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Social Norm, Family Communication, and HBV Screening among Asian Americans

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Abstract

Individuals' behaviors are influenced by those of others in their social environment (i.e., descriptive norms), as well as by how individuals perceive they should behave in that environment (e.g., injunctive norms). Although social norms are thought to play an important role in hepatitis B virus (HBV) screening, limited theoretical or empirical guidance exists on how the underlying process works. In addition, norms are social phenomena that are spread through family discussion about the importance of getting HBV screening. Using the theory of normative social behavior (TNSB), this study examined the roles of injunctive norms (IN), descriptive norms (DN), and family discussion in HBV screening behavior among Asian Americans. Data from a survey of Asian Americans in the Baltimore Washington metropolitan area ($N = 877$) were used to test underlying theoretical propositions. DN and family discussion emerged as key factors in HBV screening behavior among all Asian Americans. IN were associated with HBV screening among Chinese and Korean Americans, but not for Vietnamese Americans. Family discussion moderated the influence of DN on behavior among Chinese and Vietnamese Americans. However, the main effect of DN on screening behavior was not modified by IN (no interactions between DN and IN). The results indicate that family discussion and social norms are integral in enabling Asian Americans to undergo HBV screening and warrant sensitivity in the design and implementation of a liver cancer prevention program in this high-risk group of Asian Americans.

Hepatocellular carcinoma (HCC) is the major form of primary liver cancer. Asian Americans experience the highest liver cancer incidence and mortality rates of all ethnic groups in the United States (ACS, 2017). In a recent summary of cancer incidence trends among Asian American populations (Gomez et al., 2013), Vietnamese had the highest incidence of liver cancer of all racial/ethnic groups (58.5 per 100,000 for men; 20.9 for

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women). Incidence among Korean males (34.9) and Chinese males (24.1) was much higher than among white males (8.9) (Gomez et al., 2013; Siegel, Miller, & Jemal, 2015). Chronic hepatitis B virus (HBV) infection is the most common cause of liver cancer, accounting for 80% of all cases. While HBV shows up rarely among Whites in the United States (0.1%), as many as 1 in 10 Asian Americans carry the virus, accounting for more than half of the cases in the U.S. A quarter of hepatitis B patients will eventually die of liver cancer or liver failure. Chronic HBV infection and liver cancer in Asian Americans is a source of one of the most serious—but frequently neglected—racial and ethnic disparities in the United States (Office of Minority Health, 2011).

Because of the asymptomatic nature of chronic HBV, about 65% of infected adults are unaware of their condition (Institute of Medicine, 2010). In combination with cultural, linguistic, and financial barriers, this knowledge gap can drive HBV infection rates even higher—particularly for high-risk groups, such as foreign-born Asian American immigrants. With insufficient knowledge of liver cancer prevention and treatment and low rates of HBV screening among adults, Asian Americans (AAs) are often diagnosed with late-stage cancer, resulting in high mortality rates.

AAs only constituted 6.3% of the total U.S. population in 2014, but they are the fastest-growing racial/ethnic group in the United States (Colby & Ortman, 2015; Hoeffel, Rastogi, Kim, & Shahid, 2012). In contrast to other rapidly growing ethnic groups, such as Hispanic-Americans, population growth among AAs is driven primarily by immigration rather than by U.S. births. Because HBV infection is highly endemic in their countries of birth and a high proportion of immigrants are unaware of their HBV status, AAs experience disproportionately higher incidence and mortality from diseases such as liver cancer (Torre et al., 2016). Several surveys have shown that AAs have a low HBV screening rate, ranging from 7.5% to 54% for self-reported screening rates by region and various Asian ethnic groups (Choe et al., 2006; Ma et al., 2011, 2007; Strong, Lee, Tanaka, & Juon, 2012; Taylor, Jackson, Chan, Kuniyuki, & Yasui, 2002; Thompson et al., 2002). In a self-reported survey of 1,312 AAs in the Delaware Valley region, Ma and her colleagues (2011) reported significant ethnic differences in HBV screening: Chinese (37.8%) had the highest screening rate, followed by Koreans (32.2%) and Vietnamese (20.3%). Therefore, it is important to develop educational programs to increase early detection of HBV infection through screening activities in high risk AAs.

HBV screening behavior is the first step in liver cancer prevention and hence its psychosocial determinants might be important to study. Like other important health behaviors, it is likely that determinants of HBV screening behaviors may be driven by social influences (although this has not been explicitly studied before, to our knowledge). Whether to get screened may be the result of knowing the importance of screening, but it may also be guided by the extent to which individuals believe others in their social network engage in the behavior (descriptive norms) and pressures they perceive to do the same (injunctive norms) (see Cialdini, Reno, & Kallgren, 1990).

