

Hepatitis B Screening Practice among Older Chinese in the Greater Washington, DC, Area

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Objectives: Older Chinese Americans are at greater risk of contracting hepatitis B virus (HBV) because they were born before the implementation of universal childhood vaccination policies. This study examined the prevalence of HBV screening, test results, and predictors of HBV screening among older Chinese.

Methods: Two hundred fifty-two Chinese immigrants (older than 50 years) recruited from Chinese-speaking physicians' offices in the Washington, DC, area participated in a cancer screening questionnaire. Descriptive statistics and hierarchical logistic regressions were conducted.

Results: Among the 164 participants (65%) who underwent HBV screening, 66% reported that they were susceptible to HBV infection. Stronger self-care beliefs, longer US residency, lower HBV knowledge, and lack of physician recommendations were independently and negatively associated with HBV screening.

Conclusions: Many older Chinese did not adhere to HBV screening guidelines because of cultural views and information deficiency. Culturally appropriate interventions aimed to enhance their knowledge and communication with physicians about HBV are needed for promoting screening.

Key Words: Chinese Americans, hepatitis B screening, hepatitis B virus infection, self-care beliefs

The incidence rate of liver cancer has been increasing in the United States.¹ The average age for liver cancer diagnosis is 62 years, and >90% of liver cancer cases are diagnosed among adults older than age 45.² The overall 5-year survival rate remains low at 15.2%.³ Approximately half of all liver cancer cases are attributable to chronic hepatitis B virus (HBV) infection.⁴ Individuals with a chronic HBV infection are 200 times more likely to develop liver cancer than those without the infection.⁵ Preventive measures such as HBV screening allow the early detection of HBV infection to prevent and manage potential liver cancer.⁶

The majority of Chinese people living in the United States are immigrants from China, Hong Kong, or Taiwan—a region where the prevalence of chronic HBV infection is high (with rates higher than 8% of the population)⁷; however, HBV screening is not widely accessed by Chinese Americans, whose self-reported HBV screening rates were <50%.^{8–10} Although the universal hepatitis B vaccination policies that were introduced in the region in the late 1980s have reduced the risk of contracting HBV,¹¹ a considerable proportion of Chinese Americans still have HBV infection. For instance, research showed that 21.4% of Chinese American participants in New York City had a chronic hepatitis B infection.¹² Another study in Maryland found that 5.4% of Chinese American participants were infected with HBV and nearly half of them were still

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Key Points

- Although our participants were recruited through Chinese-speaking physicians' offices and had no language or access problems, only 65% of older Chinese immigrant patients were ever screened for hepatitis B virus (HBV).
- A significant proportion of older Chinese patients (66%) reported that their screening results indicated they were susceptible to HBV infection.
- Older Chinese immigrants who retained Chinese self-care beliefs were less likely to participate in HBV screening, even after taking into account HBV knowledge and presence of healthcare sources.
- Physicians who see older Chinese immigrant patients should be aware of the potential influence of self-care beliefs and try to educate the patients about HBV infection and its potential consequences and promote HBV screening during the medical visit.

unprotected from future infection.¹³ HBV screening uptake may be even lower among older Chinese immigrants, who were born before the institution of universal hepatitis B vaccination policies. Unfortunately, little is known about older Chinese Americans' uptake of hepatitis B screening and factors associated with their screening behavior.

These older, at-risk Chinese immigrants are likely to meet cultural challenges to participate in HBV screening in the United States. Research showed that the underutilization of HBV screening among Chinese Americans was related to their low levels of HBV knowledge, poor English proficiency, lack of health coverage and a regular physician, and language discordance with the physician.^{8,9,14-16} These prior studies, however, did not take cultural factors into account. Traditional Chinese believe that self-care (taking care of one's health through regular exercise and healthy diet to prevent illness) is a more desirable preventive strategy than regularly visiting physicians.^{17,18} Self-care beliefs have been found to predict Chinese and Asian American women's low breast and cervical cancer screening rates.^{19,20} Such a culturally based belief may be a key determinant of older Chinese Americans' HBV screening behavior in addition to knowledge and access factors.

