Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Healthcare Provider and Patient Perspectives on Comprehensive Hepatitis B Prevention and Control: A Qualitative Study in Central urban area of Shanghai, China

Qing Su
Xuhui District Center for Disease Control and Prevention (XuHui District Health and Wellness Supervision Office)
Rong Duan
Xuhui District Center for Disease Control and Prevention (XuHui District Health and Wellness Supervision Office)
Lingxiao Qu
Shanghai Municipal Center For Disease Control Prevention
Hanyun Ye
Chinese Center For Disease Control and Prevention
Yichen Wang
Xuhui District Center for Disease Control and Prevention (XuHui District Health and Wellness Supervision Office)
Wenyuan Huang
Xuhui District Center for Disease Control and Prevention (XuHui District Health and Wellness Supervision Office)
Yuehong Li
Lingyun Community Health Service Center, 1139 Luo Xiu Road, Shanghai
Hong Ren
Shanghai Municipal Center For Disease Control Prevention
Meixia Yang
ymeixia@sina.com

Xuhui District Center for Disease Control and Prevention (XuHui District Health and Wellness Supervision Office)

Research Article

Keywords: Chronic Hepatitis B, Qualitative research, Treatment conditions and needs, Comprehensive prevention and control, Shanghai

Posted Date: November 26th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11355779/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

The burden of chronic hepatitis B (CHB) in China remains significant. There are still numerous practical shortcomings in clinical diagnosis and treatment, grassroots prevention and control, patients' health awareness, and hierarchical referral. This study, from the perspectives of both service providers and demanders, analyzes the current status and actual service needs of CHB prevention and control in the central urban area of Shanghai, providing a practical basis for optimizing the refined management of hepatitis B in the region.

Methods

From February to May 2025, 20 healthcare service providers and 22 patients with CHB were recruited. Using stratified purposive sampling, we selected medical workers from the health administrative management department, disease control center, and hospitals at all levels. As well as included patients of different disease courses, follow-up compliance, age, and gender characteristics as the research subjects. Following the principle of information saturation in qualitative research. The data collected through a pair of semi-structured interviews were analyzed using thematic research guided by the translational medicine framework (T2–T4).

Results

We found that particularly older patients, have misconceptions and information gaps, which contributes to poor treatment adherence. The professional competence of grassroots medical workers is insufficient, and staffing levels are inadequate. The two-way referral mechanism is not yet well established, with obstacles including patients' distrust of the grassroots healthcare facilities, shortages of medication at the grassroots level, and inadequate information during the referral process. The chronic liver health management services currently implemented in Shanghai can alleviate patients’ economic burden and improve their quality of life to some extent; however, further improvement is needed. Establishing a disease-specific system that covers the entire continuum of CHB prevention, screening, diagnosis, and treatment can enhance efficiency and promote standardized management.

Conclusions

In the future, efforts should be made to explore multi-disease prevention and service innovation models, strengthen health education and psychological intervention. Improve supporting measures and grassroots services, deepen the integration of medical care and prevention, and establish a complete chain of CHB prevention, screening, diagnosis, follow-up, and psychological support.

Introduction

Viral hepatitis has been a major global public health challenge in recent decades, with chronic hepatitis B (CHB) being the primary source of disease burden. According to the World Health Organization (WHO), approximately 287 million people worldwide were living with hepatitis B or C virus (HBV/HCV) infection, and 1.34 million deaths annually are attributed to hepatitis-related diseases, over 84% of which are caused by CHB and secondary hepatocellular carcinoma (HCC) [1]. Globally, only 13% of CHB patients receive a confirmed diagnosis, and the rate of standardized treatment is less than 3%. Progress in prevention and control lags behind the strategic timeline for eliminating viral hepatitis by 2030 [2]. Therefore, the diagnosis, treatment, and management of CHB still pose a significant challenge to the disease burden at present [3].

China currently has approximately 75 million people living with CHB, accounting for nearly one-third of the global total [4, 5]. CHB is responsible for the vast majority of liver-related deaths in China [6]. As one of the most prevalent and severe liver infectious

diseases, CHB is preventable through vaccination, and its clinical outcomes can be significantly improved with antiviral therapy [4, 7]. China's vaccination program has achieved great success, with hepatitis B surface antigen (HBsAg) prevalence among children under 5 years of age reduced to approximately 1% [8]. Nevertheless, the large, long-standing of individuals with CHB continues to contribute to a substantial burden of liver cirrhosis and HCC, and the risk of ongoing viral transmission persists.

As a national benchmark city for hepatitis prevention and control, Shanghai pioneered the community-based comprehensive health management program for chronic viral hepatitis in 2012. The systematic implementation and evaluation from 2012 to 2023 have established a mature service model [9]. Meanwhile, the functional cure service system for hepatitis B in Xuhui District, Shanghai has been steadily developing. Relying on specialized clinics and individualized treatment plans, it continuously optimizes the clinical cure pathways for high-risk groups, providing technical support for reducing the long-term risk of liver diseases [10, 11]. At present, the Centers for Disease Control and Prevention (CDCs) and medical institutions have not established a standardized and effective full-cycle management model encompassing patients diagnosis, reporting, referral, follow-up, and treatment, nor have they developed an integrated mechanism linking medical care with prevention. In Xuhui District, there is a concentration of tertiary medical institutions and a number of innovative projects for liver disease prevention and control. The combination of traditional Chinese and Western medicine in diagnosis and treatment is particularly distinctive. At the same time, the population is concentrated and the social and economic levels of residents are diverse. Therefore, conducting research on hepatitis prevention from the perspective of doctor-patient supply and demand is of great significance.

The translational medicine (TM) framework provides a systematic lens for understanding how evidence-based CHB prevention and control strategies move from research to real-world implementation. The framework encompasses four stages [12]: T1 (bench-to-bedside, basic research to human studies), T2 (evidence-to-practice, clinical evidence and guidelines to routine clinical practice), T3 (practice-to-population, effective clinical interventions scaled up to community and population levels), and T4 (population-to-policy, population-level evidence translated into health policy and system decisions). This study was designed based on T2–T4 translational medicine framework to systematically identify barriers and facilitators at each implementation stage.

