

Original Article

Awareness, knowledge, and practice for hepatitis B infection in Southeast Asia: a cross-sectional study

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Abstract

Introduction: The prevalence of hepatitis B virus (HBV) infection in Southeast Asia is high. Awareness and early detection are essential for timely prevention and treatment.

Methodology: We examined the awareness of, knowledge about, practices and views on treatment for HBV infection in Southeast Asia. A cross-sectional survey was conducted from December 2016 to February 2017 among individuals from six nations in Southeast Asia—Myanmar, Thailand, Vietnam, Cambodia, the Philippines, and Singapore. The study population comprised healthcare and non-healthcare personnel.

Results: In total, 799 healthcare personnel and 1079 non-healthcare personnel completed an online survey. The prevalence of the awareness of their own HBV infection status and risk of this regionally endemic infection was 85.6% (684/799) among healthcare personnel and 54.0% (583/1079) among non-healthcare personnel. Similarly, 85.9% of healthcare personnel and 45.5% of non-healthcare personnel had good knowledge about disease transmission, complications, and the need for treatment, and 76.6% of healthcare personnel and 39.8% of non-healthcare personnel followed good HBV infection-prevention practices. Overall, 90.6% found the idea of treatment acceptable. Awareness had a significant impact on both knowledge and practice scores among both healthcare personnel and non-healthcare personnel ($p < 0.01$) but without statistically significant differences in treatment acceptance between the two groups ($p = 0.61$).

Conclusions: Awareness of HBV infection was relatively low among non-healthcare personnel in Southeast Asian populations. The provision of additional hepatitis B awareness campaigns is crucial to eliminating viral hepatitis in the region.

Key words: awareness; chronic hepatitis B infection; knowledge; Southeast Asia; treatment acceptability.

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Introduction

It is estimated that 240 million people worldwide are chronically infected with hepatitis B virus (HBV). Southeast Asia is one of the regions with the highest prevalence, where >5% of the adult population is chronically infected [1,2].

Prevention is key to minimizing HBV transmission and the long-term disease burden. A strategy addressed in the World Health Assembly, as a framework for global action against viral hepatitis, is Awareness-raising, Partnerships and Resource Mobilization [3]. The World Health Organization (WHO) has also recommended increasing awareness [1]. Level of knowledge and awareness impact on the five core interventions of a cascade of care for HBV to minimise the burden of viral hepatitis: testing, linkage to care, treatment, long-term care and prevention. Testing for

HBV infection and vaccination against it depend on the level of knowledge in a population and the awareness of healthcare personnel [4-6].

Major barriers to HBV infection control include the low numbers of infected individuals and the proportion of the general population who are aware of the disease and its implications [7]. A number of studies have indicated that lack of knowledge about HBV transmission and the consequences of infection result in low levels of vaccination and screening [7-9]. In addition, awareness of the problem, but inadequate knowledge and information in a community, could result in stigmatization and discrimination [10].

Current data are lacking on the level of awareness of HBV infection among the general population and healthcare personnel in Southeast Asia. A recent study in Laos demonstrated that 86% of students in the

healthcare professions scored poorly on an assessment of knowledge about HBV infection [11]. Since very few studies have been undertaken in this region, a better understanding of the current state of knowledge about the disease would be useful to tailor efforts to bring people into the cascade of care for HBV infection.

We conducted a cross-sectional survey to assess the level of awareness, knowledge, practice and acceptability of treatment for HBV infection in six Southeast Asian countries.

Methodology

This cross-sectional study was conducted through using an online survey across six nations of Southeast Asia--Cambodia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. The electronic questionnaire was self-administrated using a mobile device or computer. Participants comprised healthcare personnel and non-healthcare personnel aged 20 years or above.

Questionnaire development

The variables collected were demographic factors, questions assessing awareness of and knowledge about HBV infection, practice of preventive measures, and views on treatment. The questionnaire details are provided in the supplementary material.

A scoring system was used to evaluate the knowledge and practice of the respondents. The highest possible knowledge score was 17 for healthcare personnel and 16 for non-healthcare personnel. Questions on practices were the same for both groups, with a highest possible score of 5. We defined a 'good' score as 70% or above in each category.

Questionnaire translation

The questionnaire was constructed in English and then translated into Thai, Burmese, Khmer and Vietnamese, by native speakers who also spoke English. Translation into each language was validated through parallel tests conducted with native speakers who spoke both English and one of the translated languages. Study participants could choose one of the five languages provided to participate.

Online questionnaire construction and distribution

The questionnaire was built with a user-friendly interface by Typeform, available at <http://www.typeform.com/>. Pilot testing was conducted among 30 participants to check accessibility, time required, questionnaire structure, patterns of skipped answers, and missing data. At least two healthcare professionals and two non-healthcare trained

individuals in each country distributed the survey link by the chain referral process through emails, online messages, social media, and websites.

