

Debunking the myth: low knowledge levels of HBV infection among Asian American college students

Min-Jin Kim¹, Haeok Lee¹, Peter Kiang², Paul Watanabe³, Maria I. Torres⁴, Patricia Halon¹, Ling Shi¹, Daniel R. Church⁵

¹College of Nursing and Health Sciences, ²College of Education, the Asian American Studies Program, ³Department of Political Science, the Institute for Asian American Studies, ⁴Gaston Institute for Latino Community Development and Public Policy, University of Massachusetts Boston, MA, USA, ⁵Bureau of Infectious Disease, Massachusetts Department of Public Health, Jamaica Plain, MA, USA

Corresponding author: Haeok Lee
E-Mail: haeok.lee@umb.edu

Received: November 15, 2014, Accepted: December 25, 2014

ABSTRACT

Objective: To examine the hepatitis B virus (HBV)-related knowledge among Asian American college students and to determine whether there are significant differences in the level of HBV knowledge among Asian American subgroups. **Methods:** A cross-sectional survey was self-administered to assess a sample of 258 Asian American students' knowledge about HBV at the campus of the research site. **Results:** Knowledge regarding transmission and consequences of HBV infection was poor. Of a possible knowledge score of 14, the median number of correct answers was eight. There were no significant differences

between the subgroups of Asian American college students in total knowledge of HBV infection. **Conclusion:** The findings of this study point to the fact that the lack of knowledge and awareness is not limited to community settings only but also includes higher education environment. This finding brings to the forefront the importance of HBV education for Asian American college students.

Key words: Asian American subgroups, college student, HBV, knowledge, liver cancer

Introduction

Hepatitis B virus (HBV) is a serious national and worldwide health problem. The World Health Organization has estimated that more than two billion people have been infected with HBV and, if chronically HBV infected individuals are left untreated, 500,000-700,000 people will die from liver cancer or liver failure worldwide.^[1] In the US, up to two million people are estimated to have

chronic HBV infection.^[2-4] Of those, nearly 50% of chronic HBV infections occur in Asian American Pacific Islanders (AAPIs) despite the fact that AAPIs comprise less than 5% of the US population.^[5]

HBV is a blood borne and sexually transmitted virus, with time and transmission routes being varied between individuals in low HBV endemic countries and high endemic countries.^[1-4,6-8] As for low endemic regions such as North America and Europe, the majority of HBV infections occur among adults through sexual (i.e., unprotected sex) or percutaneous transmission (i.e., intravenous [IV] drug use). Whereas in the high endemic regions of Asia and Sub-Sahara Africa, the main routes of transmissions of HBV are perinatal (i.e., during childbirth) or through close household contact (i.e., sharing razors and toothbrushes).^[7,8]

Access this article online

Quick Response Code:



Website: www.apjon.org

DOI:
10.4103/2347-5625.152399

People chronically infected with HBV not only have the potential for developing cirrhosis and liver cancer but are also potential sources for infecting others.^[1,2,7,8] However, chronic HBV infection usually does not produce symptoms and people feel healthy even in the early stages of liver cancer^[7-9] so that the disease can progress without patients' knowledge. Thus, HBV infection is called a *silent killer*.^[10] Furthermore, many cases of HBV-related liver cancer are not detected until late stages, leading to a low (5%) 5-year survival rate after diagnosis.^[2,11] The HBV vaccine has been used to protect against HBV infection in the US since 1982. The Centers for Disease Control and Prevention (CDC) has reported that the incidence of acute HBV infection declined from 10.7 cases per 100,000 population in 1987 to 2.1 in 2004, an 80% decrease.^[7] This reduction is due largely to universal vaccination programs for children and the implementation of standard/universal precautions in health care. However, studies indicate that many AAPI children and young adults have missed the opportunity to participate in vaccination programs.^[12-16]

Although the prevalence of HBV is high among AAPIs, many AAPIs are unaware of their infection status, most likely due to a lack of knowledge and misconception about HBV transmission and due to not having been screened for HBV.^[1,2,17] Moreover, despite the fact that AAPI young adults are at high risk for HBV and have a need for HBV education, there are limited studies available to inform the development of AAPI college student-tailored education on the prevention of HBV infection and vaccination.

Sociodemographics and acculturation such as language, income, education and length of stay in the US are factors known to be related to knowledge of HBV infection and vaccination.^[17-23] Of the studies that have been conducted, most have focused on AAPI adults in community settings with only a few studies focused on AAPI college students. Moreover, those AAPI-focused studies only reached Asian Americans, not Pacific Islanders, and also did not report on ethnic sub-groups. Currently, there is no published information on knowledge and attitudes among disaggregated sub-groups of Asian American college students. In addition, AAPI issues and research continue to be heavily centered on California and New York. Therefore, this study focuses on AAPI young adults at risk of HBV by examining their knowledge regarding HBV infection and whether there were significant differences in HBV knowledge among AAPI college students in the North East.

