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EVALUATION OF A HEPATITIS B LAY HEALTH WORKER INTERVENTION FOR CAMBODIAN AMERICANS

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Abstract

Cambodian Americans have high rates of chronic hepatitis B virus (HBV) infection. However, only about one-half of Cambodian Americans have been serologically tested for HBV. We conducted a randomized controlled trial to evaluate the impact of a lay health worker (LHW) intervention on HBV testing and knowledge levels among Cambodian Americans. The study group included 250 individuals who participated in a community based survey in metropolitan Seattle and had not been tested for HBV. Experimental group participants received a LHW intervention addressing HBV and control group participants received a LHW intervention addressing physical activity. Trial participants completed a follow-up survey six months after randomization. Over four-fifths (82%) of randomized individuals participated in a LHW home visit and the follow-up survey response rate was 80%. Among participants with follow-up data, 22% of the experimental group and 3% of the control group reported HBV testing ($p < 0.001$). The experimental and control group testing difference remained significant in an intent-to-treat analysis. The experimental group was significantly more likely than the control group to know that Cambodians have higher rates of HBV infection than whites, HBV cannot be spread by eating food prepared by an infected person, HBV cannot be spread by sharing chopsticks, and HBV cannot be spread by shaking hands. Our findings indicate LHW interventions are acceptable to Cambodian Americans and can positively impact both HBV testing and knowledge levels.

Keywords

Cambodian Americans; Hepatitis B Infection; Lay Health Workers

INTRODUCTION

Hepatitis B virus (HBV) infection is endemic in most Asian countries and can be transmitted during childbirth, during sexual intercourse, and through close household contact [1,2].

Exposure to HBV often results in a self-limiting infection that can be asymptomatic or present as acute hepatitis, usually followed by immunity. However, a significant proportion of those exposed to HBV become chronically infected. These individuals continue to be potentially infectious to others and are at considerable risk of liver cancer, chronic active hepatitis, and cirrhosis [3]. Available data indicate that about 10% of Cambodian immigrants to the United States (US) have evidence of chronic HBV infection, compared to less than 0.5% of the general population [4-6].

HBV serologic testing is recommended for all immigrants from endemic areas of the world (e.g. Cambodia), as well as their US-born children [7]. Testing allows the identification of people who have chronic infection and should be monitored for the progression of cirrhosis and development of liver cancer, may benefit from treatment with anti-viral medications, and should take precautions against infecting others. It also allows the identification of individuals who have never been exposed to the virus, remain susceptible to future infection, and should be vaccinated [8].

Several studies have shown that only about one-half of Cambodian Americans have been tested for HBV [9,10]. Additionally, one study found that only a minority of Cambodian Americans know that Cambodians are more likely to be infected with HBV than whites (43%), HBV is more easily spread than AIDS (19%), HBV cannot be spread by eating food that has been prepared by an infected person (28%), HBV cannot be spread by coughing or sneezing (32%), HBV can be spread by sexual intercourse (46%), and HBV can be spread by someone who looks and feels healthy (43%) [11].

The Institute of Medicine (IOM) recently released a report addressing a national strategy for the prevention and control of hepatitis B and C [12]. Additionally, the Department of Health and Human Services (DHHS) recently released an action plan for the prevention, care, and treatment of viral hepatitis [13]. The IOM report and DHSS plan both call for HBV research and educational efforts focusing on high-risk populations, and emphasize the importance of improving levels of HBV testing and knowledge among foreign-born populations from endemic areas of the world [12,13].

The Cochrane Collaboration reviewed findings from randomized controlled trials that evaluated the effectiveness of lay health worker (LHW) interventions and concluded that LHW outreach is a promising approach to improving health outcomes among racial/ethnic minorities in developed counties [14]. Randomized controlled trials have shown that LHW approaches can improve breast and cervical cancer screening participation among Vietnamese American women, and a recent pilot study suggested that they can improve colorectal cancer screening participation among Chinese Americans [15-18]. In this report, we provide findings from our randomized controlled trial to evaluate the effectiveness of a LHW intervention in improving levels of HBV testing and knowledge among Cambodian Americans.

METHODS

Overview of Study

The study design is summarized in Figure 1. Trial participants were individuals who participated in a community-based survey, conducted in metropolitan Seattle, over a six-month period during 2010. Individuals were eligible for participation in our community-based survey if they were of Cambodian descent, aged 20-64 years, and able to speak Khmer or English. We attempted to interview one age-eligible man and one age-eligible woman in each household (rather than one individual in each household). The survey was conducted face-to-face in participants' homes. Survey respondents provided information about their

HBV testing history, knowledge about HBV, and demographic characteristics. Our sampling methods, survey administration, survey items, and survey response have been described in detail elsewhere [10,19].