Sample size calculation

We calculated the sample size for the two groups independently; the two groups comprised healthcare personnel and non-healthcare personnel in each country. A cross-sectional survey conducted in Hong Kong in 2010 demonstrated that 55% of the general population was aware that HBV was the most common cause of chronic viral hepatitis in their country [12]. Another study, in India in 2013, demonstrated that 84.3% of hospital interns were aware of their risk [13]. On the basis of the results of these two studies, and to remain within a margin of $\pm 3\%$ error, the minimum sample sizes were calculated as 1056 for non-healthcare personnel and 573 for healthcare personnel.

Statistical analysis

Data in the different languages were recoded as predefined numerical values, and individual scores for each section were calculated. The dataset was imported into SPSS version 18 (SPSS Inc., Chicago, IL) for analysis. For description of baseline characteristics, numbers and percentages were used for categorical variables. The mean with standard deviation and the median with the 25th-to-75th percentile range (IQR) were used for continuous variables, depending on the distribution of the data. The Mann–Whitney U test was used to compare median values between the groups. Factors affecting awareness, knowledge and practice were identified by using a chi-square test and binary logistic regression. Significant variables ($p < 0.05$) on univariate analysis were assessed by multivariate analysis. Statistical tests were performed using two-sided tests, and statistical significance was defined as a P value < 0.05 with a confidence interval of 95%.

Ethics approval and consent of participants

The respondents were informed at the beginning of the survey that participation was totally voluntary, that results were confidential, and that they had the right to withdraw at any time without penalty. All responses were recorded anonymously. The protocol was approved by the Institutional Review Board of the Faculty of Tropical Medicine, Mahidol University, Thailand (MUTM 2016-005).

Results

From December 2016 to February 2017, 4014 people were invited to participate, of whom 1998

(49.78%) agreed to start the survey. Of those 1998, 1878 (94%) actually completed the survey, comprising 799 healthcare personnel and 1079 non-healthcare personnel. Their responses provided the data for analysis (Figure 1). According to Google Analytics Tracks, 94.29% of the responses came from within Southeast Asia.

Two-thirds of the respondents were female, most (80.1%) were in the 20–40 years’ age range, and the majority were from Thailand or Myanmar. Two-thirds had tertiary education levels (Table 1).

Awareness of and knowledge about HBV infection

Overall, the healthcare personnel were significantly more aware of HBV infection than the non-healthcare personnel (85.6% vs. 54%, $P < 0.001$). The median knowledge score of the healthcare personnel was 15 (IQR 13–16), and that of the non-healthcare personnel 11 (IQR 8–14). The percentage of participants with a good score was significantly higher among the healthcare personnel than the non-healthcare personnel (85.9% vs.45.5%, $P < 0.001$) (Figure 2).

Figure 1. Flow chart of website visitors and participants in a survey about hepatitis B.

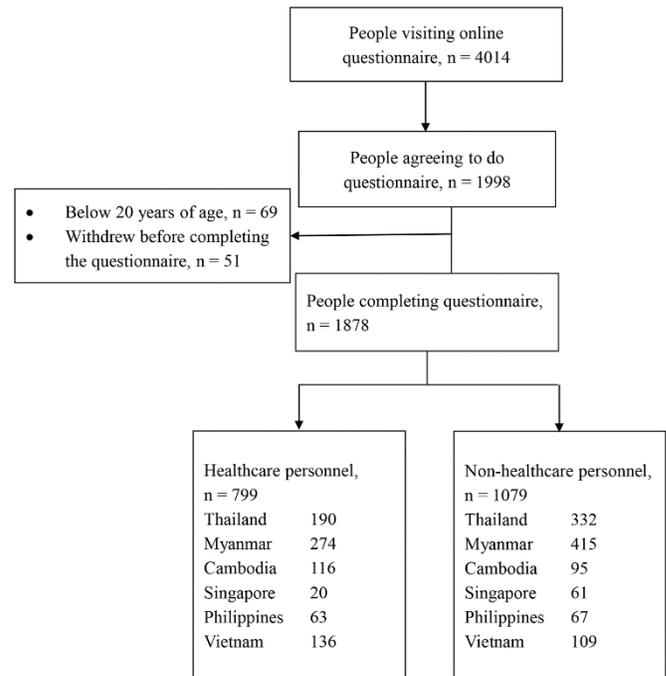


Table 1. Demographic data of participants.

