

Barriers to Screening for Hepatitis B Virus Infection in Asian Americans

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Abstract

Background Routine screening for hepatitis B virus (HBV) infection can identify individuals who need vaccination or treatment, as vaccination can prevent HBV infection. Although the overall prevalence of HBV infection in the United States is low (<1%), it is high (~10%) in Asian Americans. However, HBV screening rates in this population have been reported to be low.

Aims This article systemically reviews the reported prevalence of HBV infection, the rate of HBV screening and access to HBV care, barriers for HBV screening and care, and a possible approach for improving HBV screening in Asian Americans.

Methods Articles published from 1999 to 2011 on HBV screening and disparity in Asian Americans were identified by searching electronic databases (PubMed and Cochrane Library), and reviewed.

Results Published studies, including a recent report from the Institute of Medicine of the National Academies, revealed HBV screening rates are low in Asian Americans.

This review addresses the need for HBV screening in Asian Americans. Barriers to HBV screening are related to patients, providers, and/or the healthcare system. Screening programs that incorporate culturally sensitive interventions and include educational outreach, vaccination, and a link to healthcare services improve rates of HBV screening and vaccination in this at-risk community.

Conclusions A strategy that integrates efforts from the healthcare profession, federal agencies, and the community will be needed to improve HBV screening and access to HBV care for Asian Americans.

Keywords Hepatitis B virus (HBV) · HBV infection · Chronic hepatitis B (CHB) · HBV vaccination · Cirrhosis · Hepatocellular carcinoma (HCC) · Asian Americans

Introduction

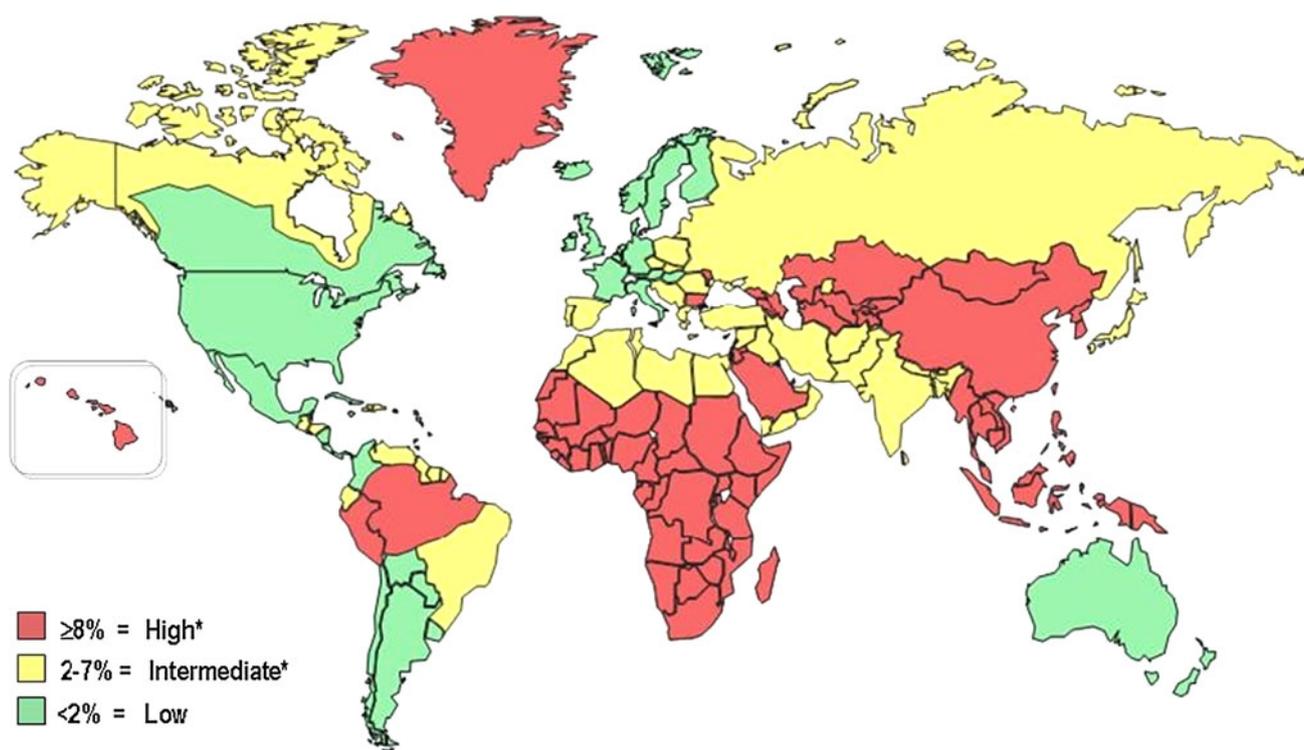
It is estimated that 350 million people are chronically infected with the hepatitis B virus (HBV) worldwide [1], a rate higher than with human immunodeficiency virus-1 (HIV, 33 million) or chronic hepatitis C virus (HCV, 170 million) infection [1, 2]. HBV prevalence can be classified into high ($\geq 8\%$), intermediate (2–7%), or low (<2%) endemicity (Fig. 1). It is estimated that 8–10% of the adult population in most Asian countries are chronically infected with HBV [1, 3].