In summary, the increasing number of immigrants to the US from HBV endemic countries has contributed to an increase in the prevalence of chronic HBV,^[2-4] despite the decreased

incidence of acute HBV infection brought about by successful immunization programs for children and certain adult groups.^[8] In particular, there is a high prevalence of chronic HBV infection in urban areas where immigrants tend to live in larger numbers. The most effective prevention of HBV infection is through education of both infected and uninfected high-risk groups to prevent further transmission of viruses.^[1-3] However, given that there are no AAPI college student-specific data on knowledge about HBV infection, the aim of this study is to assess the knowledge of HBV among a targeted population of Asian American students within an urban university context.

Materials and methods

Study design

A cross-sectional survey was self-administered to assess Asian American students' knowledge about HBV. The sample of 258 consisted of students older than 18 years and able to speak and read English, who were recruited at the campus of the research site. The reports of this article are drawn from a larger HBV prevention project approved by the institutional review board of that university in the northeastern US in 2010 and the original study design and sampling method were reported in detail elsewhere,^[24,25] and only reports on health survey findings are reported here.

This campus-based participatory research (CBPR) for Asian American college students was conducted in partnership with five Asian American Student Associations (Pan Asian, Chinese, Khmer, Korean and Vietnamese) to address the Institute of Medicine (IOM) recommendation.^[2] No Pacific Islander students participated in the study; therefore, we do not use the AAPI umbrella term to describe the sample. As an urban, public and entirely commuter university where student profiles reflect those of local community demographics, our CBPR design is closely informed by and related to the practice of community-based participatory research.

Measurement

The health survey questionnaires included sections on sociodemographic characteristics and knowledge of HBV transmission and consequences (sequel) of HBV infection. The items for knowledge of HBV were drawn from a literature review of Asian American targeted studies^[17,22,23,26,27] and then reviewed by key investigators who are experts in HBV prevention among Asian Americans to ensure not only content validity of the tool but also cultural and linguistic sensitivity to Asian American colleges. A brief 14-item scale measuring knowledge of HBV infection consisting of two sub-scales to evaluate knowledge of

transmission of HBV (nine items) and sequel of HBV infection (five items), with three responses of correct answer (yes), incorrect answer (no) and don't know/not sure (DK), was developed. Also, one item asking "whether people can get liver cancer" was added because this misunderstanding was often reported from studies with Asian Americans.

The HBV knowledge instrument was pre-tested with seven Asian American college students who took an Asian American Culture and Health Practice course at the University in 2010. Feedback from the pre-test resulted in improvement to its clarity. The students were asked to think aloud while formulating the answer to each question and then were asked follow-up questions to probe further how the students understood the question. Feedback from this pre-test resulted in consolidating items and improving the instrument's clarity. Following the pre-test, the survey was self-administered by pencil and paper to 258 Asian American college students after obtaining their signature on the informed consent form at the campus of the research site. The survey has shown high internal consistency in both subscales of transmission and sequel with Cronbach's alfa as 0.94 and 0.87, respectively.

Statistical analysis

Descriptive statistics were computed with means and standard deviations calculated for continuous variables and percentages for categorical variables. Chi-square tests and Fisher's exact tests were used when appropriate to test

differences in the demographic characteristics and each HBV question from the 14-item scale among ethnic subgroups. An overall knowledge score was calculated as the sum of correct answers to the 14-item scale. One point was given for each correct response to each question and no point was given for either an incorrect answer or an uncertain (do not know/not sure) answer. Missing responses were excluded because they were considered to be uninformative. A sum of subscales of transmission (nine items) and sequel (five items) for knowledge of HBV infection was computed and the ANOVA test was then used to examine group differences among Asian American students. We grouped HBV knowledge levels into two categories as knowledgeable and less knowledgeable based on total correct answers: Students who correctly answered more than 10 questions out of 14 questions were categorized as a knowledgeable group and students who provided less than 10 correct answers were categorized as a less knowledgeable group. Binary logistic regression was used to evaluate whether HBV knowledge was significantly associated with age, nativity, sex and ethnicity. Odds ratios (ORs) and 95% confidence intervals (CIs) were obtained. All analyses were performed using SPSS Statistics software version 19 (IBM, Armonk, NY, USA).

Results

Sociodemographic

Two hundred fifty-eight college students participated in this health survey. Table 1 presents the sociodemographic

Table 1: Sociodemographic characteristics of the AAPI college students by ethnicity (n = 258)

Variable	Cambodian (n = 21)	Chinese (n = 87)	Korean (n = 23)	Vietnamese (n = 68)	Others (n = 59)	Total (n = 258)
	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %
Age (range: 18-42)*	23.4±6.1	23.0±4.0	26.5±6.6	22.9±4.3	23.9±5.1	23.5±4.7
Sex						
Female	61.9	49.4	56.5	41.2	47.5	48.4
Male	38.1	50.6	43.5	58.8	52.5	51.6
Nativity*						
US	73.7	27.6	13.0	38.1	37.5	35.0
Foreign-born	26.3	72.4	87.0	61.9	62.5	65.0
Percent of life in the US**						
<50%	5.6	54.8	85.0	36.8	34.7	44.2
≥50%	94.4	45.2	15.0	63.2	65.3	55.8
Marital status						
Never-married	71.4	80.2	78.3	82.1	77.6	79.2
Married	14.3	9.3	21.7	7.5	13.8	11.4
Others	14.3	10.5	0.0	10.4	8.6	9.4
Monthly household income						
Less than \$5,000	57.1	54.0	43.5	52.9	45.8	51.2
Over \$5000	19.0	11.5	26.1	13.2	30.5	18.2
Don't know/not sure	23.8	34.5	30.4	33.8	23.7	30.6

