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ORIGINAL PAPER

Hepatitis B Prevalence Among Asian Americans in Michigan: An Assessment to Guide Future Education and Intervention Strategies

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Abstract Free HBV (hepatitis B virus) screening was offered at 8 health fairs to Asian Americans in Southeast and West Michigan for two and a half years as a community service to study the prevalence of hepatitis B among Asian Americans in Michigan as a first step in reducing the incidence of hepatitis B. The screening included a 4 ml blood sample and a questionnaire assessing demographics and family history of hepatitis B; tests included the HBV surface antigen and antibody. 567 people participated in the study. About 6% of the participants had chronic hepatitis B (HBV carriers), 54% had the antibody (either had the disease before or were vaccinated) and 40% had no antibody or antigen (never infected by HBV and should be vaccinated to get protection). More than 95% of the participants were immigrants. Participants indicated in the family history that 10% had relatives with hepatitis B, 5% with liver cirrhosis, and 3% with liver cancer. Results of our screening supported our hypothesis that prevalence of hepatitis B among Asian Americans in Michigan would be similar to that in Asian Americans on the East and West coasts. We need to develop a strategy in Michigan to address this disease. In conducting this study, it was noticed that there was still resistance by Asian Americans to participate in clinical studies. An education intervention that is delivered in native Asian languages and in a culturally sensitive manner is needed to effectively raise awareness of hepatitis B among Asian Americans.

Keywords Hepatitis B · Prevalence · Asian Americans · Michigan

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Introduction

It is estimated that 1.2 million, or 1 in 10, Asian Americans are chronically infected with the hepatitis B virus (HBV) [1–4]. The disproportional prevalence of chronic hepatitis B among Asian Americans (10% in comparison to <0.5% for average Americans) is one of the greatest health disparities for Asian Americans (Center for Disease Control and Prevention, 2005) [1, 4, 5].

Most of these studies were conducted on the East and West Coasts where there are large and dense Asian American populations; however, there have been no such studies conducted in the Midwest. Although there are large populations of Asian Americans residing in the Midwest and Mountain zones [6], they are spread over much wider geographic areas, which make such studies not as easy logistically to conduct as in the coastal areas. But it can still be managed reasonably where there are dense Asian American populations in metropolitan areas like Chicago and Detroit [6, 7]. Such studies will allow us to learn if there is similar hepatitis B prevalence in the Midwest.

Chronic hepatitis B patients without early detection and proper medical attention will face a 25% risk of death from cirrhosis or liver cancer [1, 8–10]. Liver cancer is the second leading cancer death among Asian American men [11]. Hepatitis B is also the leading cause of liver cancer among Asian Americans [12]. Many people with chronic HBV infection do not have symptoms and therefore are not

aware that they have the disease. Because there are simple tests for hepatitis B, treatments that can help patients get the disease under control, and vaccines that can protect uninfected people, the damage due to hepatitis B can easily be reduced [12]. It is surprising that so many Asian Americans still do not know about the disease and its consequences [13, 14]. Even in the San Francisco Bay area where there are large educated Asian American populations, the knowledge of hepatitis B is still not wide spread [15].

Since hepatitis B is one of the greatest health disparities for Asian Americans [16, 17], it is imperative to raise awareness among Asian American communities and get them screened. For this purpose, the present project was initiated in 2006 by the Healthy Asian Americans Projects at the University of Michigan, School of Nursing and the University of Michigan Health System, Department of Internal Medicine. The purpose was to study the prevalence of hepatitis B among Asian Americans in Michigan as a baseline assessment to help design education campaigns and interventions.. The ultimate goal is to have this disease under control, to reduce the incidence of deadly liver cirrhosis and liver cancer. It will take several steps to reach this goal. In this first endeavor, our primary goal was to learn about the prevalence of hepatitis B in Michigan. While offering screening, we also provided some education to the community. This paper summarizes how the study was conducted and what was found.

Methods

Education and Participant Recruitment

The education program in this phase was general, mainly to disseminate hepatitis B information among Asian American communities. Education materials were gathered from different hepatitis B education sites online, from pharmaceutical companies and from the American Liver Foundation. This literature included translations in different Asian languages: Chinese, Korean and Vietnamese, etc.