We therefore used cross-sectional data to examine three objectives of this study: the proportion of older Chinese immigrants with regular healthcare access who reported the receipt of HBV screening, the self-reported results of HBV screening by the older Chinese immigrants, and understanding factors that determined older Chinese immigrants' use of HBV screening. We hypothesized that Chinese self-care beliefs were independently and negatively associated with their HBV screening behavior.

Methods

Sample and Procedures

This study invited older Chinese American immigrants from metropolitan Washington, DC (including the District of Columbia, Maryland, and northern Virginia), who participated in a large-scale physician-based intervention study to respond to a cross-sectional survey regarding HBV screening. A total of 252 older Chinese immigrants were enrolled from 13 Chinese-speaking primary care physicians' offices between October 2008 and August 2011. These Chinese American participants were aged 50 to 75, first-generation immigrants, sought primary care at least once in the past 2 years, and had not obtained a colorectal cancer screening at clinically recommended intervals. Details of the patient enrollment have been described in another publication.²¹ Bilingual research assistants interviewed participants by telephone in either Mandarin or Cantonese. The Georgetown University institutional review board approved this study.

Measures

Self-reported HBV screening practice was assessed by asking, "Have you ever tested for hepatitis B infection?" (yes vs no).

For those who reported having undergone HBV screening, we asked their reasons for the screening, such as work requirement, school entry requirement, immigration application requirement, physician's recommendation, family members'/friend's recommendation, self-initiative, and/or other reasons. We also asked about their HBV test results, which included being susceptible (lacking evidence of HBV antibodies), a chronic carrier, immune as a result of past infection, and immune because of vaccination.

Sociodemographic variables included age, sex, educational attainment (college graduate or noncollege graduate), self-reported English-speaking ability (just fine vs not well), employment status, birthplace (China, Taiwan, Hong Kong, and other Asian countries), years of residency in the United States (>20 years vs ≤20 years), and health insurance coverage (yes vs no).

A physician's recommendation for cancer screening was assessed with one question regarding whether participants were advised by their physicians to undergo a cancer screening in the past 2 years (yes vs no). We asked a general question about their physician's recommendation for cancer screening rather than a specific inquiry about hepatitis B screening because the questionnaire assessed various cancer screening practices and questioning physician recommendations for each type of screening may add to patients' burden. Physicians who recommend cancer screening are likely to recommend HBV screening.²² Responses such as "don't know/unsure or refused to answer" were recorded as "no recommendation."

Participants' knowledge of HBV was assessed by an 11-item hepatitis B knowledge scale that has been tested in Asian Americans.²³ This scale included seven items on HBV transmission mode (eg, "if someone is infected with hepatitis B, but they look and feel healthy, do you think that person can spread hepatitis B?") and four items regarding sequelae (eg, "Do you think people with hepatitis B can be infected for life?").²³ A correct answer to each question earned 1 point. The summed score on HBV knowledge ranged from 0 to 11; higher mean scores indicated greater knowledge.

Self-care beliefs were assessed by the Chinese self-care belief scale.¹⁷ This two-item scale ("As long as I can take care of myself and keep myself healthy, I don't need to see a doctor" and "I don't visit doctors if I'm not feeling sick") has been validated in various Chinese populations (Cronbach α 0.83) and was predictive of Chinese Americans' cancer screening behaviors.^{20,24} Participants responded to each item with a range of options from 1 (strongly disagree) to 5 (strongly agree). The mean of the two items was computed as the self-care index score. A higher self-care mean score indicated stronger belief in self-care.