Individuals in the trial sample were randomized six months after they participated in the community-based survey. Immediately after randomization, individuals assigned to the experimental group were offered a HBV LHW intervention and individuals assigned to the control group were offered a physical activity (PA) LHW intervention. Both LHW interventions included the use of culturally and linguistically appropriate educational materials.

Our primary trial outcome was HBV testing completion within six months of randomization. Outcome ascertainment was based on responses to a follow-up survey. We also attempted to verify self-reports of HBV testing in the interval between randomization and follow-up survey completion with healthcare provider records. Levels of knowledge about HBV were assessed as secondary trial outcomes.

All our study materials were translated into Khmer using standard methods [20]. Project personnel with direct participant contact (survey interviewers and LHWs) were all bicultural, bilingual Cambodian Americans. Male staff members conducted study procedures with men and female staff members conducted study procedures with women.

Consent Procedures

The Fred Hutchinson Cancer Research Center Institutional Review Board approved our study protocols. Participants provided written consent for the community-based survey, trial follow-up survey, and release of medical records; and verbal consent for the LHW interventions. During the community-based survey consent procedures, participants were explicitly told that they might be offered health education in the future (if they participated in the community-based survey).

Randomization

One hundred and sixty-five households that participated in the community-based survey included one individual (a man or a woman) who had not been tested for HBV. All these individuals were entered into the trial. Eighty-five of the households that participated in the community-based survey included two individuals (a man and a woman) who had not been tested for HBV. In these households, we randomly selected one individual (the man or the woman) for entry into the trial. Therefore, a total of 250 individuals without prior HBV testing were randomized to either experimental or control status. A project coordinator assigned these men and women to the experimental or control group using a computer generated randomization list. The randomization order was based on date of community-based survey completion.

Intervention Materials

We used findings from an earlier qualitative study to develop culturally and linguistically appropriate materials for use in the HBV LHW intervention [21]. The HBV materials included an educational flipchart (available in Khmer and English) and accompanying pamphlet (with Khmer and English text), as well as a motivational Khmer language DVD (with English sub-titles). The flipchart and pamphlet provide basic information about HBV including the prevalence of chronic infection among Cambodians, ways the virus can and cannot be transmitted, importance of serologic testing, indications for vaccination, and consequences of chronic infection (e.g. liver cancer). The HBV DVD uses an educational-entertainment format to reinforce information provided in the flipchart and pamphlet.

An educational flipchart (Khmer and English versions) and accompanying pamphlet (with Khmer and English text) were also developed for the PA LHW intervention. We did not develop a PA DVD for the control group because of the expense associated with audiovisual material development. However, control group participants received a pedometer as part of their LHW intervention.

Lay Health Workers

Six LHW educators were hired by the project. They either provided HBV education to the experimental group or PA education to the control group. Four LHW educators (two men and two women) delivered the HBV intervention and two LHW educators (one man and one woman) delivered the PA intervention. All the LHWs were fluently bilingual ethnic Cambodians and conversant with Khmer culture. None of the LHWs were certified health professionals. The LHWs were trained to educate participants (about HBV or PA), motivate participants (to obtain HBV testing or engage in regular PA), and address participants' individual barriers (to HBV testing or regular PA).

Lay Health Worker Interventions

Our LHWs made up to 11 attempts to complete a home visit with each experimental and control group participant. Individuals who refused a home visit were offered intervention materials (HBV pamphlet and DVD or PA pamphlet and pedometer). During home visits, LHWs systematically asked participants if they could review the flipchart (HBV or PA) together and provided them with other intervention materials (HBV DVD and HBV pamphlet or PA pamphlet and pedometer). Additionally, the HBV LHWs attempted to complete follow-up telephone calls with experimental group participants one month after completed home visits to offer further information and assistance, as necessary.

Follow-up Survey

To trace individuals who had recently moved for the follow-up survey, we used contact information for friends/relatives (provided at the time of the initial community-based survey). Different Cambodian project personnel conducted the intervention and follow-up procedures. Interviewers made up to 11 follow-up contact attempts (including weekday, weekend, and evening attempts). All follow-up interviews were conducted face-to-face in participants' homes. Respondents received a small financial incentive for follow-up survey completion. Each follow-up survey respondent was asked whether he/she had ever had a HBV test and, if so, when the test was completed and why he/she was tested. Other questions assessed levels of HBV knowledge (using the same survey items that were included on the earlier community-based survey) and use of the project's HBV materials.

