HEPATITIS B KNOWLEDGE AND TESTING AMONG VIETNAMESE-AMERICAN WOMEN

Victoria M. Taylor, MD, MPH; Yutaka Yasui, PhD; Nancy Burke, PhD; John H. Choe, MD, MPH; Elizabeth Acorda, BA; J. Carey Jackson, MD, MA, MPH

The study objective was to examine factors associated with previous hepatitis B virus (HBV) testing among Vietnamese women. A population-based survey was conducted in Seattle. The survey was completed by 370 women (response rate: 82%). Sixty-eight percent of the respondents reported previous HBV testing. Only 44% recalled a physician recommendation for the test. The following factors were associated with previous testing in bivariate comparisons: knowing that HBV can be spread during childbirth, during sexual intercourse, and by sharing toothbrushes; doctor(s) had recommended testing; family member(s) and friend(s) had suggested testing; and family member(s) were chronically infected with HBV. In a multiple regression analysis, women who reported a previous physician recommendation had nearly a five times higher odds of testing than those who did not. Education about HBV transmission may stimulate Vietnamese women to seek testing. Intervention strategies that target social networks might be effective in increasing testing levels. Physicians should be educated about the importance of testing Asian immigrants for HBV. (*Ethn Dis*. 2005;15:761–767)

Key Words: Hepatitis B, Immigrants, Liver Cancer, Vietnamese Americans

From the Division of Public Health Sciences, Fred Hutchinson Cancer Research Center (VT, YY, EA, JC); Department of Health Services (VT, JC) and Department of Medicine (JJ) University of Washington; Harborview Medical Center (JJ); Seattle, Washington; Comprehensive Cancer Center, University of California, San Francisco, California (NB).

Address correspondence and reprint requests to Vicky Taylor, MD, MPH; Fred Hutchinson Cancer Research Center; PO Box 19024; Seattle, WA 98109-1024; 206-667-5114; 206-667-5977 (fax); vtaylor@fhcrc.org

INTRODUCTION

The 2000 US Census documented more than one million Vietnamese Americans.[1] Compared to the general Asian-American population, Vietnamese are economically disadvantaged, linguistically isolated, and particularly unfamiliar with Western culture.[2,3] While hepatocellular carcinoma (HCC) is an uncommon tumor among individuals born in the United States, it is the most common malignancy in many Asian countries.[4,5] Approximately 80% of HCCs among Asian immigrants are etiologically associated with hepatitis B virus (HBV) infection.[6] The rate of chronic HBV infection among Vietnamese Americans is >10%, compared to the general population rate of <1%.[7,8] Further, California cancer registry data show that Southeast Asian women are more than eight times more likely to be diagnosed with liver cancer than non-Latina White women.[9]

Exposure to HBV often results in a self-limiting infection that can be asymptomatic or present as acute hepatitis, usually followed by immunity.[4] However, a significant proportion of those exposed to HBV become chronically infected. These individuals can infect others and are at considerable risk of HCC as well as chronic active hepatitis and cirrhosis.[4,10] A National Institutes of Health clinical conference panel concluded that patients with chronic HBV infection should be screened (with serum testing for liver tumor markers and radiologic imaging techniques) for HCC at least once a year.[4] Additionally, chronically infected individuals should be considered for treatment with lamivudine, interferon, adefovir, liver transplantation, and new drug therapies as they become available.[11–14]

While hepatocellular carcinoma (HCC) is an uncommon tumor among individuals born in the United States, it is the most common malignancy in many Asian countries.[4,5]

In Southeast Asian communities, horizontal transmission may be responsible for a substantial number of new cases of HBV infection among household contacts of chronically infected individuals.[15–17] Additionally, those who are sexually active with other Southeast Asians are at risk of infection.[18] Vaccines that are effective in preventing HBV infection have been available for more than two decades.[19] Consequently, the American Association for the Study of Liver Disease recommends vaccinating adolescents and young adults from areas of high HBV endemicity (eg, Vietnam) as well as family members of individuals with chronic HBV infection.[20]

Jenkins and colleagues have called on cancer control agencies, such as the National Cancer Institute, to take a leadership role in raising awareness about the role of HBV in the etiology of liver cancer. They also recommended that cancer control agencies provide education about potential routes of HBV transmission, promote HBV serologic testing of all adults from

geographic areas of high endemicity, support immunization of susceptible individuals, and endorse routine monitoring of chronically infected persons.[10] This study aimed to describe hepatitis B knowledge, beliefs, and practices in Seattle's Vietnamese community and obtain information about hepatitis B testing barriers and facilitators that could be used to develop intervention strategies for Vietnamese-American women.

