Hepatitis B Foundation

Annual Progress Report: 2012 Formula Grant

Reporting Period

July 1, 2013 – December 31, 2013

Formula Grant Overview

The Hepatitis B Foundation received $720 in formula funds for the grant award period January 1, 2013 through December 31, 2013. Accomplishments for the reporting period are described below.

Research Project 1: Project Title and Purpose

Perceptions of Hepatitis B Vaccine Status Among High Risk Foreign-Born Individuals in Philadelphia–The purpose of this study is to assess the self-reported vaccination status and vaccine perceptions among high-risk Asian and Pacific Islander (API) and African immigrant communities in Southeastern Pennsylvania. These communities have disproportionately high rates of chronic HBV infection. Using anonymous data collected from 935 individuals, we will assess the agreement between people's perception of having ever been vaccinated against HBV, and their actual hepatitis B immune status. Results from this study will allow us to better understand the health literacy and cultural barriers faced by these communities, and will be important in developing population-based interventions to reduce HBV in this region.

Duration of Project

1/1/2013 –12/31/2013

Project Overview

Specific Aim 1: To assess the vaccination and immune status of a cross-sectional convenience sample of 935 foreign-born high risk individuals in Philadelphia, PA.
Objective 1A: To evaluate the rate of immunity in the cohort.
Objective 1B: To assess the agreement between perception of ever having received a hepatitis B vaccine with actual immune status.

A cross-sectional HBV prevalence study of high-risk APIs was conducted between June 2008 and December 2011. A total of 935 participants were screened at 17 distinct screening events (community health centers, churches, local businesses and social centers, and hospitals) throughout Philadelphia. Participants completed an in-language self-administered questionnaire (SAQ) with questions about demographics and previous HBV vaccination (perception of vaccination status). Self-reported vaccine perception was positive if the participant answered

"Yes" to the question, "Have you ever received vaccination or shots to protect you from hepatitis B?"

Actual vaccination status was determined through serum samples obtained at screening events. Serum samples were tested for the presence of anti-HBs (HBsAb), protective antibodies produced in response to either recovery from HBV infection or successful vaccination.

This project will look at immune status by ethnicity, age, and country of origin. All data that has been entered into an Excel database will be included in this study. The data will be cleaned by the student intern as part of a summer public health research internship program. The percent of individuals who test positive for HBsAb will be calculated, and this data will be broken down by ethnicity, country of origin and age. In addition, using Fisher's exact test ($p < .05$), we will assess the difference between APIs and non-APIs with respect to their vaccine perceptions. SAS 9.2 software will be used to conduct all statistical analyses. Participants that have positive self-reported vaccine perception and are anti-HBs (-) will be deemed to have an inconsistent perception of their protection (anti-HBs) status.

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Expected Research Outcomes and Benefits

Hepatitis B is one of the most common chronic infections in Pennsylvania, and disproportionately affects Asians and Pacific Islanders (APIs), for whom chronic hepatitis B and liver cancer represent the largest health disparity. Research in this region indicates that APIs have typically low knowledge levels regarding hepatitis B transmission, prevention (including vaccination), treatment and outcomes. With less than 10% of APIs in SEPA having ever been tested for hepatitis B infection, less than 50% having been vaccinated, and with prevalence rates in these communities between 4% and 23.4%, it is imperative that we are able to assess and successfully improve vaccination rates among the highest risk APIs and African immigrants.

Historically, foreign-born individuals in the U.S. with limited English proficiency, including APIs, exhibit low health literacy. Limited English proficiency and low health literacy can lead to difficulty understanding medical information, and can serve as barriers to satisfactory health communication. Low or inaccurate knowledge of HBV and confusion between hepatitis B screening and vaccination procedures can further exacerbate misunderstandings. This can lead

to low rates of vaccination and protection in these high-risk communities.
It is critical that those at highest risk for hepatitis B infection be protected via vaccination. Misperceptions of risk or protection status can lead to reduced rates of protection. This study will tell us if some of the highest risk individuals in the U.S. have misperceptions regarding their HBV vaccination status. The results of this study will be important in understanding health literacy issues regarding HBV in high risk groups, and can play a vital role in developing successful health literacy and adult vaccination programs in Philadelphia.

Summary of Research Completed

Specific Aim 1: To assess the vaccination and immune status of a cross-sectional convenience sample of 935 foreign-born high risk individuals in Philadelphia, PA.
Objective 1A: To evaluate the rate of immunity in the cohort.
Objective 1B: To assess the agreement between perception of ever having received a hepatitis B vaccine with actual immune status.

During the reporting period, data in the existing Excel spreadsheet were analyzed to answer the research questions. This included descriptive statistics (frequencies) to describe the cohort of 965 individuals for: hepatitis B infection status (HBsAg); hepatitis B immune status (HBsAb); gender; age; place of birth; and English proficiency. Univariate logistic regression was used to look at predictors independently to see if they were significantly associated with the two outcomes (immune vs. not immune; reporting being vaccinated vs. not reporting being vaccinated). Multivariate logistic regression was then used to identify multiple independent predictors of each outcome. Positive and negative predictive values were calculated to assess the proportion of agreement with each outcome (i.e. those reporting no past vaccination who were hepatitis B-susceptible, and those reporting past vaccination who were immune).