Medical Record Reviews

Follow-up survey respondents who reported they had received HBV testing in the six-month interval since their random assignment were asked to provide information about the date of testing, as well as the name and location of the clinic or doctor's office where testing was performed. Each of these participants was also asked to sign a medical release form giving project staff permission to request medical record verification of his/her self-reported HBV test. A copy of the HBV test result was then requested (from the relevant healthcare facility) using a form that provided the participant's name, age, and self-reported date of testing. The project contacted each healthcare facility up to three times (twice by mail and once by telephone).

Process Evaluation

Process data were collected to document implementation of the LHW interventions. Specifically, the LHWs routinely completed forms addressing the outcome of home visit attempts (e.g. agreed to participate in a home visit, refused a home visit but accepted intervention materials, or refused a home visit and intervention materials). A home visit was considered complete if the LHW was able to complete a discussion about HBV or PA at a participant's home. The experimental and control group LHWs documented use of intervention materials during home visits, and experimental group LHWs documented follow-up telephone calls.

Statistical Analysis

We conducted primary outcome analyses that included individuals with follow-up data, as well as all randomized individuals (and assumed that participants without follow-up data were not tested for HBV). Our primary outcome analyses were conducted using survey data and then further evaluated using medical records data. Fisher's exact tests were used to evaluate statistical significance with respect to differences in HBV tested proportions between the two trial arms. We used chi-square tests for secondary outcome analyses addressing HBV knowledge (proportions with correct knowledge) among experimental and control group participants with follow-up data. Multivariable logistic regression was used to estimate the odds ratio (OR) and associated 95% confidence interval (CI) for each knowledge variable at follow-up. The multivariable analyses compared the experimental and control group knowledge levels after adjusting for demographic characteristics and baseline knowledge (for the knowledge variable in question).

RESULTS

Follow-up Survey Response

As shown in Figure 1, 95 (76%) of the 125 individuals who were randomized to the experimental arm and 104 (83%) of the 125 individuals who were randomized to the control arm completed a follow-up survey. The proportions of experimental and control group participants with follow-up survey data were not significantly different.

Study Group Characteristics

The characteristics of all individuals who were randomly assigned to the experimental arm (N=125) and control arm (N=125) are given in Table 1. Participants assigned to the control group were significantly more likely to have less than 12 years of education than individuals assigned to the experimental group ($p=0.047$). At the time of randomization, our two trial groups were equivalent with respect to all other demographic characteristics as well as baseline HBV knowledge. Similarly, there were no significant differences between the experimental group (N=95) and control group (N=104) participants with follow-up data with respect to demographic characteristics or HBV knowledge levels except for educational level (55% of the experimental group and 69% of the control group had less than 12 years of education, $p=0.04$).

Hepatitis B Testing

Table 2 provides the results from our primary outcome analyses using self-reported and provider-reported data for individuals with follow-up data, as well as all randomized individuals. Among individuals with follow-up data, 21 (22%) of the 95 experimental group participants and 3 (3%) of the 104 control group participants reported they had received a HBV test in the six-month interval after randomization ($p<0.001$). This difference between

experimental and control group participants remained significant ($p < 0.001$) in our intent-to-treat analysis using self-reported data.

We were able to request medical records for 17 of the 21 experimental group participants and two of the three control group participants who reported HBV testing (the other participants refused to sign a medical records release). All the healthcare facilities responded to our requests for information about HBV testing. Medical records indicated that 11 of the 17 experimental group participants who self-reported HBV testing and signed medical release forms had been tested, and neither of the two control group participants who self-reported testing and signed medical records release forms had been tested.

The majority of responses to the survey item which asked participants (who reported testing in the interval between randomization and follow-up) why they had been tested for HBV could either be categorized as because of information he/she received from our project or because he/she wanted to know his/her HBV status (e.g. wanted to know if he/she is a carrier). Table 3 provides a summary of testing reasons in relation to medical records verification outcomes among the 21 experimental group participants who reported testing. Both the control group participants whose provider reported no record of testing indicated they were tested because they wanted to know their HBV status and the control group participant who refused to sign a medical release form said she was tested at her employer's request.