For two and a half years, we passed out about 1000 hepatitis B brochures in different Asian languages and published more than 30 articles in local Asian newspapers, e.g., Chinese, Korean and Vietnamese community newspapers. The largest metro Detroit Chinese newspaper distributes over 10,000 copies per weekly issue, others have smaller readerships. During Asian American health fairs, educational materials were distributed, seminars were offered in different languages, and sometimes presentation slides were continuously shown throughout the entire health fair for participants to watch while waiting for various clinical services.

The fair recruiting process for the hepatitis B program tied into its education program. Since we relied heavily on local Asian newspapers to announce fair information, we published hepatitis B awareness articles and put the fair information at the end of the article. Using media broadcasts on hepatitis B education helped draw attention from the community; we usually announced the upcoming fairs at the same time. We distributed hepatitis B brochures along with fair flyers in different Asian languages at public gatherings and major Asian American events. Recruiting for the hepatitis B study focused mainly on the 3 Asian groups (Chinese, Korean and Vietnamese) that had higher prevalence rates [4, 9, 18] from our earlier literature search.

In summary, our common recruiting methods for health fairs included:

- Local Asian news media (newspapers, periodicals, radio stations, a few non-regular TV programs)
- Flyers posted in Asian markets and restaurants
- Announcements and/or flyers distributed during large gatherings at local events (art exhibits, performances, holiday celebrations and religious worship)
- Personal recruitment through friends and family members
- Referral from past health event participants

Prevalence Study

Our method was to offer free HBV screening during Asian American health fairs. Our study included collecting participants' demographic information, their family HBV history information and a 4 ml blood sample for HBV surface antibody and surface antigen tests. In many of the health fairs, we collaborated with local community or health service organizations, some for specific ethnic groups, some for church or temple attendees, always including all general Asian American populations whenever possible. The fair locations were usually community centers, civic centers, or at other public gathering places (e.g., churches, temples and halls, etc.); most were in the metro Detroit, Ann Arbor, Lansing and Grand Rapids areas in Michigan, where there are large, dense Asian American populations.

Even though our studies targeted all Asian Americans, we focused on 6 major Asian ethnic groups that have larger populations in Southeast and West Michigan: [7] Asian Indian, Chinese, Filipino, Hmong, Korean and Vietnamese. We had coordinators for each of these Asian groups, usually well-known, respected community leaders who knew their people and how to reach out to their communities. Most of the educational programs we offered had literature translated into different languages since a large percentage of our clients were expected to be older immigrants who did not speak English. Typically we had translations in Chinese, Korean and Vietnamese, and sometimes Hindi (Asian Indian), Tagalog (Filipino), and Hmong.

Demographics and Background Questionnaire

Because the majority of our participants did not speak English, we had to provide translators at the fair. Translators were mostly community volunteers who had been recruited by our coordinators specifically for the fair. They were trained for an hour before the fair to get familiar with our process which is designed specifically for temporary, mobile clinics. Since it was not possible to accurately predict who were coming to each fair, sometimes there was a shortage of translators in certain languages which resulted in improperly or poorly filled-out questionnaires. This shows up in our data summary.

Because the translators provided a cultural bridge as well as a literal translation, participants volunteered information that was not strictly required to complete the questionnaire. These anecdotal recordings added to our understanding of the situations of these populations and could aid in effective design of future education campaigns and interventions.

Follow-up after Sample Collection

We contracted a commercial medical test lab to handle our blood work, including blood drawn during the health fair, transporting blood samples to the testing location and conducting HBV blood tests, and disposing of bio-hazard materials. The lab sent certified phlebotomists to the fair locations to collect the blood samples and related paper work. Usually we got the test result back within a week, and then we processed test results along with the report letters, which were then mailed to participants.

There were 3 types of HBV report letters:

1. Antigen positive (HBsAg+): These are chronic hepatitis B patients, so we accompanied the letter with a list of local liver specialists and recommended that they seek consultation and/or treatment.
2. Antibody positive (Anti-HBs+): These are people who have either had the disease or were vaccinated and are therefore immune to the disease. Because of possible transmission risk, we recommended that they advise their family members get tested.
3. Both markers are negative: These people are vulnerable and should be vaccinated to get protection. We provided a list of public health offices and recommend that they get vaccinated.

A list of nearby county health departments and local low-cost clinics was enclosed with every report letter to advise them to have their family members tested for HBV, and then either to get vaccinated or seek treatments according to the test results.

One major complication was that we needed the translation for all 3 letters in different languages so the participants could read it themselves with the proper language which protected their privacy. So each standard test report needed 4 translations: Chinese, Hmong, Korean and Vietnamese (English was used for Asian Indians and Filipinos). We had to match the right letter in the right language with the right test result to an accurate address. With 15 different possibilities (including English), we usually had to check its accuracy several times before sending the report out. We always included an English version of any translated letter in case the participant wanted to show this report to his/her family physician who may not be able to read Asian languages.

