Risk Perceptions, Barriers, and Self-Efficacy of Hepatitis B Screening and Vaccination among Chinese Immigrants

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Abstract

Hepatitis B (HBV) infection is a serious health problem among Asian Americans, including Chinese Americans. This study was conducted to measure the perceptions of risk, barriers, and self-efficacy of HBV screening and vaccination in Chinese immigrants. A cross-sectional study was conducted among 429 Chinese Americans in New York City. A pilot-tested questionnaire in Chinese was used to collect information about demographics, acculturation, and health risk perceptions, barriers, and self-efficacy related to screening and vaccination. While 89.3% of participants thought that HBV would harm them if they contracted it, only 32.8% believed that they were at risk for getting it. Participants were more likely to get screened if their physician suggested it, they thought it was a serious disease, would cause harm, and they discussed it with their spouse. Participants were less likely to get screened if they were afraid they had HBV, did not know a screening location, and it was not suggested by their doctor. Participants were less likely to get vaccinated if they did not have time, did not know a screening location, and the physician did not speak their language. Our findings suggest that community-based, culturally appropriate interventions for Chinese Americans and health care providers might increase screening and vaccination rates.

Key Words: *Heptitatis B, Chinese American Immigrants, Risk Perception, Intervention, Vaccination and Screening behaviors, Perceived Risks*

Introduction

Census data[1] indicate that there are over 2.7 million Chinese Americans in the U.S., representing 23% of the Asian American population; they are also one of the fastest growing populations and one that is highest at risk for hepatitis B virus (HBV) infection.[2] Due to a reduced concern about the threat of HBV infection in the U.S. population at large, most new immigrants are not screened for the presence of the virus. More than two-thirds of liver cancer incidence is attributed to HBV infection, which, in turn, is directly related to the absence of early screening and vaccination. The HBV virus is 100 times more infectious than the AIDS virus, hence poses a serious public health problem to large subsets of high density U.S. populations typically clustered in metropolitan areas.[3] Due to absence of symptoms associated with HBV infection, carriers can spread the virus unknowingly; hence early detection and treatment of infection can lead to eradication of the virus and amelioration of liver damage. Childhood transmission and transmission from mother to child at birth are the most common modes of virus transmission in the Chinese population.[4] The majority of children who are exposed early in life become HBV carriers.

HBV and Liver Cancer

Chinese, especially new immigrants, form close relationships in urban areas, facilitating transmission of HBV.[5, 6] Given the limited knowledge about HBV, the adverse consequences of the disease are high. Epidemiological studies have shown that persons with chronic HBV infection have a risk of developing liver carcinoma more than 200 times greater than those not infected.[7] In 75% of Chinese patients with liver cancer, there is evidence of prior HBV infection. For the period 1990-1995, the liver carcinoma mortality rate for Whites was 2.9 per 100,000, for African Americans, 4.6, Hispanics, 4.7, and Asians, 9.0.[8] While physicians may be unaware of the increased risk that Chinese Americans face, communication and other barriers also prevent delivery of services to these vulnerable populations. The majority of Chinese immigrants are either unilingual or not fluent in English to communicate with their primary care providers, hence are prone to delay or avoid visits to these providers. Further, health facilities often lack assistants to facilitate Asians' entry into the health delivery system. Studies have found that minorities report poorer patient-provider relationships compared to Whites,[9] with satisfaction being lowest for Asians than for Whites, African Americans, and Hispanics, respectively.[10] While the quality of the patient-provider relationships are differentially impacted, it is uncertain whether disparity in other health outcomes is impacted.

According to the Asian Liver Center, HBV-related liver cancer rates among male Chinese Americans are 6 times higher than male Caucasians.[11] Early screening and vaccination can reverse these trends. A study among Chinese women found that while most had heard of HBV, few knew of its transmission modes or that chronic infection lasted a lifetime. The study revealed that education level, English fluency, and household income are associated with HBV knowledge and previous HBV testing. It also found that less than half (46%) of the 124 study respondents knew that HBV could cause liver cancer, and only a third (35%) reported that they had been serologically tested. Most of those who knew they were susceptible (61%) had not been vaccinated, and less than half knew that HBV could be transmitted sexually or through asymptomatic carriers.[12, 13]