Hepatitis B Knowledge

Table 4 gives results from our secondary outcome analyses addressing HBV knowledge among individuals with follow-up data. The experimental group was significantly more likely than the control group to know that Cambodians have higher rates of HBV infection than whites, HBV cannot be spread by eating food prepared by an infected person, HBV cannot be spread by sharing chopsticks, and HBV cannot be spread by shaking hands. There were no significant differences between the trial groups for the other knowledge variables that we assessed as secondary outcomes.

Intervention Exposure

As shown in Figure 1, LHWs were able to complete home visits with 99 (79%) of the 125 individuals randomized to our experimental arm and another 5 (4%) accepted the educational materials (but refused a home visit). All of the 21 experimental group participants who reported a HBV test at follow-up had completed a LHW home visit. Our experimental group LHWs reported that they reviewed the flipchart with all the individuals who completed home visits. They also reported that the HBV pamphlet and HBV DVD were provided at the end of all but two of the experimental group home visits. Follow-up telephone calls were successfully completed with 84 (85%) of the 99 HBV home visit participants. Sixty-two (65%) of the experimental group participants who completed a follow-up survey indicated they had read the HBV pamphlet and 44 (46%) reported they had watched the HBV DVD after their LHW home visit.

DISCUSSION

Previous research has found that Chinese and Vietnamese Americans are willing to participate in LHW programs, and multiple LHW programs have been successfully implemented in Chinese and Vietnamese communities on the US West Coast [15-18,22,23]. Our process evaluation indicates that LHW interventions are acceptable to Cambodian Americans and feasible to implement in Cambodian communities. Specifically, 99 (85%) of

the 116 individuals that our HBV LHWs were able to contact and 107 (92%) of the 116 individuals that our PA LHWs were able to contact completed a home visit.

Over one-fifth (22%) of experimental group participants who completed a follow-up survey self-reported HBV testing (compared to 3% of control group participants). For 10 of the 21 experimental group participants who reported HBV testing, we were unable to verify they had been tested using provider reports (either because they refused to sign a medical release form or the relevant healthcare facility indicated it had no record of testing). However, seven of the 10 participants whose self-reported testing could not be verified using provider reports indicated they had been tested for HBV because of information they received from the project or they wanted to know their HBV infection status. Some Seattle area healthcare facilities lack computerized medical records technology and, therefore, may have difficulty finding laboratory results [24]. It is likely that at least some of the individuals who refused to sign medical records release forms or whose HBV testing self-reports were not verified by provider reports had received a HBV test.

Our HBV LHW intervention had a significant impact on knowledge about HBV. The experimental group participants were more likely than the control group participants to know that Cambodians have higher HBV infection rates than whites. Additionally, the experimental group was significantly more likely to correctly identify transmission routes that are not associated with HBV (e.g., eating food prepared by an infected person). However, there were no differences between the two trial groups in knowledge about transmission routes that are associated with HBV (e.g. sexual intercourse). Discrepancies in our findings with respect to knowledge about transmission routes are probably, at least partially, attributable to different levels of knowledge at baseline (trial participants had higher levels of knowledge about the ways in which HBV can be spread than the ways that HBV cannot be spread).

Our study has several limitations that should be recognized. First, we recruited individuals living in one geographic area of the US, and the results may not be applicable to all Cambodian Americans. Second, only individuals who agreed to complete a community-based survey were eligible for participation in the trial and survey responders may be more receptive to health education programs than survey non-responders. Third, although we requested the medical records of all individuals who reported HBV testing since randomization, we made no attempt to verify the accuracy of self-reports among individuals who reported they had not been tested; and it is possible that some of these individuals received a HBV test at the same time as other blood tests (e.g. to check cholesterol levels). Finally, our follow-up interval was only six months and some trial participants may have received HBV testing after their follow-up survey.

Our results provide evidence that LHW interventions addressing HBV can be effective for Asian populations in the US. A previous controlled study evaluated a LHW intervention to improve HBV testing and knowledge levels among Chinese Americans in Seattle and Chinese Canadians in Vancouver. This study found that LHWs were effective in improving HBV knowledge levels but only had a very limited impact on HBV testing levels [25]. Future research should evaluate the effectiveness of LHW approaches to HBV in other Asian American and immigrant groups that experience high levels of chronic infection, as well as in other geographic areas of the US.