Variable	Overall Number (%) N = 1878	Healthcare personnel Number (%) n = 799	Non-healthcare personnel Number (%) n = 1079	P value
Gender				
Male	683 (36.4)	268 (33.5)	415 (38.5)	0.090
Female	1181 (62.9)	525 (65.7)	656 (60.8)	
Not specified	14 (0.7)	6 (0.8)	8 (0.7)	
Age in years				
20–40	1504 (80.1)	663 (83.0)	841 (77.9)	0.012
41–60	340 (18.1)	127 (15.9)	213 (19.7)	
> 60	34 (1.8)	9 (1.1)	25 (2.3)	
Nationality				
Thai	522 (27.8)	190 (23.8)	332 (30.8)	< 0.001
Burmese	689 (36.7)	274 (34.3)	415 (38.5)	
Cambodian	211 (11.2)	116 (14.5)	95 (8.8)	
Singaporean	81 (4.3)	20 (2.5)	61 (5.6)	
Filipino	130 (6.9)	63 (7.9)	67 (6.2)	
Vietnamese	245 (13.1)	136 (17.0)	109 (10.1)	
Education level				
Lower than secondary	16 (0.9)		16 (1.5)	< 0.001
Secondary	84 (4.7)		84 (7.8)	
Tertiary	111 (62.1)	474 (59.3)	637 (59.0)	
Postgraduate	667 (37.3)	325 (40.7)	342 (31.7)	
Healthcare personnel				
Medical student		100 (12.5)		
Nursing student		9 (1.1)		
Doctor		366 (45.8)		
Nurse		224 (28.1)		
Pharmacist		60 (7.5)		
Medical technologist		40 (5.0)		

Practices and prevention of HBV infection

Overall, the healthcare personnel achieved a significantly higher score than the non-healthcare personnel (76.6% vs. 39.8%, $P < 0.001$). The median score for the healthcare personnel was 4 (IQR 4–5), and that for the non-healthcare personnel 3 (IQR 1–4) (Figure 3).

Acceptability of treatment

The overall treatment acceptability rate was 90.6%, and this did not differ significantly between the healthcare personnel and non-healthcare personnel (90.7% vs. 90.5%, $P = 0.89$). Of the total participants, 154 (9.4%) were chronically infected with HBV. Treatment acceptability did not differ significantly between those who were HBV-positive and those who were not (86.4% vs. 91.0%, $P = 0.06$).

In the group of 154 HBV-infected persons, 114 (74%) had consulted a doctor regarding their infection and 108 (70.1%) said they had received counselling about the infection. Most were being treated, but 19 (12.3%) were unable to accept the treatment for several reasons, including lack of clear information (12, 63.2%), fear of side effects (4, 21.1%), preference for traditional medicine (1, 5.3%), duration of treatment (1, 5.3%) and unaffordability (1, 5.3%).

Impact of awareness on knowledge, practice and perception of treatment

For the healthcare personnel, the median scores for both knowledge and practice were higher among those who were aware of HBV infection (14 vs. 16 for knowledge and 5 vs. 4 for practice; $P < 0.001$ and $P = 0.007$, respectively). However, the percentage of people who perceived treatment as acceptable did not differ significantly (90.4% vs. 93.4%, $P = 0.610$). For the non-healthcare personnel, the median scores for both knowledge and practice were higher among those who were aware of HBV infection (12 vs. 10 for knowledge and 3 vs. 3 for practice; $P < 0.001$), and similarly for treatment acceptability (93.3% vs. 87.3%, $P = 0.001$).

Factors associated with knowledge, practice and perception of treatment among healthcare personnel

Using multivariate analysis, significant factors associated with good scores on knowledge among healthcare personnel were attending updating sessions during formal training (OR, Odds ratio, 2.06, 95% confidence interval, CI, 1.25–3.41) and reading the literature (OR 2.09, 95% CI 1.35–3.23). The position of medical technologist was negatively associated with good knowledge score (OR 0.39, 95% CI 0.17–0.90).

Figure 2. Percentage of healthcare personnel and non-healthcare personnel aware of hepatitis B infection and correctly answering each question on knowledge. The questions are ordered according to awareness, mode of transmission, complications, preventability and the need for treatment.

