

Original

## Barriers to the acceptance of work colleagues infected with Hepatitis B and Hepatitis C in Japan

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**Abstract: Background:** Healthcare workers infected with Hepatitis B (HBV) or Hepatitis C virus (HCV) may undertake patient care activities if provider-to-patient transmission risks have been assessed in terms of viral load and clinical procedures. The present study investigated potential barriers to the acceptance of colleagues infected with HBV/HCV in healthcare settings after appropriate risk assessment. **Methods:** We conducted an anonymous, internet-based survey of Japanese nurses. Multivariate logistic analysis was used to assess factors associated with willingness to accept colleagues infected with HBV/HCV after risk assessment. **Results:** In total, 992 nurses responded to the survey, with 16% indicating that colleagues infected with HBV/HCV should not have patient contact after risk assessment. Willingness to accept HBV/HCV-infected colleagues was negatively associated with attitudes regarding the avoidance of contact with HBV/HCV-infected colleagues (OR: 0.49; 95% CI: 0.28-0.85). Previous professional contact with HBV/HCV patients (OR: 1.73; 95% CI: 1.36-2.12), experience of accidental injection from or personal exposure to HBV/HCV patients (OR: 2.00; 95% CI: 1.42-2.61), knowledge of HBV/HCV (OR: 2.00; 95% CI: 1.52-2.49), and female sex (OR: 1.60; 95% CI: 1.17-2.09) were positively associated with a willingness to accept HBV/HCV-infected colleagues. **Conclusions:** This study suggests that attitudes regarding the avoidance of contact with HBV/HCV-infected colleagues may be barriers to accepting these colleagues even after risk assessment has been performed. To protect the employment of nurses infected with HBV/HCV, employers should provide comprehensive

education for nurses to reduce stigma and improve understanding about the management of staff infected with infectious diseases, such as HBV or HCV.

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**Key words:** Hepatitis B virus, Hepatitis C virus, Nurses, Stigma

### Introduction

Hepatitis B (HBV) or Hepatitis C virus (HCV) infection status alone should not disqualify healthcare workers from undertaking patient care activities, provided an appropriate risk assessment has been undertaken. These diseases are not uncommon in healthcare, with the prevalence of past diagnoses of hepatitis among Japanese nurses having been estimated at 3.4% (including non-B and non-C hepatitis variants)<sup>1</sup>. Antiviral therapy can help achieve the long-term suppression of HBV replication<sup>2</sup> and cure most patients with HCV<sup>3</sup>. Effective treatment has also reduced the risk of HBV/HCV transmission from infected nurses to patients<sup>4</sup>. Therefore, nurses infected with HBV/HCV are still able to perform exposure-prone procedures after the transmission risk has been assessed under the joint supervision of an occupational medicine expert and their treating physician<sup>5</sup>. However, exposure-prone procedures have sometimes been shown to be associated with HBV/HCV provider-to-patient transmission risk, despite the use of appropriate infection control procedures<sup>6</sup>. Exposure-prone procedures carry a risk that nurses may injure themselves and bleed into the patient's open tissues, with a consequent risk of infection. The Society for Healthcare Epidemiology of America recommends that a healthcare provider who has a circulating HBV or HCV burden of less than 10<sup>4</sup> GE/mL should not

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be excluded from any aspect of patient care, including exposure-prone procedures, if they obtain advice from an expert review panel and undergo follow-up routinely by occupational medicine staff<sup>6</sup>.

Stigma and discrimination may negatively influence engagement in healthcare settings (e.g., denial of care and excessive precautions)<sup>7-11</sup>, and social discrimination against HBV/HCV-infected colleagues has been shown to exist in the Japanese working population<sup>12</sup>. Aspects of this discrimination include avoiding contact with an infected colleague, anxiety about the potential risk of infection from an infected colleague, and expressing views such as that a HBV/HCV-infected colleague may be a homosexual, have multiple sexual partners, or be a drug user. Nurses' attitudes tend to mirror those of the general public, including sexism, racism, classism, and homophobia<sup>13</sup>. Previous studies have reported that some nurses were unwilling to care for patients with HCV because of anxiety regarding the potential risk of infection<sup>14,15</sup>. Additionally, Sadoh et al. reported that a majority of nurses were not comfortable with the concept of Human Immunodeficiency Virus (HIV)-infected colleagues performing clinical procedures<sup>16</sup>. However, to our knowledge, no studies have investigated nurses' attitudes toward colleagues infected with HBV or HCV performing clinical procedures in Japan.