Statistical Analysis

Descriptive analyses and hierarchical logistic regression analyses were conducted in this study. First, we conducted a descriptive analysis to examine the basic characteristics of the participants and the most common reasons for the uptake of

Table 1. Sample characteristics and the receipt of HBV screening (N = 252)

Characteristics	n (%)	HBV screening		P
		Ever screened, n = 164 (%, SD)	Never screened, n = 88 (%, SD)	
Age, y (range 50–75)	Mean 58.5, SD 7.6	57.9 (7.5)	59.4 (7.7)	0.13
Sex (%)				
Male	117 (47.0)	73 (62.4)	44 (37.6)	0.41
Female	132 (53.0)	89 (67.4)	43 (32.6)	
Education level (%)				
<College graduate	103 (40.9)	53 (51.5)	50 (48.5%)	<0.001
College graduate	149 (59.1)	111 (74.5)	38 (25.5%)	
English-speaking ability (%)				
Well	86 (34.1)	62 (72.1)	24 (27.9)	<0.001
Just fine	85 (33.7)	61 (71.8)	24 (28.2)	
Not well	81 (32.1)	41 (50.6)	40 (49.4)	
Employment status (%)				
Employed	158 (62.7)	108 (68.5)	50 (31.6)	0.16
Unemployed	94 (37.3)	56 (59.6)	38 (40.4)	
Place of birth (%)				
China	180 (71.4)	114 (63.3)	66 (36.7)	0.36
Taiwan, Hong Kong, and other Asian countries	72 (28.6)	50 (69.4)	22 (30.6)	
US residency (%)				
>20 years	134 (53.2)	79 (59.0)	55 (41.0)	<0.05
≤20 years	118 (46.8)	85 (72.0)	33 (28.0)	
Health insurance coverage (%)				
Yes	212 (84.1)	145 (68.4)	67 (31.6)	<0.05
No	40 (15.9)	19 (47.5)	21 (52.5)	
Physician recommendation for cancer screening (%)				
Yes	145 (57.8)	105 (72.4)	40 (27.6)	<0.001
No	106 (42.2)	58 (54.7)	48 (45.3)	
HBV knowledge (range 0–11)	Mean 6.2, SD 2.4	Mean 6.6, SD 2.2	Mean 5.2, SD 2.4	<0.001
Self-care beliefs (range 1–5)	Mean 3.1, SD 1.1	Mean 2.9, SD 1.1	Mean 3.6, SD 1.1	<0.001

A higher score on HBV knowledge means that the participants have a greater knowledge of HBV transmission mode and sequelae. Likewise, a higher self-care mean score indicates a stronger belief in self-care; that is, participants with a stronger self-care belief stress taking care of their own health over visiting doctors. HBV, hepatitis B virus; SD, standard deviation.

HBV screening. Then, we ran χ^2 tests and *t* tests to report relations between patient characteristics (eg, demographics, HBV knowledge, self-care beliefs) and the uptake of HBV screening. Next, four logistic regression models using a hierarchical entry approach were run to assess factors associated with HBV screening, controlling for covariates. The first basic model included demographic variables: age, sex, US residency, educational attainment, self-reported English-speaking ability, and health insurance coverage, which were significantly associated with HBV screening in previous studies.^{8,14,25} The second regression model added the variable of physician's recommendation for cancer screening. The third model added the HBV knowledge variable. The final model included the Chinese self-care beliefs variable to examine its independent effect on HBV screening outcome.

Results

The average age of Chinese American participants was 58.5 years (standard deviation [SD] 7.6 years; Table 1). Overall, 47% of the participants were men. Approximately 60% of participants were employed. All of the participants were foreign born, mainly from China (71.4%), and had lived in the United States for 20.1 years on average (SD 10.0 years). Although 59% of the participants were college educated, only one-third of them reported that they could speak English well. Most of the participants immigrated to the United States after they completed their education in their home countries and were middle aged, making it difficult to learn English. Although the majority (84.1%) had some form of health insurance coverage, >40% of the participants did not receive a physician's recommendation for any type of cancer screening. Participants

