

Perceptions of Risk for Hepatitis B Infection among the Hmong

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Hmong Studies Journal

Volume 17, 24 Pages

Abstract

The Hmong in the U.S. who emigrated from Southeast Asia, an area where hepatitis B is endemic, experience high rates of hepatitis B infection and liver cancer compared to non-Hispanic whites. This exploratory study examined the Hmong's perceptions of risk of hepatitis B infection. We interviewed 83 Hmong women and men living in Oregon. In bivariate statistical analysis, greater perceived susceptibility, lower perceived barriers, and having a healthcare provider recommendation were each significantly related to having ever been screened for hepatitis B. Logistic regression models indicated that having a recommendation by a doctor or healthcare provider was the strongest predictor of having been screened for hepatitis B, followed by education and insurance. Future interventions with the Hmong population should focus on the important role of health care providers play in raising awareness about hepatitis B infection and increasing screening uptake.

Keywords: hepatitis B; perceptions of risk; Asians; Hmong

Introduction

Approximately two billion people worldwide are infected with hepatitis B, and 400 million individuals are chronically infected [1]. Chronic hepatitis B infection is the foremost risk factor for liver cancer and contributes to 80% of all liver cancer deaths in the world [1,2]. In the United States (U.S.), over 12 million Americans have been infected with the hepatitis B virus and an estimated 1.9 million have chronic hepatitis B [1,3]. Up to 40,000 new hepatitis B infections occur each year [1] with the highest rate of hepatitis B infection and liver cancer deaths among foreign-born individuals (47% to 70%) who come from hepatitis B endemic regions, such as Asia and Africa [4]. As such, reducing chronic hepatitis B infection is a national health priority.

Hepatitis B infection disproportionately affects Asian Americans. In fact, Asian Americans make up more than half of those who have chronic hepatitis B infection in the U.S. [4]. Hepatitis B infection is 5 to 12 times more common among Asian Americans compared to the general U.S. population [5,6]. Chronic hepatitis B infection is often referred to as the “silent killer” because those who are infected can go decades without experiencing any disease symptoms. Among many Asians with chronic hepatitis B, infection most likely occurred as infants (vertical transmission) or young children (horizontal transmission). Nearly two-thirds of those with chronic hepatitis B infection do not know that they are infected, thus, they are missing opportunities for early detection and timely treatment [1,2]. If infection is untreated, up to 25% of people with hepatitis B develop serious liver problems such as cirrhosis of the liver and liver cancer [2].

More specifically, the Hmong who emigrated from Southeast Asia, an area where hepatitis B is endemic, experience high rates of hepatitis B infection and liver cancer compared to non-Hispanic whites [7]. The Hmong were a part of the mass migration movement of thousands of refugees known as Indochinese refugees, who at the end of the Vietnam War in 1975, fled from the Southeast Asia and relocated to various countries around the world [8]. Although data on the prevalence rate of hepatitis B infection among the Hmong are limited, the studies that do exist show high prevalence of hepatitis B infection. Sheikh and colleagues [9] reported a prevalence rate of 16.7% among Hmong in California. The majority of individuals who tested positive for hepatitis B were foreign-born and had lived in the U.S. for nearly 30 years, suggesting that infection most likely occurred prior to immigrating to the U.S. High rates of hepatitis B infection among the Hmong are attributed to vertical and horizontal transmission and are further exacerbated by low screening and vaccination rates [10-13]. Hepatitis B infection is highly

preventable with a three-shot immunization series; however, the Hmong are least likely to obtain routine immunizations for their children compared to other Asian ethnic groups [14,15].

Moreover, the Hmong have the lowest survival rate for liver cancer, which is nearly two times lower than other Asian ethnic groups [16]. Reasons for such poor survival rates are that the Hmong are far more likely to be diagnosed with liver cancer at later stages of the disease and are less likely to undergo treatment, resection, or transplantation [16].