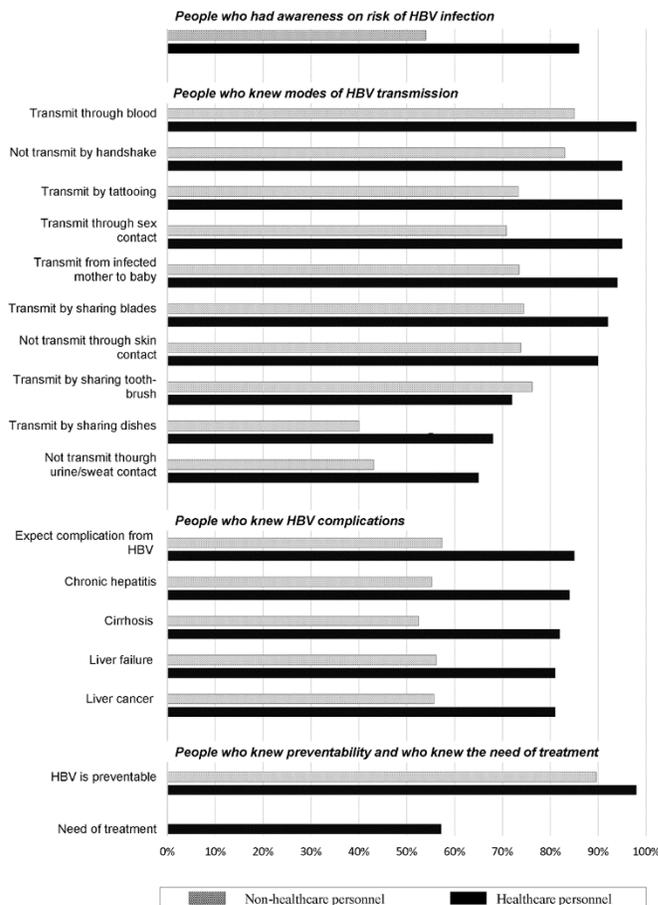


Figure 3. Percentage of healthcare personnel and non-healthcare personnel who correctly answered each question about correct practices regarding hepatitis B infection.

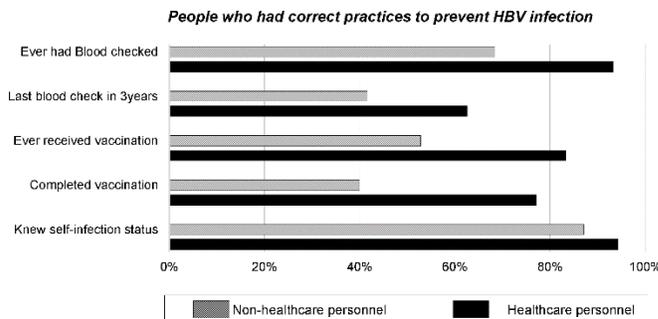
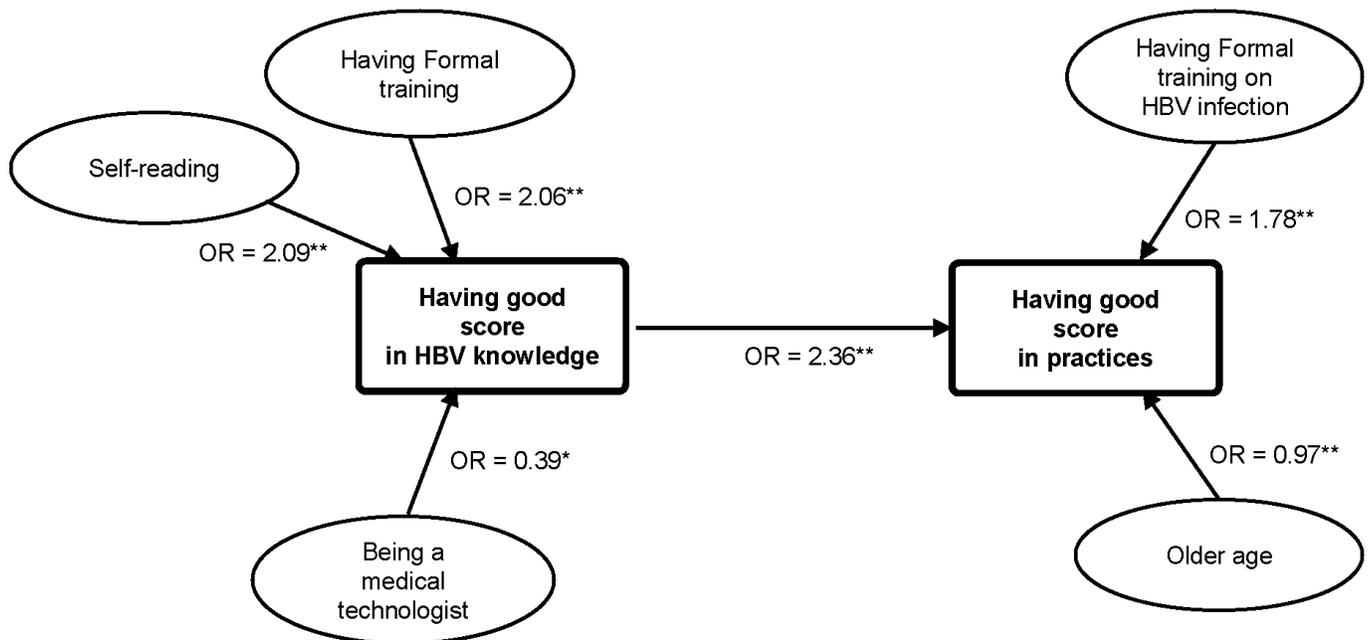


