

Suboptimal knowledge of hepatitis B infection and concerns regarding HBV vaccination among blood donors in Lao People's Democratic Republic (PDR)

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Abstract

Background:

There is a high prevalence of HBsAg in adults in Lao PDR, as seen in first-time blood donors. The high positive rate is also detected in repeat donors although the cause is unclear. By surveying blood donors, this study examines the general population's knowledge level of HBV infection and assesses the public's perception of vaccination.

Objective: The aims of this study were to assess knowledge, attitude and practices (KAP) of blood donors regarding HBV infection.

Methodology: We conducted a cross-sectional study to collect the KAP information among consenting students of high school and university in March-September, 2018. A self-answered questionnaire was also utilized among blood donors in Vientiane Capital, Luang Prabang and Khammuan Provinces. The questionnaires were distributed and completed in the classroom setting with investigators proctoring. Descriptive analysis was performed on the socio-demographic characteristics, Student's T-test were performed to examine the difference of mean and linear regression models the association between dependent and independent variables.

Results: Among 625 blood donors (132 health science students and 477 non-health science students), all had a positive attitude towards blood donation, but they had low knowledge towards hepatitis infection and prevention. Multivariable analysis showed that x factors were significantly associated with HBV vaccination. This included gender, level of education, being a health science student, HBV positivity status and awareness not to donate blood and knowledge towards vaccination. HBV vaccination hesitation was observed in blood donors who did not know that vaccination can prevent infection, and most blood donors (76.9%) answered that they were healthy so did not see the need for the vaccine and did not understand this vaccination method as prevention. A fear of injections, belief that they would not be able to drink alcohol for two weeks surrounding vaccination and that it was not necessary to prevent HBV infection were reasons given to not seek HBV vaccination.

Conclusion: Blood donors had overall poor knowledge on hepatitis B infection and prevention, particularly among the non-health student donors. Blood donors should be aware of and understand their HBsAg testing status and broaden their perception and knowledge on HBV infection and prevention.

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Keywords: KAP, HBV, blood donors.

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Introduction

Hepatitis B virus remains one of the major health issues worldwide, infecting one third of the global population (1). Recent studies estimate that between 248 million and 350 million individuals are chronically infected, placing them at risk of cirrhosis and hepatocellular carcinoma (HCC) (1,

2). The South-East Asia region is particularly burdened by HBV morbidity and mortality, and in Lao People's Democratic Republic (PDR), HBV is endemic (3, 4). A national seroprevalence study in 2007 found that 8.7% of blood donors tested positive for hepatitis B surface antigen (HBsAg), a marker of acute or chronic infection (5). Other

studies have shown HBsAg prevalence rates vary between 4.1% and 9.6% (6, 7). The impact of HBV does not go unnoticed. Lao PDR has one of the top five liver cancer rates worldwide and one of the highest HBV-caused liver cancer rates (3). In 2001, the government introduced a national vaccination program for all infants. However, vaccine coverage for adult populations remains low, including in health care workers.

To understand the spread of infection, it is essential to examine the public's knowledge of the disease and their awareness of how to control the disease. A previous study examining the knowledge of Lao health students found that 86.5% had poor knowledge of HBV. However, there have been no studies on the general population's knowledge of HBV or their awareness of their HBV infection status. Similarly, no study has looked specifically at knowledge on how to control the spread of HBV in Lao PDR (8).

The National Blood Bank operates across the country, including in rural areas, some of which have little access to medical resources. National Blood Transfusion Center reported that there was approximately 55,000 units of blood donation per year and average of 4% HBsAg positive, 0.2% anti-HCV positive, 0.2% anti-HIV positive and 0.1% syphilis positive as national reported in 2019. Many of the donation sites are schools, including high schools, universities, and health science schools. In addition to providing a survey of the prevalence of HBV across the country, the National Blood Bank provides a unique public health opportunity. After being tested, each donor is given a donor card that includes information on their infectious status. However, some donors may not or delaying receive the card before the next blood donation. If a donor tests positive for any of the disease, the blood bank has tried to apply data tracking systems during mobile donation to follow-up with the individual infectious positive donor and provide resources for further action. However, the assessment on this area is not yet formal reported. For some, this may be their only access to information on HBV personal infectious status and their awareness should be notified. Despite this effort, there remains a relatively high number of repeat blood donors who are HBsAg-positive. The effectiveness of the National Blood Bank's HBV testing, reporting, and education has not previously been studied.