This qualitative study aims to explore disease awareness and management among people with CHB, as well as the current status of prevention and control efforts from the perspectives of patients and healthcare service providers. Based on the existing work, it precisely identifies the shortcomings, explores innovative paths for integrating medical and prevention services, and builds a CHB-specific health service package and full-cycle management system suitable for the local conditions of Shanghai.

1. Materials and Methods

1.1. Participants Selection

This study employed a qualitative semi-structured interview method, simultaneously including two types of respondents: healthcare service providers and patients with CHB. The former covered all relevant institutions along the healthcare chain, including health administration, disease prevention, community healthcare services center, secondary-level medical institutions, tertiary medical institutions. This study employed a qualitative semi-structured interview method, and included two types of respondents: healthcare providers and CHB patients. The former encompassed all relevant institutions within the healthcare chain, including health management departments, disease prevention institutions, and community health centers. The questionnaire used in this study was developed specifically for this research, and details can be found in Supplementary files 1–6. The latter was selected using stratified cluster purposive sampling [13], with a focus on 13 communities in Xuhui District, based on age and gender composition. The research was reviewed by the Ethics Committee of the Sexually Transmitted Diseases and AIDS Prevention and Control Center of the Chinese Center for Disease Control and Prevention.

1.2. Inclusion and Exclusion Criteria

For service providers, the inclusion criteria were: (1) employment at the current institution for at least one year; and (2) involvement in CHB prevention and control activities within the past six months. The exclusion criteria was no contact with CHB patients or no involvement in CHB prevention and control work during the past 6 months. (3) Priority was given to experts from municipal-level public health institutions (e.g., municipal CDC) or municipal-level medical institutions (e.g., municipal tertiary

Grade-A hospitals) who undertake city-wide CHB prevention and control technical guidance or policy formulation responsibilities, so as to construct a clear institutional hierarchy spanning district-level implementation to municipal-level governance.

Patients were screened according to the following criteria. Inclusion criteria were: (1) patients aged 18 years or more at the time of treatment who sought outpatient care or were hospitalized at the hospitals involved in this study; (2) HBsAg positivity (excluding rapid tests) and/or positive CHB DNA positive; (3) current residence in Shanghai; and (4) provision of informed consent. Exclusion criteria were: (1) foreign patients, or patients from Hong Kong, Macao or Taiwan; (2) discrepancies between participants' names medical records; and (3) individuals with severe mental illness, intellectual disability, language disorders, or other conditions that would prevent participation in this study.

1.3. Data Collection and Analysis

We deployed trained investigators to conduct face-to-face, audio-recorded interviews with personnel from each participating institution. Interviews were conducted using a pre-designed semi-structured guide, with targeted follow-up questions posed as needed. Interviews were conducted when data saturation was reached and no new information emerged. Interviews lasted between 20 and 80 minutes. Before each interview, the purpose, significance, and procedures of the study were explained in detail to the participants. Interviews were conducted in a private and secure setting, and informed consent was obtained before participation.

Based on the different interviewees, determining the interview contents for the service providers and the patients. (Table 1)

Table 1
Semi-structured interview outline based on the translational medicine framework (T2–T4)

Level-1 interview theme	Level-2 interview points	Service providers					Patients
		Health administration	Center for Disease Control and Prevention	Community healthcare center	Secondary-level medical institutions	Tertiary medical institutions	
[T2] Professional cognition and professional competence	Professional understanding of CHB and job responsibilities	√	√	√	√	√	
	Mastery of CHB transmission, diagnosis and treatment guidelines		√	√	√	√	
	Public/patient cognition of CHB core knowledge		√	√			√
	Perception of CHB-related stigma and discrimination			√		√	√
[T3] Service supply and medical-prevention collaboration	Current work situation, achievements and existing shortcomings	√	√	√			√
	Division of responsibilities and inter-departmental coordination	√	√			√	√
	Medical alliance collaboration and two-way referral operation	√	√	√	√	√	
	CHB case detection and standardized management		√	√			
[T3] Grassroots management and service capacity	Cognition of grassroots chronic disease management mode			√	√	√	
	Grassroots medication and testing			√	√	√	

Note: [T2] = evidence-to-practice (guideline implementation and patient behavior); [T3] =practice-to-population (medical-prevention collaboration and grassroots scaling); [T4] = population-to-policy (resource allocation, policy support, and service innovation).

Level-1 interview theme	Level-2 interview points	Service providers					Patients
		Health administration	Center for Disease Control and Prevention	Community healthcare center	Secondary-level medical institutions	Tertiary medical institutions	
	service supply capacity						
	Patient self-management and intelligent tool promotion			√			
	Specialist services and consultation response		√	√	√	√	
[T2] Healthcare-seeking behavior and follow-up management	Healthcare-seeking behavior and treatment decision-making preference						√
	Follow-up adherence and reasons for loss to follow-up		√	√	√	√	√
	Demand and preference for CHB management services						√
[T4] Resource allocation and policy support	CHB prevention and control policy and system construction	√					√
	Funding and human resource allocation status	√	√	√			
	Medical insurance coverage and economic burden perception						√
[T4] Innovative service and development demand	Cognition and willingness of CHB functional cure				√	√	√
	Evaluation of existing chronic liver		√	√			√

Note: [T2] = evidence-to-practice (guideline implementation and patient behavior); [T3] =practice-to-population (medical-prevention collaboration and grassroots scaling); [T4] = population-to-policy (resource allocation, policy support, and service innovation).

Level-1 interview theme	Level-2 interview points	Service providers					Patients
		Health administration	Center for Disease Control and Prevention	Community healthcare center	Secondary-level medical institutions	Tertiary medical institutions	
	disease management services						
	Demand for digital health management tools			√			√
Number		W1-3	J1-6	S1-4	M1-3	N1-4	P1-22

Note: [T2] = evidence-to-practice (guideline implementation and patient behavior); [T3] =practice-to-population (medical-prevention collaboration and grassroots scaling); [T4] = population-to-policy (resource allocation, policy support, and service innovation).

