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Knowledge, attitudes, and practices regarding hepatitis B vaccination among hospital-based doctors and nurses in China: Results of a multi-site survey

Yan Liu [a,b,1], Chao Ma [c,1], Haimei Jia [d,b,1], Erping Xu [a], Yong Zhou [e], Zhujiazi Zhang [f], Li Lu [f], Lance Rodewald [g], Lixin Hao [c,*]

[a] Department of Expanded Program on Immunization, Hangzhou Center for Disease Control and Prevention, Hangzhou, Zhejiang 310021, China
[b] Chinese Field Epidemiology Training Program, Chinese Center for Disease Control and Prevention, Beijing 100050, China
[c] Department of National Immunization Program, Chinese Center for Disease Control and Prevention, Beijing 100050, China
[d] Department of Expanded Program on Immunization, Fuzhou Center for Disease Control and Prevention, Fuzhou, Fujian 350004, China
[e] Department of Expanded Program on Immunization, Fujian Center for Disease Control and Prevention, Fuzhou, Fujian 350001, China
[f] Department of Expanded Program on Immunization, Beijing Center for Disease Control and Prevention, Beijing 100013, China
[g] World Health Organization China Office, Beijing 100600, China

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ABSTRACT

Background: Hepatitis B virus (HBV) can cause chronic HBV infection, which may lead to advanced cirrhosis and liver cancer. Healthcare workers (HCWs) are at risk HBV infection as an occupational hazard. Hepatitis B vaccination of HCWs is recommended by WHO, but the status of hepatitis B vaccination among HCWs in China is seldom reported.

Methodology: We conducted a cross-sectional study in 22 hospitals of 3 developed cities in China. We interviewed managers in infectious diseases and occupational health departments, and at least 40 HCWs per hospital.

Results: We interviewed 929 HCWs; 80.8% were vaccinated against hepatitis B and 96.7% were willing to be vaccinated; 38.2% of HCWs reported having at least one needle stick or sharps injury. Three hospitals provide free hepatitis B vaccination for HCWs; hospitals with a hepatitis B vaccination policy, more HCWs reported being vaccinated (91.7% vs 79.0%, $P < 0.001$). HCWs in high risk departments ($P = 0.011$), with more knowledge of hepatitis B vaccine ($P < 0.001$), and with fewer working years ($P = 0.002$) were more likely to be vaccinated against HBV. Infectious diseases and occupational health managers had positive attitudes towards hepatitis B vaccination.

Conclusions: Hepatitis B vaccination was well accepted among HCWs. Hospital provision of free vaccine, greater HCW knowledge of HBV, and working in higher-risk settings were associated with being vaccinated. A national policy of offering hepatitis B vaccine to HCWs should be considered in China. Provision of free hepatitis B vaccine for HBsAb negative HCWs may be acceptable. Education about HBV and hepatitis B vaccine may help promote policy implementation.

1. Introduction

Hepatitis B virus (HBV) is responsible for most cases of chronic viral hepatitis [1,2]; the World Health Organization (WHO) estimates that in 2015, 257 million persons, or 3.5% of the global population, were living with chronic HBV infection [3], and an estimated 887 220 persons died as a result of HBV infection globally, including 337 454 due to hepatocellular carcinoma (HCC), 462 690 due to cirrhosis and 87 076 due to acute hepatitis in 2015 [4]. Healthcare workers (HCWs) are at risk of acquiring HBV infection through mucosal-cutaneous exposure to infectious blood or blood products, or through percutaneous exposure to contaminated sharp objects. According to WHO, there are approximately 36 million HCWs worldwide and approximately 3 million receive a sharps injury each year, with approximately 2 million exposures to HBV [5]. Estimates of the annual incidence of injuries to HCWs caused by sharp objects range from 1.4 to 9.5 per 100

* Corresponding author.
E-mail address: lixinh2010@163.com (L. Hao).
[1] Contributed equally to this article.

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HCWs, resulting in 0.42 HBV infections per 100 sharp-object injuries per year [6].

Hepatitis B vaccination is an effective way to prevent HBV infection. WHO has recommended that high risk groups, including HCWs, be targeted for routine provision of Hepatitis B vaccine. Even though HCWs are an accessible and easily identifiable population to vaccinate, many countries, including industrialized countries, face challenges addressing at-risk target groups for hepatitis B vaccination [7–9]; indeed, regional estimates for the coverage of hepatitis B immunization among HCWs ranged between 18% and 77% [10]. The Regional Action Plan for Viral Hepatitis in the Western Pacific 2016–2020 recommends increasing awareness about HBV among HCWs and implementing national policies to vaccinate HCWs and medical and health students against hepatitis B. China currently has no national policy of HCW vaccination, and the status of hepatitis B vaccination among HCWs in China is unknown. We report a 2016 investigation in 3 developed cities in the middle and eastern regions of China that assessed the status of hepatitis B vaccination and knowledge and attitudes about HBV and Hepatitis B vaccine among HCWs. The purpose of the study was to identify factors affecting hepatitis B vaccination for HCWs and provide evidence supporting HCW hepatitis B vaccination policy development.