Further, a general lack of awareness about hepatitis B infection and prevention measures (i.e., vaccination) among the Hmong exists. For example, Butler and colleagues' [17] reported low awareness among Hmong youth about how hepatitis B is transmitted; less than half of participants knew that hepatitis B could be spread through sexual intercourse. Sheikh et al. [9] reported that 62.5% of the participants in their study did not know whether they had ever been vaccinated for hepatitis B. This lack of awareness is important for development of hepatitis B education and prevention programs for the Hmong community.

The previous research suggests that reducing hepatitis B infection in this population is a public health priority. In this exploratory study, we examined perceptions of hepatitis B infection among Hmong women and men living in Oregon, a state with a rapidly growing Hmong population (estimate 6,332) [17]. The purpose of this article is to explore the Hmong's perceptions of risk of hepatitis B infection. Improving understanding of the Hmong's awareness about hepatitis B infection is critical for the development of culturally appropriate, targeted interventions to reduce hepatitis B infection in this population.

Methods

Study Design and Procedures

The quantitative study reported here was a part of a qualitative parent study on breast and cervical cancer screening conducted with the Hmong in Oregon. More specifically, we added questions regarding hepatitis B and liver cancer to the interview guide of the parent study. The methods of the larger study, described in greater detail elsewhere [18], included in-depth interviews with a purposeful sample of 83 Hmong (44 women, 39 men) in December 2009 to May 2010. Participants had to self-identify as Hmong, be 18 years or older, and live in Oregon. We recruited participants using both written and oral communication. For example, we passed out recruitment postcards (in both English and Hmong), posted flyers at Hmong churches and Asian stores where Hmong frequent, and made announcements about the study at Hmong churches. The interviews took place in locations that would ensure privacy such as in the participant's home or office, a community center, a library, or a Hmong church. Bilingual/bicultural Hmong interviewers obtained informed consent from each participant prior to conducting the interview. They conducted the interviews in Hmong, English, or a combination using a semi-structured interview guide. The interviews were audio-recorded and were approximately 45 minutes to two hours in length. Participants were compensated \$25 for their time and up to \$10 each for transportation and childcare.

Measures

Hepatitis B Screening

We selected self-reported hepatitis B screening (screened/not screened) as the primary outcome for this study. Screening was measured with the question: “Have you ever been tested for hepatitis B?” Responses were categorized into “yes,” “no,” or “don’t know.”

Health Belief Model

We used the Health Belief Model (HBM) as our theoretical framework, which has been widely used in studies to explain behavior change and as a theoretical framework for health behavior interventions [19-21]. The HBM is used to explain how beliefs about hepatitis B and liver cancer and attitudes toward prevention measures influence individual screening and vaccination behavior [22-23]. Participants’ perceived susceptibility, severity, benefits and barriers, and cues to action in relation to hepatitis B were assessed with measures adapted from Ma and colleagues instrument [23]. We used two scales, perceived susceptibility and severity. The average of three items was used to measure *perceived susceptibility* of hepatitis B: 1) I feel that I am at high risk for hepatitis B infection, 2) I worry about getting hepatitis B, and 3) I worry about getting liver cancer. The average of two items was used to measure *perceived severity*: 1) My life would change if I had hepatitis B, and 2) People infected with hepatitis B will die from liver cancer. Participants were asked how much they agreed with each of the statements above using a 5-point Likert-type scale, from *strongly disagree* to *strongly agree*. Higher average scores indicated greater perceived susceptibility and greater severity, respectively. The internal consistency of the perceived susceptibility scale was good (Cronbach’s $\alpha = .81$). The perceived severity scale, however, was not reliable ($\alpha = .32$). Thus the two severity items were used as individual items; the responses were dichotomized (agree = 1, disagree = 0).

Barriers and benefits of screening for hepatitis B were measured with summed indices.