Much of the literature on the subject of barriers to HBV among Chinese Americans points to the need for more data, especially for those of low socioeconomic and new immigrant status, and the need for more information regarding perceived susceptibility and severity, perceived benefits and costs of screening, cues to action and self-efficacy for HBV screening and vaccination.[12,14-15] In addition, there is need for more information regarding programs to improve screening and vaccination rates in healthcare delivery systems and for the development of culturally and linguistically sensitive HBV-related educational and training materials for use in these communities as well as in schools, health clinics, churches and other places where these populations congregate. Further, ethnic and cultural factors need to be considered. For example, while Asian women have been less studied than women of other groups, several barriers and trends for breast cancer screening have been measured. Fatalism and cultural beliefs regarding karma and causes of illness serve as barriers to breast cancer screening among some Asian American/Pacific Islander women.[16] Cancer may represent punishment for not living right and "bad living" brings cancer.[17] Preferences for Eastern medicine and modesty can also be barriers to screening.[16]

Cultural factors affect health beliefs about HBV among Chinese. These factors include respect for authority and elders, karma, males as decision makers, saving face, Yin/Yang, and chi. [18, 19-22] HBV infected members may not want to inform family members of the illness. It is bad luck to talk about one's illness (karma) because it might then happen to other family members. Decisions about HBV screening and

vaccination are usually decided by husbands or eldest sons. Saving face may also be important because patients may not wish to admit the presence of a problem. While in most circumstances patients may not wish to disagree with their physician, they often are reluctant to return to the physician or abide by the physician's prescription or recommendations. The concept of Yin-Yang balance, may also play an important role in patient's decision-making process. Many Asians believe that poor health can be reversed by returning to a more harmonious life through acupuncture or diet. While most Chinese Americans use traditional medicine, Western medicine is equally popular among this population.[23, 24] These factors need to be considered in the design, promotion and implementation of HBV screening and vaccination programs.

Vaccination campaigns typically target young Asian children since the vaccine is free for children under the age of 19.[25, 26] These children are also more likely to receive all three doses of the vaccine than older children.[27] Coverage of hepatitis B vaccination among high-risk Asian children is a challenge, however. In a 1988 survey of Asian children, age 4-14 years, in six major U.S. cities with no vaccination programs targeting specifically Asians, rates for the first dose ranged between 25% and 80%, and for the complete series, between 14% and 67%.[18] Asians had the worst completion rates. Only 10% of Asian children ages 15-19 had received their complete doses despite the existence of public health recommendations targeting these children dating back to 1982. There is dearth of information on Chinese adult HBV vaccination.

The Health Belief Model (HBM) components of perceived susceptibility, perceived benefits, perceived severity, self-efficacy, perceived barriers, and cues to action have been used to explain and predict health screening behaviours. In line with this model, individuals will pursue a course of action (prevent, screen, or control of poor health) if they regard themselves susceptible to the condition, believe that the condition represents a threat to their lives, that pursuit of an available course of action would decrease their susceptibility to the condition, and that any barriers to the pursuit of the action are outweighed by the benefits accruing from the action. In other words, the strength of motivation for screening and vaccination is a function of the individual's perception of vulnerability to the condition (HBV) and the condition's negative outcome (liver cancer).[14, 15] Although the model has been used to explain and predict HBV risk prevention among various populations,[28, 29, 30] further analysis research is needed to determine if the model constructs are appropriate for Chinese Americans and their behaviour regarding HBV screening and vaccination.

The purpose of this study is to measure risk perceptions, barriers, and self-efficacy among Chinese immigrants that impact their HBV screening and vaccination behavior.

Methods

Sample

Chinese American participants (N=429) in New York City were recruited using a multistage cluster sampling based on probability proportionate to size[31]. Ten Chinese community-based organizations were randomly selected from our Asian Community Cancer Coalition member organizations. These organizations served low income, low educational level individuals whose native language is either Mandarin or Cantonese and whose English fluency is limited. Selection of organizations was based on size of the organizations' membership: those with larger membership had a higher probability of being selected. A proportional allocation procedure was used to select participants from each organization based on membership. A total of 475 Chinese adults were invited to participate in the study. Participants had the choice of completing the questionnaire in English, Mandarin, or Cantonese. Of the 475 invited participants, 429 who completed the study, a response rate of 90.3%. The large majority of respondents (93.3%) were comprised of first-generation immigrants.