2. Methods

2.1. Definitions

HCWs were categorized as doctors, nurses, and medical technicians. We defined a high-risk department as one in which HCWs have more opportunity of acquiring HBV through mucosal-cutaneous exposure to potentially infectious blood or blood products or through percutaneous exposure to contaminated sharp objects, such as surgery departments, hemodialysis departments, gynecology and obstetrics departments, and hepatitis departments. Hepatitis B low-risk departments were ones in which HCWs have less opportunity of acquiring HBV, such as pulmonary departments, pediatrics departments, and dermatology departments.

2.2. Settings and subjects

We conducted a cross-sectional study in 3 developed cities in the middle and eastern regions of China: Beijing, Hangzhou, and Fuzhou. In each city, the hospitals were categorized by type to include general hospitals at province-, city- and county/district-level; infectious diseases hospitals; and children's hospitals. Hospitals were selected at random from the hospital-type lists in each city. Within each hospital, 2 hepatitis B high risk departments and 2 low risk departments were selected, and at least 40 HCWs per hospital were surveyed using convenience samples that included 5 doctors and 5 nurses in each department.

2.3. Survey questionnaire

We interviewed managers in infectious diseases departments and occupational health departments to collect information about hepatitis B vaccination policies and their interest in and suggestions for promoting hepatitis B vaccination. We interviewed HCWs with a standardized, anonymous questionnaire. Topics included demographic and educational characteristics; knowledge about hepatitis B, hepatitis B vaccine, and post-exposure treatment; and hepatitis B vaccination status. We asked 5 questions about knowledge of hepatitis B: "is a person with HBV infection at a high risk of cirrhosis and liver cancer?;" "who are sources of infection with hepatitis B virus?;" "what is the transmission route of hepatitis B?;" "what is protective antibody against HBV?;" and "is a person without hepatitis B antibody susceptible to HBV infection?" We asked 4 questions about knowledge of hepatitis B vaccine, including "can primary hepatocellular carcinoma (HCC) be prevented by hepatitis B vaccine?;" "is hepatitis B vaccine safe?;" "is hepatitis B vaccine effective?;" and "how many doses are needed for complete vaccination against hepatitis B?"

2.4. Data analysis

We used EpiData version 3.02 to double-enter data and established a database for analysis with SPSS version 12.0. HCW demographics, knowledge of hepatitis B virus and hepatitis B vaccine and the hospitals' hepatitis B vaccination situations were analyzed descriptively. Chi-square testing and multivariate logistic regression were used to analyze factors potentially associated with hepatitis B vaccination. We used 2-tail P-value significance level of 0.05.

2.5. Ethical considerations

Data were not linked to individual identifiers; HCWs completed questionnaires anonymously.

3. Results

3.1. Investigated hospitals

We conducted our study in 22 hospitals in Beijing, Fuzhou, and Hangzhou. Six hospitals were province-level; 6 were city-level; 4 were county/district-level; 3 were infectious disease hospitals; and 3 were children's hospitals (Table 1). We found that 8 hospitals had organized efforts to provide hepatitis B vaccination to HCWs. Three hospitals in Beijing had a policy of providing free hepatitis B vaccination for HCWs who had a negative HBsAb test; the other hospitals charged HCWs for the vaccine.

All managers of infectious diseases departments and occupational health departments had positive attitudes towards hepatitis B vaccination of HCWs; all thought that providing hepatitis B vaccine for free would result in better coverage than if HCWs had to pay out-of-pocket for the vaccine. Nineteen of the 22 hospitals preferred to offer vaccine at the workplace; the other 3 preferred informing HCWs to go to vaccination clinics during their free time.

Table 1
Characteristics of hospital study sites.

City	Category of hospital	No. of hospitals	No. of respondents
Beijing	Province level	2	87
	City level	2	87
	County/district level	0	0
	Infectious disease hospital	1	45
	Children's hospital	1	41
Fuzhou	Province level	2	81
	City level	2	80
	County/district level	2	79
	Infectious disease hospital	1	40
	Children's hospital	1	40
Hangzhou	Province level	2	94
	City level	2	81
	County/district level	2	90
	Infectious disease hospital	1	44
	Children's hospital	1	40
Total		22	929

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