Data are percentages except age. HBV = hepatitis B virus. Other includes Filipinos, Asian Indians and two or more race/ethnicities. *Chi-square significant at $P < 0.05$, **Chi-square significant at $P < 0.001$ two tailed

characteristics of the participants. Ethnicities of the 258 participants included 87 (33.7%) Chinese, 68 (26.4%) Vietnamese, 23 (8.9%) Korean, 21 (8.1%) Cambodian and 59 (22.9%) other Asian Americans, including Filipinos, Asian Indians and two or more race/ethnicities; there were no Pacific Islanders. Over half (51.6%) were male, and the mean age of the students was 24 years (range 18-42 years). The majority was foreign-born (65.0%), and 55.8% had lived in the US for more than half of their life. Significant differences in birth country and residence in the US were found among ethnic groups: 73.7% of Cambodian students were born in the US while only 13.0% of Koreans reported

a US birth ($P < 0.05$); 94.4% of Cambodian students spent more than half of their life in the US compared with 15.0% of Koreans ($P < 0.001$). The majority (79.2%) of students were never married.

Knowledge of HBV

There were substantial gaps and varying levels of knowledge of HBV transmission among Asian American college students. Tables 2 and 3 summarize the findings of knowledge of HBV transmission and sequel among racial/ethnic sub-groups. Table 4 presents binary logistic regression of HBV knowledge score.

Table 2: Subscale of knowledge for HBV transmission by race/ethnicity ($n = 258$)

HBV transmission (9 questions)	Cambodian ($n = 21$)	Chinese ($n = 87$)	Korean ($n = 23$)	Vietnamese ($n = 68$)	Others ($n = 59$)	Total ($n = 258$)
	Mean \pm SD, %	Mean \pm SD, %	Mean \pm SD, %	Mean \pm SD, %	Mean \pm SD, %	Mean \pm SD, %
HBV Transmission score (range: 0-9)	4.3 \pm 2.7	4.5 \pm 2.7	4.0 \pm 2.8	4.8 \pm 2.7	4.6 \pm 2.8	4.5 \pm 2.7
Get HBV as heredity						
Yes	47.6	52.9	43.5	39.7	28.1	42.6
No	23.8	14.9	13.0	22.1	35.1	21.9
Don't know/not sure	28.6	32.2	43.5	38.2	36.8	35.5
Get HBV via sex						
Yes	52.4	54.0	47.8	61.2	60.3	56.6
No	24.3	17.2	21.7	10.4	12.1	14.5
Don't know/not sure	33.3	28.7	30.4	28.4	27.6	28.9
Get HBV via sharing food tools						
Yes	38.1	27.9	26.1	27.9	14.3	25.6
No	19.0	45.3	30.4	36.8	44.6	39.4
Don't know/not sure	42.9	26.7	43.5	35.3	41.1	35.0
Hepatitis B is infectious						
Yes	71.4	48.3	56.5	64.2	61.0	58.0
No	9.5	17.2	17.4	14.9	13.6	15.2
Don't know/not sure	19	34.5	26.1	20.9	25.4	26.8
People get Hepatitis B through the air						
Yes	19.0	14.0	8.7	14.7	8.8	12.9
No	42.9	51.7	52.2	58.8	63.2	55.7
Don't know/not sure	38.1	33.7	39.1	26.5	28.1	31.4
People get Hepatitis B through child birth						
Yes	42.9	56.3	39.1	53.7	44.8	50.4
No	14.3	16.1	21.7	13.4	12.1	14.8
Don't know/not sure	42.9	27.6	39.1	32.8	43.1	34.8
People get Hepatitis B by sharing toothbrushes						
Yes	42.9	42.5	26.1	35.8	23.2	35.0
No	14.3	24.1	26.1	28.4	35.7	27.2
Don't know/not sure	42.9	33.3	47.8	35.8	41.1	37.8
People get Hepatitis B by shaking hands						
Yes	4.8	3.4	4.3	3.0	0.0	2.8
No	61.9	70.1	65.2	68.7	71.4	68.9
Don't know/not sure	33.3	26.4	30.4	28.4	28.6	28.3
People get Hepatitis B by sharing needles for injections or tattoos						
Yes	76.2	65.5	65.2	77.9	71.4	71.2
No	4.8	10.3	8.7	1.5	5.2	6.2
Don't know/not sure	19.0	24.1	26.1	20.6	22.4	22.6

Internal consistency of the HBV transmission questions ($n = 9$) was 0.93 (Cronbach's alpha). HBV = hepatitis B virus.