We hypothesized that nurses may be unwilling to accept colleagues infected with HBV/HCV even after risk assessment, suggesting the existence of stigma toward HBV/HCV-infected colleagues. Nurses represent one of the largest occupational groups in healthcare and regularly provide patient care activities<sup>17</sup>. Therefore, in the present study, we investigated barriers to nurses accepting the employment of HBV/HCV-infected colleagues within healthcare settings after appropriate risk assessment. This is important because improving the understanding of nurses' acceptance of HBV/HCV-infected colleagues may help stabilize the long-term employment situation for infected nurses.

## Materials and Methods

### *Recruitment of participants*

We conducted a cross-sectional internet-based survey of nurses in Japan. Nurses who had registered with an internet research company and who were currently working in hospitals or clinics were included in this study. Participants could receive token rewards from the company if they answered some questions (worth a few US Dollar), which could be exchanged for goods, services, or coupons. In total, 1,111 nurses met the inclusion criteria, and invitation letters were distributed to all participants via email in early 2015. Nurses who agreed to participate were then able to access the linked website and answer the online questionnaire anonymously. Participation was

strictly voluntary and informed consent was obtained before the study began.

The study was approved by the Institutional Ethics Committee of the National Center for Global Health and Medicine, Japan (NCGM-G-001747-00).

### *Study instruments (questionnaire)*

Data were gathered using an internet-based, self-administered questionnaire. Questionnaires were specifically designed for the present study on the basis of previous studies<sup>15,18-20</sup> and consisted of three parts: (1) general characteristics, (2) knowledge of HBV/HCV, and (3) attitude toward colleagues infected with HBV/HCV.

General characteristics included sex, age, marital status, workplace, and position. Information regarding their experiences related to HBV/HCV infection, including experience of dealing patients with HBV/HCV within the past 1 year, accidental injection from or personal exposure to patients with HBV/HCV, and completion of the required three courses of hepatitis B vaccinations, were also collected.

Knowledge of HBV/HCV was assessed using 10 items focusing on HBV/HCV transmission routes (Cronbach's alpha=0.87). Responses were measured on a two-point scale (0=No, I did not know, 1=Yes, I knew). A total score was calculated and then classified as a low (0 to 8 points) or high score (9 or 10 points).

Attitudes toward colleagues infected with HBV/HCV were as follows: (1) avoiding contact with a HBV/HCV-infected colleague, (2) anxiety regarding the potential risk of infection from a HBV/HCV-infected colleague, and (3) expressing views such as that a HBV/HCV-infected colleague may be homosexual, have multiple sexual partners, or be a drug user. The outcome variable for the present study was willingness to accept a colleague infected with HBV/HCV after risk assessment, assessed with the sentence "A HBV/HCV-infected colleague can have contact with patients if their viral load is low or they do not perform high-risk procedures." All attitudes were measured using a five-point Likert scale (agree, somewhat agree, somewhat disagree, disagree, and unknown).

### *Statistical analysis*

First, we calculated descriptive statistics for all variables using frequencies and proportions. Second, we used univariable and multiple regression analyses to calculate odds ratios (OR), 95% confidence intervals (95% CI), and probability (P) values to identify the variables associated with willingness to accept a colleague infected with HBV/HCV after risk assessment. Factors included in the multivariable model were sex, age, marital status, workplace, position, experience of dealing with HBV/HCV patients, accidental injection, hepatitis B vaccination status, and HBV/HCV knowledge. For the analysis, all attitude variables were reclassified into two levels (1=agree/somewhat

