

Provider Knowledge and Practice Regarding Hepatitis B Screening in Chinese-Speaking Patients

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Abstract—*Background.* The extent to which academic general medicine providers screen Chinese-speaking patients for hepatitis B virus (HBV) is not known. *Methods.* Retrospective cohort study of Chinese-speaking patients' HBV screening status and survey of providers' HBV knowledge/screening. *Results.* Most patients (65%) received HBV screening. Being screened was independently associated with marital status and years in the clinic. Providers with Asian language abilities and greater knowledge of HBV risk factors/guidelines were more likely to screen. *Conclusions.* Chinese-speaking patients in this setting were underscreened for HBV. Providers underestimated the risks associated with Chinese ethnicity. Education is needed to improve risk assessment and guideline awareness. *J Cancer Educ.* 2007; 22:37-41.

Hepatitis B virus (HBV) infection is the most common cause of liver failure and hepatocellular carcinoma worldwide and is prevalent in Chinese populations.¹⁻³ Community-level studies have shown that between 9-17% of Chinese immigrants are chronic HBV carriers, similar to the proportions in Asia.⁴⁻⁷ Hepatocellular carcinoma is the fourth most common cancer among Chinese-American men.⁸⁻⁹

Although guidelines recommend HBV screening in high-risk populations, many Chinese immigrants are not tested. In a study of Chinese women in Seattle who were interviewed in their preferred language (Cantonese, Mandarin, or English), most of whom had limited fluency in English, only 35% had been screened.¹⁰ Studies have shown that Asians who are not fluent in English are at an increased risk for inadequate preventive health care.¹¹⁻¹⁵ Because of the potential impact of English fluency on screening status, we focused our study on Chinese patients who spoke Chinese as their primary language.

Little is known about health care providers' knowledge and practices regarding HBV screening. We conducted this study to evaluate providers' knowledge and practices in an academic general internal medicine practice with a high proportion of Chinese patients. We conducted a patient

computer database review of HBV test receipt and a mailed survey of providers regarding knowledge of HBV risk factors and screening guidelines. Our preliminary hypotheses regarding university general internists were that: 1) their Chinese patients are underscreened for HBV; and 2) more provider knowledge about HBV is associated with higher screening rates.

METHODS

Practice Setting

At nearly 20% of the population, Chinese constitute the largest ethnic minority in San Francisco.¹⁶ The General Medicine Practice (GMP) at the University of California, San Francisco (UCSF) receives approximately 55,000 adult visits per year. Approximately 8% of visits are by Asian patients who speak Cantonese or Mandarin as a primary language ("Chinese-speaking Chinese"). Insurance coverage includes 15% Medicaid, 25% Medicare, 35% managed care (non-Medicare), 20% fee-for-service, and 5% uninsured patients. There are no dedicated health care maintenance appointments; rather, screening services are incorporated into initial, acute, and chronic disease care visits. The clinic providers include UCSF internal medicine residents, fellows, faculty physicians, and nurse practitioners.

Study Sample

Database Review

To evaluate providers' screening behaviors, we conducted a retrospective cohort study of HBV screening rates in Chinese-speaking Asians compared to rates in English-speaking

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Whites, using the medical center's computerized database. Because the clinic database did not code for birthplace, we used primary language as a proxy for birthplace, as Chinese people who are not fluent in English are often immigrants.¹⁵ Patients were included if they self-identified as White or Asian, spoke English or an Asian language, and had at least two visits to the practice between January 2001 and January 2004. Asians who spoke Cantonese or Mandarin were classified as Chinese-speaking Chinese, the main group of interest. We also included other Asian ethnicities for comparison.

Exclusion criteria included diagnoses of another medical condition that could have led to diagnostic testing as opposed to screening, such as acute hepatitis A, acute hepatitis B, acute or chronic hepatitis C, acute liver failure, human immunodeficiency virus (HIV) infection, hemochromatosis, Wilson's disease, or renal failure.

Provider Survey

We distributed to GMP providers a written anonymous survey that was attached to a coversheet signed by each provider so that nonrespondents could be tracked. The coversheet was then detached so that the survey, which had no other identifiers, could not be linked to individual respondents. Providers were eligible if they were a physician (resident or faculty) or nurse practitioner with a continuity practice. Respondents were entered into a raffle for medical supplies. Nonrespondents were sent a second survey 4 weeks later.

Survey Instrument

We developed the survey, pretested it with a group of physicians at another site, and revised it. Using case scenarios, we evaluated providers' screening practice and knowledge about HBV infection, testing, and prevalence in populations of varying risks. Providers were asked to estimate the number of routine follow-up visits they had over the year by asymptomatic Chinese patients and the proportion of these patients that they screened for HBV. The survey also included questions about providers' socio-demographic characteristics, including language capabilities.

