

Travel Characteristics and Health Practices Among Travellers at the Travellers' Health and Vaccination Clinic in Singapore

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Abstract

Introduction: Singapore has a fast-growing travel industry, but few studies have been done on travel characteristics and travel health practices. This study describes the profile and health-seeking behaviour of travellers attending a travel health clinic in Singapore. **Materials and Methods:** A cross-sectional survey was conducted on travellers attending the Traveller's Health and Vaccination Centre (THVC) between September and November 2002 using a standardised questionnaire. Information obtained included individual demographic and medical information, travel patterns, vaccination status and travel health practices. **Results:** Four hundred and ninety-five (74%) eligible travellers seen at THVC responded to the questionnaire. Their mean age was 36 years; 77% were professionals, managers, executives, and businessmen, students, and white collar workers. Asia was the main travel destination, and most travelled for leisure and resided in hotels or hostels. The median duration of travel was 16 days. Although >90% had previously travelled overseas, only 20% had previously sought pre-travel advice. Malays were significantly underrepresented ($P < 0.01$); and Caucasians and Eurasians were significantly more likely ($P < 0.01$) to have previously sought pre-travel advice compared with Chinese, Indians and Malays. Factors associated with seeking pre-travel advice included travel outside of Asia, especially Africa and South America. **Conclusion:** Singaporean travellers travel more often to cities rather than rural areas, compared with non-Asian travellers. Asia is the preferred destination, and travel outside of Asia is perceived as more risky and is associated with seeking pre-travel advice and vaccinations. Travel patterns and behaviours need to be taken into account when developing evidence-based travel medicine in Asia.

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Key words: Cross-sectional survey, Health behaviour, Travel, Vaccination

Introduction

The South-east Asian region has seen recent increases in travel, and pre-travel health advice is important in protecting these travellers from risks.¹ Travellers now travel to destinations with high disease risks. These travellers may be exposed to various infectious diseases within the area of travel, and may import these infectious diseases back to their country of residence.

There have been many studies conducted in the West on travel health-seeking behaviour,²⁻⁵ but there are few studies on travel health practices in Asia among residents and their reasons for visiting travel clinics. Travellers from the Asia-Pacific region have been shown to have poor travel health-

seeking behaviour, with only 31% having sought travel health advice, and only 4% having visited a travel health specialist.¹

This study surveyed the travel health practices and behaviours among visitors to a travel health clinic in Singapore. The findings were compared with a previous airport survey amongst Asians.¹ The objective was to determine the characteristics of travellers visiting a travel health clinic in Singapore by their demographic and travel patterns, and to identify the travel health-seeking behaviour among travellers. This will help travel clinics to develop more effective strategies in providing health advice.

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Materials and Methods

This study was a cross-sectional survey conducted at the Traveller's Health and Vaccination Centre (THVC) at Tan Tock Seng Hospital from 1 September to 30 November 2002. The THVC is a specialist travel health clinic in Singapore with approximately 20,000 visits per year. All prospective travellers visiting the clinic during the study period were given a standardised questionnaire comprising 72 questions on individual demographic and medical information, proposed travel itinerary, previous immunisation status, previous travel history and practices, and health-seeking behaviour. Other questions included the purpose of travel, activities, accommodation type, and previous travel health advice. Questionnaires were self-administered, except for interventions provided at the clinic, and trained interviewers were present to assist the respondents and validate their answers.

Post-travel individuals, pilgrims, and those who visited the clinic to obtain vaccinations for purposes other than travel were excluded. The occupations of those surveyed included professionals, managers, executives, and businessmen (PMEBs), white collar workers who worked indoors excluding PMEBS, and blue collar workers who worked outdoors. The racial category was divided into Chinese, Malay, Indian, and other races, the majority of which were Caucasians and Eurasians. We also stratified the respondents into "Singaporean" (Singaporeans including permanent residents), "other Asian" (other Asian nationalities) and "non-Asian" (US, Canada, Europe, Australia or New Zealand nationalities).