**Table 1.** General characteristics of the study participants (n=992)

	n	(%)
Sex		
Female	879	(89)
Male	113	(11)
Age (years)		
20-39	444	(45)
40 and over	548	(55)
Marital status		
Married	580	(59)
Single	308	(31)
Divorced or Widowed	104	(10)
Workplace		
Clinic	320	(32)
Hospital	672	(68)
Position		
Manager	131	(13)
Non-manager	861	(87)
Previous professional contact with HBV/HCV-infected patients (in the past 12 months)		
Yes	668	(67)
No	218	(22)
Unknown	106	(11)
Experience of accidental injection or exposure to HBV/HCV-infected patients		
Yes	182	(18)
No	733	(74)
Unknown	77	(8)
Completed the full (3-course) Hepatitis B vaccination schedule		
Yes	417	(42)
No	452	(46)
Unknown	123	(12)
Knowledge of HBV/HCV		
Low (0-8 points)	105	(11)
High (9-10 points)	887	(89)

agree, 0=disagree/somewhat disagree/unknown). We applied Zhang's formula to adjust the OR and 95% CI for common outcomes<sup>21)</sup>. Two-tailed tests were used and  $P < 0.05$  was considered statistically significant. Statistical analyses were performed using SPSS version 17.0 (SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc.).

## Results

In total, 992 nurses participated in the study and were included in the analysis (response rate, 89.3%). Table 1 shows the general characteristics of the participants. Most participants were female (89%), over half were aged  $\geq 40$  years (55%), and a majority of them worked in hospitals (68%). Sixty-seven percent (n=668) participants reported having had professional contact with a HBV/HCV-

infected patient in the past year, and 18% (n=182) had experienced an accidental injection from or personal exposure to a patient infected with HBV/HCV. Forty-two percent of participants (n=417) had received three courses of hepatitis B vaccinations. Around 90% of the participants were classified as having a high level of knowledge (89%).

Table 2 indicates the participants' attitudes toward a colleague infected with HBV/HCV. Although a majority of the nurses reported nondiscriminatory attitudes toward HBV/HCV-infected colleagues, 6% (n=62) disagreed, and just over 10% (n=103) somewhat disagreed with accepting a colleague infected with HBV/HCV, even after risk assessment. Additionally, 10% of the participants (n=99) agreed or somewhat agreed that they would avoid contact with a HBV/HCV-infected colleague, 19% (n=186) would feel anxious regarding the potential risk of in-

**Table 2.** Attitudes towards colleagues infected with HBV/HCV (n=992)

	Agree (%)	Somewhat agree (%)	Somewhat disagree (%)	Disagree (%)	Unknown (%)
A HBV/HCV-infected colleague can have contact with patients if their viral load is low or without performing high risk procedures (Willingness to accept a HBV/HCV-infected colleague after a risk assessment)	499 (50)	264 (27)	103 (10)	62 (6)	64 (7)
Avoiding contact with a HBV/HCV-infected colleague	29 (3)	70 (7)	304 (31)	569 (57)	20 (2)
Anxiety regarding the potential risk of infection from a HBV/HCV-infected colleague	33 (3)	153 (16)	337 (34)	445 (45)	24 (2)
A HBV/HCV-infected colleague might be homosexual, might have multiple sexual partners, or be a drug user	17 (2)	69 (7)	256 (26)	626 (63)	24 (2)

**Table 3.** Factors associated with willingness to accept HBV/HCV-infected colleagues after risk assessment

	Univariate		Adjusted	
	OR	(95%CI)	OR	(95%CI)
Avoiding contact with a HBV/HCV-infected colleague				
Disagree / Somewhat disagree / Unknown	1.00	-	1.00	-
Agree / Somewhat agree	0.46	(0.31-0.67)	0.49	(0.28-0.85)
Previous professional contact with HBV/HCV-infected patients (in the past 12 months)				
No	1.00	-	1.00	-
Unknown	1.03	(0.70-1.46)	1.19	(0.77-1.73)
Yes	1.87	(1.51-2.23)	1.73	(1.36-2.12)
Experience of accidental injection or exposure to HBV/HCV-infected patients				
No	1.00	-	1.00	-
Unknown	0.56	(0.36-0.84)	0.64	(0.39-1.00)
Yes	1.87	(1.51-2.23)	2.00	(1.42-2.61)
Knowledge of HBV/HCV				
Low (0-8 points)	1.00	-	1.00	-
High (9-10 points)	2.30	(1.85-2.73)	2.00	(1.52-2.49)
Completed the full (3-course) Hepatitis B vaccination schedule				
No	1.00	-	1.00	-
Unknown	0.51	(0.35-0.73)	0.62	(0.41-0.92)
Yes	1.22	(0.95-1.53)	0.99	(0.74-1.30)
Sex				
Male	1.00	-	1.00	-
Female	1.49	(1.10-1.92)	1.60	(1.17-2.09)