Utilizing the National Blood Bank's geographical reach, this study was conducted to examine blood donors' knowledge of HBV in order to inform policy recommendations to reduce HBV prevalence in Lao PDR. In Lao PDR, the HBV vaccine has been included in the routine immunization program since 2002 for administration at 6, 10, and 14 weeks after birth,

and monovalent HBV birth dose vaccine was initiated at referral hospitals in the capital city and expanded into rural hospitals in 2006 and home based deliveries in 2010 (9). However, many blood donors were born before HBV vaccine introduced and they might not access to the vaccination. In addition, this study looks at specific practices of disease prevention, including reporting, vaccination and knowledge, to further understand the limitations in controlling the spread of HBV in healthy blood donors. Lastly, as blood donors include health students, who is potentially becoming at high risk of infection and also integral to the curb of infection, this study further investigates the difference in knowledge of HBV between health and non-health students.

Methods

Study Population

Between April and July 2018, first-time and repeat blood donors were recruited from high schools, technical colleges and universities from Vientiane Capital, Khammuan and Luang Prabang provinces. Schools were identified using the National Blood Transfusion Center's database of blood donation sites that included health (including medical school, public health school and nursing colleges), and non-health schools. Investigators were joined by a representative of the National Blood Transfusion Center and a member of the local blood bank staff. A brief information sheet of the research was provided and the study was also verbally explained. Written informed consent was taken before starting the questionnaire. For students under the age of 18, parents and/or guardians gave informed consent. The questionnaires were distributed and completed in the classroom setting with investigators proctoring. Following collection of the completed questionnaires, the investigators conducted a brief educational session, reviewing answers to the questionnaire and providing facts regarding HBV transmission, symptoms, and vaccination. Also, educational sessions were carried out after the questionnaires were completed. The study was approved by the National Ethics Committee of Lao PDR (ref 2018/025/NECHR), the Lao Red Cross, and each participating school.

Calculation of sample size

The equation used to calculate the required sample size is as follows

$$n = Z^2 \times p(1-p) / DEFF \times d^2 / (d^2 \times RR)$$

Where n = sample size, Z = significance level for 95% confidence, p = expected prevalence, $DEFF$ = design effect, d = precision, RR = response rate.

The sample size (n) of 961 was calculated on the expect of an expected HBsAg seroprevalence (p) of 5% level of significance (Z), precision (d) of +/- 2%, design effect (DEFF) of practicability.

Questionnaire

The questionnaire was developed from an extensive literature review. It included open and closed questions, categorized into four sections: 6 demographic questions, 11 questions for hepatitis B knowledge, 5 questions for attitude and 10 questions for practice. The socio-demographic characteristics section contained closed questions related to age, sex, occupation, highest diploma obtained, number of blood donations.

The Knowledge section included closed questions on the definition of HBV, modes of transmission, risk factors, symptoms and consequences of HBV infection. Questions regarding vaccination and blood donation when HBsAg positive were also included. In addition to specific responses to knowledge questions, an overall knowledge score was computed by giving every correct answer 1 point, every incorrect answer 0 points or every "I don't know" 0 points. The maximum score achievable was 22. Incorrect answers were also included in the questionnaire. Scores were assessed on a percentage scale. Overall knowledge scores were only given to participants (n=609) who answered every question.

The Practice section included closed questions focused on practices that could lead to HBsAg positive repeat donors. Questions regarding donor cards, hepatitis B testing, donation refusal and vaccination were included, as was a question asking whether the donor would continue to donate if he/she was HBsAg+. Participants who answered they did not want to be vaccinated were contacted again to identify the reason. The questionnaire are available upon request.

Statistical Analysis

Questionnaires were double entered into Microsoft Access by two investigators and then exported to an Excel spreadsheet for data cleaning and coding. We excluded any donor who was not a current student, as well as donors who did not report the number of donations or date of last donation. This was done in order to understand the HBsAg positive status among repeated donors. Questionnaires with over 50% incomplete answers were also excluded from further analysis. In order to better understand barriers to vaccination, the investigators conducted follow-up calls to participants to learn why they were not interested in receiving the vaccine. The original answers were kept for statistical analysis. The investigators also conducted a follow-up survey to cross-reference the self-reported HBsAg status from the

questionnaire with the blood test results from the blood bank for 194 (29.5%) of donors.

Age was regrouped into three categories: less than 18 years, 19-20 years, and above 21 years old. Highest diploma obtained was also regrouped to be High School or above High School.