Factors associated with the current visit to the THVC and those associated with previous pre-travel health-seeking behaviour were analysed. The factors associated with the current visit were analysed by Pearson's chi-square test and Fisher's exact test. Univariate and multivariate analysis with logistic regression models were then performed on the outcome variable of previous visit to a travel health clinic, with the input variables of gender, race, nationality, age group, occupation, income, and past frequency of travel. The variables selected for multivariate analysis were those of significance or importance. The multivariate analysis was performed to determine the demographic groups and travel patterns that were more likely to result in previous visits to travel health clinics. All analyses were performed using the statistical software Stata version 8.2, with the level of significance set at $P < 0.05$.

National demographic data were obtained from the national statistics department for comparison.⁶ The racial distribution for residents in Singapore during the same period was 77% Chinese, 14% Malays, 8% Indians, and 1% others, while the age distribution was 28% below 20 years, 15% from 21 to 30 years, 19% from 31 to 40 years,

18% from 41 to 50 years, 10% from 51 to 60 years, and 11% above 60 years. We compared our findings with the results from our previous large-scale airport survey amongst travellers departing from Asian cities.¹

Results

During the study period, 669 eligible travellers visited the travel health clinic. Of these, 495 (74%)

Table 1. Demographic and Travel Patterns of Travellers Visiting the Traveller's Health and Vaccination Centre

Variables		Frequency (%)
Gender	Male	50
	Female	50
Race	Chinese	74
	Malay	2
	Indian	11
	Caucasians and Eurasians	13
Nationality	Singaporean	81
	Other Asian	12
	Non-Asian	7
Age group	Less than 20 years	13
	20 to 30 years	26
	31 to 40 years	24
	41 to 50 years	20
	51 to 60 years	11
	More than 60 years	6
Occupation	PMEB*	22
	Students	25
	Blue collar	4
	White collar	30
	Others	19
	Income	No income
Up to \$2000		23
\$2000 to \$4,999		34
\$5000 to \$9999		14
\$10000 or more		6
Purpose of travel [†]	Leisure	66
	Business	25
	Mission work	21
	Education	9
Accommodation during travel [†]	Hotel/hostel	69
	Relative/friend	15
	Campsite	11
	Own	9
Food during travel [†]	Local (non-hotel)	48
	Hotels	42
	Self cooked	22
	Others	13
Duration of travel	Up to 1 week	8
	1 week up to 2 weeks	30
	2 weeks up to 4 weeks	37
	4 weeks or more	25

* Professionals, Managers, Executives, and Businessmen

† The percentages do not sum to 100% because of multiple answers per individual

responded to the questionnaire. For 419 (85%) of the respondents, this was their first visit to a travel health clinic, while 433 (89%) indicated that this was their first visit to the THVC.

Demographic and Travel Patterns

The demographic information of visitors to the travel clinic is shown in Table 1. The mean age of the travellers was 36 years. Compared to the racial distribution in Singapore, Malays were significantly underrepresented in the survey ($P < 0.01$) while Caucasians and Eurasians were significantly overrepresented ($P < 0.01$). By nationality, Singaporeans comprised about 81% of all travellers, with other Asians comprising about 12% and non-Asians about 7%. Compared to the national age distribution, there were higher proportions in the 20 to 30 years ($P < 0.01$) and 30 to 40 years ($P = 0.03$) age groups visiting the travel clinic than in the general population. However, there were lower proportions in the < 20 years and > 60 years age groups visiting the clinic ($P < 0.01$ in both groups). Among the visitors, 77% were PMEBs, students, and white collar workers.

Among the respondents, 66% were travelling for leisure, 25% were going on business trips, while 21% were embarking on mission work. The majority of the travellers planned to stay in hotels or hostels during their trip (69%), 15% planned to stay with friends and relatives whom they were visiting, and 11% would be staying on campsites. Among the respondents, 48% planned to dine at local non-hotel establishments. The median duration of travel was 16 days, with 62% of travellers planning to travel for more than 2 weeks. The main activity proposed by the travellers was hiking (25%), followed by water sports (17%),

construction relief work (14%), and beach activities (12%). Among those who were to perform construction relief work, 61% would be travelling for mission/relief work. Those who travelled for mission/relief work also stayed less often in hotels ($P < 0.01$), compared to those travelling for business or leisure, but more often in hostels and with the local population ($P < 0.01$).