Instrument

The instrument was pilot tested among 25 Chinese adults with knowledge of either Mandarin or Cantonese. Content validity was achieved based on the comments from pilot participants. The instrument was modified for language readability and content acceptability. The questionnaire consisted of 47 items related to demographics (i.e. age, gender, ethnic background, marital status, education level, and income), acculturation (e.g. English language ability and use, length of time participants had lived in the U.S) and health risk perceptions, barriers, and self-efficacy related to screening and vaccination. For the internal reliability, a spearman rho was performed on the demographic variables and a significant ($p<.01$) positive correlation of .65 was obtained. For internal consistency, subscales of Health Believe Model constructs were validated on a pilot sample of

Vietnamese adults (N=98), Cronbach's alpha ranged from 0.81 to 0.94.

The design of the questionnaire was based on the Health Belief Model, which has been used across diverse populations. It was used in this study to measure perceived susceptibility and severity, benefits and costs, cues to action, and self-efficacy regarding HBV screening and vaccination among Chinese Americans. For example, perceived susceptibility was measured by asking the participants if they believed they were at risk of getting HBV and whether pregnant mothers should get screening for HBV. Perceived severity was assessed by two items: the first measured perceptions of HBV among racial/ethnic groups and the second, measured whether participants thought they would be harmed if they had HBV. Self-efficacy was measured by whether participants believed they would go for screening or vaccination within the next 6 months. Perceived barriers were measured by asking why participants would not go for screening and providing reasons from a checklist that includes several choices (lack of knowledge, feeling well, language problems, no physician, no time, no insurance, high cost, embarrassment, fear of positive result, not suggested by doctor, and no knowledge of where to go). Cues to action included items which measured whether anyone in the participant's family was a carrier or had tested positive for HBV, if they had attended a HBV workshop, and if they knew there was free screening.

A written informed consent was obtained from all participants in the study. Collected data were anonymous and analyzed without personal information identification.

Data Analysis

Descriptive statistics, contingency coefficient correlations, and logistical regression analyses were employed. Descriptive statistics were reported for demographic variables that included: age, ethnicity, gender, birthplace, years lived in U.S., marital status, education level, employment, household income, type and status of insurance coverage, and English language proficiency; knowledge about the association between HBV and liver cancer, about screening test and vaccination, mode of HBV transmission, preventive measure against HBV; attitudes about HBV, screening and vaccination behaviour, and perceived susceptibility, severity; barriers to screening and vaccination; benefits; cues to action; and self-efficacy. Chi-square analyses were conducted for the bivariate relationship between the dependent variables of being screened and vaccinated and the independent variables of demographics, knowledge, and attitudes about HBV. Contingency correlations (c) were reported for perceived risk, barriers, and self-efficacy and the dependent variables of screening and vaccination behaviours.

Two separate logistical regression analyses were performed to identify potential predictor variables for the dependent variables of getting screened and vaccinated for HBV. The independent variables in both analyses were perception of risk, perceived barriers, perceived benefits, and cues to action. A forward stepwise selection of variables was used to select variables for inclusion in the final model. The criterion for entry of variables was .10 for each step, and the significance criterion for selection of whether the variable remained was .05[32]. Nagelkerke's Max-rescaled R^2 an estimate of the variation in the dependent variable explained by the logistic regression model was estimated.[33, 34]

Results

Demographic Characteristics of Respondents

The mean age of participants was 57.1 years (Table 1). Participants included males (38.4%) and females (61.6%), 93.3% of whom were foreign-born and had, on average, lived 17.5 years in the U.S. The majority was married (69.2%), had a high school education or less (68.4%), and was employed or retired (83.3%), making under $20,000 per year (74.5%), and spoke (84.4%) and read English (83.8%) poorly or not at all.

Perceived Susceptibility and Severity

As shown in Table 2, 32.8% of participants believed that they were at risk for getting HBV and that Asian Americans were more at risk than other racial/ethnic groups (62.9%), especially Chinese (68.9%). Participants thought that HBV would harm them if contracted (89.3%), and that it was a serious disease (M=7.83, SD=2.73). There was a significant correlation between thinking that Asian Americans were susceptible and getting screened ($c=.21$, $p<.05$) and vaccinated ($c=.17$, $p<.01$).