Hepatitis B surface antigen (HBsAg) seroprevalence is low (<1%) in North America [1]. The estimate that 1.4 million individuals are chronically infected with HBV in the US [4] likely significantly underestimates the true prevalence of this condition, as immigrants from countries where HBV is endemic, most notably Asian Americans, have been under-represented in these surveys [5–7].

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*Individuals born in locations with intermediate or high prevalence should be routinely screened for HBV infection

Fig. 1 Global distribution of hepatitis B virus infection (2006). Adapted from: Centres for Disease Control and Prevention. *Morb Mortal Wkly Rep.* 2008;57:1–16

Among newly screened Asian American immigrants in the US, HBsAg prevalence has been 6.2–14.8% [8–10]. Accounting for this immigrant population, approximately two million people carry chronic HBV infection in the US [5, 6, 11].

The Asian American immigrant population in the US is a rapidly growing and diverse community. From 1990 to 2000, the Asian American population grew faster than the general population (72 vs. 13%) [12] and the projected increase will be from 4% of the total population in 2007 to 9.2% by 2050 [13]. This rapidly expanding population of HBV-infected individuals can be associated with high rates of chronic hepatitis B (CHB) and related morbidity and mortality, such as cirrhosis and hepatocellular carcinoma (HCC).

Natural History of HBV Infection

Acute HBV infection is characterized by positive HBsAg and IgM antibodies to HBV core antigen. Recovery from acute infection is characterized by elimination of HBsAg and

HBV DNA and the development of antibody to HBsAg (HBsAb) [14]. In those with chronic infection, HBsAg remains detectable >6 months. HBV transmission at birth, in the neonatal period or in early childhood, is associated with higher rates of CHB: 90% of those infected during infancy and 30% of those infected during childhood remain chronically infected [15, 16]. Approximately 25% of individuals infected as infants or young children could die prematurely from cirrhosis-related liver failure and HCC [17, 18].

Most Asian Americans with chronic HBV infection remain asymptomatic, and many patients may even have normal serum alanine aminotransferase (ALT) levels, but some may have significant underlying hepatic fibrosis and/or necro-inflammation [19, 20]. CHB accounts for 30% of cirrhosis cases and 53% of HCC cases worldwide [21–23], and 15–25% individuals are at risk for premature death from these complications [24]. A higher HBV DNA load has been associated with higher risk for cirrhosis and HCC [25]. Before effective HBV treatment became available, the 5-year survival rate in patients with CHB and compensated cirrhosis is 55% [26], and 14% in patients with HBV-related decompensated cirrhosis [27]. HCC may