Results

Health Fair Participant Demographic Information

Data used in this paper were collected from the first 8 health fairs where we offered free HBV screening. Each participant filled out a registration with their demographic information. Not every fair participant took the HBV screening but those who elected to participate in the screening also filled out a family HBV history, and signed a hepatitis B project informed consent form. The first table provides general information on these health fairs: dates, locations, total participants, average age, etc. and breakdown of the 3 ethnic groups with the highest hepatitis B prevalence.

The average HBV screening rate from all fairs was about 67%, which covered a wide range from 36.3 to 94.1% across the 8 health fairs. Although we did not have a question in the registration asking for their reasons not to participate, some of the participants volunteered their answers when asked whether they would take the HBV screening. These reasons included: they already knew their status or they were tested before or they had been vaccinated Table 1.

In Table 2 we compare the characteristics of those who participated in the HBV screening versus those who did not. Since we only asked HBV screening participants whether they were tested for HBV before, we do not have this information for those who did not take the HBV screening; and that is why the last comparative parameter cannot include a column for the Group B participants. However, one noticeable fact was that there were fewer percentages of Filipinos and Asian Indians taking HBV screening. The completion rate of the questionnaire was not very high. When the sample size of a group is too small, the data is not statistically sound and may look strange; some of the data do look very strange due to the extremely small sample size.

Table 1 Health Fair Dates and Locations

Date	Location	Setting	Total no. of participants	Age of participants, mean + SD	No. (%) of Chinese	No. (%) of Korean	No. (%) Vietnamese	No. (%) participated in HBV screening
9/10/2006	Southfield	Cultural centre	257	52.8 ± 12.5	80 (31.1%)	25 (9.7%)	46 (17.9%)	167 (65%)
1/10/2007	Ann Arbor	U of M Med school	61	58.2 ± 18.4	49 (92.5%)	0	0	36 (59.0%)
2/28/2007	Southfield	Cultural centre	39	48.3 ± 14.6	8 (20.5%)	18 (46.2%)	13 (33.3%)	33 (84.6%)
9/29/2007	Grand Rapids	Cultural centre	165	49.5 ± 14.1	48 (39.3%)	5 (4.1%)	52 (42.6%)	97 (58.8%)
10/27/2007	Madison Heights	Community centre	109	58.8 ± 14.0	79 (84.9%)	0	14 (15.1%)	96 (88.1%)
2/2/2008	Ann Arbor	U of M Med school	102	47.1 ± 17.5	41 (46.6%)	5 (5.7%)	1 (1.1%)	37 (36.3%)
4/27/2008	Warren	Church	48	49.5 ± 12.8	11 (25.6%)	0	0	37 (77.1%)
5/24/2008	E. Lansing	MSU Med school	68	44.8 ± 19.0	53 (81.5%)	3 (4.6%)	3 (4.6%)	64 (94.1%)
Total			849	52.7 ± 15.7	369 (43%)	56 (7%)	129 (15%)	567 (67%)

In general, we had more women than men in our health fairs, and this was also true for the break down between the HBV and non-HBV groups. There was no age difference between the two groups. Our data show that more than 95% of our fair participants were immigrants; their average age at time of immigration to the US was about 35 years of age, pretty much the same for both groups. In the column for health insurance, it clearly shows there was a difference: those didn't have health insurance were more likely to have taken our free screening. In summary, aside from health insurance, there was not much difference between the 2 groups.

HBV Screening Results

We will show the screening results in two bar charts first and then a large overall summary in Table 3. The test involves 2 bio markers: surface anti-gen (HBsAg) and surface anti-body (anti-HBs). These 2 markers are mutually exclusive, so there are only 3 kinds of screening results: either antigen positive or antibody positive or both negative.

About 6% of the participants (33 out of 567) had chronic hepatitis B (HBV carriers), 54% (307 out of 567) had the antibody (either had the disease before or were vaccinated) and 40% (227 out of 567) had no antibody or antigen (never infected by HBV and should be vaccinated to get protection) (Chart 1).

Among the HBV carriers (antigen positive), 17 were men and 15 were women and one did not mark gender. But the prevalence for men was 8.0% (17/213) and 4.3% (15/351) for women (Chart 2).