Table 3: Subscales of knowledge for sequel and general aspect of HBV infection by race/ethnicity (n = 258)

HBV sequel (5 questions)	Cambodian (n = 21)	Chinese (n = 87)	Korean (n = 23)	Vietnamese (n = 68)	Others (n = 59)	Total (n = 258)
	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %	Mean ± SD, %
Hepatitis B sequel (range: 0-5)	2.4±1.7	2.7±1.8	2.4±1.9	2.5±1.8	2.6±1.7	2.6±1.8
Most people infected with Hepatitis B can be recognized easily by their appearance?						
Yes	4.8	11.5	13.0	8.8	5.1	8.9
No	76.2	59.8	47.8	63.2	71.2	63.6
Don't know/not sure	19.0	28.7	39.1	27.9	23.7	27.5
Hepatitis B causes liver cancer in the long run?						
Yes	57.1	61.6	47.8	57.4	52.5	56.8
No	0.0	3.5	8.7	5.9	8.5	5.4
Don't know/not sure	42.9	34.9	43.5	36.8	39.0	37.7
Hepatitis B causes liver cirrhosis in the long run?						
Yes	45.0	46.0	47.8	48.5	50.0	47.7
No	0.0	8.0	4.3	8.8	3.4	6.3
Don't know/not sure	55.0	46.0	47.8	42.6	46.6	46.1
Hepatitis B carriers can drink as much alcohol as non-carriers?						
Yes	15.0	9.2	17.4	11.8	10.5	11.4
No	35.0	50.6	47.8	44.1	40.4	45.1
Don't know/not sure	50.0	40.2	34.8	44.1	49.1	43.5
Hepatitis B carriers can smoke as much as non-carriers?						
Yes	19.0	9.2	13.0	14.7	8.5	11.6
No	33.3	56.3	52.2	35.3	45.8	46.1
Don't know/not sure	47.6	34.5	34.8	50.0	45.8	42.2
General aspects Do you think that: Get liver cancer because of stress*						
Yes	14.3	28.7	56.5	17.9	8.5	22.6
No	33.3	26.4	13.0	26.9	37.3	28.4
Don't know/ not sure	52.4	44.8	30.4	55.2	54.2	49.0

The internal consistency of the HBV sequel questions (n = 5) was 0.87 (Cronbach's alpha). HBV = hepatitis B virus, *Chi-square significant at $P < 0.05$

In general, knowledge regarding transmission and consequences of HBV infection was poor. Of a possible knowledge score of 14, the median number of correct answers was eight; only two individuals provided all correct answers. Only 22% of respondents thought that HBV was not hereditary and half of them knew that HBV could be acquired through child birth or through sexual contact, while 27-38% responded as “not sure or do not know (DK).” Thirteen percent to 26% had misconceptions that HBV could be transmitted through the air or by sharing utensils, while more than half incorrectly thought that people with HBV infection could be easily recognized by their appearance. More than half of them knew that HBV causes liver cancer (57%) and liver cirrhosis (48%). Eleven percent of the participants thought that the persons with hepatitis B infection could drink alcohol beverages or smoke as much as those without HBV infection, while 44% responded as DK.

There were no significant differences within sub-groups in both transmission-and sequel-related knowledge of HBV as

well as in individual items. Korean participants were more likely to believe that HBV was hereditary but not transmitted by sharing toothbrushes than other groups. There was a statistically significant association between HBV knowledge score and sex ($P < 0.05$). Female students were twice more knowledgeable than male students (OR = 2.0, 95% CI). There was also a statistically significant association between HBV knowledge score and age ($P < 0.05$). Older students were more knowledgeable than younger students (OR = 1.1, 95%CI), after adjusting for other covariates. Regarding stress and liver cancer, 22.6% of participants responded that stress caused liver cancer. There was a significant difference between ethnicity groups ($P < 0.05$), as only 14% Cambodians thought that stress caused liver cancer while 57% of Koreans believed that stress causes liver cancer.

Discussion

The most concerning finding of this study is that Asian American students' knowledge about transmission routes of HBV is low. Only 22% correctly believed that HBV was

Table 4: Binary logistic regression of HBV knowledge score (n = 258)

Variables	Raw Odds ratio	95% CI	Adjusted Odds ratio	95% CI
Age*	1.1	1.02, 1.15	1.1	1.04, 1.23
Sex*				
Male	1.0	—	1.0	—
Female	1.6	0.96, 2.73	2.3	1.23, 4.34
Nativity				
Foreign born	1.0	0.64, 1.96	1.0	—
US born	1.2	0.90, 1.15	1.5	0.63, 3.50
Ethnicity				
Chinese	1.0	—	1.0	—
Cambodian	1.0	0.36, 2.75	0.5	0.13, 1.61
Korean	0.8	0.32, 2.36	0.6	0.17, 1.85
Vietnamese	0.4	0.36, 1.45	0.8	0.40, 2.12
Others	1.4	0.70, 2.72	1.3	0.57, 3.15
Percent of life in the US				
<50%	1.0	—	1.0	—
≥50%	1.2	0.67, 2.11	1.3	0.57, 3.15
Marital status				
Never-married	1.0	—	1.0	—
Married	1.8	0.80, 3.86	0.5	0.14, 1.71
Others	0.9	0.35, 2.24	0.6	0.17, 2.10
Monthly household income				
Less than \$5,000	1.0	—	1.0	—
Over \$5000	1.3	0.66, 2.60	1.0	0.41, 2.20
Don't know/not sure	0.7	0.38, 1.30	0.6	0.28, 1.28