Table 1 *is here*

All the interview recordings were transcribed verbatim into textual materials. The data were analyzed using the deductive thematic analysis method [14], and the overall themes and sub-themes were extracted in conjunction with the research objectives. Through independent coding by two individuals, cross-checking, and consensus-building through discussion, the coding reliability was ensured. The NVivo 11 software was employed to facilitate this phase of data processing. The deductive thematic analysis was explicitly guided by the translational medicine framework (T2–T4): initial codes were first mapped to the three translational stages (T2: evidence-to-practice; T3: practice-to-population; T4: population-to-policy), and sub-themes were then extracted within each stage in conjunction with the research objectives. This theory-driven approach strengthened the conceptual coherence of the qualitative analysis. The use of a deductive framework guided by translational medicine stages is consistent with established approaches in multi-stakeholder qualitative research examining evidence-to-practice translation [15–17].

1.4. Quality Control

Themes were identified through discussion based on the interview outline. One investigator coded all the interview materials, and a second investigator independently reviewed the coding. Any discrepancies were resolved through re-examination of the data and discussion until consensus was reached.

2. Results

2.1. Demographic characteristics

Among the 20 respondents of service providers, 3 were from the health administrative department (coded as W1-3), 6 from the CDC (coded as J1-6), 4 from community health service centers (coded as S1-4), 3 from secondary medical institutions (coded as M1-3), and 4 from tertiary medical institutions (coded as N1-4). Their ages ranged was from 27 to 61 years old (Table 2). Importantly, among the tertiary hospital respondents, discipline leaders from municipal tertiary Grade-A hospitals were enrolled. The deliberate inclusion of these municipal-level experts creates a clear hierarchical structure—from community-level implementation, through district-level coordination, to municipal-level technical guidance and policy influence—ensuring that findings generated in Xuhui District can be interpreted and generalized within the broader municipal context of Shanghai.

Table 2
Basic demographic characteristics of service providers

Demographic characteristics	Number	Proportion(%)
Sex		
Male	9	45.0
Female	11	55.0
Age (years)		
≤35	3	15.0
36–45	8	40.0
46–55	7	35.0
>55	2	10.0
Professional title		
Junior level	3	15.0
Intermediate level	6	30.0
Sub-senior level	5	25.0
Senior level	6	30.0
Institutional type		
Health administration	3	15.0
Center for Disease Control and Prevention	6	30.0
Community healthcare center	4	20.0
Secondary-level medical institutions	3	15.0
Tertiary medical institutions	4	20.0

Table 2 *is here*

A total of 22 patients were recruited for interviews, representing different gender and age groups (coded as P1-22). Participants fell into three treatment and follow-up categories: treated with continuous follow-up and medication adherence in the past three years (8 patients); treated with intermittent follow-up and taking medicine in the past three years (7 patients); and not treated (7 patients). The reported duration of HBV infection ranged from less than 1 year to 62 years. Diagnoses were made through self-testing, preoperative screening, routine physical examinations, or blood donation screening (Table 3).

Table 3
Basic demographic characteristics of people with CHB

Demographic characteristics	Number	Proportion(%)
Sex		
Male	11	50.00
Female	11	50.00
Age (years)		
18–35	4	18.18
36–50	5	22.73
51–64	4	18.18
65–75	5	22.73
≥76	4	18.18
Treatment condition		
Under treatment	8	36.36
Treatment interruption	7	31.82
Not treated	7	31.82
Education		
Primary school or below	2	9.09
Middle school	13	59.09
Bachelor's degree or above	4	18.18
Secondary-level medical institutions	3	13.64
Census register		
Rural	5	22.73
Urban	17	77.27
The duration of HBV infection (years)		
<5	3	13.64
5–15	3	13.64
16–25	9	40.91
26–35	1	4.55
>35	6	27.27

Table 3 *is here*

2.2. Professional cognition and professional competence

2.2.1 Supply-side professional cognition and guideline mastery

Healthcare professionals at all levels reached a consistent core consensus (Table 4): CHB is the leading cause of cirrhosis and HCC in China, imposing heavy disease and economic burdens on individuals and the healthcare system. All respondents confirmed that newborn hepatitis B vaccination within 24 hours after birth is the most effective primary prevention strategy.

Table 4
Representative quotes of core themes from interviewees

Interview theme	Interviewee type	Representative quote
Professional cognition and professional competence	J2	CHB is the main cause of liver cirrhosis and liver cancer in China. There are over 7 million living with CHB in the country, while nearly 10% of them develop liver cirrhosis and 8% develop liver cancer each year, placing a very heavy burden on both the economy and families
	M3	The CHB prevention and treatment guidelines are updated annually, and staff need to learn the latest concepts, drug therapies, and treatment d discontinuation methods
	S1	The public has a limited understanding of CHB, confuses it with schistosomiasis and fatty liver, relies on folk remedies, and there is social discrimination
	N4	I once encountered a 19-year-old patient with CHB who developed liver cancer. They only came to the hospital after experiencing significant ascites and abdominal distension. Some patients did not pay enough attention to CHB
	P3	There is deep-rooted discrimination against CHB in society. I feel my father somewhat dislikes patients like us, and this situation seems inevitable. Even though I am related to him by blood, he still dislikes me and urges me to be hospitalized. If even family members are afraid, let alone others in society
Service supply and medical-prevention collaboration	W2	In grassroots work, prevention and control staff are mainly responsible for monitoring, while general practitioners are less involved, though their participation is crucial
	N3	Some secondary hospitals lack a dedicated infectious disease department, and CHB care is dispersed across gastroenterology and internal medicine departments, leading to uncoordinated management
	M3	Barriers in the medical alliance include recognition of testing results, incomplete drug availability at grassroots hospitals, and inability to share patient information
Grassroots management and service capacity	S3	The community health service center does not have an infectious disease department and is unable to undertake follow-up work or manage medication storage
	S1	According to the standard of 1.5-2 public health doctors per 7,000 permanent residents, current staff levels are clearly insufficient
Healthcare-seeking behavior and follow-up management	N1	Some patients did not initiate antiviral treatment after diagnosis due to fear of discrimination or the belief that 'no symptoms means no need for treatment
	S2	Elderly and low-education patients were lost to follow-up because they forgot follow-up dates. Migrant patients returned home without connecting with local services
Resource allocation and policy support	J4	There is a severe shortage of funds. The investment in CHB prevention and control is minimal, with only tens of thousands of yuan from all levels of funding each year.
	J6	The number of CHB patients is large, but there is a lack of dedicated personnel and specialized departments. There are no staff solely responsible for hepatitis-related work in all levels of hospitals, most are part-time staff from other departments.
Innovative service and development demand	P10	My father passed away from lung cancer last year, which has made me pay more attention to health. Coincidentally, I had the opportunity to receive further treatment that could improve my health and reduce the risk of cancer, thanks to the advanced medical conditions in Shanghai

Frontline clinicians stated that CHB prevention and treatment guidelines are updated annually, and staff need to continuously learn the latest diagnostic criteria, antiviral regimens and treatment discontinuation standards to ensure standardized diagnosis and treatment.