Notably in Table 3, 2 out of 3 of the hepatitis B patients did not know they were infected before taking the screening; 18 out of 33 stated they had never been diagnosed with HBV infection and 4 didn't know or did not report whether they were diagnosed with hepatitis B before. Although not everyone answered every question, most of the questions had enough samples to provide statistically sound data.

Chi-square analysis was used to compare the test results with each characteristic. Only age and ethnicity had correlations. The youngest hepatitis B patient was 18 years of age and the oldest 67. The 40-49 age group had the most HBV patients, older people had very few cases with slightly more in the younger groups. In the breakdown for ethnic groups, our study indicated in Southeast Michigan, Hmong had the highest prevalence rate, followed by Vietnamese, Chinese and Korean. Some groups had such an extremely low sample size that their data provided no statistical values.

Relationships between Questionnaire and Blood Test Results

Based on those who answered about their birth place, 96% of the participants were immigrant. Slightly less than 4% were US born. Although only 30 out of 33 hepatitis B patients answered that they were immigrants, we can confidently say that all 33 hepatitis B patients were immigrants based on other demographic answers (e.g., native language or age moved to the US) of the 3 who did not provide the answer for their birth place. More than half of the participants showed antibody positive but less than

Table 2 Characteristics between people who did and did not participate in the HBV screening program

Ethnic groups	Total participants		Gender (male/female/UK)		Age (mean + SD)		No. born in the US (yes/no/UK)		Age moved to US (mean + SD)		No. (%) with health insurance		No. (%) previously tested for HBV
	Group A	Group B	Group A	Group B	Group A	Group B	Group A	Group B	Group A	Group B	Group A	Group B	Group A
Chinese	306	123	114/192/0	41/52/30	54 ± 17	59.5 ± 15.3	9/286/11	3/109/11	37 ± 18	43.7 ± 22.0	164 (53.6%) $N = 306$	45 (43.3%) $N = 104$	52 (17%)
Vietnamese	129	13	46/81/2	5/3/5	50 ± 13	40.9 ± 13.3	2/104/23	1/10/2	35 ± 15	23.3 ± 7.1	49 (38.0%) $N = 129$	8 (61.5%) $N = 13$	14 (10.9%)
Korean	52	6	19/33/0	0/5/1	48 ± 12	29.7 ± 16.2	0/49/3	2/4/0	31 ± 12	9.5 ± 11.3	11 (21.1%) $N = 52$	6 (100%) $N = 6$	10 (19%)
Hmong	27	6	10/16/1	1/5/0	48 ± 14	45.3 ± 10.1	1/25/1	0/6/0	23 ± 13	17.2 ± 12.4	19 (70.4%) $N = 27$	3 (60.0%) $N = 5$	4 (14.8%)
Asian Indian	20	26	11/9/0	10/15/1	46 ± 14	42.3 ± 12.9	0/20/0	1/24/1	39 ± 14	26.5 ± 10.6	15 (75.0%) $N = 20$	18 (64.3%) $N = 26$	1 (5%)
Filipino	14	31	3/11/0	7/21/3	55 ± 13	54.1 ± 15.8	1/13/0	1/28/2	33 ± 8	49.4 ± 16.1	6 (42.9%) $N = 14$	16 (64%) $N = 25$	1 (7%)
Thai	4	1	3/1/0	1/0/0	46 ± 14		0/4/0	0/1/0	25 ± 5	20.0 ± 0.0	0	–	0
Japanese	1	0	0/1/0	0	56		0/1/0	0	18	0	1 (100%) $N = 1$	0	0
Others	7	10	1/6/0	7/3/0	48 ± 15	55.7 ± 12.6	1/6/0	4/6/0	19 ± 18	25.6 ± 0..9	2 (28.6%) $N = 7$	9 (90%) $N = 10$	1 (14%)
Missing	7	8	0/0/7	0/0/8			0/0/7	00/8					
Total	567	224	207/350/10	72/104/48	52±	53.8 ± 16.7	14/508/45	12/188/24	35±	37.6 ± 21.2	267 (41.7%) $N = 567$	105 (55.5%) $N = 189$	83 (14.6%)

Group A: Fair participants took the HBV screening

Group B: Fair participants did not take the HBV Screening

Table 3 Comparison of persons infected (HBsAg+), immune (anti-HBs+) or seronegative (HBsAg(−)/anti-HBs(−))