Perceived benefits were measured with five items: 1) Getting tested is an effective way to detect hepatitis B infection, 2) Getting tested prevents transmission of hepatitis B to others, 3) Getting vaccinated for hepatitis B reduces worry about liver disease, 4) Vaccination is the best way to prevent liver cancer, and 5) Early detection will make it easier to treat hepatitis B infection. Four items were used to measure *perceived barriers* to hepatitis B screening: 1) Language is a barrier for me to get screened and vaccinated for hepatitis B, 2) I do not know where to get screened and vaccinated for hepatitis B, 3) I am scared to find out if I test positive for hepatitis B, and 4) Screening is not necessary if I feel well. For both the measure of benefits and of barriers, each positive response was tallied as 1 (0 for negative) and then summed, with higher summed index scores associated with greater perceived benefits and barriers.

There were three dichotomous (yes = 1, no = 0) “Cues to action” for screening behavior: 1) Has a doctor or other health care provider ever told you that you should be tested for hepatitis B? 2) Do you have a family member who has hepatitis B? and 3) Have you attended a hepatitis B education workshop in the past?

Health Care Behaviors

Open ended questions about health care behaviors included, “Do you ever seek preventive care? By that, I mean going to the doctor or other health care provider when you are not sick.” The second question asked, “Do you have one person you think of as your personal doctor or health care provider?” Which was followed with “Is there more than one, or do you not have anyone who you think of as your personal doctor or health care provider?” Responses included: “yes, only one,” “more than one,” and “no, does not have a personal doctor or health care provider.”

Demographic Characteristics

Standard demographic questions assessed participants' social and health status such as gender, age, marital status, years of education, and health insurance status. Linguistic acculturation was measured with items taken from Anderson et al.'s [24] acculturation scale for Southeast Asians. The items asked participants how well they understand, speak, read, and write English and how well they understand, speak, read, and write in Hmong. Responses were based on a 4-point Likert scale (1 = not at all to 4 = very well). A score was composed for each language proficiency scale with higher scores equaling greater acculturation.

Data Analysis

Descriptive statistics (e.g., means, standard deviations, frequencies and percentages) were used to summarize demographic data and HBM components of susceptibility, severity, benefits, barriers, and cues to action. There were missing data for only two items in the interview; "understanding" English and "understanding" Hmong, with 13/83 (15.6%) missing. This was not regarded as imputable and the cases were dropped in listwise analyses. Bivariate logistic regression models were fit to examine the potential relationship of linguistic acculturation and each HBM component to screening behavior. Given the small sample size, we chose to consider those bivariate relationships with a p-value of .10 or smaller significant. Finally, logistic regression models were fit to determine the relationships of demographic variables and HBM components to hepatitis B screening (screened/not screened). Model 1 contained all of those significant predictors of screening from the demographic characteristics, Model 2 contained all of the significant health belief predictors of screening, and Model 3 contained all six predictors. Quantitative data were doubly entered and analyzed using IBM SPSS v.22 [25].

Results

Univariate

As presented in Table 1, the average age was approximately 39 years (SD = 13.2), and more than three quarters of participants were married. Slightly more than half (53%) of participants reported having been vaccinated for hepatitis B, and fewer than 10% were diagnosed with chronic hepatitis B. Slightly more than half (53%) reported seeking preventative care.

Regarding health beliefs, the participants reported relatively high perceived benefits (M = 4.02, SD = .59). Both perceived susceptibility (M = 2.84, SD = 1.07) and perceived barriers (M = 2.35, SD = .77) were lower. The average, in response to, “My life would change if I had hepatitis B” was .76 (SD = .43) and to, “People infected with hepatitis B will die from liver cancer” was .58 (SD = .50). Over a third (37%) reported having a family member diagnosed with hepatitis B. Very few participants had ever attended a hepatitis B education workshop before, and 36% had had a doctor or other health provider recommend being tested for hepatitis B.

