Hepatitis B: a cross-sectional survey of knowledge, attitudes and practices amongst backpackers in Thailand

Keywords: Vaccination; Cross-Sectional Studies; Risk-Taking; Travel

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Abstract

Background

In 2013, 200 million tourists visited countries that are endemic for hepatitis B virus (HBV). Backpackers are potentially at greater risk of hepatitis B than other travellers yet exposure to HBV remains under researched in this population.

Method

A cross-sectional survey of backpackers visiting two islands in Thailand was performed during early 2015. Participation in activities with high HBV exposure risk was recorded, alongside rates of vaccination and an evaluation of knowledge and attitudes towards the risk of HBV.

Results

1680 questionnaires were completed and analysed; the median participant age was 24 (range: 18-68) and 47.9% were male. 20.8% took part in activities with a high risk of HBV exposure. Over two-thirds of the sample were not protected against HBV. 24% were able to correctly identify HBV transmission methods. 44.1% underestimated the risk of HBV in Thailand.

Conclusions

The proportion of backpackers participating in high-risk activities was double the level found in previous studies that have examined the HBV exposure risk amongst travellers to endemic countries. Voluntary risk activities were the largest source of potential exposure to HBV and rates of vaccination are low. Backpackers should be considered for routine vaccination and education on risk behaviours should be included in the pre-travel consultation.

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1.1 Introduction

Hepatitis B is a viral infection that can cause a spectrum of liver disease including acute illness and long-term complications [1]. The heaviest burden of diseases is in Asia and Sub-Saharan Africa [2]. A vaccine for hepatitis B virus (HBV) has been available since 1986; it reduces rates of hepatitis after exposure and is ninety-five per cent effective at preventing chronic carriage of HBV [3]. HBV is one of the commonest vaccine-preventable diseases in travellers [4]. Since the 1950s, international tourism has shown almost uninterrupted growth: the fastest growing destination, South East Asia, is a high HBV endemicity region [5,6]. In 2013, 200 million tourists visited countries where more than five per cent of the population are chronic carriers of HBV [5,6]. Travellers from countries with low HBV prevalence are particularly at risk as either vaccination or previous infection is required for immunity.

HBV is transmitted by contact with infected blood or bodily fluids either through the skin (percutaneous) or through mucosal membranes (transmucosal). Infection by sexual contact, contaminated medical or dental equipment and skin penetrating procedures occurs in all intermediate and high prevalence countries [2,7]. Hepatitis B presents a risk both to non-immune travellers and, on returning home, to their close contacts [8]. The World Health Organisation (WHO) has recommended universal vaccination against HBV since 1992 but some western countries, including the United Kingdom (UK), have opted for selective vaccination strategies based on individual risk factors [9]. Vaccination for travel is not routine: the Department of Public Health England suggests a decision should be made depending on the duration of travel, planned activities and the destination's HBV prevalence [10]. Vaccination is expensive and usually paid for by the individual [11].

Backpackers are a distinct subset of international travellers; they typically travel for longer durations, alone or in small groups and stay in low-cost accommodation [12]. As backpackers are typically younger than other travellers they are less risk-averse and more likely to engage in adventurous activities [12]. These factors combined place them at greater risk of contracting hepatitis B than other travellers, yet exposure to HBV remains underresearched in this population. Thailand is a popular backpacker destination and the WHO classifies the country as having 'intermediate-high' HBV prevalence, as 5-6% of adults are chronic carriers [6].

This study aims to determine the proportion of backpackers visiting two islands in Thailand who are at high risk of HBV exposure and identify the factors associated with exposure, immunisation and seeking pre-travel health advice.

1.2 Method

1.2.1 Design

Cross sectional survey

1.2.2 Setting

The research was conducted at the ferry ports of two islands, which are popular with backpackers: Ban Mae Haad, Koh Tao and Thong Sala, Koh Phangan in Thailand.

1.2.3 Participants

Backpackers, defined as travellers on a limited budget, staying in low cost accommodation and carrying their belongings in a backpack [12], who were able to understand spoken and written English, were recruited for the survey. Thai nationals were excluded as data suggest that tourists on domestic vacations behave differently to those on international trips [13]. Individuals who lacked capacity or were under 18 years of age were also excluded. In

122 accordance with the University of Birmingham's policies, US citizens were excluded from the
123 survey.