Characteristics	HBs Ag(+) chronically infected		Anti-HBs(+) immune		HBsAg(−)/Anti-HBs(−) unprotected		$\rho+$	Total
	#	%	#	%	#	%		
Overall	33		307		227			567
Gender							0.77	
Female	15	45.5	190	61.9	146	64.3		351
Male	17	51.5	116	37.8	80	35.2		213
Missing	1	3.0	1	0.33	1	0.44		3
Age (years)							0.0002	
<30	4	12.1	52	16.9	8	3.5		64
30–39	6	18.2	34	11.1	25	11.0		65
40–49	12	36.4	53	17.3	42	18.5		107
50–59	5	15.2	73	23.8	67	29.5		145
60–69	5	15.2	57	18.6	47	20.7		109
>69	0	0	28	9.1	36	15.9		64
Missing	1	3.0	7	2.3	1	0.4		13
Born in US							0.27	
Yes	0	0	13	4.2	6	2.6		19
No	30	94	277	90.2	203	89.4		510
Missing	2	6.3	17	5.6	18	7.9		37
Age moved to US (years)							0.39	
<20	3	9.1	23	7.5	6	2.6		32
20–39	7	21.2	63	20.5	47	20.7		117
40–59	1	3.0	39	12.7	23	10.1		63
>60	1	3.0	19	6.2	16	7.1		36
Missing	21	63.6	173	53.1	135	59.5		319
Ethnicity							0.02	
Asian Indian	0	0	10	3.3	10	4.4		20
Chinese	17	51.5	164	53.4	125	55.1		306
Filipino	0	0	7	2.3	7	3.1		14
Hmong	3	9.1	14	4.6	10	4.4		27
Japanese	0	0	0	0.0	1	0.5		1
Korean	2	6.1	33	10.8	17	7.5		52
Thai	0	0	4	1.3	0	0.0		4
Vietnamese	10	30.3	72	23.5	47	20.7		129
Others	1	3.0	2	0.7	4	1.8		7
Missing	0	0	1	0.3	6	2.6		7
Total	33	5.8	307	54.1	227	40.0		567
Family history							0.68	
Yes	9	28.1	35	11.4	15	6.6		59
No	20	62.5	229	74.6	177	78.0		426
UK/missing	3	9.4	43	14.0	35	15.4		81
Previous HBV test							0.71	
Yes	10	31.3	58	18.9	15	6.6		83
No	18	56.3	211	68.7	180	79.3		409
UK/missing	4	12.5	38	12.4	32	14.1		74
Ever vaccinated							0.32	
Yes	5	15.6	75	24.4	17	7.5		97
No	23	71.9	181	59.0	166	73.1		370
UK/missing	4	12.5	51	16.6	44	19.4		99

Table 3 continued

Characteristics	HBs Ag(+) chronically infected		Anti-HBs(+) immune		HBsAg(−)/Anti-HBs(−) unprotected		$\rho+$	Total
	#	%	#	%	#	%		
Health insurance							0.96	
Yes	11	34.4	147	47.9	115	50.7		273
No	19	59.4	122	39.7	89	39.2		230
UK/missing	2	6.3	38	11.4	23	10.1		63

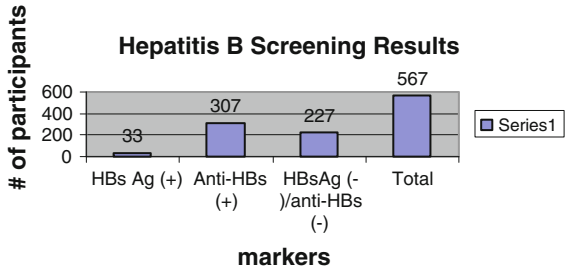

Chart 1 Total screening results

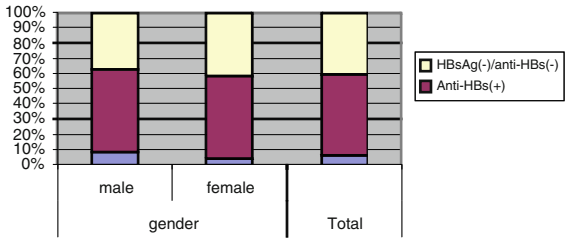

Chart 2 Screening results breakdown between men and women

18% of overall participants were vaccinated. That implies many immigrants were infected with HBV before moving to the US. So for practical purposes, our HBV data were mainly for Asian immigrants, not for US born Asian Americans, identifying a target group for design of future education and intervention efforts.