Bivariate Logistic Regression

Of the 10 demographic characteristics measured, in single predictor logistic regression models, three were significantly related to having been screened for hepatitis B (see Table 2). Those who had attended college were 2.31 times more likely to have been screened than those who had not attended college. Those who had insurance were 5 times more likely to have been screened than those who did not have insurance, and for each positive point difference in English proficiency, participants were 1.87 times more likely to have been screened.

The relationships between healthcare practices, susceptibility, benefits, barriers, cues to action, and hepatitis B screening are presented in Table 3. There were 3 significant predictors of hepatitis B screening at $p < .10$, for each positive point difference in susceptibility, participants

were 1.16 times more likely to have been screened. Conversely, for each positive point difference in barriers, participants were only .86 times as likely to have been screened. By far, the largest predictor of having been screened was one of the cues to action, "Has a doctor or other healthcare provider ever told you that you should be tested for hepatitis B?" Participants having received such a recommendation were 12.6 times more likely to have been screened than those who had not received such a recommendation.

Logistic Regression Models

There were 3 logistic regression models with multiple predictors fit to the data that are presented in Table 4. In Model 1, when examined simultaneously with other demographic characteristics, English proficiency was no longer a significant predictor. In Model 2, susceptibility was no longer a significant predictor of screening. In Model 3, which explains 37% of the variance, there were three significant predictors of having been screened for hepatitis B. The strongest predictor was having received a recommendation by a doctor or healthcare provider. Those who had received such were 14.5 times more likely to have been screened than those who had not received a recommendation. The other two significant predictors were education and insurance.

Discussion

This study examined hepatitis B screening behavior among the Hmong in Oregon, a state with a small to moderate-sized, but growing Hmong population. Our study contributes to the body of literature that suggests the prevalence of hepatitis B infection in Hmong is similar to that of Asian Americans as a whole at approximately 10%, which is higher than that of the general U.S. population (< 5%) [10, 26]. In general, our findings point to the need for further research to understand the factors that contribute to low screening rates among the Hmong.

In our multivariate model, having a doctor's recommendation was the strongest predictor of having been screened. This finding aligns with other research suggesting that Asian Americans highly regard providers' opinions and recommendations in terms of health care. Several studies, including those with the Hmong [7] and other Asian ethnic groups [27-29] have reported similar findings. This predictor is not unique to hepatitis B screening, having a doctor's recommendation is an important and significant predictor of other preventive screenings such as breast [30-33], cervical [34-37], and colorectal [38, 39] cancer screenings. This finding affirms the important role providers play in promoting preventive screenings among Asians, specifically the Hmong population. Hepatitis B screening is not a usual preventive procedure the Hmong may ask their providers about, and providers may not recommend it to them, resulting in missed opportunities to offer hepatitis B testing and to vaccinate those who are susceptible. In addition, Hmong may not be recognized as a high risk group for hepatitis B infection, further creating barriers in access to hepatitis B screening and vaccination. Further research from both the patient and provider perspectives may identify barriers to communication about hepatitis B and inform efforts to increase awareness and improve screening and vaccination rates.

In this study, both education and having health insurance were significant predictors of hepatitis B screening. These results are consistent with findings in other Asian American populations [23, 27, 28]. Research shows that educational attainment is positively linked to several factors that affect health, both directly and indirectly, such as having a higher income and, in turn, having health insurance, and greater use of preventive services [41, 42]. In contrast, lower education is associated with lower hepatitis B knowledge and hepatitis B screening [23]. The lack of awareness about hepatitis B infection, transmission, and preventive measures are important issues to address in the Hmong community. Studies have shown that for the Hmong,

lack of awareness leads to low vaccination rates [16]. Future interventions should focus on raising awareness about hepatitis B infection and promote screening and vaccination uptake.

