Chronic hepatitis B infection among high-risk Asian and Pacific Islander communities in Philadelphia

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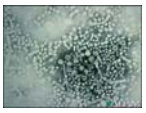
Hepatitis B Virus

Definition

- HBV is the most common, serious liver infection in the world
  - Acute vs. chronic infection

Transmission

- Direct blood contact
- Sexual transmission
- From mother to child
  - During the labor and delivery process
  - Most common route worldwide



Prevention

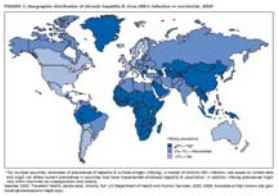
- Safe and effective 3-dose vaccine
- Offers life-long protection
- Recommended for all babies in U.S., and high risk adults

Outcomes of Chronic HBV Infection

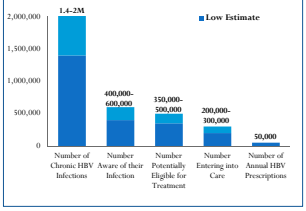
- Up to 800,000 deaths each year worldwide
- HBV is the 2nd leading carcinogen in the world, after tobacco
- HBV-related deaths are primarily due to:
  - Cirrhosis
  - Primary liver cancer (Hepatocellular Carcinoma (HCC))
  - Liver failure
- Up to 25% of chronically infected individuals exposed at birth or early childhood will die prematurely

Background

- Magnitude of the problem globally
  - 240 million chronic infections
  - 2 million in the U.S.



- HBV-related health disparities in Asians and Pacific Islanders
  - Burden of disease (50%)
  - Diagnosis (25%)
  - Health care access (10%)



Background Continued

- Critical knowledge gaps
  - Accurate prevalence estimate of chronic HBV in the U.S.
  - Factors associated with HBV infection and immunity in foreign-born APIs, particularly in Philadelphia.
  - Epidemiological landscape of chronic HBV infection in high-risk API communities.
- Purpose
  - Determine the factors associated with HBV infection and protection (immunity) among APIs in Philadelphia who participated in community-based screening

Project Aim

Aim: To describe the infection, protection and susceptibility status among a sample of 2,047 high-risk foreign-born and 2nd generation APIs in Philadelphia.

- Quantitative analysis of survey and seroprevalence data from 2,047 foreign-born and 2nd generation APIs residing in Philadelphia

Research questions

- What is the prevalence of HBV infection and immunity among API individuals who participated in community-based screening in Philadelphia?
- What are the demographic and family history characteristics of infected, immune and susceptible individuals?
- What factors might be associated with HBV infection, protection, susceptibility and linkage to care?

Data Sources

Data collection (survey data, HBV blood screening results) at community-based screenings in Philadelphia (n=2,047).

	Question	Question Type
Demographics	Age	Fill-in
	Gender	Multiple choice
	Ethnicity	Multiple choice
	Highest level of education	Multiple choice
	Is English your primary language?	Y/N
Immigration history	Country of birth	Fill-in
	Year arrived in U.S.	Fill-in
Family history of HBV/HCC	Do you have a family member with hepatitis B?	Y/N/DK*
	If yes, who?	Multiple choice
	Do you have a family member with liver cancer?	Y/N/DK
	If yes, who?	Multiple choice
	Do you live with anyone who has hepatitis B?	Y/N/DK
Health care access/usage	Do you have health insurance?	Y/N
	Do you have a regular doctor?	Y/N
	Have you seen a doctor within the past 12 months?	Y/N
Personal HBV history	Why are you here for testing?	Multiple choice
	Have you ever been tested for hepatitis B?	Y/N/DK
	If yes, what was the test result?	Pos, Neg, DK
	Have you ever received the hepatitis B vaccine?	Y/N/DK

Blood test results

- HBsAg+/HBsAb- Infected
- HBsAg-/HBsAb+ Protected
- HBsAg-/HBsAb- Needs Vaccine

Data Analysis

- SAS version 9.3 (SAS Institute Inc., Cary NC)
- Univariate logistic regression: determine the unadjusted odds ratios (OR) and 95% Confidence Intervals of selected factors associated with HBV infection, susceptibility, immunity and linkage to care. X^2 tests were run for all variables, with an α level of <0.05.
  - Predictors: age, gender, time in the U.S., country of birth, education level, health insurance status, English as a primary language, family history of HBV/HCC, status of having a regular medical provider and having seen a doctor within the past 12 months, and having previous knowledge of a personal HBV infection.
- Multiple logistic regression: estimate the independent effects of related variables on: infected, immune, and susceptible.
  - Final model selection for all three models was guided by minimizing Akaike Information Criterion (AIC) as well as public health relevance and utility of inclusion/exclusion of individual variables.