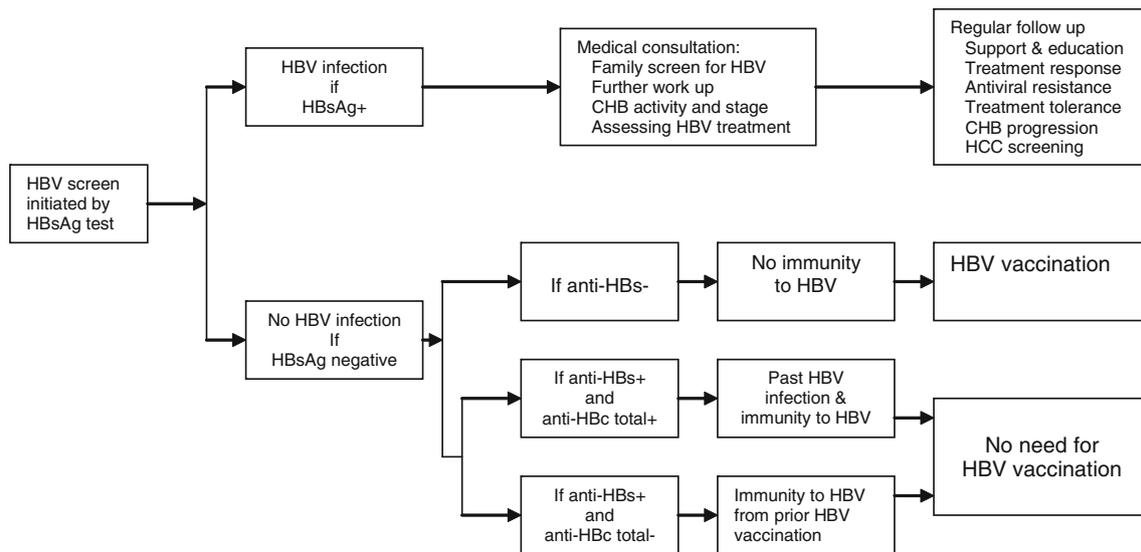


Fig. 2 Algorithm of HBV screening, interpretation of the test results, and suggested medical advice

develop without cirrhosis and in individuals below the age at which HCC screening is recommended [28].

Importance of HBV Screening in Asian Americans

The importance of HBV screening and vaccination was emphasized in a recent proposal on a national strategy for the prevention and control of hepatitis B and C by the Institute of Medicine (IOM) of the National Academies [29]. Routine HBV screening is a prudent public health and medical care initiative that permits early diagnosis and management of CHB, as well as vaccination to reduce vertical and horizontal HBV transmission. This is especially important in Asian Americans because of the higher HBV prevalence and risk of complications in this community.

The goals of HBV screening are identification of (1) chronically infected persons who may benefit from treatment and/or education about needed lifestyle changes to prevent transmission, (2) close contacts of infected individuals for HBV screening and HBV vaccination if not immune or medical care if CHB, and (3) chronically infected persons for monitoring of disease activity and HCC surveillance. Figure 2 summarizes a suggested approach to initial screening for individuals at risk of HBV infection.

HBV screening is important because HBV is a highly transmissible disease with significant public health implications, and vaccination can prevent HBV infection and associated complications. Nearly two-thirds of foreign-born HBV-infected Asian Americans are unaware of their infection status [9, 30], 25–61% of Asian Americans remain susceptible to HBV infection [9, 10, 31–35], and many other

Asian Americans with HBV infection report having been vaccinated [36–41]. Screening identifies HBV carriers and allows for notification of uninfected family contacts and exposed sex partners for screening and vaccination [42]. HBV vaccination is >90% effective in preventing HBV infection in healthy adults [43].

HBV screening is important because, of all ethnic groups, Asian Americans have the highest incidence and mortality from HBV-related HCC [44, 45]. Universal application of HBV vaccination has significantly decreased the incidence of HCC in many countries [46]. HBV screening is also important because CHB is now a treatable disease [20, 47]. Studies have demonstrated that early diagnosis and effective antiviral treatment improves clinical outcomes by reducing progression of CHB to cirrhosis and the need for liver transplantation [25, 48–58].

HBV screening and vaccination have been demonstrated to be cost-effective public health measures [9, 24, 59]. Two strategies were found to be highly cost-effective when compared to voluntary HBV screening in Asian Americans: (1) screen-and-treat strategy and (2) screen, treat, and ring vaccination strategy [59]. Ring vaccination refers to the vaccination of close contacts of infected persons.