METHODS

Sampling Methods

Census data indicate that Seattle's Vietnamese community is concentrated in the southern part of the city.[21] Therefore, our survey sample was drawn from seven contiguous south Seattle zip codes. McPhee and his colleagues at the University of California have shown that >95% of Vietnamese families share 23 last names.[22] We applied this list of names to the 2001 telephone book for metropolitan Seattle. Specifically, we identified 1639 Vietnamese households that were located in the target zip codes. We randomly selected 602 of these households for inclusion in the survey. Because nine addresses were subsequently found to be duplicates, the final study sample included 593 households.

Household Recruitment

Our study procedures were approved by the University of Washington Institutional Review Board. To raise awareness among households selected for participation, we publicized the survey by placing posters in community settings such as Vietnamese grocery stores. Households received an introductory mailing from the medical director of the international medical clinic at Seattle's county hospital (JJ). The letter informed households that a project interviewer would be visiting their home and asking a household member to complete an interview. Approximately two weeks after each introductory mailing, bilingual, bicultural, female survey workers visited the household to conduct an interview. Participation incentives included posters depicting Vietnamese artwork as well as a summary of Seattle organizations providing social and health services to Vietnamese families. Respondents were given the option of completing their survey in Vietnamese or English. Five door-to-door attempts were made to contact each household (including at least one daytime, one evening, and one weekend attempt). Each interview took ≈45 minutes to complete.

Participant Selection

We aimed to interview one woman aged 18 to 64 years in each household. Our project collaborates with a coalition of Vietnamese community members who believed that the survey response rate would be negatively affected if we attempted to list household members and then randomly select a respondent in each household with two or more age-eligible women. Coalition members also advised us not to use the "nearest birthday" method of participant selection (ie, asking to speak to the woman with the most recent birthday).[23] Specifically, they reported that a meaningful proportion of older Vietnamese women do not know their exact date of birth and routinely use the first of January for US documentation purposes. However, to ensure our sample was representative of different age groups, we randomly assigned households to one of two groups: households where we initially asked to speak with a woman in the 18–39 age-group (and then asked to speak with a woman aged 40–64 if no women were in the younger age group); and those where we initially asked to speak with a woman in the 40–64 age-group (and then asked to speak with a woman aged 18–39 if no women were in the older age group).

Survey Development

The survey development was guided by an earlier qualitative study (which included unstructured interviews as well as focus groups with members of Seattle's Vietnamese community), our research group's previous experience conducting women's health surveys in Asian-American communities, and the diagnostic component of the PRECEDE framework.[24–29] PRECEDE was developed to enhance the quality of health education interventions by offering practitioners a systematic planning process.[30] The acronym stands for Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation.[29] It has been successfully applied to early detection programs targeting racial/ethnic minority populations and is believed to be particularly applicable to cancer control.[30,31] The survey instrument was developed in English, translated into Vietnamese, back-translated to ensure lexical equivalence, reconciled, and pretested.[32] Because some Vietnamese immigrants have little formal education, we made the response options as simple as possible. Specifically, the response options for most survey items were yes, no, and not sure/don't know.

Survey Content

Respondents were asked whether they had ever heard about a disease or infection called hepatitis B. After responding to this question, they were read the following statement: "The disease called hepatitis B is an inflammation of the liver caused by a viral infection that makes the skin and eyes go yellow. People with the infection lose their appetite and often experience nausea as well as vomiting." Women were then asked if they had ever had a blood test to see if they currently have hepatitis B or have had it in the past. Survey participants were queried about their age, marital status, educational level, and household income. Respondents specified how many years they

had lived in the United States as well as their age at immigration and provided information about their English-language proficiency.

According to PRECEDE, factors affecting behavior can be broadly grouped as predisposing, reinforcing, and enabling. Predisposing factors include an individual's knowledge, beliefs, and perceptions. Social support of a behavior by important referents and previous experiences are considered reinforcing. Enabling factors are those skills and resources that positively or negatively facilitate change.[29] The survey instrument included a section addressing knowledge and beliefs about hepatitis B (predisposing factors). Specifically, respondents were asked whether hepatitis B can be spread during sexual intercourse, during childbirth, by sharing toothbrushes, and by someone who looks and feels healthy. They were also asked if they thought people with hepatitis B can be infected for life, hepatitis B can cause liver cancer, people can die from hepatitis B, and Vietnamese are more likely to be infected with hepatitis B than whites. Our questionnaire included four survey items about reinforcing factors. Specifically, participants indicated whether physician(s) had ever recommended hepatitis B testing, family member(s) had ever suggested testing, friend(s) had ever suggested testing, and any of their family members were chronically infected with HBV. Other questions were related to healthcare access (enabling factors). Women were asked if they had a regular source of care, a regular provider, and health insurance and if concern about cost was a barrier to health care.