Perceived Barriers and Benefits

Barriers to screening for HBV were also measured (Table 2). The following were statistically significant barriers to obtaining screening: they felt well (34.6%), did not know where to get screened (12.5%), their doctor did not suggest it (17.7%), and not knowing if insurance plan covered HBV

screenings or vaccinations (24.8%). Statistically significant barriers to obtaining vaccination were: no time (10.8%), did not know where to go to get screened (12.5%), and having a primary care provider (85.6%).

Perceived benefits of screening (Table 3) included getting reassurance that they did not have HBV (44.5%) and self-efficacy (51.6%). There was a significant ($p<.05$) correlation between feeling well ($c=0.18$), knowing where to get screened ($c=0.21$), no insurance ($c=0.17$), knowing if insurance covered the cost ($c=0.21$) and getting screened. A separate correlation analysis among barriers showed that there was a significant ($p<.01$) correlation between having time ($c=0.16$), knowing where to get screened ($c=0.14$), and having a primary care provider ($c=0.19$), and getting vaccinated.

A correlation analysis among benefits showed that there was a significant ($p<.01$) correlation between reassurance of not having HBV ($c=0.19$) and the physician recommending the person to get screened ($c=0.27$), with screening behavior. A separate correlation analysis among benefits showed that there was a significant ($p<.01$) correlation between reassurance of not having HBV ($c=0.11$) and the physician recommending the person to get screened ($c=0.14$), with screening behavior and getting vaccinated.

Cues to Action

Participants reported that if they discussed HBV with family members (62.8%), friends (64.8%), and their physician advised (49.7%) they would be more likely to go for screening or vaccination (Table 3). There was a significant ($p<.05$) correlation between discussing HBV with family ($c=0.17$) and friends ($c=0.15$) and getting screened, being recommended by the physician ($c=0.18$), and between discussing HBV with family ($c=0.12$) and attending an HBV workshop ($c=0.12$) and getting vaccinated.

Self-Efficacy

As shown in table 3, participants (51.6%) indicated that they thought they would go for screening or vaccination within the next 6 months which was significantly correlated with screening behavior ($c=0.14$).

Determination of Screening Behavior

A logistic regression analysis was conducted to determine which HBM components best predicted screening behavior for HBV (Table 4). The variables which inversely correlated with screening behavior were: afraid of finding out that they had HBV, did not know a screening location, and screening was not suggested by their doctor. The variables which positively correlated with screening behavior were perceptions that, if contracted, HBV was a serious health problem, HBV caused personal harm, for sake of compliance with physician's request, and if the person discussed screening with spouse. Odds that a person would be screened were 1.3 times higher if they thought getting HBV was serious, 3.9 times higher if they thought it caused harm, 2.4 times higher for sake of compliance with a physician's request, and 3.8 times higher if screening was discussed with spouse. The Max-rescaled R^2 was 0.39 which indicated that 39% of the variance in getting screened was explained by the logistical regression model.

Determination of Vaccination Behavior

A logistic regression analysis was conducted to determine which HBM components best predicted vaccination behavior for HBV (Table 5). The variables which inversely correlated with vaccination behavior were: not having time, did not know a screening location, and not speaking the physician's language. The variables which positively correlated with vaccination behavior were having a primary care physician. Odds that a person would be vaccinated were 10.5 times higher if they had a primary care physician. The Max-rescaled R^2 was 0.17 which indicated that 17% of the variance in getting screened was explained by the logistical regression model.

Discussion

The purpose of this study was to measure risk perceptions, barriers, and self-efficacy among Chinese immigrants of lower socioeconomic status and limited English proficiency that may have an impact on HBV screening and vaccination behavior.

Overall, while the majority of study participants (70%) thought that their racial/ethnic group was more at risk, especially being Chinese, and that HBV was a serious disease that could harm them if contracted (89.3%), only a third (32.8%) believed they were personally at risk. This is consistent with James and Chen[27] who found that most parents (66%) did not believe that their children were at risk for being infected by HBV. Our study, nonetheless, found a significant correlation between perceiving Asian Americans as more susceptible to HBV and getting vaccinated. Based on the HBM, it would be predicted that Asian Americans who personally

perceive that they are at risk would be more likely to seek screening and vaccination. The findings of our study however, are at variance with those of Pulido and colleagues[35] who found that Chinese parents who felt their children might be at risk for HBV infection are only slightly more likely (OR=1.44) to have their children complete the vaccine series. Cultural factors may play a role in screening behavior and there may be differences with respect to age within an Asian American subgroup. For example, older Asian Americans may shy away from screening and vaccination because of modesty or because they may have a different health care orientation than younger Asians.[36, 37]