2.2.2 Demand-side disease cognitive gaps

Widespread misconceptions existed among the public and patients, especially in elderly and low-education groups: confusion between blood-borne and digestive tract transmission, misunderstanding of mother-to-child transmission as hereditary disease, and the pervasive false belief that "no symptoms mean no need for treatment". Most asymptomatic patients neglected regular follow-ups, and some sought medical care only after severe complications such as as-cites occurred.

2.2.3 Stigma and discrimination status

Social stigma against CHB remained prominent. Many patients initiatively adopted separate eating, avoided social activities, and suffered from psychological isolation and anxiety. Family-level discrimination was also observed in some cases, which further aggravated patients' self-stigma and reduced their willingness to actively seek diagnosis and treatment.

2.3 Service supply and medical-prevention collaboration

2.3.1 Work status and existing shortcomings

At present, CHB prevention and control is mainly led by CDC departments. Shanghai has achieved remarkable results in newborn vaccination and community chronic liver disease management, but there are still prominent shortcomings in the whole-cycle closed-loop management. The connection between clinical treatment and public health management is not tight, and the efficiency of collaborative work needs to be improved.

2.3.2 Inter-departmental responsibility division and coordination

The division of responsibilities among health administration, CDC and medical institutions is not fully clear. There is a lack of normalized multi-departmental coordination mechanism, and the work of CHB prevention and control has not formed a joint force. Clinical departments have low participation in public health management such as case reporting and follow-up, resulting in disconnection between medical treatment and prevention.

2.3.3 Medical alliance collaboration and two-way referral

The two-way referral mechanism within the medical alliance is not yet sound. Barriers include mutual recognition of test results, insufficient CHB medication supply at grassroots level, and non-interoperable patient information systems across institutions. Most medical alliances have not incorporated CHB into the scope of key collaborative diseases, and the referral pathway has not formed a standardized closed loop.

2.3.4 Case detection and standardized management

CHB cases are mainly detected through preoperative screening, routine physical examination, blood donation screening and active community screening. However, the case management system is not perfect: the information transmission between reporting institutions and management institutions is not timely, and some cases are lost to follow-up after diagnosis. Standardized management rate of confirmed cases still needs to be improved.

2.4 Grassroots management and service capacity

2.4.1 Cognition of grassroots chronic disease management mode

Grassroots medical workers generally recognize the necessity of incorporating CHB into community chronic disease management, but they believe that the current basic public health service model mainly focuses on common chronic diseases such as hypertension and diabetes, and the professional management of infectious chronic diseases represented by CHB is insufficient.

2.4.2 Medication and testing service supply capacity

Community health service centers generally lack complete CHB-related testing items and antiviral drug varieties, which cannot meet the needs of patients' routine follow-up and medication renewal. This is one of the core reasons why patients are unwilling

to receive follow-up management at the grassroots level.

2.4.3 Patient self-management and intelligent tool promotion

Most grassroots institutions have not carried out systematic self-management guidance for CHB patients. Digital management tools such as WeChat mini-programs are still in the preliminary promotion stage, and the actual utilization rate is low. Grassroots workers lack relevant training and cannot effectively guide patients to use intelligent tools for disease management.

2.4.4 Specialist services and consultation response

Community health service centers generally have no independent infectious disease departments, and CHB consultation and management are mostly undertaken by public health physicians or general practitioners part-time. Their professional ability to answer professional questions such as antiviral treatment and disease progression assessment is limited, and they need technical support from superior hospitals.

2.5 Healthcare-seeking behavior and follow-up management

2.5.1 Healthcare-seeking behavior and treatment decision preference

Most patients prefer to choose tertiary hospitals for initial diagnosis and treatment, and have insufficient trust in the professional capacity of grassroots medical institutions. The main factors affecting patients' choice of medical institutions include physician's professional competence and sense of responsibility, travel distance, appointment convenience and drug adequacy.

2.5.2 Follow-up adherence and reasons for loss to follow-up

Spontaneous drug discontinuation and loss to follow-up are common in clinical practice, which easily lead to viral reactivation and liver function damage. Loss to follow-up is mainly concentrated in three groups: elderly and low-education patients who forget follow-up appointments; migrant populations who interrupt management due to job or residence changes; asymptomatic patients who underestimate disease risks and refuse long-term standardized treatment.

2.5.3 Demand and preference for management services

Patients' core demands for CHB management include convenient medication renewal, regular examination reminders, professional disease knowledge popularization and psychological support. Elderly patients prefer offline face-to-face management services in communities, while young patients are more inclined to accept remote and intelligent management modes.

2.6 Resource Allocation and Policy Support

2.6.1 Policy and system construction

Shanghai has issued a series of policies on community chronic liver disease management and hepatitis B functional cure, providing policy support for grassroots prevention and control work. However, the supporting implementation rules and assessment mechanisms for grassroots CHB management are not perfect, and the binding force on relevant work is insufficient.

2.6.2 Funding and human resource allocation

Funding for CHB prevention and control is seriously insufficient. Basic public health subsidies can only cover routine management work, and cannot support active screening, specialized equipment procurement and targeted health education. There is a general shortage of full-time CHB management staff at all levels. Most relevant workers assume the work part-time, and the professional competence of grassroots public health physicians cannot meet the needs of refined management.

2.6.3 Medical insurance coverage and economic burden perception

95.5% of patients are covered by basic medical insurance, and most are satisfied with the current reimbursement policy, which effectively reduces their economic burden. Patients generally accept an annual CHB test cost of about 1,000 yuan, and expect to further increase reimbursement rates or include CHB testing and antiviral drugs into free basic service packages.