Data Analysis

Answers to items with response options of yes, no, and not sure/don't know were dichotomized into yes versus other. We compared the characteristics of women who did and did not report a previous hepatitis B test. The chi-square test was used to assess statistical significance in bivariate comparisons.[33] We used unconditional logistic regression models to summarize the independent effect of individual items on HBV testing. All variables with a P value of $<.10$ in the bivariate analysis were included in our multiple regression analysis.[34]

RESULTS

Study Sample

The questionnaire was completed by 370 women. The overall estimated response rate was 82% (assuming the proportion of eligible households was the same among those that could and could not be contacted), and the refusal rate among reachable and eligible households was 15%. Three hundred and sixty (97%) of those who completed the survey did so in the Vietnamese language. The study group characteristics are summarized in Table 1. Three hundred and seventeen (86%) of the women who completed the survey had heard of hepatitis B before being given a description of the disease.

PRECEDE Factors

As shown in Table 2, the proportions of women who knew hepatitis B can be spread by sexual intercourse, childbirth, toothbrushes, and someone who looks and feels healthy were 68%, 85%, 77%, and 75%, respectively. A minority knew that people with hepatitis B can be infected for life (45%) and Vietnamese are more likely to be infected with HBV than Whites (45%).

Table 1. Study group characteristics

Variable	*n*	%
Sociodemographic		
Age (years)		
<35	114	31
35–49	124	34
≥50	130	35
Marital status		
Currently married	298	81
Previously married	24	6
Never married	48	13
Education (years)		
<6	68	19
6–11	111	30
≥12	186	51
Household income ($)		
<20,000	127	34
≥20,000	197	53
Unknown	46	13
Acculturation		
Length of time in the United States (years)		
<10	176	48
10–19	148	40
≥20	44	12
Age at immigration (years)		
<35	200	54
35–49	139	38
≥50	28	8
English proficiency		
Speaks fluently or well	54	15
Speaks quite well	79	21
Does not speak well or at all	237	64

Table 2. PRECEDE variables

Variable	*n*	%
Predisposing		
Hepatitis B can be spread during sexual intercourse	250	68
Hepatitis B can be spread during childbirth	314	85
Hepatitis B can be spread by sharing toothbrushes	284	77
Hepatitis B can be spread by someone that looks and feels healthy	276	75
People with hepatitis B can be infected for life	165	45
Hepatitis B can cause liver cancer	306	83
People can die from hepatitis B	337	91
Vietnamese are more likely to get hepatitis B than Whites	165	45
Reinforcing		
Doctor(s) had recommended HBV testing	164	44
Friend(s) had suggested HBV testing	72	19
Family member(s) had suggested HBV testing	119	32
Family member(s) were chronically infected with HBV	32	9
Enabling		
Regular source of care	329	89
Regular physician	293	79
Health insurance	328	89
Concern about cost was a barrier to care	119	32

However, most respondents believed that hepatitis B can cause liver cancer (83%) and people can die from HBV (91%). Less than one-half (44%) of our respondents recalled having received a physician recommendation for hepatitis B testing. The proportions reporting friends and family members had suggested testing for HBV were 19% and 32%, respectively. Most had a regular source of health care (89%), regular provider (79%), and health insurance coverage (89%). Approximately one third (32%) reported concern about cost as a barrier to health care.

Hepatitis B Testing

Approximately two thirds (68%) of the Vietnamese women who completed our survey reported they had been tested for HBV. Bivariate comparisons between the 253 women who had been tested and the 117 women who had not been tested are given in Table 3. No relationship was seen between HBV testing and the demographic variables examined in this study. The following variables were associated ($P<.05$) with HBV testing in bivariate comparisons: knowing that hepatitis B can be spread by sexual intercourse, childbirth, and toothbrushes; doctor(s) had recommended HBV testing; family members and friends had suggested testing; and family members were chronically infected with HBV. Health insurance ($P=.07$) and concern about cost ($P=.07$) demonstrated marginal statistical significance. Only previous physician recommendation was independently associated with previous hepatitis B testing in a multivariate analysis (OR=4.76, 95% CI=2.51–9.02, $P<.001$). However, knowing HBV can be spread during childbirth (OR=1.99, 95% CI=0.97–4.05, $P=.06$) and having family members who were chronic HBV carriers (OR=2.98, 95% CI=.94–9.49, $P=.06$) showed a trend toward significance.