The generalizability of our study is limited. We interviewed a small purposive sample limited to Hmong in Oregon. Further, we relied on participants' self-reported screening and vaccination behavior. Participants may not have clearly recollected whether they did or did not obtain hepatitis B screening when asked if they had ever been tested for hepatitis B, or they may have confused it with another screening or vaccination such as that for hepatitis A. Additionally, there could be a possibility of response bias as participants who were interested in the topic may have been more likely to participate in the study. Other limitations are the sample size and the variables that could be included. Because we added this quantitative investigation on a larger, qualitative project, we were limited by the parent study's design. Studies with larger samples could include more potential covariates in the analyses and would have greater power to detect effects. Although we included in our model several covariates identified in the literature, other unmeasured variables may be associated with hepatitis B screening and, if included in the analyses, could have increased the percentage of variance. Both sample size and additional data would address our concern regarding the lack of precision of some of the estimates (Confidence Intervals of 38.95, 20.81). Another limitation is missing data from our language variables, specifically for the question about "understanding" English and Hmong. This question was missed by one of our interviewers, but the situation was resolved quickly to mitigate further missing data. Given the limited research on this topic, however, our findings provide direction for future research. This study also had considerable strengths. We worked closely with an advisory committee comprised of Hmong community members who are leaders and well trusted in the local Hmong community [43]. Having a community advisory committee to provide input

and guidance is invaluable and adds credibility to the study in the community. Additionally, working with bilingual and bicultural interviewers on this project helped to reduce barriers accessing members of this community [43].

Hepatitis B infection is largely preventable, but it remains a disease burden for many Asian immigrant populations in the U.S. It continues to go under-recognized and under diagnosed [3]. Increasing awareness about hepatitis B prevention and decreasing the morbidity and mortality from chronic hepatitis B infection can be achieved by having more health care providers recommend screening and vaccination.

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Acknowledgements

The authors would like to thank the Oregon's Hmong community for sharing its knowledge and experiences with us. We also thank Dr. Ann Zukoski, Dr. Donna Champeau, Dr. Sunil Khanna, and Dr. Mike Pavol for their guidance on the research reported in this paper. The parent study described was supported by Award Number R21CA139147 from the National Cancer Institute at the National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Cancer Institute or the National Institutes of Health.

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Table 1. Participant characteristics.

Characteristic	Total n (%) or M (SD)
Women	44 (53.0)
Mean age (years)	38.8 (13.2)
Education	
Never attended – HS graduate/GED	41 (49.4)
Some college or more	42 (50.6)
Married	68 (81.9)
Foreign-born	51(61.4)
Number of children < 18 years	
No children	26 (36.6)
Have children	45 (63.4)
Number of children ≥ 18 years	
No children	39 (54.9)
Have children	32 (45.1)
Health insurance	69 (83.1)
English proficiency	
Understand pretty well – very well (<i>n</i> = 72)	58 (80.6)
Speak pretty well – very well (<i>n</i> = 81)	63 (77.7)
Read pretty well – very well	60 (72.2)
Write pretty well – very well	58 (69.9)
Hmong proficiency	
Understand pretty well – very well (<i>n</i> = 71)	69 (97.2)
Speak pretty well – very well (<i>n</i> = 82)	64 (78.0)
Read pretty well – very well	41 (49.4)
Write pretty well – very well	33 (39.8)
Seek preventive care	44 (53)
Ever heard of hepatitis B	90 (96.4)

Screened for hepatitis B	44 (53.0)
Vaccinated for hepatitis B	42 (50.6)
Have hepatitis B	7 (8.4)
Health Belief Model	
Perceived benefits	4.02 (.59)
Perceived susceptibility	2.84 (1.07)
Perceived barriers	2.35 (.77)
Perceived severity	
My life would change if I had hepatitis B	.76 (.43)
People infected with hepatitis B will die from liver cancer	.58 (.50)
Cues to action	
Do you have a family member who has hepatitis B?	31 (37.3)
Have you attended a hepatitis B education workshop in the past?	8 (9.6)
Has a doctor or other health care provide ever told you that you should be tested for hepatitis B?	30 (36.1)

Table 2. Bivariate logistic regression examining the relationships among demographic characteristics and hepatitis B screening.