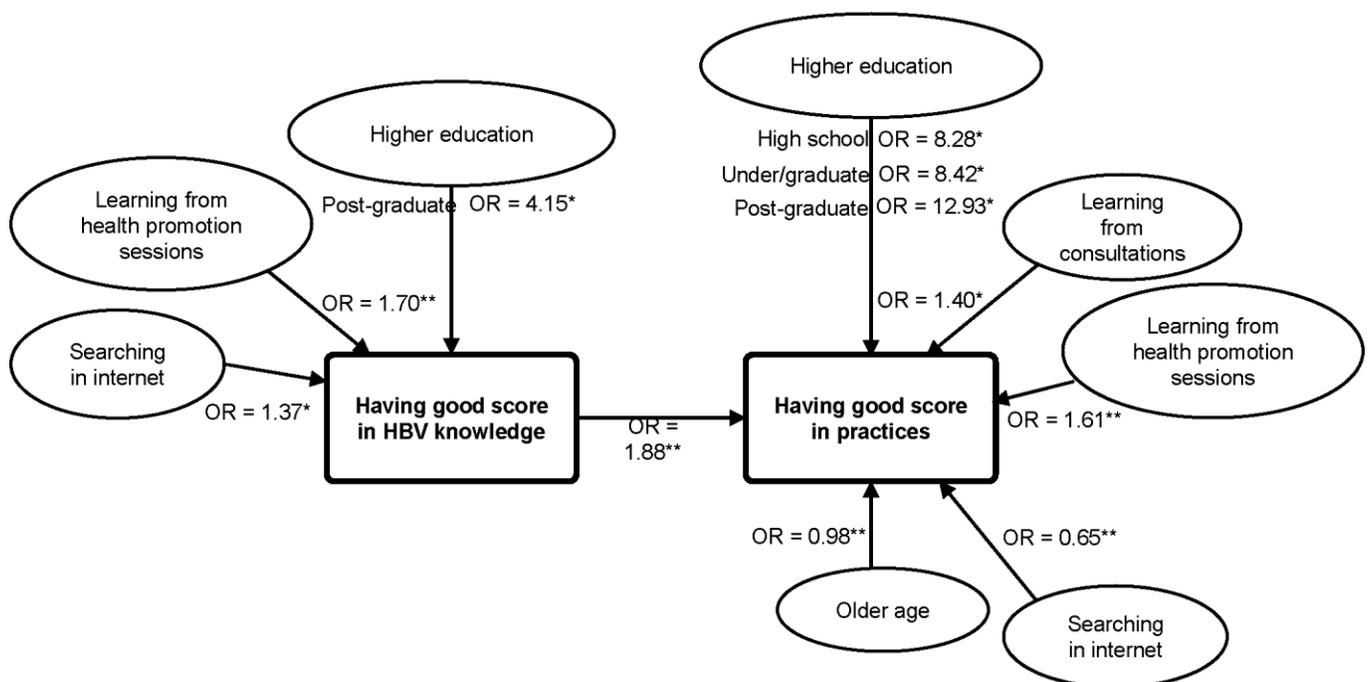
Figure 4. Factors associated with good scores for hepatitis B infection knowledge and practices among healthcare personnel (* P < 0.05 and ** P < 0.01).



Among the healthcare personnel, learning about HBV during formal training (OR 1.78, 95% CI 1.17–2.71) and having a good knowledge score (OR 2.36, 95% CI 1.52–3.67) were associated with a good score for practices regarding prevention of HBV infection. Older respondents were less likely to have good practice scores (OR 0.97, CI 0.95–0.99) (Figure 4). However, no factors were significantly associated with treatment acceptability among healthcare personnel.

Healthcare personnel who did or did not have HBV refresher training had similar median scores for knowledge and practice. However, those who had refresher training were more likely to know about post-exposure prophylaxis for occupational exposure (OR 2.70, 95% CI 1.95–3.70) and mother-to-child transmission (OR 2.18, 95 % CI 1.55–3.07).

Figure 5. Factors associated with good scores for hepatitis B infection knowledge and practices in non-healthcare personnel (* P < 0.05 and ** P < 0.01).



Factors associated with knowledge, practice and views on treatment among non-healthcare personnel

By multivariate analysis, significant factors associated with a good knowledge score among non-healthcare personnel were having a postgraduate education (OR 4.15, 95% CI 1.15–5.02), learning from health promotion programmes (OR 1.70, CI 1.31–2.21), and searching the internet (OR 1.37, 95% CI 0.06–1.76).

Among non-healthcare personnel, multivariate analysis revealed that factors associated with good scores for practice and prevention of HBV infection included education beyond secondary school, learning about HBV infection during medical consultations (OR 1.41, 95% CI 1.07–1.85), learning in health-promotion programmes (OR 1.61, 95% CI 1.23–2.12) and having a good knowledge score (OR 1.41, 95% CI 1.07–1.85). Older age and searching in internet sites were negative predictors for a good practice score (OR 0.97, 95% CI 0.96–0.97 and OR 0.65, CI 0.49–0.85, accordingly) (Figure 5).

Higher education was positively associated with acceptability of treatment among non-healthcare personnel, including having a secondary education (OR 5.27, 95% CI 1.24–22.41) and having a tertiary education (OR 3.33, 95% CI 1.04–10.65).