124 **1.2.4 Data Collection**

125 Data were collected during February and March 2015. Participants were recruited using
126 convenience sampling [14]: two researchers (GF & EM) approached travellers, in possession
127 of a backpack, who were waiting to board outward-bound ferries. The study was explained
128 and if the participant self-defined as a backpacker – 'an individual travelling on a limited
129 budget and staying in low cost accommodation' - and met the inclusion criteria they were
130 invited to take part in the study. No cut-offs were used to define a limited budget or low-cost
131 accommodation. Participants were provided with an information sheet and questionnaire to
132 complete and return to the researcher. Ethical approval for the study was sought from an
133 Internal Ethics Committee at the University of Birmingham (Reference number: 2014-
134 15/C1/LJ/05).

135 **1.2.5 Instruments**

136 The questionnaire consisted of four sections, (i) demographic data (ii) pre-travel health advice
137 (iii) health problems and health service usage (iv) HBV knowledge, attitudes and practices.
138 Section (iii) data relate to a study conducted by another University of Birmingham student.

139 Protection against HBV was classified as having completed a vaccination schedule (3
140 or more doses) or reporting a previous HBV infection [15]. Potential exposure to HBV was
141 assessed by asking the participants if they had taken part in risky activities classified as 'low'
142 and 'high' risk; high-risk activities involved skin perforation or unprotected sexual contact
143 whilst low risk activities were documented transmission routes that did not involve skin
144 perforation or unprotected sexual contact (Table 1) [16].

Table 1.

Classification of 'risky activities'	
Risk Level	**Activity**
High	Tattoo; Piercing; Unprotected sex; Medical treatment (stitches, injections, surgery, blood transfusion, acupuncture); Dental treatment; Injecting drugs
Low	Manicure/Pedicure; Barbershop shave; Attending a bleeding individual

1.2.6 Data Analysis

Data were analysed using IBM SPSS Statistics v22 (IBM Corp, Armonk, NY, USA); the demographic data were examined and the sample characteristics presented. The median age was presented as the distribution was positively skewed. The proportions of participants who had participated in high HBV risk activities and reported completed vaccination schedules against HBV (3 or more doses) were calculated. Binary logistic regression identified associations between exposure or completed vaccination schedule and the pre-selected variables (Table 2). Knowledge scores were calculated by awarding one mark per correctly answered question and making a total score (range 0-9). The median total score was calculated, as the data were not normally distributed.

Table 2.
Variables selected for binary logistic regression analysis of exposure and having completed a vaccination schedule

Nominal variable	**Measurement variables**
Exposure	Age, gender, travelling alone, travelling with a sexual partner, planned trip duration, duration so far, sought pre-travel advice, knowledge score, protection against HBV, perceived HBV risk to self and underestimate of HBV risk in Thailand
Completed vaccination schedule	Age, gender, planned trip duration, pre-travel advice, knowledge score, perception of risk to self and whether they believe vaccination is effective

1.3 Results

Of the 1825 individuals who consented to take part and completed the survey, the questionnaires from 1680 participants were usable and analysed (Fig. 1 Recruitment Flowchart). The median age of the sample was 24 years (IQR 6; Range 18-68), 802 (47.9%) were male. 1325 (79.5%) of the sample were residents of Europe, 239 (14.3%) were from Canada, Australia and New Zealand. The remaining 6% was made up of residents from South

163 America, Africa and Asia. The demographic characteristics of the sample are shown in Table
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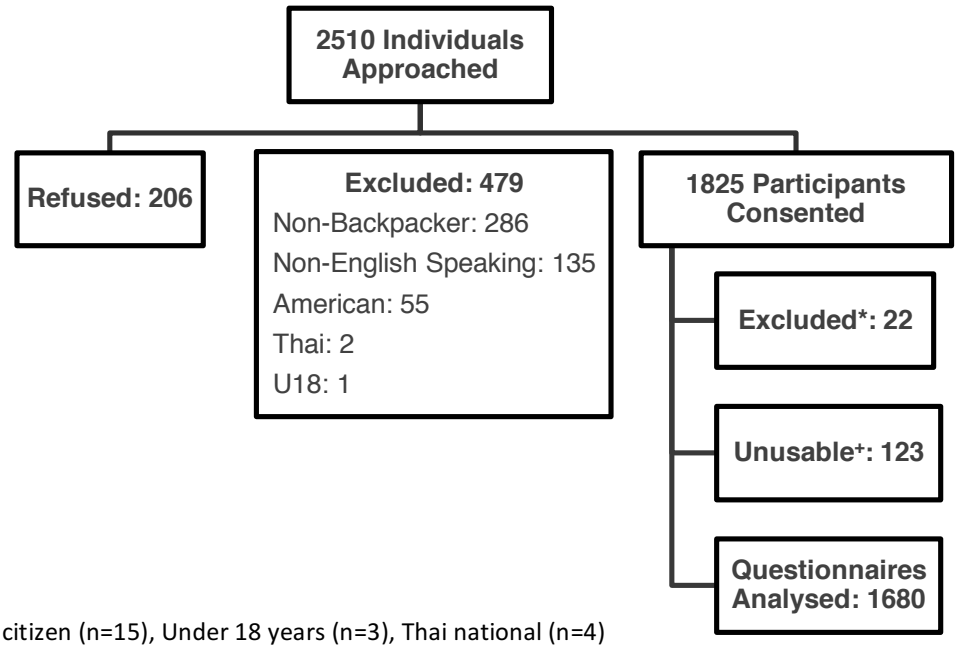
Figure 1. Recruitment Flowchart