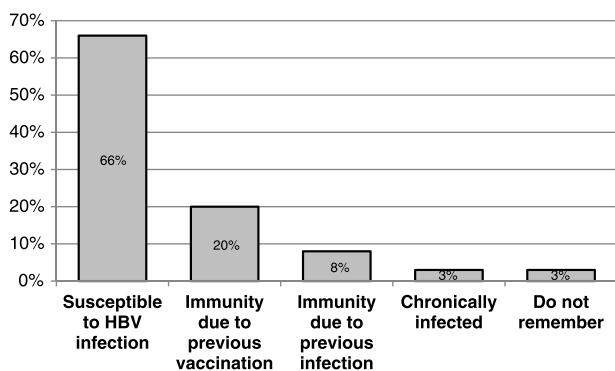


Fig. 1. Screening test results among those who were tested (n = 164) for hepatitis B virus (HBV).

who were screened had greater HBV knowledge and lower levels of self-care beliefs than those who were not screened (both $P < 0.001$).

Among 252 participants, 164 (65%) reported that they had undergone an HBV screening. Approximately 33% of the 164 were screened because of their physician’s recommendation, followed by self-initiation (18.3%), work requirement (14.0%), and immigration requirement (13.4%; Fig. 1). Of the 164 ever-screened patients, 108 (66%) were identified as susceptible to HBV, meaning that they had not developed immunity to the virus and were at risk for HBV infection; 20% reported that they already gained immunity from previous vaccination; 8% were immune because of their previous HBV infection; 3% reported that the screening results indicated they were chronically infected; and 3% did not remember the screening results (Fig. 2).

Results from logistic regression (Table 2) showed significant predictors of HBV screening behavior. Model 1 indicated that Chinese immigrants living in the United States >20 years were less likely to obtain HBV screening than those who immigrated <20 years ago. A physician recommendation for cancer screening in model 2 and HBV knowledge in model 3 positively predicted the outcome after controlling for socio-demographic variables. The final model 4 showed that self-care beliefs were independently and negatively associated with the receipt of HBV screening after controlling for all of the variables from models 1 through 3, meaning that every one-point increase in self-care beliefs was associated with a 39% decreased likelihood of being screened for HBV infection (odds ratio [OR] 0.61, 95% confidence interval [CI] 0.46–0.81). The negative association between the length of US residency and screening outcome remained significant (OR 0.33, 95% CI 0.16–0.67). Having a physician recommendation (OR 2.06, 95% CI 1.09–3.88) and greater HBV knowledge (OR 1.23, 95% CI 1.07–1.41) significantly increased the likelihood of HBV screening uptake.

Discussion

To the best of our knowledge, this is the first study that examined factors associated with hepatitis B screening behavior

among older Chinese Americans. Approximately 65% of older Chinese immigrant patients were ever screened for HBV and two-thirds of them displayed no antibodies for HBV infection. In addition to various external reasons such as physician recommendation and work/immigration requirements, culturally based beliefs and HBV knowledge determined older Chinese individuals’ receipt of HBV screening

The screening rate found in our study is far from the Centers for Disease Control and Prevention (CDC)–recommended universal screening rate of 100%.²⁶ According to the CDC recommendations, individuals from countries with high chronic HBV infection rates should receive HBV screening, regardless of vaccination status in their countries of origin.²⁶ Although our participants were recruited through Chinese-speaking physicians’ offices and had no language or access problems, a considerable number of them have not yet been screened for HBV infection. The rates of HBV screening were even lower in other studies that enrolled Chinese immigrants from community settings (48%–54%).^{9,25} Given that older Chinese immigrants are at high risk for developing liver disease and cancer,^{27,28} it will be essential to promote adherence to the CDC’s guidelines for HBV screening in this growing and aging Chinese American population.