Discussion

In this study, 85.6% of healthcare personnel and 54% of non-healthcare personnel were aware of hepatitis B infection. Of the healthcare personnel,

85.9% had good knowledge scores, while only 39.8% of non-healthcare personnel scored as well. Similar disparities were found in the scores for practices related to HBV. Awareness was independently associated with good knowledge and practice among both healthcare and non-healthcare personnel. Formal training and reading the literature were useful sources of information for healthcare personnel. Those who scored better among non-healthcare personnel were younger, had a higher educational level and were more likely to learn about HBV during medical consultations and health-promotion sessions.

Like the finding in the present study, awareness among healthcare personnel in most other Asian studies has been found to be high, although the definitions used in assessing HBV awareness have varied (Table 2). Our results were similar to those of a study in Hong Kong which investigated a similar population and used similar questions about HBV awareness and the risk of acquiring HBV infection. However, our results differ from awareness levels found in communities within Asia and Asian communities outside Asia (Table 3).

In our study, the scores for knowledge and practice among the healthcare personnel were good, but those from members of the non-healthcare personnel were considerably lower. Non-healthcare trained persons lacked knowledge about the complications of HBV infection, which might have made them less aware and concerned about the topic overall. In the study among Asians living in Canada, 68% were aware of HBV infection, but >60% did not know about the major

Table 2. Studies on awareness of hepatitis B infection among healthcare personnel in Asia.

Author Year/Country	Study design	Type of healthcare personnel	Sample size	Definition of awareness	Proportion aware of HBV infection
This study, 2017, 6 countries of Southeast Asia	Cross-sectional, self-administered online survey	Senior clinical students, clinical and paramedical healthcare staff	799	HBV infection risk or knowing one's own status	86%
Choudhury <i>et al.</i> [18] 2015, India	Cross-sectional, self-administered survey	Medical, dental and nursing students and interns of a medical college	332	Transmission via blood and body fluids	97%
Pathoumthong <i>et al.</i> [11] 2014, Laos	Cross-sectional, self-administered survey	Students of health profession	961	Risk of HBV infection	37%
Ghomraoui <i>et al.</i> [19] 2014, Saudi Arabia	Cross-sectional self- administered self- completed survey	Medical students at a tertiary care academic hospital	444	Vaccination including doses, type and route	60%
Ibrahim <i>et al.</i> [20] 2014, Syria	Cross-sectional self- administered survey	Medical students of a private medical school	128	HBV infection	92%
Setia <i>et al.</i> [13] 2013, India	Cross-sectional self- administered survey in	Medical, dental and nursing interns at a tertiary hospital	255	Occupational risk	84%
Patil <i>et al.</i> [21] 2012, India	Cross-sectional, self-administered survey	Auxiliary health workers in a hospital	300	Main modes of transmission	97%

HBV hepatitis B virus.

consequences of infection, such as cirrhosis and liver cancer [14].

Higher education was positively associated with good knowledge and practice scores in our study population. Higher education was also a significant predictor of higher knowledge score among Asians in North America, as studied by Cheng *et al.* [15] and Yau *et al.* [16]. The latter group also found, as we did, that younger age was positively associated with better HBV knowledge [16]. These findings suggest that public-health agencies would do well to address the knowledge gap among those with a lower level of education, and the elderly.

People who had a good knowledge score in both the healthcare personnel and non-healthcare personnel groups were likely to have good practice scores. In a study among Asians in San Francisco, those with a higher level of knowledge were more likely to be tested for HBV and to have their children vaccinated [17]. There was a positive association between knowledge and practice scores of healthcare personnel in our study and those of healthcare personnel in India [13].

Formal training and reading medical literature were directly associated with good knowledge and practice among healthcare professionals. This finding suggests that an update course on HBV infection should be undertaken on a regular basis. Experts can also guide staff to good resources in the literature. Informing them of the best sources and providing technical and facility support may all contribute to efficient learning. Refresher training, specifically about HBV, must be revised as new information becomes available, and it

should be designed for different staff levels and conducted in local languages.

Members of the non-healthcare personnel had good scores when they learned about HBV from health promotions, medical consultations, or the internet. In an Asian community in British Columbia, internet use was a positive predictor for better knowledge about HBV infection [16]. However, even though 88% of participants in that study were bilingual, 80% said they prefer HBV information in their native languages. Reliable information and knowledge should be provided in local languages in each region.

Media and social websites were the source of information for the greatest percentage of people, but these were not associated with good knowledge and practice scores among non-healthcare personnel in our study. Media and social websites may not provide accurate information, at least for this study population. The accuracy and reliability of health information in the media needs to be explored. Reliable sources should be accessible, and public-health authorities in each country should guide people to those sources.

Even though the overall treatment acceptability rate was 90.6% and did not differ by age, occupation, or HBV infection status, < 60% of healthcare personnel understood correctly the need for treatment. Increasing awareness and knowledge among healthcare personnel is an initial step for linkage to care. This suggests that the study population did not have enough information on HBV treatment and its consequences.