Current HBV Screening Recommendations

The CDC guidelines released in 2005 recommended routine HBV screening of individuals from countries with an HBV prevalence $\geq 8\%$ [60]. These guidelines were updated in late 2008 (Table 1) to expand the recommendation for routine HBV screening to all individuals born in geographic regions with an HBsAg prevalence $\geq 2\%$ [24]. It is

Table 1 Populations recommended for routine HBV screening by the US CDC [24, 60]

Risk category	Populations	Recommended screen in 2005 [60]	Recommended screen in 2008 [24]
Increased HBsAg prevalence	Persons born in regions with high prevalence of HBV infection (HBsAg prevalence $\geq 8\%$)	Yes	Yes
	Persons born in regions with high or intermediate prevalence of HBV infection (HBsAg prevalence $\geq 2\%$)		Yes
	US-born persons not vaccinated as infants whose parents were born in regions with high prevalence of HBV infection (HBsAg prevalence $\geq 8\%$)		Yes
Increased risk of exposure	All pregnant women	Yes	Yes
	Infants born to HBsAg-positive mothers	Yes	Yes
	Household, needle-sharing, or sex contacts of persons known to be HBsAg positive	Yes	Yes
	Injection drug users		Yes
	Men who have sex with men		Yes
	Persons that are sources of blood or body fluid exposures that might require post-exposure prophylaxis (e.g., needle stick, sexual assault)	Yes	Yes
Increased risk of medical consequences	HIV-positive persons	Yes	Yes
	Persons needing immunosuppressive therapy		Yes
	Persons with elevated ALT or AST of unknown etiology		Yes
Prevention of nosocomial infection	Donors of blood, plasma, organs, tissue or semen	Yes	Yes
	Hemodialysis patients	Yes	Yes

ALT alanine aminotransferase, AST aspartate aminotransferase

now recommended that all foreign-born Asian Americans be screened for HBV infection. Counseling and referral for clinical evaluation and medical care should accompany HBV screening.

Barriers to HBV Screening in the Asian American Community

Overall, fewer than 25% of Asian Americans with HBV infection have been diagnosed and approximately 40–65% of this high-risk population have not been screened [59]. The decision for HBV screening is a process influenced by personal, cultural, social, economic, as well as environmental factors. An understanding of how these various factors influence screening behavior in Asian Americans should help improve screening interventions and vaccination rates, and facilitate appropriate follow-up care in this population. Barriers to HBV screening in the Asian American community can be related to patient, health care provider and health system factors [61].

Patient-Related Barriers

Self-initiated screening depends on the individual recognizing that he/she is at risk, that the disease can result in

adverse outcomes, and that the disease can be prevented and/or treated. Many patient-related barriers have been associated with a low rate of HBV screening in Asian Americans [36–41, 61–66]. A key barrier is the lack of knowledge about HBV transmission and its consequences. According to the survey results of 301 US patients with CHB (~50% Asian American), 36% believed that HBV can be transmitted by sharing utensils with infected persons, and 20% were unaware of the complications of CHB [67]. Among Asian American subgroups, disparities in HBV knowledge and screening do exist. Those with low socioeconomic and educational backgrounds had lowest rates of HBV screening [63–65].

Language is another key barrier to HBV screening, especially for new immigrants. Limited proficiency in English or lack of an English-speaking member in the household leads to difficulties in communicating with healthcare providers, and understanding and navigating the healthcare system [61, 68–72]. Asian Americans receiving care from providers who speak their language receive more health education than those without same-language healthcare providers [69].

Cultural values and beliefs can also hinder Asian Americans from seeking medical care, including HBV screening [61, 68, 72, 73]. For example, the belief that blood is a nonrenewable vital energy for the body may

prevent individuals from having blood drawn for testing [68]. Many rely on self-treatment or even travel to their country of origin for care [73].

Other barriers to HBV screening include denial, social stigmata, concern about cost, and, if tested positive, the misconception that nothing can be done, and the concern about the impact on life and health insurance [61]. Moreover, new immigrants are generally unfamiliar with the US healthcare system and have a limited knowledge of preventive medicine and disease monitoring.