Data Definition and Analysis

For the computer database review, the primary outcome of HBV screening was defined as a serologic test for hepatitis B surface antigen (HBsAg). Patients with any combination of tests (HBsAg, HBV surface antibody [anti-HBs], total HBV core antibody [anti-HBc]) that included HBsAg were considered "screened," and patients who had no test or any combination of tests without HBsAg were considered "unscreened." We also calculated the proportion of screened patients who were positive for HBsAg. To evaluate the factors associated with HBV screening among

Chinese-speaking Chinese patients, we examined bivariate associations between screening status and socio-demographic characteristics using chi-square tests for categorical measures, such as sex, insurance, marital status, race, and ethnicity, and using student *t*-tests for continuous measures, such as age, number of visits, and years in the practice. We reviewed all listed variables for bivariate analyses and identified significant variables to enter in the logistic model simultaneously using the criteria of significant bivariate associations with having been serologically screened ($P < 0.05$).

For the provider survey, we defined the correct test for chronic carrier state to be HBsAg alone, and the correct test for immunity to be anti-HBs alone. We examined frequencies of correct responses to each of the 11 knowledge questions and calculated a summary score by summing the number of correct responses to the 11 knowledge questions (minimum 0, maximum 11). We evaluated bivariate associations between knowledge score, socio-demographic characteristics, and provider screening using *t* tests for knowledge score comparisons and chi-square tests for comparisons of categorical variables. Providers' self-reported screening rates of Chinese patients were categorized as "high" ($> 50\%$ of the time) or "low" ($\leq 50\%$ of the time). To assess factors that were independently associated with screening, a model was developed using exact logistic regression. The model included the providers' use of Asian language with patients, sex, training status (resident or not), and HBV knowledge score.