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FIGURE 1.
TRIAL OVERVIEW

TABLE 1
BASELINE CHARACTERISTICS OF RANDOMIZED INDIVIDUALS (N=250)

Variable	Experimental Group N=125 n (%)	Control Group N=125 n (%)	All Trial Participants N=250 n (%)	p-value
<u>Demographic Characteristics</u>				
Male gender	63 (50)	62 (50)	125 (50)	0.90
<45 years old	59 (48)	60 (48)	119 (48)	0.95
<12 years education	66 (53)	79 (65)	145 (59)	0.047
Currently married	89 (71)	83 (66)	172 (69)	0.41
<20 years old at immigration	52 (42) *	45 (36) *	97 (39)	0.34
Speaks English fluently or well	33 (26)	26 (21)	59 (24)	0.30
<u>Knowledge</u>				
Cambodians are more likely to be infected with HBV than whites	26 (21)	27 (22)	53 (21)	0.82
HBV cannot be spread by eating food prepared by an infected person	46 (37)	35 (28)	81 (32)	0.14
HBV cannot be spread by sharing chopsticks	29 (23)	23 (18)	52 (21)	0.35
HBV cannot be spread by coughing	36 (29)	28 (22)	64 (26)	0.25
HBV cannot be spread by shaking hands	84 (67)	94 (75)	178 (71)	0.16
HBV can be spread by sharing childbirth	89 (71)	84 (67)	173 (69)	0.49
HBV can be spread during sexual intercourse	91 (73)	82 (66)	173 (69)	0.22
HBV can be spread by sharing razors	97 (78)	93 (74)	190 (76)	0.55
HBV can be spread by sharing needles	113 (90)	113 (90)	226 (90)	>0.99
HBV can be spread by someone who looks healthy	82 (66)	85 (68)	167 (67)	0.69
HBV can cause liver cancer	91 (73)	81 (65)	172 (69)	0.17
There is treatment for HBV	78 (62)	80 (64)	158 (63)	0.79

* Includes 9 experimental group participants and 9 control group participants who were US-born

TABLE 2**HEPATITIS B TESTING BY TRIAL ARM**

Variable	Experimental Group n (%)	Control Group n (%)	p-value
<u>Individuals with follow-up data</u> (experimental group N=95, control group N = 104)			
Self-reported hepatitis B testing	21 (22)	3 (3)	<0.001
Medical records verified hepatitis B testing	11 (12)	0 (0)	<0.001
<u>All randomized individuals</u> (experimental group N=125, control group N = 125)			
Self-reported hepatitis B testing	21 (17)	3 (2)	<0.001
Medical records verified hepatitis B testing	11 (9)	0 (0)	0.001

TABLE 3**REASONS FOR HEPATITIS B TESTING AND MEDICAL RECORDS OUTCOMES**

Outcome	Reason		
	<u>Information from project</u>	<u>Wanted to know HBV infection status</u>	<u>Other</u>
Medical records verified testing	8	3	0
Provider reported no record of testing	1	2	3 [*]
Refused to sign medical records release form	2	2	0

* Testing completed during an annual check-up or routine prenatal exam

TABLE 4

HEPATITIS B KNOWLEDGE BY TRIAL ARM (N=199)

Variable	Experimental Group N=95 %	Control Group N=104 %	Unadjusted p-value	Adjusted OR (95% CI) *
Cambodians are more likely to be infected with HBV than whites	62	29	<0.001	5.3 (2.7 - 10.6)
HBV <u>cannot</u> be spread by eating food prepared by an infected person	67	36	<0.001	4.7 (2.4 - 9.4)
HBV <u>cannot</u> be spread by sharing chopsticks	52	20	<0.001	4.5 (2.2 - 9.2)
HBV <u>cannot</u> be spread by coughing	52	37	0.03	1.8 (1.0 - 3.4)
HBV <u>cannot</u> be spread by shaking hands	92	76	0.003	4.6 (1.8 - 11.7)
HBV can be spread during childbirth	82	80	0.68	1.2 (0.6 - 2.7)
HBV can be spread during sexual intercourse	79	74	0.42	1.4 (0.7 - 3.0)
HBV can be spread by sharing razors	86	84	0.60	1.2 (0.5 - 2.8)
HBV can be spread by sharing needles	94	91	0.53	1.3 (0.4 - 4.3)
HBV can be spread by someone who looks healthy	76	72	0.56	1.1 (0.5 - 2.1)
HBV can cause liver cancer	75	76	0.84	0.9 (0.5 - 1.9)
There is treatment for HBV	75	63	0.06	1.8 (0.9 - 3.5)

* Adjusted for gender, age, education, marital status, age at immigration, English fluency, and baseline knowledge (for the knowledge variable in question)