7%)	9 (11.0%)	17 (28.8%)	39 (25.7%)	30.6 (0.002**) 0.172#
Somewhat Difficult	12(22.6%)	22 (26.8%)	25 (42.4%)	21 (13.8%)	
Somewhat Easy	33 (62.3%)	37 (45.1%)	10 (16.9%)	78 (51.3%)	
Very Difficult	2 (3.8%)	4 (4.9%)	3 (5.1%)	10 (6.6%)	
Very Easy	3 (5.7%)	10 (12.2%)	4 (6.8%)	4 (2.6%)	
Missed Follow-Up Appointments for Hepatitis B					
No	16 (30.2%)	27 (32.9%)	22 (37.3%)	51 (33.6%)	0.653 (0.884)
Yes	37 (69.8%)	55 (67.1%)	37 (62.7%)	101 (66.4%)	
chi sq test, p value <.05 is statistically significant, # week association					

Patterns of Access to Care Across Place of Residence

Table 5: Patterns of Access to Care Across Place of Residence

Access to Health care	Rural (N=149 (%)	Urban (N=197) (%)	Chi sq (p Value) if sig.-Cramer v
Distance to Nearest Healthcare Facility for Hepatitis B Treatment			
< 5 Km	36 (24.2%)	81 (41.1%)	32.80 (0.000***) #.30
5–10 Km	68 (45.6%)	101 (51.3%)	
10–20 Km	32 (21.5%)	10 (5.1%)	
> 20 Km	13 (8.7%)	5 (2.5%)	
Type of nearby health facility			
Private	27 (18.1%)	47 (23.9%)	1.66 (0.198)
Public	122 (81.9%)	150 (76.1%)	
Availability of Medicines at Nearby Health Facility			
Always	96 (64.4%)	124 (62.9%)	12.65 (0.005**) #0.191
Most of the time	5 (3.4%)	27 (13.7%)	
Never	35 (23.5%)	31 (15.7%)	
Rarely	13 (8.7%)	15 (7.6%)	
Ease of Getting Appointment for Hepatitis B Treatment			
Neutral	35 (23.5%)	33 (16.8%)	12.34 (.015) #.18
Somewhat Difficult	28 (18.8%)	37 (18.8%)	
Somewhat Easy	63 (42.3%)	110 (55.8%)	
Very Difficult	14 (9.4%)	5 (2.5%)	
Very Easy	9 (6.0%)	12 (6.1%)	
Missed Follow-Up Appointments for Hepatitis B			
No	55 (36.9%)	61 (31.0%)	1.34 (0.246)
Yes	94 (63.1%)	136 (69.0%)	

A statistically significant association was found between residence and distance to the nearest healthcare facility (χ^2 = 32.80, p < 0.001; Cramer's V = 0.30), indicating a moderate effect size. Notably, only 24.2% of rural respondents reported residing within 5 km of a healthcare facility, compared to 41.1% of urban respondents. Furthermore, rural residents were substantially more likely to live 10–20 km (21.5%) or more than 20 km (8.7%) from a facility compared to urban dwellers (5.1% and 2.5%, respectively). In terms of the type of nearby healthcare facility, no significant difference was found between rural and urban populations (p = 0.198). However, a larger proportion of rural residents (81.9%) reported having access only to public healthcare, in contrast to urban residents (76.1%).

Availability of medicines at the nearest facility showed a significant association with place of residence (χ^2 = 12.65, p = 0.005; Cramer's V = 0.191), though the strength of the association is weak to moderate. Interestingly, both rural (64.4%) and urban (62.9%) patients reported that medicines were "always" available at similar rates. However, urban respondents were more likely to report availability 'most of the time' (13.7%), while rural respondents more often reported 'never' receiving medicines (23.5%).

A statistically significant association was also found between residence and ease of getting an appointment (χ^2 = 12.34, p = 0.015; Cramer's V = 0.18). Urban residents more frequently described the process as 'somewhat easy' (55.8%) compared to rural residents (42.3%), while rural respondents were more likely to report neutral (23.5%) or very difficult (9.4%) experiences.
Interestingly, no statistically significant difference was observed between rural and urban residents in terms of missed follow-up appointments (p = 0.246). However, adherence was slightly better among rural residents (36.9% did not miss follow-ups) than among urban counterparts (31.0%).

IV. DISCUSSION

The findings of this study underscore the significant influence of social determinants of health (SDoH) on access to care among Hepatitis B patients who were lost to follow-up under the National Viral Hepatitis Control Program (NVHCP) in Rajasthan. With 73.2% of respondents providing consent and 38.4% completing full interviews, the study demonstrates a promising level of engagement from previously untracked patients. This reinforces the importance of targeted re-engagement strategies to bring patients back into the continuum of care.