While the majority of our study participants had a physician, more than half (52%) lacked knowledge about HBV and only a quarter (25%) knew if their insurance covered screening or vaccination. The study revealed, however, that despite the fact that the majority of participants had health care providers who were conversant in Chinese, they had not discussed hepatitis B with their providers. While cost was been found to be a barrier to universal vaccination in previous studies it was not a significant factor for screening and vaccination for HBV in the current study.[38] The large number of participants (79.3%) who stated that they would seek screening if they knew it was free, would suggest that free screenings might be a strong incentive for screening and vaccination among Asians.

Screening and Vaccination Behavior

The independent variables which were significantly positively correlated with HBV screening included: if people thought that the disease was serious (OR=1.3), it caused harm (3.9), the doctor suggested to get screened (OR=2.4), and they discussed screening with their spouse (OR=3.8). The independent variables that significantly negatively correlated with screening included: if they thought that they were afraid they already had HBV, they did not know a screening location, and it was not suggested by their doctor. These findings indicate that fear of having HBV may not be sufficient to motivate participants to engage in screening activities. Our study data suggest that although fear of having hepatitis B was significantly correlated with screening (c=0.19) and vaccination behavior (c=0.11), these factors may not be sufficient to lead to screening. If, on the other hand, participants were advised by their physician to engage in screening, they would discuss it with friends and family, they would have self-efficacy for screening, and would be much more likely to go for screening. The variables which significantly inversely correlated with vaccination behavior were: not having time, did not know a screening location, and not speaking the physician's language. The variables which significantly positively correlated with vaccination behavior were having a primary care physician. The odds that a person would be vaccinated were 10.5 times higher if they had a primary care physician. The model accounted for 17% of the variance in getting vaccinated. Generally, individuals are more likely to get screened and vaccinated, if their physician recommended it, a finding that is supported by Pulido and colleagues [35] who observed that children whose parents did not discuss HBV with their child's health provider were less likely to get screened and vaccinated. This study also found that vaccination rates for HBV increased as a function of health care providers' advice to parents. These variables accounted for approximately 39% of the variance in screening behaviour.

This study had two limitations. First, the sample was restricted to Chinese Americans who were predominantly of low socioeconomic status, had limited English proficiency, and who were participants in community organizations. Generalizations beyond the study population may be inappropriate or limited. Second, Chinese immigrants were overrepresented in the sample (93.3%) than the case for the general Chinese population of NYC (75%) and therefore may not be representative of the general population of Chinese. In general, these findings suggest a need for public health efforts that aim at increasing perceived susceptibility and an understanding of increased risk of HBV infection among Chinese Americans, especially first-generation immigrants.

Educational interventions will need to be culturally (contextually and linguistically) tailored to increase awareness of risks, reduce barriers identified in this and other studies that have focused on other Asian Americans, and promote self-efficacy to improve HBV screening and vaccination rates. Our findings also indicate that there exists a need to examine whether educational interventions for providers would affect increases in screening and vaccination rates among Asians.

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Table 1. Sample Characteristics

	N = 429 %
Age (Mean, SD)	57.1 (19.3)
19-25	6.4
26-35	10.1
36-50	25.2
51-65	16.8
66+	41.5
Gender	
Male	38.4
Female	61.6
Birth in US	6.7
Years in US (M, SD)	17.5(11.1)
Marital status	
Married	69.2
Single	14.1
Divorced/Separated	2.8
Widower	13.6
Education level	
< High school	36.0
High school	32.4
University	22.3
Graduate and above	9.4
Household income	
<20,000	74.5
20,000-40,000	12.7
40,000+	12.9
Speak English	
Fluently	15.6
Fairly/Poorly/None	84.4
Read English	
Fluently	16.2
Fairly/Poorly/None	83.8