OR: Odds Ratio; 95%CI: 95% Confidence Interval (adjusted for sex, age, marital status, workplace, position, experience of dealing patients with HBV/HCV, accidental injection, hepatitis B vaccination status, HBV/HCV knowledge)

fection from a HBV/HCV-infected colleague, and 9% (n=86) would express views such as that a HBV/HCV-infected colleague may be homosexual, have multiple sexual partners, or be a drug user.

Table 3 presents factors associated with willingness to accept a colleague infected with HBV/HCV after risk assessment. After adjusting for confounders, willingness to accept a HBV/HCV-infected colleague was negatively as-

sociated with attitudes toward avoiding contact with a HBV/HCV-infected colleague (OR: 0.49; 95% CI: 0.28-0.85). Previous professional contact with a patient with HBV/HCV (OR: 1.73; 95% CI: 1.36-2.12), experience of accidental injection from or personal exposure to a patient infected with HBV/HCV (OR: 2.00; 95% CI: 1.42-2.61), knowledge of HBV/HCV (OR: 2.00; 95% CI: 1.52-2.49), and female sex (OR: 1.60; 95% CI: 1.17-2.09) were posi-

tively associated with willingness to accept a colleague infected with HBV/HCV.

## Discussion

This study investigated Japanese nurses' attitudes toward their colleagues who were (or may hypothetically be) infected with HBV/HCV. Specifically, we examined factors associated with willingness to accept the employment of a HBV/HCV-infected colleague after the risk of nurse-to-patient transmission had been assessed. This study revealed that some nurses were unwilling to accept colleagues infected with HBV/HCV, probably as a risk avoidance strategy. On the other hand, previous professional contact, accidental injection, and knowledge levels, which were associated with a willingness to accept HBV/HCV-infected colleagues), appeared to be mitigating factors.

An attitude of avoiding contact with HBV/HCV-infected colleagues was negatively associated with a willingness to accept that colleague even if risk assessment had been performed. Some early studies reported, for example, that nurses may assume patients with HCV are injecting drug users<sup>22,23</sup>. Some nurses may also view injecting drug users as being less cooperative, more dangerous, less truthful, and more demanding<sup>24,25</sup>. These negative views associated with HCV status may influence their attitudes toward infected colleagues. Furthermore, nurses may feel uncomfortable with HBV/HCV-infected colleagues who provide patient care, suggesting that employers should provide appropriate education and communication targeted at nurses to reduce stigma and improve understanding about the management of healthcare colleagues who have been infected with infectious diseases.

Although a majority of the respondents in the present study did not report discrimination against HBV/HCV-infected colleagues, some discriminatory attitudes still existed. These findings are similar to those of some previous studies on discriminatory attitudes toward HBV/HCV, although the discrimination in those studies was toward infected patients rather than colleagues<sup>26-28</sup>. Nevertheless, nurses appear to be less discriminatory than the general working population of Japan<sup>12</sup>; for example, 32% of the general working population vs 10% of nurses would avoid contact with infected colleagues, 36% (general working population) vs 19% (nurses) reported anxiety about the potential risk of infection, and 24% (general working population) vs 9% (nurses) would expressed negative views regarding infected colleagues. These results may be explained by the fact that nurses have greater level of knowledge regarding the transmission and treatment of blood-borne diseases<sup>29</sup>. Age was not found to be a predictive factor in the present study, a finding that was inconsistent with some other research conducted in Japan, which found that older age ( $\geq 40$  years) was independently

associated with decreased discriminatory attitudes, although the participants of that particular study were not healthcare workers<sup>30</sup>. Nevertheless, employers will still need to consider the confidentiality of healthcare workers with infectious diseases to help these workers cope with potentially discriminatory attitudes<sup>31</sup>.