Characteristic	Screened for hepatitis B (<i>n</i> = 71)		
	β	<i>SE</i>	<i>OR</i> (95% <i>CI</i>)
Sex			
Male			Referent
Female	-.47	.49	.63 (.24, 1.65)
Age in years			
18-39			Referent
40 and over	-.29	.49	.75 (.28, 1.96)
Education			
Never attended – HS graduate/GED			Referent
Some college or more	.84	.50	2.31 (.87, 6.15)*
Marital status			
Not married			Referent
Married	-.12	.62	.88 (.26, 2.98)
Place of birth			
Foreign-born			Referent
U.S.-born	.16	.50	1.18 (.44, 3.15)
Number of children < 18 years			
No children			Referent
Have children	.45	.56	1.56 (.52, 4.70) ^a
Number of children ≥ 18 years			
No children			Referent
Have children	-.06	.53	.95 (.34, 2.67) ^a
Health insurance status			
No insurance			Referent
Have insurance	1.61	.67	5.00 (1.36, 18.39)**
English proficiency	.63	.29	1.87 (1.06, 3.32)*
Hmong proficiency	-.09	.37	.92 (.44, 1.90)

Note: **p* < .10, ***p* < .05; ^a *n* = 60 due to missing data; ^b *n* = 58 due to missing data.

Table 3. Bivariate logistic regression examining the relationships between health care practices, susceptibility, severity, benefits, barriers, cues to action and hepatitis B screening.

Characteristic	Screened for hepatitis B (<i>n</i> = 71)		
	β	<i>SE</i>	<i>OR</i> (95% <i>CI</i>)
Primary health care provider			Referent
No provider			Referent
Have provider	.59	.50	1.80 (.67, 4.78)
Preventive care			Referent
Does not seek preventive care			Referent
Does seek preventive care	.90	.50	2.46 (.92, 6.58)*
Susceptibility	.15	.075	1.16 (1.01, 1.34)*
Severity			
My life would change if I had hepatitis B	1.06	.58	2.89 (.93, 9.02)
People infected with hepatitis B will die from liver cancer	.38	.47	1.46 (.58, 3.66)
Barriers	-.16	.08	.86 (.73, .99)*
Benefits	-.04	.07	.96 (.84, 1.10)
Cue to Action			
Has a doctor or other health care provider ever told you that you should be tested for hepatitis B?	2.54	.61	12.6 (3.82, 41.81)**
Do you have a family member who has hepatitis B?	-.09	.45	.92 (.37, 2.22)
Have you attended a hepatitis B education workshop in the past?	1.07	.85	2.92 (.55, 15.41)

Note: **p* < .10, ***p* < .001

Table 4. Fitted logistic regression models predicting Hepatitis B screening.

	Model 1					Model 2				Model 3					
	Std B	SE	OR	95% CI	p-value	Std B	SE	OR	95%CI	p-value	Std B	SE	OR	95%CI	p-value
Education	1.02	.55	2.78	1.01-8.16	p<.05						1.43	.69	4.20	1.69-16.48	p<.05
Insurance	1.68	.69	5.36	1.38-20.81	p<.05						1.93	.88	6.89	1.22-38.95	p<.05
English Proficiency	.065	.07	1.07	.93-1.23	ns						-.02	.09	.99	.83-1.17	ns
Susceptibility						.219	.278	1.24	.72-2.15	ns	.33	.31	.29	1.39-.76	ns
Barriers						-.817	.372	.44	.213-.915	p<.05	-.45	.43	.64	.27-1.47	ns
Doctor Recommendation						2.39	.649	10.96	3.07-39.1	p<.001	2.67	.72	14.46	3.56-58.79	p<.001
Cox and Snell R ²			.13					.30					.37		