Table 2. Risk Perceptions and Barriers by Screening/Vaccination of HBV

Risk Perceptions	N=429 %	Screening N=429 c	Vaccination N=429 C
Perceived susceptibility			
Believe at risk	32.8	0.14	0.09
Perceived severity			
Perception of ethnic group at greatest risk			
Whites	7.7	0.08	0.00
Blacks	21.6	0.13	0.06
Hispanics	15.3	0.12	0.03
Asian Americans	62.9	0.21*	0.17**
Perception of ethnic subgroup at greatest risk			
Chinese	68.9	0.17*	0.09
Vietnamese	24.0	0.13	0.02
Cambodian	20.3	0.12	0.07
Filipino	6.9	0.11	0.02
Korean	5.4	0.11	0.03
Hmong	5.1	0.08	0.12*
Hepatitis B virus would harm if contracted	89.3	0.15*	0.10*
Hepatitis B virus is a serious disease (Mean, SD)[a]	7.83(2.73)	0.33*[b]	0.20[b]
Perceived barriers			
Lack of knowledge	51.6	0.09	0.02
Feeling well/No health problems	34.6	0.18 *	0.05
Language problem	9.0	0.06	0.04
No doctor	6.7	0.10	0.06
No time	10.8	0.12	0.16**
Did not know where to get screened	12.5	0.21***	0.14**
No transportation to facility	3.5	0.10	0.07
No insurance	9.6	0.17*	0.02
High cost of the screening test	4.9	0.04	0.01
Fear of a positive results	0.9	0.10	0.03
Embarrassment/Shame	0.3	0.05	0.03
Not suggested by your doctor	17.7	0.18**	0.04
Have primary care provider	85.6	0.13	0.19***
Physician speak your language	78.0	0.12	0.01
Did not know if insurance plan covers screenings/vaccinations	24.8	0.21***	0.09

*p<.05, **p<.01, ***p<.001

[a] Ten point scale where, 1=Least Serious and 10= most serious.

[b] Point biserial correlation (one dichotomous and one interval variable)

c= contingency coefficient (nominal variables)

Table 3. Perceived Benefits and Self-Efficacy by Screening and Vaccination

Perceived Benefits	N=429 %	Screening N=429 c	Vaccination N=429 c
Reason for screening			
Fear had hepatitis B virus	44.5	0.19**	0.11*
Covered by insurance	13.2	0.14	0.11
Significant other/family member/friend has it	7.1	0.05	0.00
Self-efficacy	51.6	0.14*	0.07
Cues to Action			
Family member is a carrier	11.8	0.15	0.11
Attended hepatitis B virus workshop	10.3	0.10	0.12*
Doctor told person to get screened	49.7	0.27***	0.14*
Would go if free screening/ vaccination	79.3	0.13	0.04
Discuss hepatitis B virus with significant other/family	62.8	0.17**	0.12*
Discuss hepatitis B virus with Friends	64.8	0.15*	0.04
Spousal support if wanted Screened/vaccinated.	88.6	0.10	0.08

*p<.05, **p<.01, ***p<.001
c= contingency coefficient (nominal variables)

Table 4. Final Logistic Regression: Predictor Variables of Screening for HBV using the Health Belief Model Components

N = 429	B(SE)	Odds Ratio	95% C.I.
Hepatitis B virus is a serious disease	.25(.08)	1.29***	1.11, 1.50
Hepatitis B virus will cause harm	1.36(.64)	3.90*	1.10, 13.85
Afraid had hepatitis B virus	-1.24(.39)	.29**	.13, .63
For sake of compliance with physician	.88(.38)	2.40*	1.17, 4.93
Did not know screening location	-1.90(.79)	.29*	.03, .71
Not suggested by the doctor	-1.26(.56)	.29*	.10, .86
Discuss screening with spouse	1.34(.62)	3.82*	1.13, 12.90
Constant	-3.61(2.15)	.03	

*p<.05, **p<.01, ***p<.001

Table 5. Final Logistic Regression: Predictor Variables of Vaccination for HBV using the Health Belief Model Components

N = 429	B(SE)	Odds Ratio	95% C.I.
No time	-2.31(1.06)	.10***	.01, 0.79
Did not know screening location	-1.74(.77)	.18*	.04, 0.79
Had a primary care physician	2.36(.69)	10.55***	2.73, 40.7
Difficulty speaking English	-1.37(.48)	.26**	.10, 0.66
Constant	1.08(1.71)	2.96	

*p<.05, **p<.01, ***p<.001