In broader terms, this is one of the central ideas behind the theory of normative social behavior (TNSB; Rimal & Real, 2005). The literature provides strong evidence for the

dental, and eye exam): A higher level of acculturation has been found to be associated with a number of better preventive health behaviors among Asian immigrants (Jung et al., 2017; Lee, Chae, Jung, Chen, & Juon, 2016; Lee, Chen, Jung, Baezconde-Garbanati, & Juon, 2014). In contrast, greater length of residence in the U.S. is associated with decreased HBV screening (Strong et al., 2012; Tanaka, Gehan, Chen, & Wang, 2014; Tanaka, Strong, Lee, & Juon, 2013). In this paper, we will explore the role of acculturation on HBV screening.

Application of the TNSB to liver cancer prevention leads to the prediction that the relationship between DN and HBV screening behavior among AAs may be enhanced by IN and family discussion. However, there have been no empirical studies to explore these potential influences on HBV screening and vaccination behaviors in high-risk AAs. Overall, we hypothesized that the influence of descriptive norms on screening behavior is strengthened when (a) IN are strong and (b) interpersonal communication is high. In addition, we explored potential differences in TNSB constructs between three ethnic subpopulations (i.e., Chinese, Korean, and Vietnamese Americans) and how these differences predicted their HBV screening behavior. Also, in the special context of immigrants, we hypothesized that less acculturated Asian Americans are more likely to have HBV screening. This study fills a significant gap in the health communication literature by extending TNSB to the study of HBV screening behavior among AAs and by providing evidence to leverage its potential in designing effective interventions.

Methods

We used the baseline survey data collected for the Maryland Asian American Liver Cancer Education Program (hereafter “the Program”) for this analysis. The Program was a cluster randomized control design that tested the hepatitis B/liver cancer educational program. The Program received approval for Human Subject Research from the Institutional Review Board of Johns Hopkins Bloomberg School of Public Health.

Recruitment Strategy

The Program recruited 877 participants (294 Korean, 303 Chinese, and 280 Vietnamese immigrants) living in the Baltimore–Washington metropolitan area. Between November 2009 and June 2010, self-identified Asian American adults (18 years of age and older) at various Chinese, Korean, and Vietnamese community-based organizations (CBOs) completed a self-reported questionnaire. The sampling frame for these organizations was created from ethnic yellow-pages, industry membership directories, and suggestions from community leaders in the targeted region. We contacted the leaders or pastors of these CBOs to seek their consents. A total of 32 organizations agreed to participate in the Program. Then, participants were recruited from faith-based organizations (churches and temples) and CBOs (e.g., language schools and college cultural group organizations). Asian grocery stores, restaurants, and nail salons were additional locations from which participants were recruited. Organizational membership was not a requirement for participation (see more detail, Juon & Park, 2013; Strong et al., 2012).

Data Collection Procedures

A total of 940 individuals were recruited, of which 93% ($n = 877$) agreed to participate and completed the study. Volunteers were required to be at least 18 years old and had never participated in hepatitis B education. Participants filled in a paper form of self-administered baseline questionnaire in their choice of the language (their native language or English).

Measures—HBV screening behavior, the dependent variable, was measured by asking participants “Have you ever had hepatitis B screening, which is not liver function test?” (Strong et al., 2012). It was coded yes (=1) or no (=0).

Descriptive norms (DN) are one dimension of normative beliefs, defined as norms which pertain to the prevalence of a behavior (Cialdini et al., 1990). DN were elicited by asking respondents three questions about their perceptions of the proportion of key groups living in the United States (friends, family members, and other Asians) having ever had HBV screening (Lapinski, Maloney, Braz, & Shulman, 2013; Rimal & Real, 2005). Response categories ranged from none (1) to all (7). Three items were used to create a composite index score for DN by summing scores, with higher scores indicating greater descriptive norms for HBV screening ($n = 3$, $\alpha = 0.82$).

Injunctive norms (IN) were defined as norms which pertain to social pressures experienced by participants to conform (Cialdini et al., 1990). IN focused on respondents’ perceptions about support for HBV screening, specifically by asking whether participants believed other persons (family members, close friends, most people that they know, and their physician) approved of having HBV screening (Lapinski et al., 2013; Rimal & Real, 2005) ($n = 4$, $\alpha = 0.94$). A 7-point Likert scale was used, ranging from “strongly disagree” (1) to “strongly agree” (7). Four items were used to create a composite index score for IN by summing up the scores. Then, we used the median split for making two categories (approval [=1] or disapproval [=0]).