The final data were exported to IBM SPSS 16 for preliminary analysis and STATA for further data analysis. Data were analyzed using descriptive statistics as well as bivariate (Chi-square, Fisher's exact test, t-student test and Welch's ANOVA) and multivariable logistic regression. A two-tailed *p*-value of 0.05 was considered statistically significant.

Table 1: Knowledge Scores of Donors by Demographics

Parameter	Donors n (%)	Knowledge Score (± SD)	p- value
Gender			
Male	275 (45.7)	48.1 (± 18.0)	NS
Female	327 (54.3)	46.7 (± 19.2)	
Province			
Vientiane	282 (46.3)	46.8 (± 17.8)	NS
Khammuon	122 (33.7)	48.2 (± 17.7)	
Luang Prabang	205 (20.0)	47.5 (± 20.6)	
Education Levels			
High School	212 (34.8)	43.5 (± 1.3)	<.001
Above High School	297 (65.2)	49.4 (± 0.9)	
Age Group			
<=18 years	223 (36.6)	43.9 (± 19.4)	0.002
19-20	216 (35.5)	50.6 (± 17.4)	
=>21 years	164 (26.9)	48.0 (± 19.0)	
Number of Donations			
First Time Donor	318 (52.6)	46.3 (± 18.8)	NS
Repeat Donor	287 (47.4)	48.4 (± 18.7)	
Health Science Student			
Yes	132 (21.7)	58.7 (± 1.3)	<.001
No	477 (78.3)	44.16 (± 0.8)	
HBs Ag Status Known			
Known	311 (51.1)	49.0 (± 1.1)	0.03
Unknown	298 (48.9)	45.6 (± 1.1)	

Results

Demographics

A total of 625 blood donor participants from three different regions of Lao PDR and from 22 study sites were enrolled. Vientiane capital accounted for 290 participants (46.4%), Luang Prabang 207 participants (33.1%) and Khammuan 128 participants (20.5%). Participants included 326 first time donors (52.1%) and 295 repeat donors (47.2%). Four participants (0.8%) did not verify the number of previous blood donations. Over half of participants (53.8%) identified as female and the

majority (64.6%) had an above high school education level. Roughly one third of participants (36.5%) of participants were aged 18 years or lower, 36.5% aged 19 or 20 years and 26.9% were 21 years or older. When questioned whether they knew their HBsAg status, 47.4% did not know their status.

Table 2. Comparison of knowledge levels between health and non-health student blood donors

	All Participants (N=609) n (%)	Health Students (N=132) n (%)	Non-Health Students (N=477) n (%)	p-value
Can someone HBsAg positive donate blood?				
No	409 (67.2)	100 (75.8)	309 (64.8)	0.03
Yes	23 (3.8)	6 (4.6)	17 (3.6)	
I don't Know	177 (29.1)	26 (19.7)	151 (31.7)	
How is Hepatitis B transmitted?				
Blood	395 (64.9)	107 (81.1)	288 (60.4)	<.001
Mother to Child	310 (50.9)	78 (59.1)	232 (48.6)	0.03
Unprotected Sex	155 (25.5)	50 (37.9)	105 (22.0)	<.001
Mosquitoes	112 (18.4)	19 (14.4)	93 (19.5)	NS
I don't Know	109 (17.9)	3 (2.3)	106 (22.2)	<.001
What are the symptoms of hepatitis B?				
Jaundice	413 (67.8)	112 (84.9)	301 (63.1)	<.001
Fatigue	327 (53.7)	72 (54.6)	255 (53.5)	NS
Dark Urine	203 (33.3)	41 (31.1)	162 (34.0)	NS
Fever	120 (19.7)	25 (18.9)	95 (19.9)	NS
Abdominal Pain	90 (14.8)	18 (13.6)	72 (15.1)	NS
I don't know	139 (22.8)	13 (9.9)	126 (26.4)	<.001
Are symptoms visible in all patients?				
No	263 (43.2)	89 (67.4)	174 (36.5)	<.001
Yes	163 (26.8)	26 (19.7)	137 (28.7)	
I don't know	183 (30.1)	17 (12.9)	166 (34.8)	
What are the risk factors of hepatitis B?				
Family Health History	330 (54.2)	104 (78.8)	226 (47.4)	<.001
Working in a Health Care Facility	72 (11.8)	38 (28.8)	34 (7.1)	<.001
Blood Transfusion	297 (48.8)	70 (53.0)	227 (47.6)	NS
Dental/Surgical Operations	71 (11.7)	24 (18.2)	47 (9.9)	0.01
Eating Raw Food	327 (53.7)	45 (34.1)	282 (59.1)	<.001
I don't know	64 (10.5)	5 (3.8)	59 (12.4)	.004
What are potential outcomes of HBV infection?				
Chronic HBV infection	384 (63.1)	105 (79.6)	279 (58.5)	<.001
Liver Cancer	393 (64.5)	92 (69.7)	301 (63.1)	NS
Cirrhosis	288 (47.3)	68 (51.5)	220 (46.1)	NS
Meningitis	67 (11.0)	11 (8.3)	56 (11.7)	NS
HIV	46 (7.6)	9 (6.8)	37 (7.8)	NS
I don't know	83 (13.6)	8 (6.1)	75 (15.7)	0.004
Can vaccination prevent the spread of HBV?				
Yes	274 (45.0)	92 (69.7)	182 (38.2)	<.001
No	53 (8.7)	11 (8.3)	42 (8.8)	
I'm not sure	284 (46.6)	29 (22.0)	255 (53.0)	