Most important, we found that a significant proportion of older Chinese immigrants (66%) were susceptible to HBV infection. The high rate of susceptibility in our older Chinese immigrant sample may be attributed to two reasons. First, most of our older Chinese patients were born in the early 1950s. These older Chinese patients benefited less from the universal childhood hepatitis immunization policies initiated in their home countries in the late 1980s or the early 1990s; hence, many older Chinese immigrants may not have vaccine-derived HBV immunity. Second, older Chinese immigrants, plausibly with a stronger perception of the stigma associated with HBV infection, may avoid reporting their chronic infection status and prefer to report that they were susceptible.²⁵ As such, it is important to screen older Chinese American immigrants for

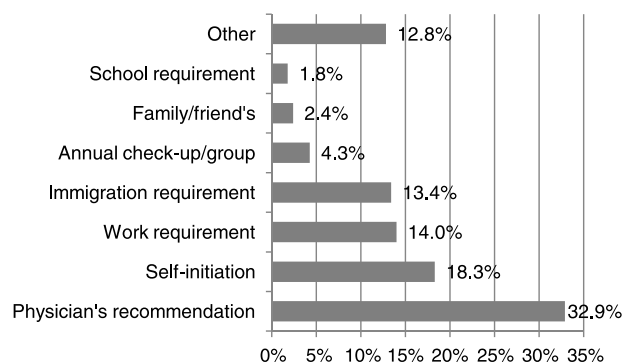


Fig. 2. Reasons why the participants (n = 164) underwent hepatitis B virus (HBV) testing. Percentages may not total exactly 100% because multiple answers were allowed. The “other” response included other reasons for screening (eg, pregnancy, family history of infection, part of annual checkup).

Table 2. ORs of determinants associated with the use of HBV screening (N = 252)

Determinants	Model 1	Model 2	Model 3	Model 4
Age	1.00 (0.96–1.04)	1.00 (0.96–1.05)	1.01 (0.96–1.06)	1.02 (0.97–1.07)
Sex (male = 1, female = 0)	0.77 (0.43–1.40)	0.81 (0.45–1.47)	0.88 (0.49–1.61)	0.94 (0.50–1.75)
US residency > 20 years (yes = 1, no = 0)	0.35 (0.18–0.66)***	0.33 (0.17–0.63)***	0.32 (0.16–0.62)***	0.33 (0.16–0.67)**
College graduate (yes = 1, no = 0)	1.79 (0.87–3.70)	1.66 (0.80–3.45)	1.35 (0.63–2.89)	1.26 (0.57–2.77)
English-speaking ability (reference = well)				
Just fine	1.07 (0.49–2.34)	1.14 (0.52–2.50)	1.11 (0.50–2.49)	1.18 (0.52–2.69)
Not well	0.42 (0.15–1.15)	0.42 (0.15–1.18)	0.46 (0.16–1.31)	0.45 (0.16–1.32)
Health insurance coverage (yes = 1, no = 0)	1.84 (0.83–4.07)	1.60 (0.71–3.61)	1.65 (0.71–3.87)	1.63 (0.67–3.70)
Physician recommendation for cancer screening (yes = 1, no = 0)		1.95 (1.08–3.52)*	1.94 (1.06–3.58)*	2.06 (1.09–3.88)*
HBV knowledge (range 0–11)			1.25 (1.10–1.43)***	1.23 (1.07–1.41)**
Chinese self-care beliefs (range 1–5)				0.61 (0.46–0.81)***

A higher score on HBV knowledge means that participants have a greater knowledge of HBV transmission mode and sequelae. Likewise, a higher self-care mean score indicates a stronger belief in self-care; that is, participants with a stronger self-care belief stress taking care of their own health over visiting doctors. HBV, hepatitis B virus; OR, odds ratio.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

HBV infection, educate them with accurate knowledge, and change attitudes toward HBV screening and treatment.