2.7 Innovative Service and Development Demand

2.7.1 Cognition and willingness of functional cure

Most patients have no knowledge of CHB functional cure, and some have concerns about treatment safety and cost. Their primary treatment expectation is to control disease progression rather than achieve clinical cure. A small number of patients receiving interferon therapy have high recognition of functional cure and are willing to actively cooperate with standardized treatment.

2.7.2 Evaluation of existing chronic liver disease management services

Community-based chronic liver disease management services are widely recognized by patients, especially elderly patients with high follow-up compliance. Patients affirmed the responsibility of community staff and the convenience of nearby follow-up, but suggested that the service content should be further enriched, and professional technical support should be strengthened.

2.7.3 Demand for digital health management tools

Young patients have high acceptance of digital management tools, and their core demands include evidence-based health education, test result query, medication reminders, follow-up appointment and integrated comorbidity management. However, elderly patients face an obvious digital divide. Patients generally have concerns about health information privacy and security.

Table 4 *is here*

Figure 1 *is here*

Discussions

Interpreted through the translational medicine (TM) framework (T2–T4), the findings of this study reveal interconnected barriers across the three implementation stages of CHB prevention and control in Shanghai. The following discussion is organized by translational stage: T2 (evidence-to-practice) addresses disease cognition, stigma, and patient behavior; T3 (practice-to-population) addresses medical-prevention integration, grassroots capacity, and digital service scaling; T4 (population-to-policy) addresses resource allocation, insurance policy, and innovative service models. This stage-based interpretation helps identify where translational breakdowns occur and what coordinated interventions are needed.

A substantial proportion of participants with CHB had misconceptions and knowledge gaps, which are well-documented contributors to poor treatment adherence [18–20] and treatment failure [21–26]. CHB is often asymptomatic and progresses insidiously, yet persistent inflammation can ultimately lead to cirrhosis and HCC [27, 28]. Even participants aware of CHB risks neglected disease management due to the absence of overt symptoms [29, 30]. Overall, participants' knowledge of HBV remains suboptimal, with pronounced knowledge gaps observed among individuals with lower educational levels and older age.

While online sources and media campaigns effectively reduce disease transmission [31], older adults rely more on interpersonal communication with providers, family, and friends. Health education should therefore be tailored to different demographic groups and extended beyond patients to the general public to disseminate accurate CHB information [32], which is critical for reducing stigma and psychological burden. Insufficient patient trust in primary care stems from information asymmetry, uneven grassroots capabilities, and prior negative medical experiences [33, 34]. Future health education should thus strengthen doctor-patient communication and medical information transparency alongside knowledge dissemination.

Patients with CHB commonly experience both self-stigma and social discrimination [25], yet professional psychological counseling, peer support, and patient communities remain underdeveloped, making it difficult to establish a complete social support system [35, 36]. De-stigmatization should be integrated into comprehensive CHB prevention through psychological counseling channels, peer support mechanisms, and public health education to foster an inclusive social medical environment [37].

At the medical service system level, CHB prevention and control still faces insufficient medical-prevention integration, weak grassroots capabilities, and inadequate resource allocation. As a systematic project spanning prevention, diagnosis, treatment, and management, it requires clear collaborative division of responsibilities across institutions to achieve the rational pattern of “treating severe diseases in hospitals, managing minor conditions in communities” [38–40], However, our findings indicated that the current referral mechanisms supporting this division of labor remains inadequate and lacks a standardized closed-loop process. Therefore, establishing an effective two-way referral system among community healthcare institutions, secondary hospitals, and tertiary hospitals is of critical importance. Furthermore, eliminating information silos in CHB prevention and control is essential for achieving integration of medical treatment and disease prevention. There is an urgent to accelerate the development of a regionally integrated information platform for CHB prevention and control to enable seamless communication and data sharing among the CDCs, medical institutions, and community healthcare services.

Since 2011, Shanghai has been fully promoting community health reform and exploring the integrated community management services for CHB [41], and the clinical services for functional cure are continuing to be strengthened. Building on this foundation, the development of a hierarchical service model for the whole-course management of people with CHB can support the sustained delivery of more comprehensive and coordinated services, thereby enhancing treatment accessibility and reducing patients’ physical and psychological burdens [42–44]. Correspondingly, health management service packages for patients have evolved from a primary focus on public health interventions to the integration of basic medical services, with the core goals of reducing disease stability. However, the current service and operation mechanisms remain in need of refinement. It is urgent to establish a comprehensive health management system for CHB that enables seamless information sharing and delivers standardized, streamlined health services will help optimize clinical practices, improve operational efficiency, and elevate service quality. With the continuous iteration of new drug research and diagnosis strategies, by further optimizing individualized treatment paths and improving the overall management model, more suitable cure plans can be matched for different populations[30].

Younger patients demonstrate high acceptance of digital health services delivered via WeChat Mini-Programs and dedicated health applications—particularly features such as remote follow-up consultations, automated medication reminders, and real-time laboratory or diagnostic report notifications [45–47]. In contrast, older adults face significant barriers due to the digital divide, including limited digital literacy and reduced proficiency in operating mobile health platforms, which impedes their effective engagement with tel-medicine and remote care models [48, 49]. Additionally, widespread concerns persist regarding the confidentiality and security of personal health information. Current liver disease management applications suffer from functional homogeneity, offering largely overlapping features while lacking differentiated, evidence-informed core capabilities, such as personalized pharmacotherapy support and integrated multi-morbidity prevention strategies. Consequently, actual user adoption and sustained engagement remain sub-optimal [46]. To enhance inclusivity, usability, and trust, future iterations should prioritize age-inclusive interface design, robust privacy-by-design safeguards, streamlined user workflows, and the integration of a family-assisted care module enabling caregiver involvement in patient monitoring and management.

Financial support and medical insurance policies are also important strategies for facilitating the early elimination of CHB. First-line antiviral agents, including entecavir, tenofovir, and pegylated interferon α [50], have been included in the basic medical insurance reimbursement list. It is possible to explore a commercial combination medical insurance model for combined screening of chronic liver diseases and tumors, as an effective supplement to basic medical insurance, to expand the coverage of patients' long-term health protection and further improve the multi-level medical security system that combines basic medical insurance and commercial insurance. From a T4 translational perspective, these resource and policy constraints reflect the broader challenge of translating population-level implementation evidence into sustainable health system investments, a barrier widely documented in translational research organizations in China [51].