The proposed and previous destinations visited by those who had never previously sought travel health advice at a travel clinic are shown in Table 2. The main proposed travel destinations for these travellers were Indochina (26%), the Indian subcontinent (26%), and Africa (21%). Apart from travel to Indochina, the Middle East and Central America, all the other destinations had significant differences when comparing proposed travel versus travel history amongst first-time travel clinic visitors. Travellers were more likely to visit travel clinics for the first time when travelling to the Indian subcontinent, South America and Africa ($P < 0.01$ for these destinations), compared to their previous travels. Correspondingly, visitors were less likely to visit the clinic for the first time when travelling to the rest of Asia, Europe, and South America ($P < 0.01$ for these destinations) compared to their previous travel. There were no first-time visitors to the clinic who were planning to travel to Japan, Korea, or Taiwan. On the other hand, there were no first-time visitors to the clinic who had previously travelled to South America.

Travel Health-seeking Behaviours

With regard to pre-travel health-seeking behaviour among clinic visitors (Table 3), 50% had learned about the clinic through friends, while the media, the internet, and travel agents each influenced less than 5% of visitors. Ninety-

Table 2. Proportion of Travel to Proposed Destinations Compared to Previous Destinations Among First Time Visitors to Travel Health Clinics*

Destination	Proposed visit to destination, n = 418 (%)	Previous visits to destination for first time travel health advice seekers, n = 326 (%)	P value
Indochina	26	34	0.07
China	14	24	<0.01
Japan, Korea, Taiwan	0	11	<0.01
Indonesia, Malaysia, Philippines	8	38	<0.01
Indian subcontinent	26	10	<0.01
Oceania	1	23	<0.01
Europe	4	16	<0.01
Middle East	3	3	0.52
Africa	21	4	<0.01
Central America	1	1	1.0
South America	7	0	<0.01
North America	3	14	<0.01

* The percentages in the columns do not sum to 100% because of travel to multiple locations per individual

Table 3. Travel Health-seeking Behaviour Among Visitors to the Traveller's Health and Vaccination Centre

Variables		Frequency (%)
Knowledge about Traveller's Health and Vaccination Centre	Newspaper	4
	Polyclinics	6
	General practitioners	11
	Media (television, radio, magazines)	3
	Travel agents	4
	Friends	50
	Travel clinic pamphlets	3
	Internet	3
	Others	25
First consult if ill during or after travel	General practitioners	66
	Polyclinics	14
	Emergency department	9
	Traveller's Health and Vaccination Centre	4
	Communicable Diseases Centre	6
	Others	2
Previous travel outside Singapore		94
Ever consulted doctor before travel*		20
The main driver for consult [†]	Own accord	74
	Advice of travel agency	2
	Advice of friends	13
	Internet	0
	Media advertising	0
	Others	7
Received pamphlet or booklet on travel health [†]		43
Received advice on prevention of travellers' diarrhoea [†]		62
Received advice on prevention of malaria [†]		65
Satisfied with advice given [†]		84
Received travel vaccinations [†]		69
Ever visited had a general health examination pre-travel*		18
Ever visited had a general health examination post-travel*		7
Brought a personal first aid kit for travel*		49

* These questions were posed only to those who had previous travel outside Singapore

† These questions were posed only to those who had previous travel outside Singapore and had consulted a doctor prior to travel

four per cent had previously travelled outside Singapore but of those with such travel experience, only 20% had previously consulted a doctor before travel. In addition, less than 70% of those who had consulted a doctor before travel had received vaccinations or preventive advice. Only 18% of travellers had previously had a pre-travel general health examination.