RESULTS

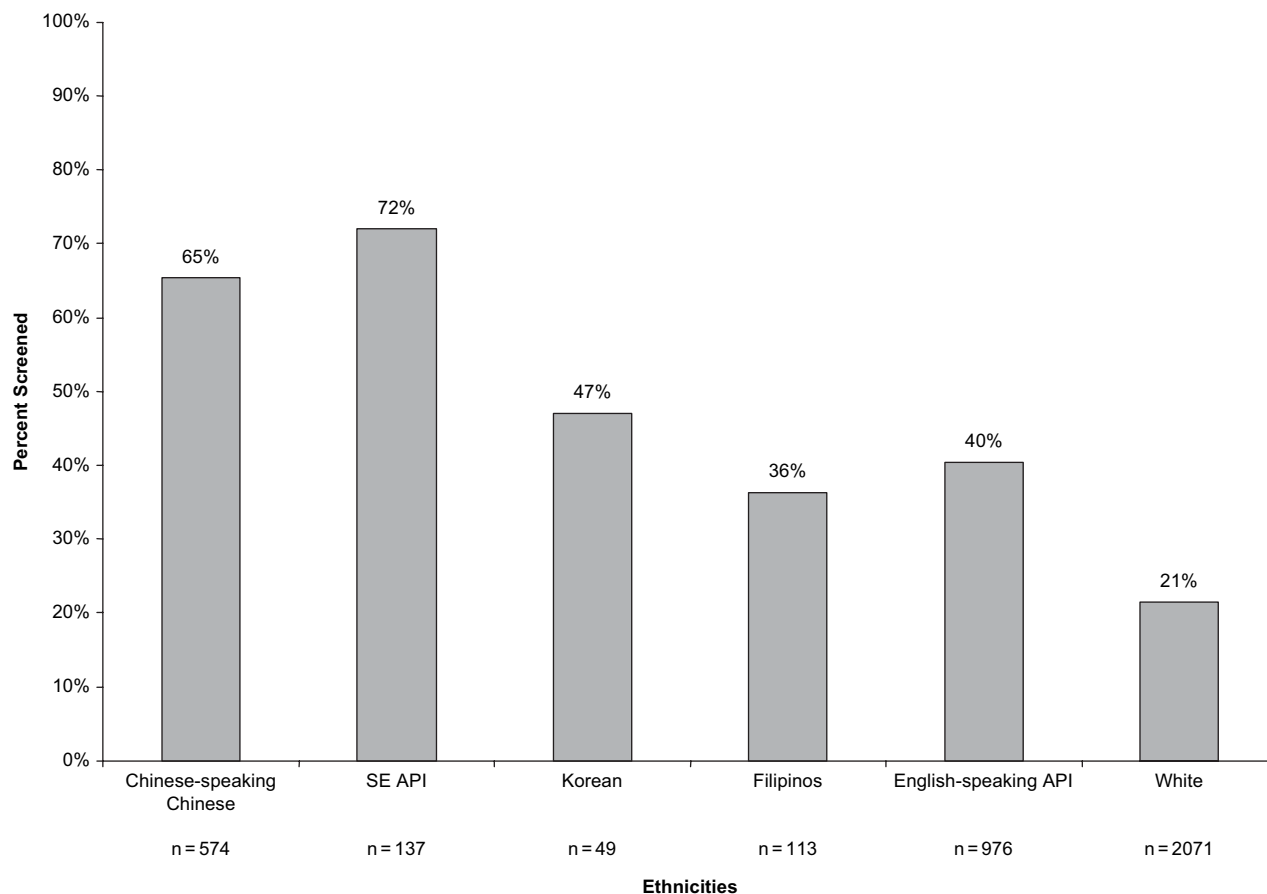
Database Review

Patients who met the inclusion criteria included 878 Chinese-speaking Chinese, 9687 non-Hispanic white, 2420 English-speaking Asian-Pacific Islander (API), 312 Tagalog-speaking API (Filipino), 190 Vietnamese-, Laotian-, or Thai-speaking Southeast (SE) API, and 104 Korean-speaking API (Korean). Figure 1 shows the screening rates by ethnicity.

The rate of screening for HBV among Chinese-speaking Chinese was 65%, compared to 21% for non-Hispanic Whites. Using Whites as the reference group, all Asian ethnic groups were significantly more likely to have been screened ($P < 0.05$). Of those screened, the proportion with positive HBsAg test was 6% for Chinese-speaking Chinese, 7% for SE API, 2% for Korean, 5% for Filipino, 5% for English-speaking API, and 1% for White patients.

Logistic Regression Modeling

The three variables that were significantly associated with screening ($P < 0.05$) in the bivariate analyses were entered into the logistic regression models (Table 1). The multivariate analysis showed that being married (odds ratio [OR] 1.62, 95% confidence interval [CI] 1.19-2.20) and being a patient of the practice for more years (OR 1.06, 95%CI 1.03-1.08) were significantly associated with HBV



API = Asian-Pacific Islander; SE API = South East Asian-Pacific Islander.

FIGURE 1. Percentage of HBV screening by patient population group.

screening while the number of practice visits (OR 1.01, 95%CI 0.94-1.10) was not.

Provider Survey

Ninety-one of 111 eligible providers responded to the survey (82% response rate). Nearly 61% were residents, 36% faculty or fellows, and 3% nurse practitioners. Mean age was 34 years and 65% were female. Providers' self-identified race was 65% White, 23% Asian, 6% Latino, 1% African-American.

HBV Knowledge Questions

When asked about which test to order for HBV screening, 30% of respondents selected answers that did not include the correct test (HBsAg). Of the 70% of respondents who correctly selected one or more serological tests that included HBsAg: 37% chose HBsAg alone as their test of choice; 21% chose HBsAg and anti-HBc and anti-HBs; and 12% chose HBsAg and anti-HBc. Eighty-five percent correctly identified anti-HBs as the proper test for HBV immunity. All respondents knew that Chinese immigrants had a higher prevalence of chronic HBV than non-Hispanic

White or U.S.-born Chinese people. However, respondents incorrectly identified HIV-infected persons (16%), men who have sex with men (18%), and intravenous recreational drug users (23%) as having a higher prevalence of chronic HBV than Chinese immigrants.

Bivariate Associations

Resident physicians identified anti-HBs as the correct test for immunity less frequently than did other providers (faculty, fellows, and nurse-practitioners) (76% vs 97%, $P = 0.007$). Those who reported screening Chinese patients more than half of the time had higher knowledge scores than those who did not (9.63 vs 8.87, $P = 0.032$). Residents also were less likely to screen these patients more than half of the instances compared with other providers (27% vs 54%, $P = 0.03$). However, there was no significant difference in total knowledge scores between residents and other providers.

Logistic Regression Analysis

In multivariate analyses, providers who spoke an Asian language with their patients were more likely than those

TABLE 1. Factors Associated with HBV Screening Among Chinese-Speaking Chinese Patients

Patient Attributes	Screened (n=574)	Unscreened (n=304)	P Value
	Number (%) or Mean ± SD		
Mean age in years	63 ± 16.9	64 ± 19.6	0.36
Female sex	352 (61)	189 (62)	0.81
Male sex	222 (39)	115 (38)	
Public insurance	368 (64)	203 (67)	0.47
Private insurance	192 (33)	91 (30)	
Self-pay/uninsured	14 (2)	10 (3)	
Married	431 (75)	196 (65)	0.0009
Not married	143 (25)	108 (35)	
Mean visits to GMP	13.7 ± 6.7	10.9 ± 7.0	< 0.0001
Mean years in GMP	3.4 ± 2.3	2.8 ± 2.2	0.0003

GMP = general medicine practice; HBV = hepatitis B virus; SD = standard deviation.