This study has several limitations. First, the qualitative interviews allow for in-depth exploration participants’ subjective experiences and perceptions, the findings are not readily quantifiable and are not amenable statistical inference. Second, the study participants were likely drawn from individuals who were willing to share their experiences and who were relative engaged in disease management. Patients who declined participation due to stigma or who held strongly negative attitude towards the healthcare system may not have been represented, potentially leading to a biased positive perspectives. Future research should address these limitations by incorporating larger and more diverse samples and by both qualitative and quantitative methods.

Conclusions

Our study delineates the current landscape of CHB prevention and treatment through in-depth interviews, identifying patients' unmet needs and providing actionable insights. First, strengthening precise and differentiated health education, enhancing public awareness, and reducing social stigma are essential for improving disease detection and treatment rates. Second, the diagnostic and therapeutic competence of healthcare professionals at all levels underpins patient trust, while professional responsibility and empathy serve as a vital bridge in doctor-patient relationships. Third, continued efforts are needed to alleviate patients' economic burden. Fourth, community health management practices should be optimized with enhanced financial, human resource, and technical support, alongside a multi-disease prevention model integrating hepatitis B with diabetes and metabolic liver disease. Fifth, medical-prevention integration should be deepened, cross-institutional collaboration improved, and standardized tiered treatment and two-way referral promoted. Interpreted through the translational medicine framework (T2–T4), these findings underscore that effective CHB control requires coordinated interventions across all three stages: at T2, strengthening evidence-based education and reducing stigma to improve adherence; at T3, deepening medical-prevention integration and enhancing grassroots capacity to scale effective interventions; and at T4, optimizing resource allocation, insurance policies, and innovative service models to translate evidence into sustainable system improvements. The inclusion of municipal-level experts ensures these recommendations are grounded in a multi-level governance perspective, enhancing their applicability to municipal policy making in Shanghai.

Declarations

Ethics approval and consent to participate

Before conducting the interview, the researchers provided the interviewees with a detailed briefing on the interview content, the scope of information to be collected, and relevant research protocols. Only after securing their informed consent were the interviewees invited to sign the informed consent form.The study has been approved by the Medical Ethics Expert Committee of the National Health and Family Planning Commission (X241028814), and was conducted in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

National Comprehensive Prevention and Control Model Research Project for Hepatitis B; Shanghai Three-Year Action Plan for Strengthening the Public Health System (GWVI-11.1-05); Shanghai Three-Year Action Plan for Strengthening the Public Health System (2023–2025; GWVI-11.1-07).

Author Contribution

QS: participate in surveys, analysis, and interpretation of data; drafting and revising the article. HR: participate in the conception and design of the study. LQ and HY: carry out quality control on surveys and data analysis, and put forward revision suggestions. RD, YW, YL and WH: participate in surveys, organize data, and conduct quality control. MY: Organize field surveys, perform quality control,critically revised the manuscript for intellectual content. All authors read and approved the manuscript.

Acknowledgement

We are grateful to the Shanghai Association for the Prevention and Control of Sexually Transmitted Diseases and AIDS for the financial support. We acknowledge the Shanghai CDC ,Shanghai Sixth People's Hospital, Shanghai Eighth People's Hospital, and Lingyun and Tianlin Community Health Service Centers for their support during the research period.

Data Availability

Data and materials from this study are available from the corresponding author upon reasonable request.

Abbreviations

CHB Chronic hepatitis B

HCC Hepatocellular carcinoma

WHO World Health Organization

HBsAg Hepatitis B surface antigen

CDCs Centers for Disease Control and Prevention

HBV Hepatitis B virus

MTCT Mother-to-child transmission

References

1. Global hepatitis report. 2026. World Health Organization. 2026.
2. Manne V, Gochanour E, Kowdley KV. Current perspectives into the evaluation and management of hepatitis B: a review. Hepatobiliary Surg Nutr. 2019;8(4):361–9.
3. Viral hepatitis. B and C burden of disease, WHO policy adoption status in countries, 2025. World Health Organization; 2025.
4. Yan R, Sun M, Yang H, Du S, Sun L, Mao Y. 2024 latest report on hepatitis B virus epidemiology in China: current status, changing trajectory, and challenges. Hepatobiliary Surg Nutr. 2025;14(1):66–77.
5. Hui Z, Yu W, Fuzhen W, Liping S, Guomin Z, Jianhua L, et al. New progress in HBV control and the cascade of health care for people living with HBV in China: evidence from the fourth national serological survey, 2020. Lancet Reg Health West Pac. 2024;51:101193.
6. Subic M, Zoulim F. How to improve access to therapy in hepatitis B patients. Liver Int. 2018;38(Suppl 1):115–21.
7. Liu Z, Li M, Hutton DW, Wagner AL, Yao Y, Zhu W, et al. Impact of the national hepatitis B immunization program in China: a modeling study. Infect Dis Poverty. 2022;11(1):106.
8. Chen S, Li J, Wang D, Fung H, Wong LY, Zhao L. The hepatitis B epidemic in China should receive more attention. Lancet. 2018;391(10130):1572.
9. Ren H, Xu D, Qu L, Shen X, Chen K, Pan Q, et al. Evaluations of Community-based Healthcare Management for Patients with Chronic Viral Hepatitis - Shanghai Municipality, China, 2012–2023. China CDC Wkly. 2025;7(30):991–6.
10. Zheng JR, Wang ZL, Feng B. Hepatitis B functional cure and immune response. Front Immunol. 2022;13:1075916.
11. You H, Wang F, Li T, Xu X, Sun Y, Nan Y, et al. Guidelines for the Prevention and Treatment of Chronic Hepatitis B (version 2022). J Clin Transl Hepatol. 2023;11(6):1425–42.
12. Singaram M, Muraleedhran VR, Sivaprakasam M. Cross fertilisation of Public Health and Translational Research. J Indian Inst Sci. 2022;102(2):763–82.