*US citizen (n=15), Under 18 years (n=3), Thai national (n=4)
+Due to corruption of electronically stored data files

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Table 3
Participant Demographics

	n (% of total)

Age Group	18-24 years	955 (56.8)
	25-34 years	651 (38.8)
	>35 years	63 (3.8)
Gender (Male)		802 (47.9)
Planned Trip Duration	< 1 month	591 (35.3)
	>1-3 months	600 (35.9)
	>3-6 months	270 (16.1)
	>6-12 months	136 (8.1)
	>1 year	76 (4.5)
Trip duration so far	< 2 weeks	310 (18.5)
	2 - 4 weeks	689 (41.0)
	4 - 8 weeks	408(24.3)
	>8 weeks	232 (13.8)
Visiting other countries in SE Asia		907 (54)
Travel Group	Alone	262 (15.8)
	Pair	902 (54.6)
	Group	489 (29.6)
Travelling with a sexual partner		515 (31.3)
Total = 1680		

1.3.1 Pre-travel preparation

Pre-travel health advice was sought by 1346 (80.1%) of participants; the most popular source of pre-travel information was the Internet followed by relatives/friends. Of the 1202 (71.5%) participants who answered the questions concerning topics of advice received from a health care professional, 761 (63.3%) recalled receiving information of HBV risk factors and 835 (69.5%) recalled receiving advice about the HBV vaccine.

1.3.2 Knowledge of HBV

The median knowledge score was 5 (IQR=4) out of a total possible score of 9; these questions were answered by 1592 (94.8%) of the 1680 participants. 370 (24%) participants correctly

answered that HBV can be transmitted by blood and sexual contact but not by contaminated food and water or toilet visits.

1.3.3 Attitudes towards HBV

When asked to estimate the risk of HBV in Thailand, 740 (44.1%) participants either did not know or considered the risk to be low. 510 (30.4%) participants considered themselves to be at risk of HBV whilst 632 (37.1%) did not considered themselves at risk, the remainder were unsure. The majority of participants considered vaccination to be effective at preventing infection, while 24.5% were unsure whether it was effective.

1.3.4 Practices: Exposure Risk and Immunisation

332 (20.8%) participants took part in one or more activity with a high HBV exposure risk (Table 4). 381 (22.7%) participants reported taking part in an activity with a low associated exposure risk. 1010 (60%) of the sample did not report a high or low risk activity.

Table 4.
Participation in activities with an HBV exposure risk

Exposure Level	Risk Activity	n (%)
Low	Manicure/pedicure	244 (14.5)
	Barbershop shave	100 (6.0)
	Attended a bleeding individual	69 (4.1)
High	Body Modification[+]	131 (7.8)
	Medical or Dental Treatment*	85 (5.1)
	Injected drugs	27 (1.6)
	Had sex with someone other than a regular partner	353 (22.7)
	Did not always use a condom	153 (9.8)
	Paid for sex	47 (3.5)
	Did not always use a condom	13 (1.0)

Percentages may not add up to 100 due to missing data. [+]Body Modification encompasses tattoos and piercings. *Medical treatment includes surgery, blood transfusions, injections, and acupuncture and stitches. Participants can select multiple answers.

Of the 1277 individuals reporting vaccination against HBV, 397 (31.1%) had completed the schedule (three or more doses) whilst 561 (43.9%) had received either one or two doses; 319 (25%) did not know how many doses they had received. 504 (30.0%) of the sample were protected against HBV (previous infection or three or more vaccine doses).