Among 946 participants with serology and questionnaire data, 61 (6.4%) tested HBsAg+, indicating current infection with HBV. Among HBsAg negative (HBsAg-) subjects, 492 (55.6%) were anti-HBs positive (anti-HBs+) (indicating immunity) and 393 (44.4%) anti-HBs- (indicating susceptibility). Among 177 self-reporting past HBV immunization, 8 (4.5%) were HBsAg+ and 56 (31.6%) were anti-HBs-, i.e. 36.1% of participants reporting past vaccination may have misperceived themselves as immune to HBV infection. The positive predictive value (PPV) of vaccination self-report for serology indicating immunity (anti-HBs+) was 0.638 (95% CI 0.563-0.709). The negative predictive value (NPV, i.e. proportion of those reporting no past vaccination who were HBV-susceptible) was 0.438 (0.402-0.474). Please refer to Table 1 for details.

Among those reporting HBV immunization, the proportion with anti-HBs+ serology was not significantly associated with age group, gender, API vs. other race, US vs. foreign born, or language preferences. Among those not reporting HBV immunization, the proportion with anti-HBs- serology was significantly associated with race (45.0% API vs. 58.6% other race, p=0.01) and primary language (59.3% English vs. 45.8% other, p=0.006) but not with age group, gender, or birthplace (data not shown). Multivariable analyses did not change these findings.

Discussion of Results

Denniston et al[1] reported a PPV of 0.53 for self-reported HBV immunization in the National Health and Nutrition Examination Survey (NHANES) and highlighted the dangers of dependence on self-report of vaccination in individuals' misperception of immunity, missed opportunities for vaccination, and the need for routine data collection systems for adult vaccinations. In our study, PPV was higher (0.64), which is not unexpected in a population with higher exposure to natural infection HBV since PPV increases with prevalence. We also used a less rigorous definition of immunization and were limited to serology that did not allow distinction between natural and vaccine-induced immunity. Those who tested as susceptible but believed that they had been immunized may have been vaccine non-responders, may have mistaken other immunizations for HBV vaccine, or may not have fully understood the question asked. Because the SAQ did not include questions about timing and number of vaccine doses, we cannot exclude the possibilities of waning anti-HBs titers with time or lack of completion of the full vaccine dose schedule.

Our findings have direct relevance for public health practitioners conducting HBV screening in high risk populations, where resource limitations may not always allow verification of self-reported immunization history. In our program, all subjects are tested regardless of immunization self-report, and all who test as susceptible are advised to be immunized and provided with free or low cost options for doing so. Had we relied upon subjects' reports of immunization, nearly one-third of HBV-susceptible subjects would not have been informed of their susceptible status. We also found that nearly 13% of HBV-infected individuals, unaware of their infection status, believed themselves to have been immunized.

Our study was conducted largely in Asian-American immigrant communities where the risk of HBV infection is high. Historically, foreign-born individuals in the U.S. with limited English proficiency, including APIs, exhibit low health literacy[2,3,4], which is a barrier to effective health communication[5]. Our findings highlight the need for improved health literacy in Asian immigrant communities through culturally-competent HBV education and for the adoption of key recommendations of the Institute of Medicine's 2010 report on viral hepatitis prevention and control, especially the continued development of programs to increase knowledge and awareness of HBV among providers and at-risk populations and the expansion of immunization registries and other information systems to include adults[6].

Literature Cited

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2. Nguyen GT, Bowman MA. Culture, language, and health literacy: communicating about health with Asians and Pacific Islanders. *Fam. Med.* Mar 2007;39(3):208-210.
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Table 1: Population description by serology result

	N(%) HBsAg+ N=61	N (%) anti-HBs+/HBsAg- N=492
Age (years)		
18-29	9/98 (8.4)	72/98 (73.4)
30-39	18/115 (13.5)	58/115 (50.4)
40-49	10/177 (5.4)	87/176 (49.4)
50-59	16/207 (7.2)	99/207 (47.8)
60-69	6/173 (3.4)	106/173 (61.3)
≥ 70	1/105 (0.9)	62/105 (59.1)
	p_{trend} = 0.0004	p_{trend}=0.54
Sex		
Male	32/372 (8.6)	199/339 (58.7)
Female	28/571 (4.9)	292/543 (53.8)
	p_{Exact}=0.03	p_{Exact}=0.16
Race		
API	51/792 (6.4)	428/741 (57.8)
Other	10/155 (6.5)	64/144 (44.4)
	P_{Exact}=1.00	p_{Exact}=0.004
Place of birth		
United States	0/70 (0.0)	442/792 (55.8)
Foreign Born	60/852 (7.0)	32/69 (46.4)
	p_{Exact}=0.01	p_{Exact}=0.16
Primary language		
English	4/154 (2.6)	64/149 (43.0)
Other	56/780 (7.2)	417/724 (57.6)
	p_{Exact}=0.03	p_{Exact}=0.001
Reported HBV immunization	8/177 (4.5)	113/169 (66.9)
Yes	53/770 (6.9)	379/716 (52.9)
No/Not answered	p_{Exact}=0.30	p_{Exact}=0.001

*** Totals differ due to missing data**