DISCUSSION

We found that the rate of serologic testing for hepatitis B among Vietnamese-American women (68%) was considerably higher than the rates reported by Cambodian women in a 1997 Seattle study (38%) and Chinese women in a 1999 Seattle study (35%). Similarly, our Vietnamese women had higher levels of knowledge than the Cambodian and Chinese women who participated in these earlier studies. For example, the proportions of Cambodian, Chinese, and Vietnamese women who knew that HBV causes liver cancer were, 54%, 46%, and 83%, respectively.[25,28] Our qualitative work indicated that some Vietnamese immigrants had been exposed to a hepatitis B educational campaign in Vietnam prior to immigration. The higher hepatitis B knowledge and testing rates among Vietnamese women (when compared to Cambodian and Chinese women) may have been related to this educational campaign. Nonetheless, almost one third (32%) of the participants did not recall being serologically tested for HBV, and our survey demonstrated some knowledge deficits.

We had hypothesized that HBV testing would be associated with certain demographic characteristics. For example, we expected testing to be associated with younger age at immigration (because women who immigrate before 35 years of age are more likely to receive obstetric services in the United States). Surprisingly, we found no association between any of the demographic characteristics examined in this study and HBV testing. In contrast, we found a strong relationship between testing

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Table 3. Bivariate associations between hepatitis B testing levels, sociodemographic characteristics, acculturation, and PRECEDE factors

Variable	Tested for HBV (%)	*P* value
Sociodemographic		
Age (years)		
<35	66	.26
35–49	65	
≥50	74	
Marital status		
Currently married	69	.81
Previously married	67	
Never married	65	
Education (years)		
<6	65	.15
6–11	64	
≥12	74	
Household income ($)		
<20,000	70	.82
≥20,000	68	
Unknown	65	
Acculturation		
Length of time in US (years)		
<10	69	.24
10–19	64	
≥20	77	
Age at immigration (years)		
<35	66	.38
35–49	73	
≥50	68	
English proficiency		
Speaks fluently or well	70	.32
Speaks quite well	75	
Does not speak well or at all	66	
Predisposing		
Hepatitis B can be spread during sexual intercourse		
Yes	73	.004
No	58	
Hepatitis B can be spread during childbirth		
Yes	72	<.001
No	46	
Hepatitis B can be spread by sharing toothbrushes		
Yes	73	<.001
No	53	
Hepatitis B can be spread by someone that looks and feels healthy		
Yes	70	.18
No	63	
People with hepatitis B can be infected for life		
Yes	72	.24
No	66	
Hepatitis B can cause liver cancer		
Yes	69	.41
No	64	
People can die from hepatitis B		
Yes	69	.26
No	59	
Vietnamese are more likely to be infected with hepatitis B than whites		
Yes	71	.35
No	66	
Reinforcing		
Doctor(s) had recommended hepatitis B testing		
Yes	88	<.001
No	52	
Friend(s) had suggested hepatitis B testing		
Yes	88	<.001
No	64	
Family member(s) had suggested hepatitis B testing		
Yes	87	<.001
No	60	
Family member(s) were chronically infected with HBV		
Yes	88	.01
No	67	
Enabling		
Regular source of care		
Yes	70	.15
No	58	
Regular provider		
Yes	70	.20
No	62	
Health insurance		
Yes	70	.07
No	56	
Concern about cost was a barrier to health care		
Yes	62	.07
No	71	

levels and knowledge about HBV transmission routes. In a previous analysis of factors associated with Pap testing in the last three years, knowledge variables were also more important than demographic characteristics among Vietnamese-American women. The only demographic variable associated with recent Pap testing use was marital status (never married women were less likely to have received a recent Pap test than currently and previously married women), but multiple knowledge items (eg, knowing that Pap testing is necessary if asymptomatic, if sexually inactive, and after menopause) were related to cervical cancer screening.[35]

A relatively low proportion (44%) of respondents reported a previous physician recommendation for HBV testing. Multiple studies, conducted in diverse populations, have found an association between physician recommendation and women's use of breast and cervical cancer screening tests.[26,27,36–40] For instance, a strong association between physician recommendation and Pap testing receipt has recently been demonstrated among Cambodian women in Washington as well as Vietnamese women in California and Texas.[26,40] Among our study participants, women who had received a physician recommendation had 4.8-fold higher odds of having been tested for hepatitis B than those who had not received a physician recommendation.