Family Discussion (FD): Respondents were asked whether they ever discussed HBV screening with their family members (0 = no; 1 = yes).

Acculturation is measured by proportion of life spent in the U.S. which indicates how much an Asian-American is used to the American culture and lifestyle (0 = < 25% of their life; 1 = 25% of their life),

Control variables included age, sex (0 = male; 1 = female), education level (0 = high school; 1 = college; 2 = college graduate+), and family history of HBV infection (0 = no; 1 = yes).

Statistical Analysis

Logistic regression was used to assess main effects and interaction effects. Interaction effects were tested by including a cross-product in the regression model that included the two corresponding main effects (between DN and IN and between DN and FD). We conducted multivariate regression analysis in the total population and then conducted subgroup analysis by ethnicity. We used Stata version 13 for all analyses (StataCorp, 2013).

Results

Table 1 presents characteristics of study participants. The sample consisted of 877 Asian Americans (303 Chinese, 294 Koreans, 280 Vietnamese). Vietnamese Americans were younger than Chinese and Korean Americans ($p < .05$). There were also some ethnic differences in education, social norms, and family communication ($p < .001$): Chinese Americans were more highly educated than Korean and Vietnamese Americans, and they had higher levels of graduate school education (50.2%, 17.3%, and 8.2%, respectively). Chinese Americans reported the highest mean DN scores (3.34) followed by Vietnamese Americans (3.08) and Korean Americans (2.73). Vietnamese Americans had higher proportion of approving IN and family discussion than the other two ethnic groups. More than two thirds of Vietnamese Americans (69.2%) had spent more than 25% of their life in the United States, compared to Korean Americans (59.5%) and Chinese Americans (58.1%) ($p < .05$). Chinese Americans (54.6%) had higher HBV screening rates than Korean Americans (45.6%) and Vietnamese Americans (39.4%) ($p < .001$).

Zero-order correlations were computed across all variables to assess overlapping variance. Table 2 shows that three background variables (education, proportion of life spent in the United States, family history of HBV infection) were significantly associated with HBV screening. Social norms (i.e., injunctive and descriptive norms) and family discussion were also significantly related to HBV screening. This table also shows that, except for significant correlation between family history of HBV infection and family discussion ($r = .38, p < .001$), remaining correlations were modest and there was little risk for multicollinearity for the multivariate analyses.

Logistic regression analyses combining all respondents showed that there were main effects of social norms (i.e., descriptive and injunctive norms) and family discussion on HBV screening (see Table 3). Education and proxy measure of acculturation (i.e., proportion of life spent in the United States) were also associated with HBV screening. However, there was no interaction between DN and FD and between DN and IN in bivariate analysis. In multivariate analysis, stronger social norms were associated with an increase in HBV screening (OR = 1.13, 95% CI 1.09, 1.17 for DN; OR = 1.70, 95% CI 1.24, 2.31 for IN). Those who had family discussion about HBV screening were more likely to have HBV screening than those without any family discussion (OR = 4.05, 95% CI 2.64, 6.21). In addition, acculturation was negatively associated with HBV screening: Those who spent more than 25% of their life in the United States were less likely to have HBV screening than those who spent less than 25% of their life in the United States (OR = 0.50, 95% CI 0.37, 0.69).

In bivariate analysis (Table not shown), there were no interactions between DN and IN for all three subgroups of Asian Americans. However, we found significant interactions between DN and FD among Chinese Americans and Vietnamese Americans. Table 4 presents the results of multivariate analyses of subgroups by ethnicity including Chinese, Korean, and Vietnamese Americans. We found main effects of DN and FD on HBV screening among all three subgroups of Asian Americans: higher DN and having family communication were associated with an increase in HBV screening. IN were associated with HBV screening in

Chinese Americans and Korean Americans, whereas IN had no main effect on HBV screening in Vietnamese Americans. Living a high proportion of life in the United States was associated with a decrease in HBV screening in Chinese and Korean Americans. Higher education was also associated with an increase in HBV screening in Chinese and Vietnamese Americans.