1.3.5 Factors associated with high exposure risk

In a binary logistic regression model the pre-selected variables explained 13% of the variability in the data (Nagelkerke R^2=0.13) and correctly predicted 7.2% (n=22) of individuals who reported a high exposure risk. Gender, age, 'planned trip duration <1 month' and 'total duration so far' were significantly associated with high exposure risk. The adjusted odds ratios are presented in Table 5.

Table 5.
Adjusted Odds Ratios for Variables Associated with High HBV Exposure Risk

		HBV Exposure Level			
		High n=332	Low or None n=1266		
		n (%)	n (%)	OR (95% CI)	Sig.
Median participant age (years)		23	24	0.94 (0.90-0.97)	0.001*
Gender	Male	186 (56.0)	568 (44.9)	1.0 (ref)	
	Female	143 (43.1)	695 (54.9)	0.61 (0.47-0.80)	<.001*
Duration of trip	< 1 month	64 (19.3)	501 (39.6)	0.45 (0.22-0.92)	<.001*
	> 1 month	264 (79.5)	793 (62.6)	1.0 (ref)	
Median duration so far (weeks)		4.0	3.0	1.03 (1.02-1.04)	<.001*

Percentages may not add up to 100 due to missing data.

1.3.6 Factors associated with completed vaccination

In a binary logistic regression model the pre-selected variables explained 4.6% of the variability in the data and did not predict any of the individuals who had completed a vaccination course.

1.3.7 Visiting a travel clinic or family doctor/nurse

Participants who reported visiting a travel clinic or family doctor/nurse as part of their pre-travel health advice had significantly higher knowledge scores than individuals who had

used other sources of pre-travel health advice (Mann-Whitney U: 165681; r=-0.09; p=0.001). There was no statistical difference in participation in high HBV exposure risk activities between individuals who had visited a travel clinic or their family doctor/nurse and those who had sought pre-travel health advice elsewhere (X^2 (1, n=1285) = 0.66; p=.418).

1.4 Discussion

1.4.1 Main Findings

One in five backpackers had participated in a high exposure risk activity during their travels. Two-thirds of the sample, which participated in high HBV exposure risk activities, reported no protection against HBV. There was no association between participation in high-risk activities and protection against HBV. Four variables were found to be independently associated with high exposure risk but the model explained only a small amount of the variability in the data, suggesting that other factors may also play a role in high-exposure risk.

In the present study, over 40% of participants reporting vaccination had not completed the vaccination schedule, which requires three doses over six months or an accelerated course of three doses over two months [10]. 23.6% of participants had completed a HBV vaccination schedule (3 or more doses).

Over half of the sample had visited a travel clinic or their family doctor/nurse prior to departure: this was associated with higher knowledge scores but was not associated with any reduction in high-risk exposure. More than 60% of participants who had received advice from a health care professional reported being informed about HBV risk factors and given information about the vaccine.

1.4.2 Comparison with previous literature

The proportion of backpackers who participated in high-risk activities, whilst visiting the two islands of Thailand, was double the level found in previous studies examining HBV

exposure risk amongst travellers to endemic countries [8,17,18]. Unforeseen medical care has previously been identified as the largest source of potential HBV exposure whilst travelling [19] but in this study, voluntary risk activities were the largest source of potential exposure to HBV: 9.5% of participants reported having unprotected sex and 7.8% reported a tattoo or piercing whilst abroad. The proportion of backpackers at risk of HBV as a result of requiring medical or dental treatment (5.1%) is similar to that found in studies of other groups of travellers [8,17,19].

Four out of five participants reported seeking pre-travel health advice: this is much higher than studies of other types of travellers [7,17,20,21] and consistent with previous surveys of backpackers [22]. Previous studies of HBV vaccination amongst travellers have not consistently reported dose number, but the rate of protection against HBV (previous infection or completed vaccination scheme [15]) in this study is lower than in the findings of a European Airport Survey (30% vs. 44%) [21]. In the present study, two-thirds of the participants who took part in high-risk activities were vulnerable to developing HBV, as they had not completed a vaccination scheme or acquired immunity from previous infection: this is a larger proportion than in studies of other types of travellers to high endemicity countries [8,17,19].