RESULTS

Demographic, health care and HBV-history characteristics of 2,047 study participants.

Characteristic	Total Number (%)	Missing
Gender		0
M	826 (40.35)	
F	1,221 (59.65)	
Age		0
18-29	195 (9.53)	
30-45	506 (24.72)	
46-55	540 (26.38)	
56-69	615 (30.04)	
>70	191 (9.33)	
Country of birth		37
China	670 (33.33)	
Vietnam	570 (28.36)	
Korea	265 (13.18)	
Cambodia	163 (8.11)	
India	109 (5.42)	
Indonesia	109 (5.42)	
U.S.	43 (2.14)	
Lao, Burma, or Bhutan	48 (2.39)	
Other (Africa, Malaysia, Hong Kong, Thailand, Taiwan, Japan)	33 (1.64)	
Years in U.S.		148
0-2	200 (10.53)	
3-5	191 (10.06)	
6-10	356 (18.75)	
11-15	297 (15.64)	
≥16	855 (45.02)	
English as a primary language		28
Yes	183 (9.06)	
No	1,836 (90.94)	
Education level		184
Less than HS diploma	718 (38.54)	
HS diploma/GED	572 (30.70)	
Technical/vocational	86 (4.62)	
Some college	132 (7.09)	
College degree	264 (14.17)	
Graduate education	91 (4.88)	
Insurance status		35
Yes	754 (37.48)	
No	1,258 (62.52)	
Having a primary care physician		38
Yes	817 (40.67)	
No	1,192 (59.33)	
Seen a doctor in the past 12 months		855
Yes	554 (46.48)	
No	638 (53.52)	
Family history of HBV		0
Yes	246 (12.02)	
No	1,174 (57.35)	
Don't know	627 (30.63)	
Family history of HCC		421
Yes	137 (8.43)	
No	1,191 (73.25)	
Don't know	298 (18.33)	
Living with someone with HBV		193
Yes	146 (7.87)	
No	1,257 (67.80)	
Don't know	451 (24.33)	
Previous HBV test		77
Yes	415 (21.07)	
No	1,130 (57.36)	
Don't know	425 (21.57)	
Tested positive for HBV before		25 of 415
Yes	75 (19.23)	
No	154 (39.49)	
Don't Know	161 (41.28)	
Receipt of HBV vaccine		68
Yes	356 (17.99)	
No	1,156 (58.41)	
Don't know	467 (23.60)	

RESULTS

HBV and linkage to care status of 2,047 participants.

HBV Status	Frequency	Percent
Infected (HBsAg+/HBsAg-)	165	8.08
Protected (HBsAg-/HBsAg+)	1,182	57.91
Susceptible (HBsAg-/HBsAg-)	694	34.00

Linkage to Care Status	Frequency	Percent
Referred to care	94	100.00
Made first appointment with clinician	58	61.70
Completed first appointment with physician	35	37.23
Loss to follow-up, refusal to seek care, or not followed-up within project deadline	36	38.30

Variable	OR (CI)
Gender	
M	1.00
F	0.60 (0.39-0.90)
AGE	
18-29	1.00
30-55	0.90 (0.47-1.71)
>55	0.51 (0.24-1.08)
Country of birth	
Vietnam	1.00
China	0.90 (0.55-1.46)
Korea	0.56 (0.23-1.36)
Cambodia	0.65 (0.27-1.54)
India	<0.01 (<0.01->9.99)
Indonesia	0.45 (0.08-1.53)
U.S.	<0.01 (<0.01->9.99)
Refugee*	0.70 (0.15-3.26)
Other (Africa, Malaysia, Hong Kong, Thailand, Taiwan, Japan)	<0.01 (<0.01->9.99)
Education level	
HS diploma or less	1.00
Some college or more	0.54 (0.29-0.99)
Insurance status	
Yes	1.00
No	1.55 (0.81-2.98)
English as a primary language	
Yes	0.89 (0.36-2.23)
No	1.00
Having a Regular physician	
Yes	1.00
No	1.29 (0.70-2.41)
Disclosure variable	
Yes	1.89 (1.05-3.40)
No/DK	1.00
Previous HBV test	
Yes	1.00
No	0.17 (0.10-0.27)
Don't Know	0.29 (0.17-0.51)

Results of multiple logistic regression (Odds Ratios (OR) and Confidence Intervals (CI)) for "infected with HBV." Represents final model for this outcome.