Willingness to accept a HBV/HCV-infected colleague was positively associated with previous professional contact with HBV/HCV infected patients and accidental or personal exposure to patients infected with HBV/HCV. Our results differed from most previous studies, which have often focused on nurses' willingness to care for patients with HCV<sup>11,14</sup>. Experience of professional contact with a patient with HBV/HCV or an accidental injection from a patient infected with HBV/HCV were related to the perceived risk of HBV/HCV infection<sup>32</sup>. Risk perception may exacerbate one's fear of dealing with patients infected with HBV/HCV<sup>15</sup> but may also promote empathic understanding toward HBV/HCV-infected colleagues who would like to continue working after acquiring HBV/HCV. Therefore, risk perception may positively influence willingness to accept a HBV/HCV-infected colleague. Professional and workplace-related education regarding the practical occupational risk of HBV/HCV infection including peer training programs, may offer a potential solution in this regard<sup>33</sup>.

The current study revealed that a higher level of HBV/HCV knowledge was positively associated with participant's willingness to accept a HBV/HCV-infected colleague, a finding consistent with that of previous research<sup>12,34</sup>. Knowledge regarding HBV/HCV transmission is essential to accurately assess provider-to-patient transmission risks, and therefore, nurses with a high level of HBV/HCV knowledge may have more positive attitudes toward HBV/HCV-infected colleagues who are engaged in patient care activities if the risk had been assessed. In contrast, lack of knowledge probably exacerbates the fear of contracting HBV/HCV infection, and consequently affects individual behavior toward a HBV/HCV-infected colleague<sup>15</sup>. Our participants reported acceptable levels of knowledge, suggesting nurses' knowledge about HBV/HCV may be effective in improving their attitudes toward people infected with HBV/HCV.

Uncertain HBV vaccination status was negatively associated with willingness to accept a colleague infected with HBV/HCV, a finding consistent with that of previous studies<sup>28,35</sup>. Uncertain vaccination status is known to influence fear regarding occupational HBV risk, which in turn affects nurses' unwillingness to accept a HBV/HCV-infected colleague<sup>29</sup>. Ideally, all nurses should be vaccinated against HBV. However, about half of our participants indicated that they had not been completely vaccinated against HBV. In the United States, the estimated coverage of HBV vaccination among nurses has been shown to be around 80%<sup>36</sup>, possibly because employers

have been required to offer HBV vaccine to all people at occupational risk of HBV infection since 1991<sup>37)</sup>. Improved access to HBV vaccination was seen as important not only for nurses' protection from infection but also to improve their willingness to accept an infected colleague. On the other hand, treatment levels for HCV-infected patients have been shown to be suboptimal in Japan, suggesting that more attention is required in this area<sup>38)</sup>.

Our findings suggested that male nurses were less willing to accept a HBV/HCV-infected colleague than their female counterparts. This was inconsistent with the results of a previous study conducted in Belize, which showed that female healthcare workers were more stigmatizing toward patients with HIV than male healthcare workers<sup>18)</sup>. Future research should examine sex-based differences in attitudes toward people infected with HBV/HCV.

The current study had certain limitations that should be considered. Firstly, a cross-sectional study design was utilized, which could not determine cause and effect relationship. Secondly, we conducted an internet-based survey, and selection bias may have occurred through factors related to internet access and use, and those who participated may have had higher levels of HBV/HCV knowledge<sup>39)</sup>. Even so, an anonymous internet-based survey was deemed to be an appropriate method of investigation, given the sensitive nature of the topic. Thirdly, we assessed attitudes toward colleagues infected with HBV and HCV in a single (combined) questionnaire, which did not delineate between the different illnesses. Individuals may have different attitudes toward these diseases, given that knowledge about these illnesses may overlap or be confused<sup>40)</sup>. Future research in this area should therefore assess HBV and HCV attitudes separately. Finally, we measured attitudes using a five-point Likert scale and then dichotomized into a two-point scale during logistic regression analysis, which may have affected the item variability and the ability to detect differences.

In conclusion, the present study found that attitudes toward colleagues infected with HBV/HCV may be a barrier to accepting these colleagues, even after risk assessment has been performed. To protect the employment of HBV/HCV-infected nurses, employers should provide education and communication targeted at all staff to help reduce stigma and improve understanding about the management of healthcare workers with infectious diseases.

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