Even among those who were HBV-positive, the majority (86.4%) thought treatment was acceptable.

Table 3. Studies on awareness of hepatitis B infection among non-healthcare personnel in Asian populations.

Author Year/Country	Study method	Members of non- healthcare personnel	Sample size	Definition of awareness	Proportion who were aware
This study, 2017, 6 countries of Southeast Asia	Cross-sectional, self-administered online survey	General community	1079	HBV infection risk or self-status	54%
Yau <i>et al.</i> [16] 2012, Canada	Cross-sectional, telephone survey	Asian community	1013	HBV infection	79%
Leung CM <i>et al.</i> [12] 2010, Hong Kong	Cross-sectional, telephone survey	General community	506	HBV as most common infection in country	55%
Li H <i>et al.</i> [22] 2009, China	Cross-sectional survey, face-to-face interview	Reproductive-aged women in a rural area	790	HBV infection	48%
Haider <i>et al.</i> [23] 2008, Pakistan	Cross-sectional, self-administered survey	Women at an obstetric clinic	121	HBV infection	68%
Cheung <i>et al.</i> [14] 2005, Canada	Cross-sectional survey, face-to-face interview	Chinese and Southeast Asian Canadians	1008	HBV infection as a community concern	68%
Taylor <i>et al.</i> [24] 2002, US	Cross-sectional, online survey	Vietnamese American	715	HBV infection	81%

HBV, hepatitis B infection.

This percentage was relatively higher than in another study of an Asian American community by Tokes K *et al.* in 2011, in which 39% of HBV-positive people were reluctant to receive long-term treatment because of concerns about long-term side effects and the cost of treatment [14]. The higher level of acceptability in our study might be because only 70.1% of those who were HBV-positive people had received counselling about treatment.

While the prevalence of chronic hepatitis B infection has been estimated to be 5% to 7% among adults in Southeast Asia [1], 9.4% of our study participants reported they were positive for HBV infection. This somewhat higher prevalence may be an overestimate, as there could be selection bias among individuals who knew they had chronic hepatitis B and were therefore more willing to participate in the study.

Conclusion

Awareness of hepatitis B infection was high among the healthcare personnel, but relatively low among the non-healthcare personnel. Awareness of the disease was positively associated with good knowledge and good practice scores among both the healthcare personnel and non-healthcare personnel groups surveyed. Raising public awareness of HBV infection and providing informative sources to various communities are crucial in this region, to increase access to treatment for those with chronic hepatitis B, to reduce transmission, and enhance prevention.

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Conflict of interests: No conflict of interests is declared.

Annex – Supplementary Items

Introduction before questionnaire

This is a survey to study awareness and knowledge of chronic hepatitis B in this region, 6 countries in Southeast Asia. You are requested to participate by answering the following questions if you are twenty years old or above.

Your answers will be kept totally confidential. You will be anonymous since we will not ask your name. You will need to spend about 10 minutes to answer these questions.

You can choose any of the four languages to response. (English, Khmer, Myanmar, Thai, or Vietnamese)

For both healthcare persons and general community			
No.	Variables	Data	Remark / Scoring
Demography			
1	Date of participation	__ / __ / ____	
2	Participant No.		For data record
3	Age	_____ years	
4	Gender	1- Male 2- Female 3- Not specified	One choice only No scoring
5	Nationality	1- Thailand 2- Myanmar 3- Cambodia 4- Singapore 5- Philippines 6- Vietnam	One choice only No scoring
6	Education	1- Secondary and less 2- High School 3- Graduate 4- Post graduate	One choice only No scoring
7	Occupation	1- Healthcare staff/student <ul style="list-style-type: none"> • medical student 3rd year and above • nursing student 2nd year and above • doctors • nurses • pharmacists • medical technologists and technicians 2- Non-healthcare person	One choice only No scoring

Awareness on hepatitis B			
8	How do you aware of hepatitis B infection?	1- I am not aware of that. 2- I am at risk of being transmitted because my country has high rate of hepatitis B positive people. 3- I am not at risk of being transmitted because my country has low rate of hepatitis B positive people. 4- I am already hepatitis B positive.	Those who are aware are who choose either #2 or #4.