In terms of post-travel health-seeking behaviour, the majority of travellers (80%) would first consult a general practitioner or the polyclinic (public primary healthcare centres) if they fell ill during or after travelling. Four percent would visit the THVC, while 6% would visit the Communicable Disease Centre, which is Singapore's main infectious diseases referral centre. Of those with previous travel history, 7% had had a general health examination performed post-travel.

Previous Travel Health-seeking Behaviours

The results for the univariate and multivariate analysis (Table 4) represent the odds ratios (ORs) of having previous travel health-seeking behaviour. From the univariate analysis, Caucasian and Eurasian travellers were significantly more likely to have previously sought travel health advice compared to ethnic Chinese travellers (OR, 3.8). Non-Asians were also significantly more likely to have previously sought travel health advice compared to Singaporeans (OR, 4.2). All of the non-Singaporean Asians did not previously seek travel health advice. Those above 30 years of age were more likely to have previous travel health-seeking behaviour compared to those below 20 years of age (OR, >2). PMEBs were 1.7 times more likely to have previous travel health-seeking behaviour than other occupations, and those who had travelled 4 or more times

Table 4. Univariate and Multivariate Factors Associated with History of Previous Visits to Travel Clinics with the Corresponding Odds Ratios (OR), 95% Confidence Intervals (CI) And *P* Value

Variable	No.	Univariate analysis			Multivariate analysis		
		OR	95% CI	<i>P</i> value	OR	95% CI	<i>P</i> value
Gender							
Male	248	1					
Female	247	0.8	(0.5, 1.3)	0.40			
Race							
Chinese	357	1			1		
Malay	9	0.9	(0.1, 7.6)	0.95	1.6	(0.2, 14.8)	0.67
Indian	55	0.9	(0.4, 2.3)	0.84	1.5	(0.7, 5.8)	0.18
Caucasians and Eurasians	65	3.8	(2.1, 7.0)	>0.01	6.6	(2.3, 19.4)	>0.01
Nationality							
Singaporean	399	1			1		
Other Asian*	59	NA			NA		
Non-Asian	36	4.2	(2.0, 8.5)	>0.01	0.9	(0.3,3.0)	0.82
Age group							
Up to 20 years	66	1			1		
21 to 30 years	127	1.0	(0.3, 2.7)	0.93	0.7	(0.2, 2.4)	0.61
31 to 40 years	122	2.2	(0.9, 5.8)	0.10	1.3	(0.4, 4.2)	0.64
41 to 50 years	97	2.5	(0.9, 6.7)	0.07	1.6	(0.5, 5.2)	0.42
51 to 60 years	54	2.3	(0.8, 6.7)	0.14	0.6	(0.1, 2.6)	0.52
More than 60 years	30	2.0	(0.6, 7.2)	0.29	0.9	(0.3, 4.3)	0.86
Occupation							
PMEB [†]	92	1			1		
Other occupations	283	0.6	(0.3, 1.1)	0.10	0.7	(0.3, 1.4)	0.28
Employment							
Not employed	101	1					
Employed/Salaried	354	1.4	(0.7, 2.7)	0.36			
Past travel frequency							
1-3 times	164	1			1		
4 or more times	322	1.7	(0.9, 2.9)	0.08	1.3	(0.6, 2.9)	0.68

* All individuals of "other Asian" nationality did not have previous travel health-seeking behaviour

† Professionals, Managers, Executives, and Businessmen

Only race, age group, occupation, and past travel frequency were included in the multivariate analysis

were 1.7 times more likely to have had previous travel health-seeking behaviour than less frequent travellers. From the multivariate analysis, most factors were co-dependent, but Caucasians and Eurasians were still significantly more likely to have had previous travel health-seeking behaviour (OR, 6.6; $P < 0.01$) after adjusting for confounders.