A salient barrier to HBV screening among older Chinese is their self-care beliefs. Consistent with prior cancer screening research,^{19,20} our study found that older Chinese American immigrants who retained Chinese self-care beliefs were less likely to participate in HBV screening, even after taking into account knowledge and the presence of healthcare accessibility. Research also showed that self-care beliefs are negatively related to the frequency with which Chinese immigrants visit their doctors.²⁹ When Chinese patients hold strong self-care beliefs and do not experience any physical symptoms of liver disease, they may lack motivation to obtain information about HBV screening from their physicians. Patients may be less likely to actively seek information if they have low levels of HBV knowledge and poor English proficiency to solicit information about HBV screening.

Our study found that Chinese immigrants who lived in the United States for a longer time (>20 years) were less likely to undertake HBV screening than those who had a shorter residence. This is consistent with other study findings in Chinese Americans or Asians.²⁵ This result highlights two main challenges: suboptimal viral hepatitis service in the United States and linguistic and cultural barriers that older Chinese patients face. First, the CDC's guidelines for HBV screening among high-risk individuals (eg, immigrants from HBV-endemic countries) have not been, in general, well translated into practice.⁶ Research indicates that physicians' knowledge and awareness about the importance of HBV screening for Asian Americans remains suboptimal in the United States,⁶ and this may in turn affect their recommendation of HBV screening to patients. Lack of a physician's recommendation may become more detrimental for older Chinese patients when they hold self-care beliefs and lack sufficient knowledge of HBV to initiate communication about screening. In addition, physicians may not be aware of Chinese

patients' self-care beliefs and their influence on their uptake of HBV screening. In addition to these challenges, efforts to screen and vaccinate against HBV, in both clinical and community settings, have focused on younger and more recent immigrants who entered the United States after the 1990s.³⁰ The combination of all of these challenges may create a major barrier to completing HBV screening. As such, an educational intervention designed to address cultural, knowledge, and clinical factors experienced by older Chinese immigrants will help reduce their risk of HBV infection and increase their participation in HBV screening.

When interpreting our findings, several limitations should be considered. First, the results of this study were based on self-reported data. As with other studies that did not verify the validity of self-reported HBV screening behavior,^{30,31} the present study lacked the resources to verify the self-reported screening with medical records, especially for HBV screening that took place in the patients' home countries. Second, because of the cross-sectional nature of the data, we were unable to follow up on whether participants who reported susceptibility to future HBV infection subsequently received a complete series of hepatitis B vaccinations. Third, to investigate older immigrants' HBV screening, we used a convenience sample from an intervention study that was overdue for colorectal cancer screening in one geographic area; the results cannot be generalized to either the Chinese population in other areas or to those who adhere to colorectal cancer screening guidelines. By narrowing our focus to the older Chinese immigrants who did not adhere to cancer screening guidelines, however, we were able to better understand factors associated with HBV screening in this at-risk population.

Conclusions

The results of this study provide evidence that physicians and public health practitioners need to communicate with older Chinese immigrants about HBV screening. Our findings

highlight a need to increase awareness and knowledge of HBV in both primary care physicians who see older Chinese immigrant patients and the patients themselves. Specifically, increasing physicians' knowledge about HBV screening guidelines and awareness of Chinese patients' self-care beliefs will enhance physicians' discussions about HBV infection and its potential consequences with their Chinese patients. In addition, it will be essential to educate older Chinese immigrants who hold strong self-care beliefs and stigmatized views about HBV infection and who do not visit physicians for regular medical checkups. Research indicates that community-based intervention programs enable effective outreach to culturally isolated Chinese immigrants and promote their mammography screening behavior.^{32,33} Hence, developing a culturally and linguistically appropriate community-based HBV intervention program will be our next step to increase HBV screening in older Chinese immigrant patients, therefore allowing further examination of their screening outcomes with valid medical information. Overall, our study has contributed information for future intervention research to effectively reduce HBV infection susceptibility and prevent the development of liver cancer in this at-risk population.

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