In bivariate analyses (Table), among Chinese-speaking Chinese patients, the following factors were significantly associated with prior screening: being married ($P = 0.0009$), greater number of years in the clinic ($P = 0.0003$), and greater number of clinic visits ($P < 0.0001$).

who did not to screen more than half of their Chinese patients (OR = 20.7, 95%CI 1.85-119.5). A higher knowledge score regarding HBV was also associated with increased screening (OR 1.57 for each additional item answered correctly; 95%CI, 1.03-2.50). Being a resident (OR 0.43, 95%CI, 0.11-1.61) was not significantly associated with screening.

DISCUSSION

To our knowledge, this study is one of the first to assess a group of primary care providers for both HBV knowledge and screening practices. We found that only two-thirds of Chinese-speaking Chinese patients in an academic general medicine practice had been screened for HBV, and that 30% of providers did not identify the correct screening test. Providers who knew more about HBV risks and screening reported higher rates of screening their Chinese patients; for each additional knowledge item answered correctly, the odds of screening more than half of their patients increased by about 50%. Providers who spoke an Asian language were also more likely to screen.

The HBV screening rate of 65% in our study is higher than that in other Chinese studies, which showed screening rates of 35% among Chinese women in Seattle and 39% in Canada.^{10,13} These prior studies were based on self-reports, which are not as reliable as the computerized laboratory records used in our study. In addition, our study was clinic-based while the others were community-based, and thus barriers such as access may have led to lower screening rates. Even so, the screening rate in our study fell short of the 100% rate that is recommended for universal screening.

Prior studies have shown that factors associated with Chinese people in North America having been screened for HBV included education, English fluency, knowledge about HBV, and patient report of provider recommendation.^{10,13,17} Our study suggests that being married and being a long-term patient of a primary care practice, the latter being a proxy for regular health care, are also associated with screening. Provider-related factors associated with greater screening include having a provider who has Asian language ability or who has greater knowledge of HBV guidelines.

Primary care providers are in a unique position to deliver screening because of their continuity of care with patients. In our survey, 30% of the providers would have ordered the wrong test to screen for chronic HBV infection, which suggests that one explanation for underscreening may be provider error. Although the providers knew that Chinese ethnicity was a risk factor, they underestimated its magnitude compared to other common risk factors (eg, HIV infection, intravenous drug use). Higher levels of knowledge were significantly associated with higher screening rates, suggesting that educating providers about the relative risks of HBV transmission and screening guidelines may improve screening rates.

We found that providers who spoke an Asian language were more likely to report testing Chinese patients for HBV. This effect could be a result of improved patient-provider communication in the absence of a language barrier. However, prior literature has suggested that Chinese patients with physicians of Chinese ethnicity were less likely to receive breast, cervical, and colorectal cancer screening tests.¹⁸ It is possible that there is heightened awareness of the burden of HBV through shared background between Asian providers and patients.

Our study has several additional strengths. We focused on a general medicine clinic in an academic center with a large number of Chinese patients. Focusing on an academic practice was particularly important because many preventive services are underused in this setting by poor or minority patients.¹⁹ Another strength in the database review is that we relied on serological documentation of HBV testing, rather than on patient self-report, as has been used in the past.^{10,13}

There were several limitations in our study. First, results from patients in a university-based general medicine practice may not be generalizable to those in community-based practices; however, the study population included a large number of Chinese patients of all insurance tiers and thus represented a diverse population. Second, due to the limitations in the computerized medical records, primary language (Cantonese or Mandarin) and race (Asian) were used to select immigrants of Chinese ethnicity. Third, the database does not document details about testing, such as providers' reasons for testing, or previous and offsite screening of a patient; thus we do not know if providers considered but rejected screening because patients reported being screened elsewhere. Finally, providers' knowledge of HBV

risk and screening guidelines may not reliably translate into actual screening behavior.

Nonetheless, this study highlights the need to educate university-based general medicine providers about hepatitis B risk assessment and screening guidelines. Prior research has shown that health care providers can impact their patients' decisions to undergo cancer screening by raising the issue during appointments.^{20,21} Electronic reminder systems have been used with success in improving cancer screening and preventive services in ambulatory care clinics,²²⁻²⁵ particularly in academic settings.²⁶ We plan to develop and implement an educational program and an electronic reminder system to improve HBV risk assessment and screening in our academic general medicine clinic.

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