HBV = hepatitis B virus. CI = confidence interval, *P < 0.05

not hereditary while 35% responded as “do not know.” Six of 10 (61.2%) students thought that HBV was transmitted by sharing food utensils, while only one-third (34.5%) knew that HBV was transmitted by sharing toothbrushes and slightly more than half knew that HBV was transmitted by unprotected sex and during childbirth. Such findings that the numbers of Asian American college students were not aware that HBV can be transmitted through sexual contact as well as during childbirth are disappointing because, as a group, they are not only at high risk due to the higher prevalence of HBV infection among AAPIs but they are also at a sexually active as well as reproductive age. Although this study did not ask about their sexual activities or the use of contraception, the CDC^[28] found that 79.5% of college students are sexually active and that only 52.6% of college students reported that they had used a method of contraception the last time they had vaginal intercourse.^[29]

Preventing HBV infection from mother-to-child in women of reproductive age by early identification of HBV-exposed pregnancy is very important. One of the overarching goals of the action plan for the prevention, care and treatment of viral hepatitis is to eliminate mother-to-child transmission of HBV.^[30] Our data indicated that, overall, female college students had greater knowledge than male students;

however, as for mother-to-child transmission, only 50% of the students provided a correct answer, but there was no difference between male and female students (male: 49% vs. female: 51%). This finding suggests that further efforts should be made in educating AA college students, especially female students in reproductive age, about mother-to-child transmission of HBV infection and its prevention by the neonatal immunization program.

The low levels of knowledge about HBV infection among college students are consistent with previous studies conducted with community dwelling adults including Cambodian, Chinese, Korean and Vietnamese in community settings.^[17-23,26] Knowledge about transmission routes of HBV was especially low, with only 13% of Korean college students correctly answering that HBV is not genetic — A finding that is significantly lower than the 44%-52% found in Lee and colleagues' study.^[17] Lee and others concluded that familial clustering of HBV infection may have been perceived as genetic factors or as an inheritance pattern in families in this ethnic group.^[16] Interestingly, Korean students commonly thought that stress was a major cause of liver cancer compared with other groups; however, there is no research to confirm that stress alone causes liver cancer. Detecting an overall low level of knowledge about HBV infection among Asian Americans in a higher educational setting was a surprising, but also disturbing finding.

The low levels of knowledge about HBV infection are consistent with a similar study conducted with Vietnamese college students in Texas.^[24] However, the findings of low knowledge levels are disappointing as the participants in our study are university-level students and fluent in English. In other studies, lower levels of knowledge about HBV infection among Asian American immigrant populations have been found to be impacted by low education as well as poor English language proficiency and ineffective communication with health care providers and health care educators.^[2,7,17-23,26] Compared with immigrant adults in community settings, college students without language barriers were assumed to have increased access to medicine, information and knowledge. However, we found that higher education and English proficiency were not predictors of HBV knowledge.

As for misunderstanding HBV as hereditary, the clustering of HBV infection within close family members among Asians^[2,8,31] might be a cause of this mistaken view of HBV as being genetic, and that is why a family feels stigmatized by having an HBV family member.^[32-34] Despite the heterogeneity of AA culture, most AA cultures have in common several

cultural values: Interdependence, collectivism, family centeredness.^[35-37] Given the collectivist nature of AA culture, having HBV is a reflection on the family rather than the individual and families with HBV infection might perceive or encounter public stigma. Misunderstanding of transmission through casual contact means individuals suspected of being infected have avoided sharing a meal.^[33,34] In the same vein, the infected individuals with inadequate knowledge can lead to self-isolation, which may be associated with delays in seeking health care. Especially, not being allowed to share meals in AA communities is a very serious social pressure since sharing food is seen as public acknowledgement of being related that is an important bond-strengthening social interaction in Asian culture.^[33,35,38] Because of misunderstandings about the transmission routes of HBV and the stigma of HBV infection, individuals sometimes prefer to remain unaware of their disease condition, which increases opportunities for transmitting the virus and missing the chance to be treated.^[39,40] An important issue to be considered is the question of whether or not the patient and family experiences an unnecessary degree of stigma because of misunderstanding about the nature of transmission of the virus and a lack of knowledge of recent discoveries of available treatment, and it is worth exploring in future investigation.