Knowledge of hepatitis B

Due to 16 (2.6%) incomplete questionnaires, only 609 surveys were used in the analysis of knowledge. We characterized donors by demographics and found that education level, age groups, health or non-health student and HBsAg known status showed statistics significant of knowledge score level. (Table 1)

The mean overall knowledge score of health students ($58.7\% \pm 1.3\%$) was significantly higher ($p < .001$) than non-health students ($44.2\% \pm 0.8\%$). In addition to calculating an overall knowledge score, knowledge of hepatitis B was analyzed by individual question.

Donors had a higher understanding of the potential consequences of HBV compared to their knowledge of transmission, risk factors, and vaccination. Among the health students, 79.6% knew that HBV infection might lead to chronic hepatitis B and 69.7% knew that the virus might cause liver cancer. Among non-health students, 58.5% identified chronic HBV infection as a potential outcome and 63.1% identified liver cancer as a potential outcome. Only 37.9% of health students and 22.0% of non-health students were able to correctly identify unprotected sex as a mode of transmission (Table 2).

When asked how hepatitis B is transmitted, 81.1% of health students correctly identified blood as a mode of transmission compared to only 60.4% of non-health students ($p = 0.03$). Only 59.1% of health students and just under half of non-health students (48.6%) correctly identified that HBV can be transmitted from mother to child ($p < .001$). Regarding risk factors, only 28.8% of health students and 7.1% of non-health students understood that working in a health facility is a risk factor ($p < .001$). When asked whether vaccination can prevent the spread of infection, only 69.7% of health students and 38.2% of non-health students responded "yes" ($p < .001$).

Attitude and Practice

Asked if they plan to donate blood again, 529 donors (85%) responded "yes" and 53 participants (8.48%) stated that they would continue to donate blood even if they tested positive for HBsAg; 11.9% of repeat donors compared to 6.4% of first-time donors ($p = 0.02$).

Although 496 donors (80.5%) confirmed that they had received their card, these numbers varied between provinces; 257 (90.2%) in Vientiane, 156 (76.1%) in Khammun and only 83 (65.9%) in Luang Prabang.

However, receiving a card did not necessarily indicate that participants knew their HBV status or understood the test results displayed on the card. Among donors who did not know their status, 188 (64.4%) stated that they received their donor card.

Furthermore, we conducted a follow-up survey to cross-reference the self-reported HBsAg status from the questionnaire with the blood test results from the blood bank for 194 (29.5%) of donors. Out of these 194 donors, the blood bank found 8 donors to test positive for HBsAg in all three provinces. However, of these positive donors, only 3 (37.5%), knew that they were positive. Four of the other 5 donors stated that they were HBsAg negative and 1 did not know their status.

Vaccination

Only 206 donors (33.01%) stated that they had received the complete three doses of the HBV vaccination 63 (30.7%). Vaccination was significantly higher in Vientiane (38.0%) than in Luang Prabang (33.2%) and Khammuon (23.4%) ($p < .001$). Health students had significantly higher vaccination rates than non-health students (51.9% and 28.3%, respectively; $p < .001$). Furthermore, those who knew that vaccination can prevent infection had significantly higher vaccination rates than those who did not know; (46.2% and 23.1%, respectively; $p < .001$).