Knowledge on hepatitis B infection			
9	Where did you mostly learn about hepatitis B from?	(For general community) 1- Healthcare staff during consultations 2- Health promotion sessions 3- Media 4- Social websites 5- Search in internet 6- Health promotion sessions	More than one choice No scoring.
		(For healthcare staff) 1- Only in the formal medical/nursing/laboratory training 2- Online courses 3- Refresher courses at my department 4- Self-readings	More than one choice No scoring.
10	What are modes of transmission of hepatitis B? 1- Skin contact 2- Via blood 3- Contact with urine and sweat 4- Sex contact 5- Infected mother to baby 6- Hand shaking 7- Sharing dishes 8- Sharing shaving blades 9- Sharing tooth-brush 10- Tattooing	1- Yes No Do not know 2- Yes No Do not know 3- Yes No Do not know 4- Yes No Do not know 5- Yes No Do not know 6- Yes No Do not know 7- Yes No Do not know 8- Yes No Do not know 9- Yes No Do not know 10- Yes No Do not know	One choice for each Maximum score = 10 Minimum score = 0 1- +1 if No 2- +1 if Yes 3- +1 if No 4- +1 if Yes 5- +1 if Yes 6- +1 if No 7- +1 if No 8- +1 if Yes 9- +1 if Yes 10- +1 if Yes
11	What are the complications of hepatitis B? 1- No complication 2- Chronic hepatitis 3- Liver failure 4- Liver cancer 5- Cirrhosis of Liver	1- Yes No Do not know 2- Yes No Do not know 3- Yes No Do not know 4- Yes No Do not know 5- Yes No Do not know	One choice for each Maximum score = 5 Minimum score = 0 1- +1 if No 2- +1 if Yes 3- +1 if Yes 4- +1 if Yes 5- +1 if Yes
12	Is hepatitis B preventable?	1- Yes 2- No	One choice only +1 if yes

		3- Do not know	
Experience on testing and vaccination			
13	Have you ever had your blood checked for hepatitis B?	1- Yes 2- No 3- Do not know	One choice only +1 if yes
14	If no, why? (Skip if answer of No.13 is #1.)	1- I did not know I should. 2- I do not think I need. 3- I do not afford to pay. 4- I forgot to check.	One choice only No scoring
15	When was your last blood checked for hepatitis B? (skip if answer of No.13 is #2 or #3)	1- Within last 3 year 2- More than 3 years ago 3- Do not know	One choice only +1 if #1
16	Why was your blood checked? (skip if answer of No.13 is #2 or #3)	1- Advised by a healthcare staff 2- During a medical check up 3- During an antenatal visit 4- Advised by a friend/family 5- Self-prescription 6- Do not know	One choice only No scoring
17	Have you ever been vaccinated for hepatitis B?	1- Yes 2- No 3- Do not know	One choice only +1 if yes
18	If no, why? (Skip if answer of No.17 is either #1 or #3.)	1- I don't know vaccine is available. 2- I don't know I should. 3- I don't think I need it because I am not at risk. 4- I don't afford to pay for vaccine. 5- Others	One choice only No scoring
19	Did you complete 3 doses? (Skip if answer of No.17 is #2.)	1- Yes 2- No 3- Do not know	One choice only +1 if yes
20	Have you been infected with hepatitis B?	1- Yes 2- No 3- Do not know	One choice only +1, if #1 or #2
If #1, will be led to question no. 22.			
If either #2 or #3, will be led to question no. 21.			

Acceptance to treatment (for non-HBV positive person)			
21	Will you take the long-term treatment if you turn to hepatitis B positive?	1- Yes 2- No	One choice only No scoring
<i>End of questionnaires for persons who are not hepatitis B positive</i>			
Acceptance to treatment (for HBV positive person)			
22	Have you ever seen a doctor to consult your hepatitis B status?	1- Yes 2- No	One choice only No scoring
23	Have you ever been counseled about the treatment of hepatitis B?	1- Yes 2- No	One choice only No scoring
24	Have you ever got treatment for hepatitis B?	1- Yes 2- No	One choice only No scoring
25	Will you take the treatment if you are advised to? (Skip if answer of No.24 is #1)	1- Yes 2- No	One choice only No scoring
26	If no, why? (Skip either if answer of No.24 is #1 or if answer of No.25 is #1.)	1- I am not very clear about the information on treatment. 2- I am afraid of the side effects. 3- Because the treatment takes very long. 4- I prefer traditional medicine. 5- Because the treatment is not free, and I do not afford to pay.	One choice only No scoring
<i>End of questionnaires for persons who are hepatitis B positive</i>			

Additional questions asked to healthcare staff

<i>No.</i>	<i>Variables</i>	<i>Data</i>	<i>Remark / Scoring</i>
Knowledge on hepatitis B infection			
1	Did you get refreshment sessions about information on hepatitis B after your training (medical school, nursing, laboratory course)?	1- Yes 2- No 3- Not remember	One choice only No scoring
2	When was the last one? (Skip if answer of No.1 is either #2 or #3)	1- Less than 3 years ago 2- Over 3 years ago	One choice only No scoring
3	Do you get any information about post exposure prophylaxis for hepatitis B if you get an accident at your work place?	1- Yes 2- No	One choice only No scoring
4	Do you get any information about post exposure prophylaxis for a baby after delivery if the mother is hepatitis B positive?	1- Yes 2- No	One choice only No scoring
5	Do all hepatitis B positive patients need to start treatment?	1- Yes 2- No 3- Do not know	One choice only +1 if No