Among the 33 chronically infected hepatitis B patients, 5 of them reported being vaccinated earlier. They might have contracted the disease before they received vaccination, but were not aware or screened prior to vaccination. This possibility was raised voluntarily by one of these 5 participants but could not be explored more afterwards for the other 4 since our consent form did not allow us to call participants back for subsequent questions.

Among the 307 participants who had HBV antibody, 75 were vaccinated; therefore 232 must have had acute hepatitis B earlier in their life, very possibly before coming to the US. Adding the 33 chronic hepatitis B patients to this group of 232 acute hepatitis B patients, 265 participants (46% = 265/567) were infected with HBV (acute or chronic). We can conclude that about 46% of the Asian immigrants had hepatitis B and 12% (33/265) never overcame it and became chronic. Further analysis of individual answers also showed 4 US born with HBV antibody were not vaccinated, so they must have gotten the antibody from an HBV infection, yet none of them had a family history of HBV infection, or at least not that they were aware of. There were also 17 participants who claimed they were vaccinated but showed negative for antibody. We did not obtain information on how long ago participants were vaccinated nor what the dosage was.

Almost one-third of the chronic hepatitis B patients came from families with an indicated HBV history. It is not surprising to see the association between the test results and family HBV history since it is a disease that can infect family members. Asian immigrants with HBV infection have a very high probability of passing the disease to other family members if they have no education about preventative measures. To reduce this health disparity, all family members living with a hepatitis B patient should learn how the disease is transmitted and how to avoid it., We will do further work on identification of interventions that will reduce the risk to family members.

Close to 88% of the participants answered questions about their family hepatitis B background: 10% of the total answering participants had relatives with hepatitis B, 5% with liver cirrhosis, 3% with liver cancer. Roughly 85% answered questions about his/her own HBV related symptoms: 3% had jaundice, 3% knew they had liver disease, 5% knew they had hepatitis B, 2% knew they had acute hepatitis. Only 15% were tested for hepatitis B before, and 17% were vaccinated. Given these statistics among this participating small slice of the Michigan Asian American population, we feel that wider testing and vaccination of this target group is imperative.

About 90% of participants answered the question about health insurance, and among them 45% had no health insurance at all. Almost 2/3 of the hepatitis B patients did not have health insurance, therefore treatment was not likely to be in their plan. There was no clear link between health insurance and HBV infection since the disease appeared to have been contracted by a majority of the participants before they came to the US.

Discussion

Our age brackets show that the majority of the immigrants came over between the ages 21–59. We believe that people who came over between the age 21–39 were usually here to pursue advance studies and settled down afterwards, therefore they would have health insurance from employer; those came over at the age 40–59 were here following their children who settled down first, and therefore were less likely to have health insurance. This information was not from the questionnaire used in our study, but collected as anecdotes by our translators through casual conversations with some of the participants, plus our many years of engagement and service within the Asian American community.

The percentage of those who were previously screened for HBV is relatively high among our participants. Some of the antigen positive patients (HBV carriers) who were previously screened knew they had the disease, so they took every opportunity to be screened again to see if the disease would cure itself without treatment. Some of the participants who were screened before just wanted to make sure they had not gotten the disease since their last screening or that the disease did not come back again if they had acute hepatitis B before. These are some of the reasons we gathered from talking with participants during the health fair. This also gives us clear evidence and strong reasons to offer more HBV education. Another immediate need is a treatment and vaccination plan to follow up with those who need them from our past studies. As healthcare professionals, our jobs are not complete without this follow-up step.

Most of the studies in our literature evaluation have shown the need to educate the Asian American community [2, 14, 19, 20]. Our education program so far has only been disseminating HBV information to the community with no feedback on how effective the information has been. To include feedback, our next step is to design an education intervention that can be measured for its effectiveness so that we can distribute information both more widely and more effectively to help control the disease. A captive group given pre- and post-questionnaires will measure the effectiveness of an intervention. We have previously used this method effectively in our successful colorectal cancer education campaign [22].

During our hepatitis B study over the past 3 years, we have found that many Asian Americans are still very reluctant to participate in clinical studies, even when we offered free HBV screenings. There is some literature [23, 24] confirming this fact too, not just health studies, but also many clinical trials [25]. That indeed tells us more intense and properly designed education should be forthcoming as our next step. Any education intervention has to be culturally sensitive to Asian Americans and use their native languages [21]. Because of our findings on hepatitis B incidence among immigrants, this should also include more education on general healthcare issues and the American healthcare system.

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