A total of 93 participants (17.1%) stated that they were not interested in the vaccine. As confirmed during follow-up, most donors (76.9%) explained that they were already healthy so did not see the need for the vaccine. One donor stated they did not understand this method of prevention, one had a fear of injections, another believed they would not be able to drink alcohol for two weeks surrounding vaccination and one donor stated it was not necessary to prevent against HBV infection.

Multivariable analysis showed several factors that were significantly associated with HBV vaccination: gender, level of education, health science student, HBV status awareness and vaccination knowledge (Table 3).

Discussion

The primary aim of this study was to assess the knowledge of HBV and get better understanding of blood donors' perception of vaccination as well as blood donation. The mean knowledge score among all donors was 47.31%. Similar studies in other HBV-endemic countries showed varying, but in general, low levels of knowledge (10-12).

The low level of knowledge concerning how HBV is transmitted is particularly concerning. While most donors were able to identify blood as a medium of transmission, only 37.6% of health students and 21.8% of non-health students knew that HBV is sexually transmitted. This lack of awareness of HBV as a sexually transmitted infection is consistent with other studies (13). In order to prevent the spread of infection, it is critical that education around transmission is comprehensive as well as accessible to the whole

population, but particularly to future health care workers. Furthermore, education should include information for early detection of disease, including signs and symptoms of infection. The majority of blood donors- 85.0% of health students and 62.7% of non-health students - identified jaundice as a symptom of hepatitis. However,

knowledge was low regarding other symptoms including fatigue, dark urine and fever. Although many infected with acute HBV are asymptomatic, early detection of symptoms can be effective in reducing the risk of chronic infection, as well as the diagnosis of HCC (14-16).

Table 3. Factors associated with vaccination status (n=597)

Parameter	Vaccinated	Univariate Analysis		p-value	Multivariate Model Predicting Vaccination		p-value
	n (%)	cOR	CI 95%		aOR	CI 95%	
Gender:							
Male (ref)	72/274 (26.2)						
Female	132/327 (40.1)	1.88	[1.3-2.7]	<0.001	2.08	[1.42-3.05]	<0.001
Province:							
Vientiane (ref)	108/282 (38.3)						
Khammuon	29/122 (23.8)	0.5	[.31-.81]	0.005	0.55	[.32-.96]	0.04
Luang Prabang	67/205 (32.7)	0.78	[.54-1.14]	NS	0.76	[.5-1.16]	0.34
Education Levels:							
High school (ref)	45/212 (21.2)						
Above High School	159/397 (40.1)	2.48	[1.69-3.65]	<.001	--		
Age Group:							
<=18 years (ref)	56/223 (25.1)						
19-20	78/216 (36.1)	1.69	[1.12-2.54]	0.1	1.36	[.86-2.14]	NS
=>21 years	68/164 (41.5)	2.11	[1.37-3.26]	0.001	1.85	[1.15-3.00]	0.011
No. of Donations:							
First time donor (ref)	98/318 (30.8)						
Repeat Donor	106/287 (36.9)	1.3	[.94-1.84]	NS	--	--	
Student classification:							
Non-health care student (ref)	135/477 (28.3)						
Health-care student	69/132 (52.3)	2.77	[1.87-4.12]	<.001	2.08	[1.33-3.26]	0.001
HBsAg status known:							
No (ref)	77/298 (25.8)						
Yes	127/311 (40.8)	0.5	[0.36-0.71]	<.001	0.54	[0.37-0.8]	<.001
Know vaccine is preventative:							
No (ref)	77/335 (23.0)						
Yes	127/274 (46.4)	2.89	[2.04-4.1]	<.001	2.36	[1.61-3.44]	<.001

Education level and age, in addition to education degree (health science versus non-health sciences) were the only significant predictors of HBV knowledge. Knowledge levels were not significantly different between donors of different provinces, nor did they significantly differ between first time donors and repeat donors. This suggests that the blood drive has a limited amount of educational impact across Lao PDR. There is an opportunity for the blood bank to play a further role in educating the general public on HBV, as well as other transmittable diseases, through the actual blood donation event.

Donor awareness of vaccination was also found to be low. While 69.9% of health students knew that vaccination prevents the spread of HBV infection, only 37.7% of non-health students knew about the role of vaccination. The lack of awareness

translates to the low vaccination coverage of donors—only 33.01% of donors received the HBV vaccination with only 10.3% receiving the complete three doses. The 2014 study among health students, however, showed a 21% complete vaccination coverage (8). Although vaccination was low among all populations, those with higher levels of education as well as higher knowledge scores were significantly more likely to be vaccinated. Those who knew that vaccination is effective had 2.4 times the odds ratio of being vaccinated than a donor who did not know about vaccination. This further suggests the need for expanding awareness and education on vaccination, particularly among adult populations.