Obstacles to screening can be overcome, especially when a family member, friend, or doctor recommends screening [40, 41, 65, 66]. Other motivators are the development of severe complications of CHB (i.e., cirrhosis or HCC) in a family member [37, 39, 41, 66], fear of transmitting the disease to a family member [41, 66], or peace of mind [32]. Knowledge that HBV-related disease is treatable, screening is important for diagnosing and preventing the disease, there is insurance coverage for screening and disease treatment and, for uninsured individuals, access to low-cost or free screening, are also motivators to agreeing to be screened for HBV.

Healthcare Provider-Related Barriers

Primary care physicians are often the point of entry into the US healthcare system and, therefore, they are in a unique position to identify individuals at risk for CHB and provide screening and referrals to specialists. Gaps in healthcare provider knowledge about HBV are another barrier to screening. Physicians may not know the HBV risk factors or may underestimate the risk in Asian Americans. As a result, they may not screen immigrants from HBV-endemic areas or household contacts of HBV-infected persons [38, 74, 75]. A recent survey indicated that perceiving that a patient is not at risk for CHB is the most common reason for not screening Asian American patients [76]. Another survey of family physicians found that <70% of respondents would screen immigrants from HBV-endemic areas and only 50% would screen household contacts of HBV-infected persons [74].

Another survey of academic general medicine providers with a large number of Chinese patients found that 30% of respondents did not select the correct test for HBV screening [38]. While all respondents knew that Chinese American immigrants had a higher CHB prevalence than Caucasians, they underestimated its magnitude compared to other risk factors. Providers who spoke an Asian language were more likely to report testing Asian patients for HBV. The provider's cultural background may be a barrier to HBV screening [61].

Key motivators for providers to screen for HBV include an understanding that screening is cost-effective [77],

vaccination of high-risk groups is covered by insurance, and effective HBV treatment is available if it is indicated. Healthcare providers may need to establish relationships with specialists that treat CHB to identify patient referral channels for the management of patients diagnosed with HBV infection.

Healthcare System-Related Barriers

The complex US healthcare system often presents a formidable barrier to many immigrants without an adequate knowledge of how the system works, the health and social services available, and knowledge about health benefits. The referral system can also act as a barrier because, in their country of origin, patients could go directly to a specialist without a referral [9]. Language barriers and lack of or inadequate health insurance may also limit access to the US healthcare system.

Many Asian American immigrants, especially those of low socioeconomic status, lack health insurance, which discourages HBV screening [30, 63]. Fewer uninsured Asian Americans access and utilize healthcare services than uninsured individuals of other racial/ethnic groups [78]. Interestingly, underutilization of healthcare services is also found in some Asian Americans with health insurance [61].

Community-based clinics with culturally friendly environments are likely to facilitate healthcare for patients perceiving cultural barriers. Providing cultural training to providers in the clinic or hospital may overcome barriers for patients to access the healthcare system [79].

HBV Screening Efforts in the Asian American Community

In response to the unmet medical need for increased HBV screening in the Asian American community, many outreach programs have been dedicated to increasing public awareness of CHB and HBV screening and vaccination in Asian Americans.

A recent publication summarized experiences of 31 US community-based HBV screening programs [80]. Most of these programs incorporate HBV education (74%), screening (90%), and vaccination components (90%). Typically, these programs feature culturally sensitive and linguistically targeted educational outreach efforts that promote awareness of HBV screening, prevention, and treatment, and include a counseling component with linkages to healthcare services and follow-up care.

Some programs provide referrals for HBV-seropositive patients to affiliated clinics for evaluation, medical care,

and/or treatment at no or low cost [10, 81]. Educational materials, as well as surveys and questionnaires, are developed with input from, and tailored to, the targeted community. Furthermore, educational outreach that considered the individual and family and friends at risk proved to motivate participants to be screened and, if appropriate, vaccinated. Strategic outreach locations to disseminate health information targeted to the specific community allowed these programs to reach large segments of the intended audience (e.g., churches, community clinics, and health fairs).