The DN and FD interaction term was significant for Chinese Americans and Vietnamese Americans. Further analysis of interaction pattern showed that among Chinese Americans, the association between DN and HBV screening was greater when they had family discussion than when they had no family discussion. Those with high DN and having FD were most likely to have HBV screening, while those with low DN and having FD were least likely to have HBV screening ($OR = 1.37, p < .05$). We found a different interaction pattern among Vietnamese Americans ($OR = 0.83, p < .05$). For those who had family discussion, there was a moderate inverse association between DN and likelihood of having HBV screening, whereas among those who did not have family discussion, the association between DN and likelihood of having HBV screening was positive and strong (steeper slope than the other one). This pattern of interaction is shown in Figure 1.

Discussion

Asian Americans are disproportionately at higher risk of liver cancer associated with HBV infection. HBV screening is the first step for hepatitis B prevention, and so investigating the various determinants of this behavior, including the role that social norms play, is important in developing effective behavioral interventions to increase HBV screening. This current study is the first to apply the theory of normative social behavior (Rimal & Real, 2005) to examine whether social norms are important determinants of the HBV screening behavior among high risk groups of Asian Americans: Chinese, Korean, and Vietnamese Americans in the Baltimore Washington metropolitan area.

These findings lend support to our hypotheses that both social norms and family discussion are important determinants of HBV screening behavior. Consistent with other research (Sieverding et al., 2010), we found that DN are significant predictors of HBV screening behavior. The fact that DN plays a meaningful role in predicting HBV screening has practical significance. It appears that HBV screening of others in the Asian American community influences their own screening behaviors. To date, we have not been able to identify an intervention increasing HBV screening that included a DN component.

The significant contribution of IN to HBV screening among two subgroups of Asian Americans (e.g., Chinese and Korean Americans) is consistent with earlier study of cancer screening behaviors (Smith-McLallen & Fishbein, 2008). In contrast, we did not observe a significant main effect of IN on HBV screening among Vietnamese Americans. Given the inconsistent independent contribution of IN to predictions of HBV screening among Vietnamese Americans, one possible explanation for this difference is that no correlation between IN and DN was noted. On the other hand, the average correlation between IN and DN was $r = .12, p < .05$ for Korean Americans and $r = .23, p < .01$ for Chinese Americans. It is perhaps the case that the relative weights of DN in predicting HBV screening behavior

differed between Vietnamese Americans and other two subgroups of AAs such as Chinese- and Korean-Americans. Consistent with a previous study on contraceptive use behavior (Rimal & Lapinski, 2015), family discussion was associated with increased HBV screening among all three subgroups of AAs.

The TNSB posits that the influence of DN on behavior is modified by family discussion and IN. We found support for the first proposition: Consistent with other research on contraceptive use (Rimal & Lapinski, 2015), we found the moderating role of family discussion was an agent of normative influence on HBV screening behavior for Chinese and Vietnamese Americans, but not for Korean Americans. One of the key functions of interpersonal discussion is to transmit information about norms in the Asian American family. It is through discussions that individuals come to learn about the collective opinions that govern the appropriateness of those behaviors.

It is interesting to note that the effect of DN on HBV screening behaviors was negatively associated with family discussion among Vietnamese Americans. This is an intriguing finding: it is not clear why this pattern of findings would only apply for Vietnamese Americans. One likely (though speculative) explanation might be found in the observation that the Vietnamese American study participants were somewhat different from the Chinese and Korean American participants in that they were younger and less educated. Those who were younger and more educated ($r = -.34, p < .01$) might be expected to have less communication from family members. We speculate that overall communication with family (let alone discussion on HBV) is quite limited due to language and cultural barriers between them and their parents' generation. Hence, the influence of family discussion among Vietnamese Americans needs to be explored in future study.

In addition, it is interesting that family discussion did not serve to boost the influence of DN on HBV screening behavior for Korean Americans. Family discussion has a direct influence on screening (in a positive way), but it does not have any moderating role in the relationship between normative beliefs and behaviors. This certainly warrants further inquiry, for it suggests that it may be important to study the content of those conversations, which may be different among the three groups. We did not collect data about communication content.

We did not find support for the second proposition for the moderating role of IN in the relationship between DNs and HBV screening behavior across the three Asian American groups. This was somewhat surprising because, according to the TNSB, we expected descriptive norms and injunctive norms would work synergistically to predict HBV screening behavior. In particular, the lack of an interaction effect between DN and IN in total or within subgroups of AAs was inconsistent with other research on intentions to have prostate and colon cancer screening among men (Sieverding et al., 2010). The nonsignificant moderating role of IN suggests that AAs are more likely to have HBV screening if they believe they are under pressure from significant others. Also, their perception of whether other comparable AAs are having HBV screening is equally important. Our study thus shows that both social norms influence HBV screening behaviors among Asian immigrants. Recently, few studies have examined the interaction of IN and DN on HBV screening

behavior. Further research is required to explore on this process of preventive health behaviors.