Given the fact that there are misperceptions about the modes of transmission and relatively low levels of awareness of HBV rather than being linked to concepts of moral deficit in the ways that have characterized human immunodeficiency virus-related stigma among the AA college students, improving the quality of HB education among AA college students is essential for successful efforts to reduce hepatitis B-related stigma. One example case is the San Francisco Hep B Free (SFHBF) campaign.^[41] The SFHBF campaign created increasing awareness and education about the importance of screening and vaccination among AAPIs. The evaluations found that a partnership approach was successful in increasing awareness about HBV and in changing community views of hepatitis B by successfully de-stigmatizing and de-personalizing hepatitis B.^[41] As for college students, a similar program utilizing a partnership approach with the students, student associations, health providers, faculty and stakeholders at the university to reduce HB-related stigma and increase awareness of HBV prevention is worth replicating in campus-based settings.

There are several possible interpretations for the low knowledge levels among English-proficient college students. First, Asian Americans exhibit a high prevalence of HBV compared with the general population in the US.^[2-4] However, HBV is not treated as a national health

priority.^[42-44] Consequently, there is little funding or other support for a public health response including education and services among Asian American populations. Moreover, there is limited to no mainstream media coverage about HBV infection specifically tailored toward Asian Americans, except in areas of California. Second, formal HBV education has not been integrated at the school and Asian American community levels. According to the report from the Immunization Action Coalition, for example, only 14 states mandate or require HBV vaccination for students entering colleges or universities and only eight states mandate HBV education.^[45]

We included “do not know/not sure (DK)” as a choice that might limit the propensity for participants to guess their answers and, therefore, increase the accuracy of responses. Hence, the knowledge level of our study participants might be lower than other studies in which the DK category was not included.

We found significant sex difference favoring women’s HBV knowledge levels. Studies reported that Asian American with higher knowledge were more likely to have received HBV vaccination or blood screening.^[26-27,46] Thus, differences in knowledge between male and female Asian Americans may reflect different health behaviors and histories among college students. Asian American male students with lower HBV knowledge are a particular concern because, according to the IOM, the risk of HBV infection and complications of chronic HBV are higher and more common in men.^[2] The finding of sex difference in HBV knowledge is an important factor that should be taken into consideration when educational interventions are designed to increase HBV knowledge among Asian American college students.

HBV education programs targeting Asian Americans are needed with emphasis on reaching students prior to and during college in order to increase the knowledge and awareness of HBV infection and the importance of HBV screening and vaccination. However, any successful prevention or health intervention program for HBV infection should incorporate into its development an understanding of what knowledge the targeted young adults do have. Faculty and staff as well as student organizations, in partnership with university health care providers, can play an important role in Asian American student outreach and education regarding the importance of HBV screening and vaccination.

Limitations

There are several limitations in this study. First, the survey was conducted at one university, which may limit

generalizability to other schools or districts. Second, we used convenience sampling; therefore, the subjects might not represent all AAPI college students. Third, the sample size of some ethnicity groups was small. This may have decreased the statistical power to detect the difference. At the same time, the non-residential commuter profile of the university's overall student body reflects the demographics of the region's urban center, and the profile of students in the study is similar to the profile of ethnic subgroups among local Asian American communities.^[47] Moreover, of the 258 participants, 65% were foreign born, which is also consistent with the percentage of foreign-born Asian Americans nationally (66.5%), according to the 2010 US census.^[48]

Conclusion

A knowledge deficit is one of the most important challenges to decreasing HBV transmission.^[1] The findings of this study point to the fact that the lack of knowledge and awareness is not limited to community settings only but also includes higher education environments. This finding brings to the forefront the importance of HBV education for Asian American college students. Thus, HBV-specific health educational programs are needed to increase awareness and knowledge among Asian American college students and the health care professionals who work with them. Asian American college students are the fastest growing population enrolling in US colleges and universities. In the 30-year period between 1979 and 2009, AAPI students increased five-fold from 235,000 to 1.3 million, and it is estimated that it will continue to increase by 35% more in 2019.^[49] These populations have rates of HBV and liver diseases that are significantly higher than the general population in the US,^[3,4] making this a serious and significant public health problem. More effective health education, screening and vaccination programs must be developed, implemented and evaluated in order to achieve HBV prevention for this at-risk population.

Acknowledgment

This work was supported by the Healey Grant from the University of Massachusetts Boston. The authors would like to thank the Asian American Students Association at the UMass Boston.