Although the national Expanded Programme on Immunization (EPI) was launched in 2001 to provide vaccinations to all infants, the majority of

blood donors were too old to be included in the initial roll of this program (6, 9). Furthermore, despite current estimates of 85% routine infant vaccination coverage for HBV containing vaccine at 6, 10 and 14 weeks of age, studies have shown lower prevalence of protective anti-HBs antibodies (17-22). As vaccination status was self-reported in our study, we are unable to confirm the actual protective coverage. There is a need for future studies to assess the actual coverage of HBV vaccination and the efficacy of EPI among general adolescent and adult population.

Based on the self-reported vaccination status, there is a high need for greater vaccination coverage across Lao PDR, particularly for health care students given their higher risk for HBV exposure (e.g. through needle stick injuries) as future health care workers. In our study, only 51.9% of health care students reported being vaccinated. This finding aligns with a previous study in Lao PDR that showed a low level of protection against HBV among health care workers (8, 22). A policy to vaccinate all health care students with 3 doses of HBV vaccine would increase the protection for these essential workers in their later careers and also strengthen the education around vaccination for these students.

We identified problems such as donor lost or not receive card, not be informed or get counselling on their positivity of serology testing status that potentially cause high positive HBsAg in repeat donors. In order to improve the detection and exclusion of HBsAg donors and mechanisms to communicate and increase donor knowledge about HBV infection, donors should receive the results immediately to increase donor awareness of positive results. Repeat positive donors should receive a free serology test again following the guidelines for donors if they have serology positive testing results before the next donation.

The challenges of communication included that many donors still did not receive a donor card and did not understand their result status, others lost their donor card, and most donors who know their positive HBsAg results wanted to confirm blood tests again and did not talk about their status. Half of donors did not bring their donor cards during blood donation campaign. However, one third did not receive results before the next blood donation and half received results but did not come for counseling. Time constraints and logistical challenges prevented blood donors from discussing HBV with the blood bank staff during blood donation campaigns.

During the follow-up calls to donors who said they did not want to receive the vaccine; we found a continued high rate of vaccine hesitancy. These calls were conducted after the educational session

following the original questionnaire, suggesting that that more educational interventions should be initiated regarding the benefits of vaccination. Similarly, there could be great benefit for a more in-depth study exploring the reasons for vaccine hesitancy and the impact of socio-demographics on vaccine skepticism.

This study also illustrated that there is a lack of awareness of personal infectious status. Only 52.3% of donors knew their HBV status even though 64.4% of these donors claimed to have received a blood donor card from the blood bank. The donor card is designed to indicate infection status for HBV, however, without proper explanation or education regarding the card, it fails to be effective. The lack of awareness of HBV status, particularly among infected individuals, is concerning as well as avoidable. In addition to redesigning the donor card to be more informative and comprehensible, cards should be delivered to donors with supplementary educational material, including electronic and paper-based resources for HBV positive donors to receive care and prevent further transmission.

Limitations

As participant selection was not systematically randomized, we cannot exclude various selection bias in the different groups. This study also does not necessarily reflect knowledge of HBV in the general public particularly older adults who are most at risk of developing liver cancer.

Conclusions

Through this study, we found that donors had very low awareness of HBV risk, symptoms, transmission, and vaccination. Many of those who are positive for HBsAg are still among repeat donors and they had low awareness of their HBsAg positivity status and return for blood donation again. There was a limited application of consistent tracking systems during mobile donation. We recommend improving the blood donation system to detect, clearly inform and provide counseling to all HBsAg positive blood donors. Donors should receive test results immediately and donor cards for counselling if there is any positive result.

To increase their awareness on HBV infection and prevention by using different media outlets during every blood donation campaign. It is important to ensure that all HBsAg positive donors know how to approach healthcare facilities for follow-up their health if they have HBV positive. Health students or future health care worker should receive HBV vaccination. To increase public education on HBV, the blood drive network can offer a tremendous opportunity for public health education, particularly to remote places. Other opportunities of HBV vaccination, adolescent and adults HBV

vaccination via mass education campaign, World Hepatitis Day should be promoted.

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