13. Heary CM, Hennessy E. The use of focus group interviews in pediatric health care research. J Pediatr Psychol. 2002;27(1):47–57.
14. Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide 131. Med Teach. 2020;42(8):846–54.
15. Jia Y, Cheng G, Wang H, Ma B, Cai Y, Ren X, et al. Barriers and facilitators to implementing pulmonary rehabilitation guidelines in China: a qualitative study using implementation science frameworks. Health Res Policy Syst. 2025;23(1):51.
16. Tseng E, Smith K, Clark JM, Segal JB, Marsteller JA, Maruthur NM. Using the Translating Research into Practice framework to develop a diabetes prevention intervention in primary care: a mixed-methods study. BMJ Open Qual. 2024; 13(2).
17. Khoury MJ, Gwinn M, Yoon PW, Dowling N, Moore CA, Bradley L. The continuum of translation research in genomic medicine: how can we accelerate the appropriate integration of human genome discoveries into health care and disease prevention? Genet Med. 2007;9(10):665–74.
18. Abreu RM, Bassit LC, Tao S, Jiang Y, Ferreira AS, Hori PC, et al. Long-term virological and adherence outcomes to antiviral treatment in a 4-year cohort chronic HBV study. Antivir Ther. 2019;24(8):567–79.
19. Wang ML, Chen EQ. [Impact of treatment compliance in chronic hepatitis B]. Zhonghua Gan Zang Bing Za Zhi. 2022;30(11):1266–9.
20. Zhu C, Gao Y, Jiang L, Ding B, Sun Y. Better plans and more powerful evidence are needed in the research and treatment of chronic hepatitis B in China. Int J Clin Exp Med. 2015;8(12):22030–8.
21. Liu J, Liang W, Jing W, Liu M. Countdown to 2030: eliminating hepatitis B disease, China. Bull World Health Organ. 2019;97(3):230–8.
22. Zhou X, Zhang F, Ao Y, Lu C, Li T, Xu X, et al. Diagnosis experiences from 50 hepatitis B patients in Chongqing, China: a qualitative study. BMC Public Health. 2021;21(1):2195.
23. Chen Y, Xie C, Zhang Y, Li Y, Ehrhardt S, Thio CL, et al. Knowledge regarding hepatitis B mother-to-child transmission among healthcare workers in South China. J Viral Hepat. 2018;25(5):561–70.
24. Bolutayo K, van Manh AL, Cohen N, Ndiaye D, Jandorf L, Perumalswami PV. Reducing Liver Cancer Risk in African-Born Immigrants Through Culturally Targeted Hepatitis B Group Education Programs. J Cancer Educ. 2018;33(6):1201–5.
25. Huang J, Guan ML, Balch J, Wu E, Rao H, Lin A, et al. Survey of hepatitis B knowledge and stigma among chronically infected patients and uninfected persons in Beijing, China. Liver Int. 2016;36(11):1595–603.
26. Lu B, Zhu L, Wang X, Zhong L, Cheng Y, Fan J, et al. Effects of radiofrequency ablation combined with transarterial chemoembolization and antiviral therapy on the prognosis and quality of life in primary chronic HBV-related liver cancer. J buon. 2019;24(5):1979–84.
27. Mutimer D, Brown M, Logan J, Kelgeri C. Patient Source of Referral Is a Key Determinant of Subsequent Retention in Care for Young Chronic Hepatitis B Patients. J Viral Hepat. 2025;32(2):e14059.
28. Terrault NA, Lok ASF, McMahon BJ, Chang KM, Hwang JP, Jonas MM, et al. Update on prevention, diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. Hepatology. 2018;67(4):1560–99.
29. Yardeni D, Chang KM, Ghany MG. Current Best Practice in Hepatitis B Management and Understanding Long-term Prospects for Cure. Gastroenterology. 2023;164(1):42–e606.
30. Lim SG, Baumert TF, Boni C, Gane E, Levrero M, Lok AS, et al. The scientific basis of combination therapy for chronic hepatitis B functional cure. Nat Rev Gastroenterol Hepatol. 2023;20(4):238–53.
31. Ma J, Ma S. Dynamics of a stochastic hepatitis B virus transmission model with media coverage and a case study of China. Math Biosci Eng. 2023;20(2):3070–98.
32. Kheir OO, Freeland C, Abdo AE, Yousif MEM, Altayeb EO, Mekonnen HD. Assessment of hepatitis B knowledge and awareness among the Sudanese population in Khartoum State. Pan Afr Med J. 2022;41:217.
33. Mukhtar NA, Evon DM, Yim C, Lok AS, Lisha N, Lisker-Melman M et al. Patient knowledge, beliefs and barriers to hepatitis B care: results of a multicenter, multiethnic patient survey. 2021; 66(2):434–41.
34. Nie JB, Cheng Y, Zou X, Gong N, Tucker JD, Wong B et al. The vicious circle of patient–physician mistrust in China: health professionals' perspectives, institutional conflict of interest, and building trust through medical professionalism. 2018; 18(1):26–36.