References

- World Health Organization [WHO], Hepatitis B. (Fact Sheet no. 204) [Internet]. Geneva, Switzerland: World Health Organization; 2000 [Last updated in 2013 July; cited 2013] Available from: <http://www.who.int/mediacentre/factsheets/fs204/en/index.html>.
- Institute of Medicine [IOM]. Hepatitis and Liver Cancer: A National Strategy for Prevention and Control of Hepatitis B and C. 2010 [Last cited in 2013] Available from: www.iom.edu/Reports/2010/Hepatitis-and-Liver-Cancer-A-National-Strategy-for-Prevention-and-Control-of-Hepatitis-B-and-C.aspx.
- Cohen C, Evans AA, London WT, Block J, Conti M, Block T. Underestimation of chronic hepatitis B virus infection in the United States of America. *J Viral Hepat* 2008;15:12-3.
- Kowdley KV, Wang CC, Welch S, Roberts H, Brosgart CL. Prevalence of chronic hepatitis B among foreign-born persons living in the united states by country of origin. *Hepatology* 2012;56:422-33.
- U.S. Census Bureau. American Fact Finder, Census Data. 2011. [Last cited in 2013] Available from: http://www.census.gov/newsroom/releases/archives/facts_for_features_special_editions/cb10-ff07.html
- Custer B, Sullivan SD, Hazlet TK, Iloeje U, Veenstra DL, Kowdley KV. Global epidemiology of hepatitis B virus. *J Clin Gastroenterol* 2004;38 (10 Suppl 3):S158-68.
- Centers for Disease Control and Prevention [CDC]. A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United State. *MMWR Morb Mort Wkly Rep* 2006;55 RR16:1-25.
- Weinbaum CM, Williams I, Mast EE, Wang SA, Finelli L, Wasley A, et al. Recommendations for identification and public health management of persons with chronic hepatitis B virus infection. *MMWR Recomm Rep* 2008;19:1-20.
- CDC. Hepatitis B. Available from: <http://www.cdc.gov/vaccines/vpd-vac/hepb/downloads/PL-dis-hepB-color-office.pdf>. [Last accessed in 2013].
- U.S. Department of Health and Human Services. Action plan for the prevention, care and treatment of viral hepatitis, Updated 2014-2016. Available from: <http://aids.gov/pdf/viral-hepatitis-action-plan.pdf>. [Last accessed in 2014 Feb].
- American Cancer Society. Cancer facts & figures. 2009. Atlanta, GA. 2009.
- Euler GL. Changing the legacy for Asian Americans and Pacific Islanders. *Asian Am Pac Isl J Health* 1998;6:304-10.
- Euler GL. Have we met the 2000 goals and objectives? What's next? *Asian Am Pac Isl J Health* 2000;8:113-5.
- Jenkins C, Mcphee SJ, Wong C, Nguen T, Euler G. Hepatitis B immunization coverage among Vietnamese-American children 3 to 18 years old. *Pediatrics* 2000;106:1-8.
- Kim YO. Access to hepatitis B vaccination among Korean American children in immigrant families. *J Health Care Poor Underserved* 2004;15:170-82.
- Rodewald LE, Tan L. Balancing the childhood immunization program with the urgent needs for adult hepatitis B immunization. *Public Health Rep* 2007;122 Suppl 2:52-4.
- Lee HO, Lee OJ, Kim S, Hontz I, Warner A. Differences in knowledge of hepatitis B among Korean immigrants in two cities in the rocky mountain region. *Asian Nurs Res* 2007;1:165-75.
- Wu CA, Lin SY, So SK, Chang ET. Hepatitis B and liver cancer knowledge and preventive practices among Asian Americans in the San Francisco bay area, California. *Asian Pac J Cancer Prev* 2007;8:127-34.
- Lee H, Levin M, Kim F, Warner A, Park W. Hepatitis B infection among Korean Americans in Colorado: Evidence of the need for serologic testing and vaccination. *Hepatitis Monthly* 2008;8:91-6.
- Lin SY, Chang ET, So SK. Why we should routinely screen Asian American adults for hepatitis B: A cross-sectional study of Asian in California. *Hepatology* 2007;46:1034-40.