1.4.3 Strengths & Limitations

Previous studies on HBV exposure amongst travellers have been conducted either via airport surveys [21], or by online [19,23,24] or postal questionnaires [25]. The online and postal recruitment methods had low response rates and a large proportion of respondents had not visited countries with endemic HBV [19,23,24,25]. Airport surveys calculated exposure risk based on behaviour on previous journeys: this assumes similar behaviour in various destinations and on different types of holidays [21]. In contrast, the present study had

a much higher response rate and participants were recruited in an endemic country and asked about their behaviour on their current trip.

Data were collected over two months on two islands in Thailand and so may not be representative of backpackers year-round across the whole of Thailand or of backpackers visiting other countries in South East Asia. Due to the study design, causality cannot be inferred from the results. 123 (7%) of the completed questionnaires were unusable due to an electronic data file corruption, but this is unlikely to have introduced a source of bias considering the large sample size. Participants were selected using convenience sampling, which could be a source of bias. However, all visitors to the islands had to leave by ferry and the researchers systematically approached all individuals at the ferry port to minimise this bias. A further limitation of the study is that sexual preferences were not considered: men who have sex with men are known to have an increased risk of HBV [26]. In accordance with the University of Birmingham policy, participants from the United States had to be excluded. The survey was only available in English, due to time limitations, therefore also excluded those unable to read English. Collectively this limits the generalizability of the results. The sample was largely made up of European residents, which in conjunction with the requirement to understand English, may bias the results. However, an ethnographical study of backpackers found that backpackers are typically of Western origin and have a higher level of education than the general level in their country [27]. There was no significant difference in risk taking behaviours between backpackers of European and non-European origins.

1.4.4 Clinical Implications

Non-immune individuals who partake in high-risk activities whilst visiting endemic countries are at risk of developing hepatitis B; in the UK twelve percent of acute HBV cases in the UK reported overseas travel during the incubation period [28]. Contracting HBV whilst

travelling has consequences not just for the individual but also for their close contacts on return home and the healthcare system of their country of origin. One in twenty healthy adults who contract HBV will develop a persistent infection and become chronic carriers capable of transmitting the virus [29]. Persistent infection is often asymptomatic but is associated with late stage complications such as chronic hepatitis, cirrhosis and hepatocellular carcinoma that can be complex and expensive to treat [30, 31].

The World Health Organisation recommends universal vaccination and this has been implemented by 22 of the 29 European Union countries but the UK has opted for a selected vaccination scheme [9]. UK guidelines state that 'at-risk' travellers to endemic countries should be vaccinated and that the HCP should make an assessment of the risk depending on the duration of travel, planned activities and the destination's HBV prevalence [10]. A fifth of the present study sample was from the UK and of these approximately thirty per cent were fully vaccinated against HBV; there was no association between vaccination against HBV and participation in high HBV exposure risk activities. Given the low level of immunisation amongst the UK participants in the present study and the failure to immunise the at-risk population it is recommended that UK immunisation guidelines are revised to consider vaccination of all backpackers travelling to Thailand and South East Asia.

For a vaccination schedule to be completed, consultation with a HCP needs to occur at least 2 months prior to departure; for this to occur the individual must be aware of the need to visit a HCP and consult well in advance of their trip. The increased risk of HBV exposure in this population was mainly attributable to participation in voluntary risk activities and this should be considered during the pre-travel health consultation. Backpackers should be advised about practising safe sex and taught about the risks of unsterile needles and the need for good hygiene standards in tattoo parlours alongside vaccination advice. Condom use

should also help to aid the control of other STDs and the avoidance of unwanted pregnancy. Further research is needed to identify the most effective method of increasing vaccination uptake and reducing risk behaviors amongst backpackers.

1.5 Conclusion

Hepatitis B is a preventable disease that can cause acute illness and chronic complications. Whilst a high proportion of backpackers in Thailand seek pre-travel health advice, only 30% in our sample were protected against HBV and 20% placed themselves at high risk of HBV exposure due to their behavior whilst abroad. Early consultation with a HCP before travel and promotion of HBV vaccination are required to bolster the rates of protection. Furthermore, backpackers could benefit from sexual health advice and the risks of body modification whilst abroad in order to reduce their risk of contracting hepatitis B.

1.6 Appendix

See attached file

1.7 Acknowledgements & Role of funding source

I would like to thank all the participants for giving up their time to take part in our study. The project would not have been possible without the cooperation of the Thai Tourist Police.

I would also like to thank Frank Ker & his family for their financial support of the project via a bursary granted by the College of Medical and Dental Sciences, University of

Birmingham. This support was purely financial and played no role in the study design, data collection, analysis or interpretation.

1.8 Conflicts of interest

None declared

1.9 References

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