The finding that greater residential tenure in the United States correlated with lower likelihood of HBV screening is intriguing. Consistent with earlier studies (Strong et al., 2012; Tanaka et al., 2014, 2013), our result shows that the more acculturated an Asian American, the less likely he/she is to have HBV screening. This may be due to lower perceived risk of HBV infection as one becomes more identified as an American, since an average American has lower risk of HBV infection than an average Asian. However, it could also suggest that more recent immigrant groups are prioritized by healthcare providers or public health outreach for HBV prevention activities, and they also may be more easily identified in geographic or cultural enclaves than immigrants who are more assimilated. However, this will need further empirical studies to confirm.

A strength of our study is that it is one of only a few research studies to examine interpersonal communication as an agent of normative influence on HBV screening. The current study's findings will expand our scientific knowledge of the role of TNSB in HBV screening. Despite these strengths, the study is not free from limitations. First, a sampling frame from CBOs was used, and to minimize the sampling bias due to excluding those who do not attend these organizations regularly, we targeted Asian groceries, nail salons, and restaurants. The findings of the analyses should be understood in this context, and its generalizability may be limited only to the Program participants. Second, those who voluntarily participated in the study might be more motivated to learn about HBV infection, introducing selection bias.

Conclusion

Our study showed that targeting either social norms or family discussion about having HBV screening alone would be sufficient to increase HBV screening for all Asian Americans. Norms-based interventions to increase liver cancer awareness associated with HBV infection are necessary to focus on changing not only descriptive norms but also injunctive norms and family discussion. Our findings also suggest that interventions and communications targeting liver cancer prevention should give special consideration to ethnically specific tailored interventional strategies to effectively increase HBV screening among subgroups of AAs.

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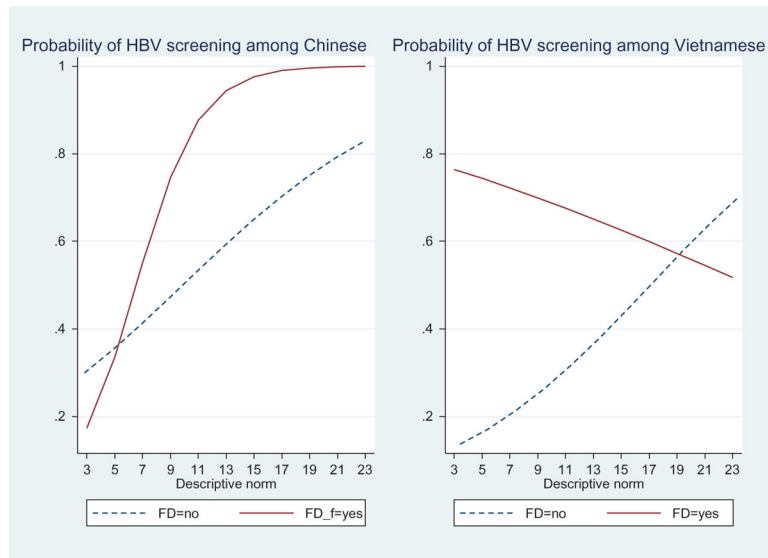


Fig. 1. Interaction between descriptive norms and family discussion (FD). Interactions are adjusted for all covariates.

Table 1Study participant characteristics (*n* = 877)

Characteristics	Korean (<i>n</i> = 294) <i>N</i> (%)	Chinese (<i>n</i> = 303) <i>N</i> (%)	Vietnamese (<i>n</i> = 280) <i>N</i> (%)	<i>p</i> value
Age (mean±SD, range)	46.1, 13.5 (19–77)	45.9, 11.5 (21–80)	43.1, 15.1 (18–89)	.013
Gender				
Male	113 (38.4)	120 (39.6)	131 (46.8)	.09
Female	191 (61.6)	183 (60.4)	149 (53.2)	
Education				
< High school	38 (12.9)	23 (7.6)	55 (19.6)	<.001
High school+	109 (37.1)	48 (15.8)	138 (49.3)	
College graduate	96 (32.7)	80 (26.4)	64 (22.9)	
Graduate school +	51 (17.3)	152 (50.2)	23 (8.2)	
Has some HBV infected family member				
No/not sure	255 (87.0)	260 (85.8)	233 (83.8)	.544
Yes	38 (13.0)	43 (14.2)	45 (16.2)	
Proportion of life spent in the United States				
<25% in life	119 (40.5)	127 (41.9)	86 (30.8)	.012
25% in life	175 (59.5)	176 (58.1)	193 (69.2)	
Descriptive norms mean ± SD (1–8)	2.73, 1.36	3.34, 1.70	3.08, 1.48	<.001
Injunctive norms (%)				
Not approved	162 (55.1)	186 (62.0)	129 (46.4)	<.001
Approved	132 (44.9)	114 (38.0)	149 (53.6)	
Family discussion				
No	245 (83.6)	244 (80.5)	197 (70.6)	<.001
Yes	48 (16.4)	59 (19.5)	82 (31.9)	
HBV screening				
No	160 (54.4)	137 (45.4)	169 (60.6)	<.001
Yes	134 (45.6)	165 (54.6)	110 (39.4)	