Vaccinations

Table 5 summarises previous vaccination history and the vaccines given during the visit to the travel clinic. Forty-eight per cent had previously had hepatitis B vaccination and 21% had had a hepatitis A vaccination within the last 10 years. More than half received the typhoid (81%), hepatitis A (77%), and diphtheria and tetanus vaccines (57%) at the current visit. Other vaccines given at the clinic at higher percentages compared to previous immunisation levels included influenza, meningococcus, and yellow

fever vaccines. All those going to yellow fever-endemic areas received the yellow fever vaccine in accordance with the World Health Organization guidelines.

Comparison to our Previous Airport Survey

We conducted a questionnaire survey amongst travellers departing from major Asian cities in the same year as this study. The proportions of those travelling for leisure and business were similar in both studies (21% and 66% in the airport study versus 25% and 61% in this study).¹ The duration of travel was longer in our cohort compared to the airport study [62% of travel clinic visitors travelled for more than 2 weeks compared to 10% of travellers at the airport ($P < 0.01$)]. Only 8% of visitors to our travel clinic travelled for less than 1 week compared with 50% of travellers at the airport study ($P < 0.01$). Thirty-two per cent of travellers in the airport study sought travel health advice before travelling, compared to the 19% who had previously

Table 5. History of Vaccinations in the Last 10 Years and Vaccinations Given to Visitors to the Travel Clinic (n = 495)

Vaccines	% previously immunised	% vaccinations recommended and given during the visit
Diphtheria/Tetanus	28	57
Cholera	5	1
Hepatitis A	21	77
Hepatitis B	48	21
Hepatitis A & B	2	6
Influenza	3	18
Japanese B Encephalitis	1	1
Meningococcus	5	15
Mumps, Measles and Rubella	16	9
Polio	18	13
Rabies	1	1
Typhoid	17	81
Varicella	2	2
Yellow fever	4	27
Pneumococcal	0.2	0.2

sought travel health advice in this study ($P < 0.01$). In the airport study, non-Asians were >7 times more likely to seek travel health advice, and our study shows similar results (both studies $P < 0.01$).

Discussion

This study provided an overview of the demographics, travel patterns, and travel health-seeking behaviour in travellers attending a large travel health centre in Singapore. In keeping with a previous airport study amongst Asian travellers, travel within Asia is the most common travel destination, but duration of travel was longer in those who sought pre-travel advice compared to the airport study (where the majority had not sought pre-travel advice). The longer duration of travel may be a reason for seeking travel health advice. However, the duration of travel (mean, 16 days) was comparable to those from other studies across Europe, South Africa, and the US.²⁻⁴ Most visitors seeking pre-travel advice were professionals and businessmen. The large number of aid/mission workers in our cohort is due to requirements by the Singapore International Foundation for mission volunteers to seek pre-travel health advice. Caucasians and Eurasians were overrepresented at our travel health centre, whereas Malays were significantly underrepresented compared to the other races in Singapore. It is possible that Malays travel less, or prefer to seek advice from Malay-speaking Muslim centres. The Haj pilgrimage is one of the main travel destinations for Malays, and pilgrims prefer to consult Muslim centres for pre-travel advice.⁷ It is important to identify factors which contribute

to the lack of pre-travel health-seeking behaviour in Malays so that culturally appropriate measures can be taken to increase uptake and to reduce travel-related medical risks.

A large proportion (89%) of this cohort experienced their first visit to a specialised travel clinic, although almost all had extensive previous travel experience. For those with previous travel history, only 20% had sought pre-travel medical advice prior to the current visit. This is lower compared with travellers from other regions. A study of US travellers to areas with malaria, hepatitis, and vaccine-preventable diseases found that 36% had sought travel health advice.⁴ A Canadian study found that 54% of travellers to malaria-endemic regions had sought travel health advice.⁸ A European airport survey on travellers to developing countries found that 52.1% had sought travel health advice.³ We investigated factors associated with seeking pre-travel advice prior to this visit. Caucasians and Eurasians were 6.6 times more likely to have previously sought pre-travel advice compared to the other races after adjusting for possible confounders. In addition, non-Asians had increased pre-travel health-seeking behaviour compared to Singaporeans and other Asians, which is similar to findings in a regional study.¹ PMEBs and frequent travellers were also more likely to have had previous travel clinic visits, although higher rates of travel may have been a contributing factor. Further studies are needed to uncover the motivational factors of Eurasian, Caucasian and non-Asian populations, PMEBs, and frequent travellers, to seek travel health advice. These can be used as educational tools to influence travel health habits.