Despite geographic proximity not differing significantly between males and females, access disparities persist in terms of perceived ease of appointments and medicine availability. Male patients more frequently reported difficulties in securing appointments (28.5%) compared to females (16.1%), suggesting that gendered roles or employment constraints may play a role. However, both genders reported similarly high rates of missed follow-up appointments (around 65%), highlighting systemic issues in continuity of care.

Education emerged as a significant factor in healthcare access. Illiterate patients were more likely to live closer to healthcare facilities, possibly due to concentration in semi-urban or underserved areas. However, they also showed higher reliance on private facilities, potentially due to perceived or actual shortcomings in public sector responsiveness. Graduates, despite better health literacy, did not show substantially better adherence, echoing findings from other contexts where structural and behavioral barriers often override educational advantages (Alberts et al., 2022).

Place of residence had a notable impact on healthcare access. Urban residents were more likely to live near facilities, yet rural respondents reported better appointment adherence and less difficulty with scheduling. This might be a reflection of how strong the ASHAs and PHC level initiatives are in rural Rajasthan's community health system. Despite the presence of infrastructure, rural people nevertheless experienced a greater rate of medication unavailability (23.5% reported "never" receiving necessary medications), indicating gaps in service delivery.

Socioeconomic inequalities were also evident. Only 17.3% of participants possessed a BPL card, suggesting under-enrollment in social protection schemes. The use of biomass fuels and shared toilets further pointed toward underlying household-level deprivations that may influence health-seeking behavior and long-term adherence. These results are consistent with previous research that highlights the importance of infrastructure deficiencies and financial hardship as major obstacles to treatment continuity for chronic diseases such as Hepatitis B (WHO, 2020).

Overall, the study confirms that in order to meet the WHO's 2030 hepatitis B elimination targets, addressing SDoH such as economic vulnerability, geographic isolation, gender norms, and educational disparities is crucial, even though clinical and programmatic interventions are also crucial (WHO, 2016; Patnaik et al., 2021). These disparities can be addressed in Rajasthan by combining community-based methods with digital follow-up systems and public health infrastructure.

V. CONCLUSION

The intricate relationship between access to care and socioeconomic determinants of health (SDoH) among Hepatitis B patients who were lost to follow-up in Rajasthan is highlighted in this study. Significant obstacles still exist despite the National Viral Hepatitis Control Program's (NVHCP) efforts, especially in the form of financial hardship, geographic distance, a lack of reaction from the health system, and irregular medication availability. While most participants reported high self-perceived adherence and trust in healthcare providers, structural and socioeconomic constraints, rather than individual willingness, appear to drive discontinuity in care.

Educational attainment, caste, occupation, and place of residence were found to be significant predictors of access and ease of engagement with healthcare services. Urban-rural differences, though sometimes subtle, revealed deeper systemic issues in service delivery and outreach. The relatively high rate of re-engagement (73.2% consent) demonstrates the potential for recovery of patients previously lost to follow-up, especially if interventions are targeted, community-driven, and sensitive to context-specific barriers. Moving forward, health programs must integrate social determinants into planning, monitoring, and delivery frameworks focusing not only on biomedical interventions but also on equity, accessibility, and culturally competent outreach. This will be essential to achieving hepatitis B elimination targets and improving health outcomes for vulnerable populations.

Ethical considerations

Ethical clearance for the study was obtained from the Institutional Ethics Committee of IIHMR University, Jaipur, ensuring adherence to established guidelines for research involving human participants.

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Conflict of interest

The authors declare that we have no conflict of interest.

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REFERENCES

Alberts, C. J., Clifford, G. M., Georges, D., & de Martel, C. (2022). Global burden of liver cancer due to hepatitis B and C virus infections: Estimates by age, sex, region and country. Journal of Hepatology, 77(2), 466–476. https://doi.org/10.1016/j.jhep.2022.04.009

Gust, I. D. (1996). Epidemiology of hepatitis B infection in the Western Pacific and Southeast Asia. Gut, 38(Suppl 2), S18–S23. https://doi.org/10.1136/gut.38.supplement_2.s18

Ministry of Health and Family Welfare (MoHFW). (2019). National Action Plan – Viral Hepatitis: Working towards elimination of hepatitis in India by 2030. Government of India.

Patnaik, S. K., Yadav, S. S., & Sharma, P. (2021). Social determinants of hepatitis B in India: A systematic review. Indian Journal of Community Medicine, 46(1), 7–14. https://doi.org/10.4103/ijcm.IJCM_251_20

World Health Organization (WHO). (2016). Combating hepatitis B and C to reach elimination by 2030: Advocacy brief. https://apps.who.int/iris/handle/10665/206453

World Health Organization (WHO). (2020). *South-East Asia Region: Hepatitis Factsheet*. World Health Organization.

World Health Organization (WHO). (2022). Global progress report on HIV, viral hepatitis and sexually transmitted infections, 2021. https://www.who.int/publications/i/item/9789240027077