Table 2

Zero-order Pearson correlation ($n = 877$)

Variable	1	2	3	4	5	6	7	8
1. Gender	—							
2. Age	.05	—						
3. Education	-.15**	-.30**	—					
4. Proportion to stay in the United States	-.02	-.05	-.01	—				
5. Family history of HBV infection	-.01	-.07*	.06	.03	—			
6. Injunctive norm	-.06	.03	.05	-.03	.07*	—		
7. Descriptive norm	.07	-.02	.08*	-.05	.07*	.12**	—	
8. Family discussion	-.04	-.02	.03	-.03	.38**	.19**	.15**	—
9. HBV screening	-.06	-.01	.22**	-.15**	.15**	.19**	.28**	.30**

Note.

* $P < .05$;

** $P < .01$.

Table 3

Logistic regression (odds ratio), assessing HBV screening, Asian Americans ($n = 877$), Baltimore–Washington metropolitan areas

	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Control variables		
Age	0.99 (0.98, 1.01)	1.01 (0.99, 1.02)
Gender (Ref = male)	0.77 (0.59, 1.01)	0.85 (0.63, 1.17)
Education (Ref = < high school)		
High school graduate	1.69 (1.05, 2.70) *	1.41 (0.81, 2.44)
College education+	3.39 (2.17, 5.29) *	3.48 (2.03, 5.94) *
Proportion stay in the US (Ref = < 25%)	0.53 (0.40, 0.70) *	0.50 (0.37, 0.69) *
Family history of HBV infection (Ref = no)	2.45 (1.65, 3.64) *	1.36 (0.84, 2.20)
Social Norm		
Descriptive norms (DN)	1.14 (1.10, 1.18) *	1.13 (1.09, 1.17) *
Injunctive Norms (IN) (Ref = not approved)	2.03 (1.55, 2.66) *	1.70 (1.24, 2.31) *
Family Discussion (FD) (Ref = no)	5.01 (3.46, 7.24) *	4.05 (2.64, 6.22) *
Interaction 1		
DN	1.12 (1.09, 1.17) *	-
FD	3.45 (1.35, 8.80) *	
DN × FD	1.03 (0.94, 1.13)	
Interaction 2		
DN	1.14 (1.09, 1.20) *	
IN	1.92 (0.98, 3.74)	
DN × IN	0.99 (0.93, 1.07)	

Note.

* $p < .05$.

Table 4

Multivariate logistic regression (odds ratio) by ethnicity, assessing HBV screening, Asian Americans, Baltimore–Washington metropolitan areas

	Korean (<i>n</i> = 294)	Chinese (<i>n</i> = 301)	Vietnamese (<i>n</i> = 280)
Control variables			
Age	1.01	0.99	1.01
Gender (Ref = male)	0.61	0.88	0.84
Education (Ref = < high school)			
High school graduate	0.74	1.96	2.01
College education+	1.14	5.85 ^{**}	4.21 ^{**}
Proportion stay in the US (Ref = < 25%)	0.31 ^{**}	0.54 [*]	0.58
Family history of HBV infection (Ref = no)	1.07	1.51	1.31
Social norm			
Descriptive norms (DN)	1.14 ^{**}	1.18 ^{**}	1.09 [*]
Injunctive norms (IN) (Ref = not approved)	3.12 ^{**}	2.31 ^{**}	0.87
Family Discussion (FD) (Ref = no)	6.35 ^{**}	2.78 [*]	5.06 ^{**}
Interaction			
DN × FD	1.53	1.37 [*]	0.83 [*]

Note.

* $p < .05$;

** $p < .01$.