We investigated travel destinations associated with this current visit and among first-time travel clinic visitors, there were more travellers to Africa, South America and the Indian subcontinent compared to these visitors' previous travel destinations. This suggests that visitors perceived the destination-specific risk of Africa, South America and the Indian subcontinent as higher and therefore sought specialist travel health advice, whereas travel to Asia, Europe or North America was not perceived as high risk. This may be due to the perceived health risk in certain regions by local travellers. One study of travellers to Peru found that although 62% would seek travel health advice before travel, more than 90% sought advice before travelling to Peru.⁹ Another study in Johannesburg of travellers to Africa found that 86% had sought travel health advice,² while another study found that high-risk travellers and travellers aware of their risks were more likely to seek pre-travel health advice.¹⁰ The perceived risks may be due to the risks that are publicly emphasised. The lack of perception of risks associated with travel within Asia is similar to our previous study amongst Asians, which documented shortcomings in knowledge, attitude and practices in Asian

travellers.¹ Asia has a documented high risk of vaccine-preventable diseases and malaria. Whilst there may be awareness of risks associated with Africa or South America,^{2,9-12} awareness needs to be raised among Asians about the risk of travel within Asia. The implication is that the development of effective travel education about the areas of greatest risk may increase the likelihood of travellers seeking travel advice before visiting these regions.

In terms of travel health-seeking behaviour, half of all visitors to the THVC had heard about the clinic from their friends. Seventy-five per cent of travellers who consulted a physician before travel had done so out of their own accord. The internet, media advertising, and travel agents played a muted role in encouraging travel clinic consultations. This is contrary to other studies, which found that travel agent advice was important in predicting travel health-seeking behaviour.^{13,14} However, there are now numerous media available to the public as sources of travel health advice in addition to or in lieu of traditional travel clinic consultations. Further study is needed to determine the utilisation of the internet and other media for travel health advice vis-à-vis travel clinic consultations. Among those who had pre-travel consultations, less than half received reference materials and less than two-thirds received advice on important diseases such as travellers' diarrhoea and malaria. Better coverage of the risks and possible interventions may increase the effectiveness of travel healthcare.¹⁵ Most travellers also consulted a primary healthcare physician if they fell ill during or after travel. Continuing education for physicians should include travel health to enable them to more effectively address travellers' needs.¹⁶

The percentage of previous immunisations versus vaccinations given at the clinic also indicates the need for further education. Vaccinations provided at the travel clinic indicate the risks posed by those diseases during travel. Local travellers need to be aware of the risks and to seek advice since Asian travellers have lower rates of travel vaccination compared to non-Asian travellers.¹ This is true for even common illnesses such as influenza, where travellers may not be aware of the risks.¹⁷ It is important to emphasise that risks can be lowered by seeking proper travel health advice, intervention and preparation.¹⁸⁻²⁰

There are some limitations to the study. We conducted the survey on all eligible visitors to the THVC during the study period, to increase the sample size and reduce biases. However, the 3-month study period may have introduced biases as travel patterns may differ from other periods of the year. In addition, due to the need for informed consent, we could not collect information on the non-respondents (26% of all visitors). Future studies should sample visitors throughout the year, and provide demographic estimates of non-respondents for comparison.

Conclusion

As travel becomes more frequent amongst Asians, travel education is needed to understand the risks involved and to enable better preparation. Travellers also need to be educated on the presence of specialist travel clinics through different modalities, to allow them to seek appropriate travel healthcare. More studies on the travel habits of Asian populations need to be done, especially with the increasing affluence and diverse travel habits in the region.

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