Group educational interventions have been used to improve knowledge and a variety of health behaviors.[41–44] For example, Maxwell et al recently reported their results from a group-randomized controlled trial to increase breast cancer screening among Filipina-American women in Los Angeles. Women aged ≥40 years were invited to attend a group session with a health educator. Among recent immigrants (ie, women who had spent <10 years in the United States), mammography screening increased significantly more in the

intervention arm than in the control arm (a 27 vs 6 percentage point increase, $P<.05$).[44] Only 19% of our study participants reported that a friend/friends had ever suggested HBV testing. However, 88% of the women who reported that a friend had suggested HBV testing also reported that they had been tested. These findings suggest that group educational programs for Vietnamese women, which encourage learning through establishing social norms and peer modeling, may be effective in increasing HBV testing levels.

Our study has several limitations that warrant discussion. First, we recruited households in areas of Seattle with a relatively high proportion of Vietnamese residents. Our findings may not be generalizable to other geographic areas or Vietnamese who live in communities with small Asian-American populations. Second, only households with listed telephone numbers associated with complete address information were eligible for the survey; we do not know to what extent such households are representative of Seattle's Vietnamese community. Third, survey respondents may have had different demographic characteristics and preventive behavior patterns than those who were unreachable or refused participation. Fourth, self-reports may be faulty because of inaccurate recall, desirability bias, or confusion about the purpose of blood tests for liver dysfunction. Fifth, HBV testing is part of routine obstetric care in the United States, and we did not specifically ask women if they had any children who were born in this country. Finally, our study focused on HBV knowledge and testing practices and did not address the vaccination of susceptible individuals nor the monitoring and management of patients with chronic HBV infection.

Despite the limitations, our study has several strengths. Specifically, we used population-based sampling methods, administered the survey face-to-face, and had a high response rate. Further, we used the PRECEDE model as a conceptual framework for our survey and measures, which allowed us to systematically classify factors identified by our qualitative work and facilitates the application of our results to intervention planning. In general, the quantitative findings were consistent with findings from our earlier qualitative study.[24] However, the quantitative findings also suggest that predisposing and reinforcing factors may be more important than enabling factors within the context of Vietnamese women's HBV testing practices. Specifically, knowledge about routes of hepatitis transmission (ie, sexual intercourse, childbirth, and toothbrushes), social support of family members and friends, and physician recommendation were strongly associated ($P<.01$) with previous HBV testing. On the other hand, 89% of the sample had health insurance and a regular source of care. Enabling factors may be more important in other areas of the country (where, for example, the Medicaid eligibility criteria are more stringent than in Washington State).

Few publications address liver cancer control interventions for Asian-American communities. However, researchers have evaluated two public health interventions to increase HBV vaccination rates among Vietnamese children and adolescents. A media-led information and education campaign was conducted in Houston, and a community mobilization strategy was conducted in Dallas. Washington DC served as a control area. Pre- and post-intervention surveys showed that both intervention strategies were effective in increasing parents' knowledge about hepatitis B, as well as vaccination rates among children and adolescents.[45] In addition, the National Hepatitis B Task Force and the Jade Ribbon Campaign are currently providing hepatitis B education to Asian-American communities.[46,47] Our findings suggest that health education about routes of HBV transmission may stimulate patients to seek testing. Intervention programs that use social networks within Vietnamese communities might also increase HBV testing rates. Finally, physicians who serve Asian immigrant populations should be educated about the importance of HBV testing.

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AUTHOR CONTRIBUTIONS

Design and concept of study: Taylor, Yasui, Jackson
Acquisition of data: Taylor, Yasui, Acorda, Jackson
Data analysis and interpretation: Taylor, Yasui, Burke, Choe, Jackson
Manuscript draft: Taylor, Yasui, Burke, Choe, Acorda, Jackson
Statistical expertise: Yasui
Acquisition of funding: Taylor, Yasui, Jackson
Administrative, technical, or material assistance: Taylor, Yasui, Burke, Choe, Accorda, Jackson
Supervision: Taylor, Burke, Acorda, Jackson