HBV Infection

Variables significantly associated with increased risk of HBV infection after univariate analysis:

- Being male
- Between the ages of 18-55
- Not speaking English as a primary language
- Not having health insurance
- Not having a regular primary care physician
- Having a high school diploma or less
- Having a family member with either HBV or HCC
- Living with an infected individual
- Having had a previous HBV test.

Results of multiple logistic regression (Odds Ratios (OR) and Confidence Intervals (CI)) for the outcome "protected against HBV." Represents final model for this outcome.

Variable	OR (CI)
Gender	
M	1.00
F	1.13 (0.93-1.63)
AGE	
18-29	1.00
30-55	0.70 (0.49-0.99)
>55	0.67 (0.47-0.97)
Country of birth	
Vietnam	1.00
China	0.88 (0.70-1.12)
Korea	1.41 (1.03-1.93)
Cambodia	0.89 (0.62-1.28)
India	0.02 (0.01-0.63)
Indonesia	0.39 (0.26-0.60)
U.S.	1.21 (0.59-2.50)
Refugee*	0.47 (0.26-0.85)
Other (Africa, Malaysia, Hong Kong, Thailand, Taiwan, Japan)	0.32 (0.15-0.67)

HBV Protection (Immunity)

Significant associations after univariate analysis:

- Being born in Korea associated with increased likelihood of protection.
- Being between ages 30-45, being born in India, Indonesia, or a "refugee" or "other" country were significantly associated with a decreased likelihood of being protected against HBV infection.

Results of multiple logistic regression (Odds Ratios (OR) and Confidence Intervals (CI)) for the outcome "susceptible to HBV." Represents final model for this outcome.

Variable	OR (CI)
Gender	
M	1.00
F	1.05 (0.84-1.31)
AGE	
18-29	1.00
30-55	1.39 (0.91-2.14)
>55	1.89 (1.21-2.95)
Country of birth	
Vietnam	1.00
China	1.14 (0.86-1.50)
Korea	0.91 (0.62-1.32)
Cambodia	1.39 (0.94-2.01)
India	60.80 (21.89-168.85)
Indonesia	3.67 (2.24-5.75)
U.S.	1.71 (0.76-3.86)
Refugee*	2.67 (1.44-4.92)
Other (Africa, Malaysia, Hong Kong, Thailand, Taiwan, Japan)	3.94 (1.91-8.58)
Family history of HBV	
Yes	1.00
No/Don't know	1.59 (1.01-2.50)
Living with someone with HBV	
Yes	1.00
No/Don't know	1.01 (0.58-1.76)
Previous HBV test	
Yes	1.00
No	1.97 (1.45-2.67)
Don't know	1.74 (1.45-2.67)

HBV Susceptibility

Significant associations after univariate analysis:

- Being born in India, Indonesia, a "refugee" or "other" country
- Not having a family member with HBV/not knowing
- Not living with an infected person/not knowing
- Not having been tested for HBV before or not knowing whether one has been tested before.
- Being between ages of 18-29 was associated with decreased likelihood of being susceptible.

Study Implications & Future Directions

- Reaching high-risk, underserved communities
  - Enhanced education
  - Targeted screening
    - Men, younger adults
  - Data collection
    - Implications of high prevalence (vs. CDC estimates)
    - Compare with data collection from other urban community programs
- HBV infection, susceptibility and protection
  - Advocacy for more adult vaccine resources
  - Look at refugee health programs for screening and vaccination

Study Limitations

- Data were collected as part of a cross-sectional, non-randomized study.
  - Can only look for associations between variables, not causality
- Only included information on those who were screened at free community events in Philadelphia from 2007-2013
  - Limited generalizability
  - Potential for selection bias (unmeasured)
  - No information on "refusers" or "non-joiners"
- Missing data
  - Misunderstanding, stigma, length of questionnaire, altered protocol
- Potential for measurement error, response/interview/recall bias
- There were variables that were not measured (employment, citizenship, HBV knowledge)

Thank You!

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