One notable ongoing approach is a large-scale campaign launched by the city of San Francisco, CA, aimed to screen, vaccinate, and treat HBV in all Asian Americans by providing convenient, free or low-cost testing at partnering health facilities and events [81]. This program involves a strong collaboration between the public health system and organizations that provide educational outreach and links to medical care. A community-based campaign reported that 67% of patients diagnosed with CHB via a screening program had accessed medical care for HCC screening within 1 year after their diagnosis, and 78% had encouraged family-member screening for HBV [31]. The results demonstrate that targeted intervention is effective in reaching Asian Americans and not only increases HBV screening but also vaccination and access to, and utilization of, follow-up care [31, 82].

National policy efforts to reduce the significant disparities in HBV prevalence and CHB-related morbidity and mortality rates between Asian Americans and other ethnic groups are ongoing. Efforts are underway to make HBV screening and vaccination a mandatory part of primary care for Asian Americans. In the past few years, two bills known as The National Hepatitis B Act, were introduced in Congress and the Senate. These bills call for the development of a national plan for hepatitis B that would increase screening and expand vaccination in high-risk populations such as Asian Americans, and increase federal funding for research to improve HBV prevention and treatment options, giving priority to individuals with limited healthcare access. In October 2009, a new bill, the Viral Hepatitis and Liver Cancer Prevention and Control Act of 2009, was introduced to address the US hepatitis B and hepatitis C epidemic.

In October 2008, an independent panel convened by the National Institutes of Health examined issues related to HBV infection and management. Their recommendations included routine HBV screening for newly arrived immigrants from countries with an HBV prevalence $\geq 2\%$, consistent with the latest CDC screening recommendations [83]. This action should facilitate access to care for infected individuals and their families and provide more complete data on disease prevalence.

Conclusion and Future Directions to Improve HBV Screening in Asian Americans

Many barriers to effective HBV screening exist in the Asian American community, including patient-related barriers, healthcare provider-related barriers, and health system-related barriers. Motivators, or solutions, to these challenges include improved awareness of CHB and education of patients and healthcare providers about the importance of screening. Effective screening programs must include culturally sensitive educational outreach efforts that promote awareness of HBV screening, prevention, and treatment, and include a counseling component with linkages to healthcare services and follow-up care. Although many ongoing screening programs incorporate these components, there remains much room for improvement. Greater efforts are needed to improve HBV screening rates and ultimately reduce this common liver disease in Asian Americans.

Research to improve HBV screening rates should first focus on a better understanding of the actual and perceived barriers to screening. Well-designed multicenter and multicultural studies are needed to: (1) define and rank barriers to HBV screening in different ethnic communities; (2) develop effective, measurable, and cost-effective screening approaches to overcome these barriers; (3) validate the feasibility and effectiveness of these approaches; and (4) evaluate the best mechanism to widely apply effective HBV screening approaches in Asian American communities. Due to the limited published data on the effectiveness of different approaches to HBV screening, evaluation and validation of these programs is sorely needed. Collaborative efforts and partnerships are needed among primary care providers serving Asian Americans and other at-risk populations, government, and the pharmaceutical industry to improve HBV awareness, screening, and vaccination.

Additionally, efforts are needed to address healthcare provider- and healthcare system-related barriers to screening and educate providers and healthcare systems on motivators to screening. Because of the diversity of the Asian American community, cross-cultural training, which is currently limited in medical school curricula, should be provided to healthcare providers to address the diversity within this community. Similar to the successful campaign for preventing perinatal HBV transmission by screening all pregnant women, a universal screening program for all Asian American adult immigrants and at-risk populations could be implemented by the healthcare system, perhaps at their first healthcare visit.

The National Institute of Diabetes and Digestive and Kidney Diseases launched the Hepatitis B Clinical Research Network in 2007 to promote translational research on HBV infection. This effort will provide not only an opportunity to

study the pathogenesis and management of CHB but also a systematic approach to assess and prioritize resource needs and establish an evidence-based strategy to integrate all available resources to reduce ethnic disparities and improve the outcomes of HBV infection in all patients at risk, including Asian Americans. In response to the IOM report released last year, the US HHS recently released its *Action Plan for the Prevention, Care and Treatment of Viral Hepatitis*, which provides further recommendations and a nationwide strategy to improve our ongoing efforts to prevent viral hepatitis and related disease [84].

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