21. Quang YN, Vu J, Yuk J, Li CS, Chen M, Bowlus CL. Prevalence of hepatitis B surface antigen in US-born and foreign-born Asian/Pacific islander college students. *J Am Coll Health* 2010;59:37-41.
22. Ma GX, Shive SE, Toubbeh JI, Tan Y, Wu D. Knowledge, attitudes, and behaviors of Chinese hepatitis B screening and vaccination. *Am J Health Behav* 2008;32:178-87.
23. Taylor VM, Talbot J, Do HH, Liu Q, Yasui Y, Jason JC, *et al.* Hepatitis B knowledge and practices among Cambodian Americans. *Asian Pac J Cancer Prev* 2011;12:957-61.
24. Lee H, Kiang P, Watanabe P, Halon P, Shi L, Church DR. Hepatitis B Virus Infection and Immunizations Among Asian American College Students: Infection, Exposure, and Immunity Rates. *J Am Coll Health* 2013;61:67-74.
25. Kim S, Lee H, Kiang P, Kalman D, Ziedonis DM. Factors associated with alcohol problems among Asian American college students: Gender, ethnicity, smoking and depressed mood. *J Subst Use* 2014;19:12-7.
26. Taylor V, Gregory Hislop T, Bajdik C, The C, Lam W, Acorda E, *et al.* Hepatitis B ESL education for Asian immigrants. *J Community Health* 2011;36:35-41.
27. Hwang JP, Huang CH, Yi JK. Knowledge about hepatitis B and predictors of hepatitis B vaccination among Vietnamese American college students. *J Am Coll Health* 2008;56:377-82.
28. CDC. Key Statistics from the National Survey of Family Growth. 2010. Available from: http://www.cdc.gov/nchs/nsfg/abc_list.htm. [Last cited in 2013].
29. American College Health Association. American College Association-National College Health Assessment II: Reference Group Executive Summary Fall 2012. Hanover, MD: American College Health Association. 2012. Available from: http://www.acha-ncha.org/docs/ACHA-NCHA-II_ReferenceGroup_Executive_Summary_Fall2012.pdf. [Last cited in 2013].
30. U.S. Department of Health and Human Services. Action Plan for the Prevention, Care, & Treatment of Viral Hepatitis. 2014. Available from: <http://www.aids.gov/pdf/viral-hepatitis-action-plan.pdf>.
31. Hann HW, Hann RS, Maddrey WC. Hepatitis B virus infection in 6,130 unvaccinated Korean-Americans surveyed between 1988 and 1990. *Am J Gastroenterol* 2007;102:767-72.
32. Lee H, Yang J, Cho J, Fawcett J. Complexity and uncertainty of living with an invisible virus of hepatitis B in Korea. *J Cancer Educ* 2010;25:337-42.
33. Lee H, Hann HW, Yang J, Fawcett J. Recognition and management of HBV infection in a social context. *J Cancer Educ* 2011;26:516-21.
34. Lee H, Kiang P, Chea P, Peou S, Tang SS, Yang J, *et al.* HBV-related health behaviors in a socio-cultural context: Perspectives from Khmers and Koreans. *Appl Nurs Res* 2014;27:127-32.
35. Won J, Krajicek M, Lee H. Culturally and linguistically competent care of a Korean-American child with autism. *Illn Crisis Loss* 2004;12:139-54.
36. Yang LW, Kleinman A, Link BG, Phelan JC, Lee S, Good B. Culture and stigma: Adding moral experience to stigma theory. *Soc Sci Med* 2007;64:1524-35.
37. Tran TT. Understanding cultural barriers in hepatitis B virus infection. *Cleve Clin J Med* 2009;76 Suppl 1:S10-3.
38. Yang LH, Kleinman A. Face and the embodiment of stigma in China: The cases of Schizophrenia and AIDs. *Soc Sci Med* 2008;67:398-408.
39. Tan N, Cheah, SL. What barriers do primary care physicians face in the management of patients with chronic hepatitis B infection in primary care? *Singapore Med J* 2005;46:333-9.
40. Yang E, Cheung C, So S, Change E, Chao S. Education and counseling of pregnant patients with chronic hepatitis B: Perspectives form obstetricians and perinatal nurses in Santa Clara County, California. *Asian Pac J Cancer Prev* 2013;14:1707-13.
41. Yoo GJ, Fang T, Zola J, Dariotis WM. Destigmatizing hepatitis B in the Asian American community: Lessons learned from the San Francisco Hep B free campaign. *J Cancer Educ* 2012;27:138-44.
42. Chao SD, Chang ET, So SK. Eliminating the threat of chronic hepatitis B in the Asian and Pacific Islander community: A call to action. *Asian Pac J Cancer Prev* 2009;10:507-12.
43. Lee H, Fitzpatrick JJ, Baik SY. Why isn't evidence based practice improving health care for minorities in the United States? *Appl Nurs Res* 2013;26:263-8.
44. Lee H, Park W. Public health policy for management of hepatitis B virus infection: Historical review of recommendation for immunization. *Public Health Nurs* 2010;27:148-57.
45. Immunization Action Coalition [IAC]. State mandates on immunization and vaccine-preventable diseases. St. Paul, MN: Immunization Action Coalition. 2011. Available from: <http://www.immunize.org/laws>. [Last cited in 2013].
46. Bastani R, Glem BA, Maxwell AE, Jo AM. Hepatitis B testing for liver cancer control among Korean Americans. *Ethn Dis* 2007;17:365-73.
47. University of Massachusetts Boston, Institution for Asian American Studies. Asian Americans in Massachusetts. October, 2012. Available from: <http://www.iaas.umb.edu/publications/general/AAs%20in%20MA%202012.pdf>. [Last cited in 2013].
48. U.S. Census Bureau. The Asian Population: 2010 Census Briefs. 2012. Available from: <http://www.census.gov/prod/cen2010/briefs/c2010br-11.pdf>. [Last cited in 2013].
49. National Commission on Asian American and Pacific Islander Research in Education (CARE). The Relevance of Asian Americans & Pacific Islanders in the College Completion Agenda. 2011. Available from: <http://www.apiasf.org/CAREreport/>. [Last accessed on 2013]

How to cite this article: Kim MJ, Lee H, Kiang P, Watanabe P, Torres MI, Halon P, *et al.* Debunking the myth: low knowledge levels of HBV infection among Asian American college students. *Asia Pac J Oncol Nurs* 2015;2:8-16.

Source of Support: This work was supported by the Healey Grant from the University of Massachusetts Boston. **Conflict of Interest:** None declared.