35. Zhang L, Chen J, Wu G, Pang S, Zhang Z, Yan YJFPH. Breaking the stigma: the role of family support in hepatitis B management from a public health education perspective. 2026; 14:1768182.
36. Jiang SX, Zhu K, Ko HHJCLJ. Stigma related to hepatitis B virus: A barrier to global viral hepatitis elimination. 2026(aop):e20260002.
37. Katcher JG, Klassen AC, Hann HW, Chang M, Juon HSJJ. Racial discrimination, knowledge, and health outcomes: The mediating role of hepatitis B-related stigma among patients with chronic hepatitis B. 2024; 31(5):248–54.
38. Najjar Z, Gupta L, Pritchard-Jones J, Strasser SI, Levy MT, Liaw ST, et al. A survey of Sydney general practitioners' management of patients with chronic hepatitis B. Med J Aust. 2016;204(2):74.
39. Dimmendaal M, Kracht PAM, Dijkstra S, Arends JE, Woonink F, Behalf Of The Reach Working Group O. Retrieval of chronic hepatitis B patients in the Utrecht region in the Netherlands. Neth J Med. 2019;77(6):199–203.
40. Sievert K, Liddle R, Tan A, Arachchi N, Valaydon Z, Allard N. Promoting hospital and primary care collaboration for timely and effective care for chronic hepatitis B in western Melbourne. Aust Health Rev. 2020;44(4):521–6.
41. Ren H, Yu Y, Hu JY, Shi Y, Lu YH, Meng W. Caregiver burden and its determinants among family members of patients with chronic viral hepatitis in Shanghai, China: a community-based survey. BMC Infect Dis. 2014;14:82.
42. Duraisamy GS, Bhosale D, Lipenská I, Huvarova I, Růžek D, Windisch MP et al. Advanced Therapeutics, Vaccinations, and Precision Medicine in the Treatment and Management of Chronic Hepatitis B Viral Infections; Where Are We and Where Are We Going? Viruses. 2020; 12(9).
43. Ertugrul H, Ekiz E, Islak Mutcali S, Tahan V, Daglilar E. Chronic Hepatitis B: Current Management and Future Directions. Diseases. 2025; 13(10).
44. Duah A, Nartey YA. Clinical Profile and Limitations in the Management of HBV Patients Attending Clinic at a District Hospital in Ghana. Int J Hepatol. 2023; 2023:4424718.
45. Lin CL, Kao JH. Global strategies and actions to eliminate hepatitis B virus infection. Clin Mol Hepatol. 2025;31(4):1197–212.
46. Su TH, Kao JH. Role of artificial intelligence in the management of chronic hepatitis B infection. Clin Liver Dis (Hoboken). 2024;23(1):e0164.
47. Hur MH, Park MK, Yip TC, Chen CH, Lee HC, Choi WM, et al. Personalized Antiviral Drug Selection in Patients With Chronic Hepatitis B Using a Machine Learning Model: A Multinational Study. Am J Gastroenterol. 2023;118(11):1963–72.
48. Hepburn J, Williams L, McCann LJJ. Barriers to and facilitators of digital health technology adoption among older adults with chronic diseases: updated systematic review. 2025; 8:e80000.
49. Feng Y, Pu K, Liu CJSR. Digital divide and healthcare service utilization among older adults with chronic liver disease in China: a nationwide cross-sectional study. 2026.
50. Hou JL. lai W. [The guideline of prevention and treatment for chronic hepatitis B: a 2015 update]. Zhonghua Gan Zang Bing Za Zhi. 2015; 23(12):888–905.
51. Paquette JS, Moulin JA, Sheehy A, Lavertu G, Diendéré E, Toi AK, et al. Building a Collaborative Translational Research Platform: Identifying Barriers and Enablers From Basic Research to Primary Healthcare. Cureus. 2025;17(2):e78699.

Figures

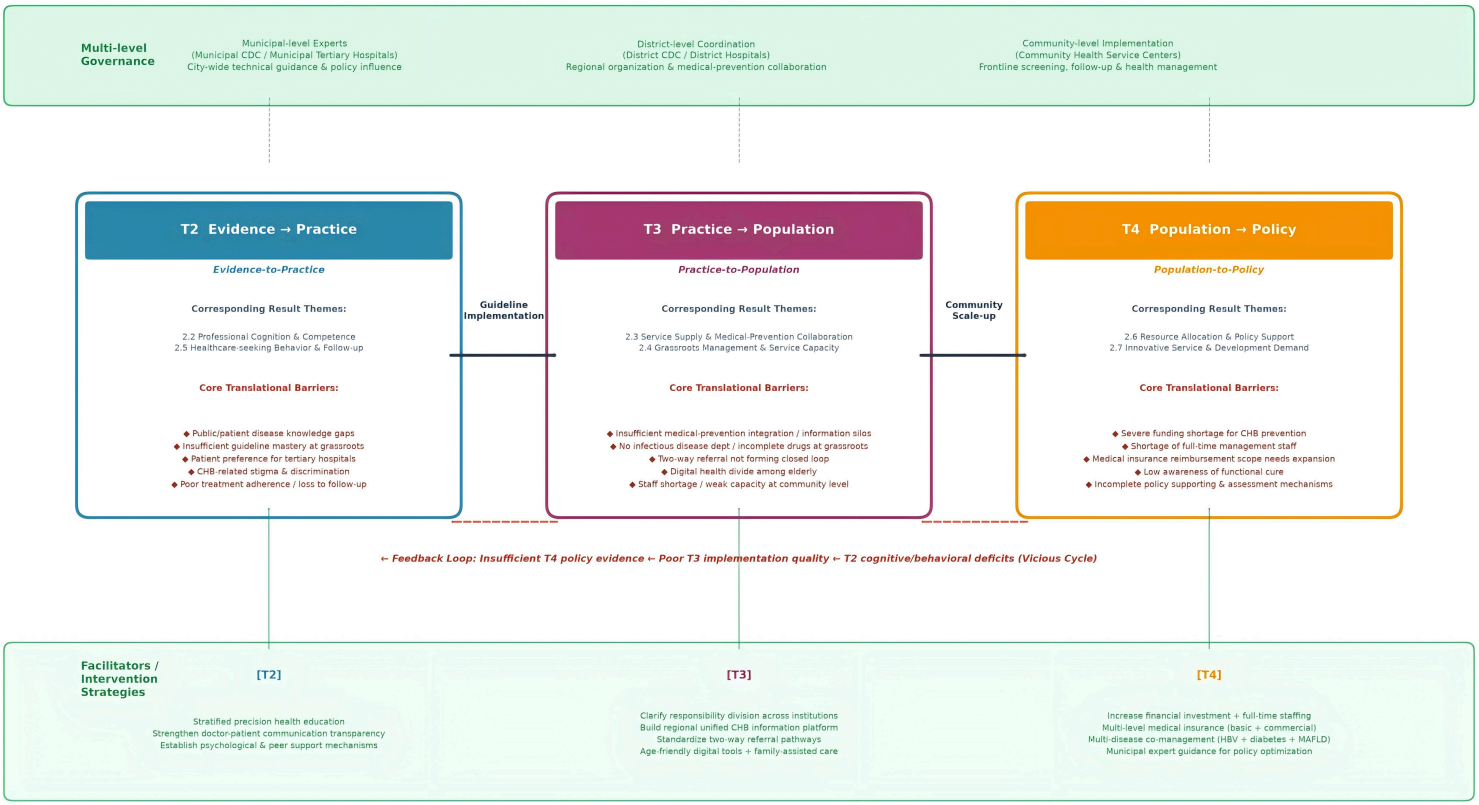


Figure 1

Integrated Conceptual Framework of T2–T4 Translational Barriers and Facilitators for CHB Prevention and Control

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Supplementaryfiles.rar