

TRAVELLERS' KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING PREVENTION OF INFECTIOUS DISEASES: A CROSS SECTIONAL STUDY FROM MALAYSIAN AIRPORTS

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Abstract. International travel is common, increasing the risk for travel related infections, making it important to understand the knowledge, attitudes and practices (KAP) of international travellers regarding prevention of travel related illnesses. We aimed to determine the KAP of travellers at two Malaysian airports, in order to inform traveller health programs. We conducted face to face interviews with travellers at Kuala Lumpur International Airport and Sultan Abdul Aziz Shah Airport, Malaysia in 2014. Study subjects were selected via convenient sampling. Inclusion criteria were travellers aged ≥ 18 years who were departing from the studied airports, were able and willing to participate in the study. Subjects were asked about their KAP regarding various travel health subjects. The data from these interviews were collected, summarized and examined with SPSS version 21 and multiple logistic regression analysis to determine factors associated with poor KAP regarding travel health. A total of 316 subjects were included in the study; 57.6% were male and 55.4% were Malaysians. Forty point five percent of subjects sought pre-travel health advice. Of those who sought pre-travel health advice, 39.8% sought it from family or friends, 35.2% from the internet and 12.5% from a physicians. Fifty-two point eight percent of subjects had received pre-travel vaccinations. No subjects were traveling to a malaria high risk country as determined by the Centers for Disease Control and Prevention, 8.2% were travelling to a moderate risk country, 28.9% were travelling to a low risk country, 12.0% were travelling to a very low risk country and 50.9% were travelling to a country with no malaria risk. Four point one percent of subjects took malaria prophylaxis medication. On multivariate logistic regression analysis, the older the study subject age, the better the travel health knowledge [odds ratio (OR)=1.03; 95% confidence interval

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(CI): 1.01-1.05; $p = 0.009$]. Being female (OR: 1.92; 95%CI: 1.16-3.18; $p = 0.011$) and those who sought travel health advice (OR: 1.77; 95%CI: 1.06-2.95; $p = 0.028$) were more likely to have good practice on travel health. Therefore, awareness program should target the male travellers to improve health practices.

Keywords: travel medicine, travel health practice, malaria, vaccination, self-care, knowledge, attitude, practice, Malaysia

INTRODUCTION

International travel has increased resulting in an increased risk for travel associated illnesses (Lee, 2014), such as infectious diseases (WHO, 2012). This has resulted in more travel health consultations encountered by travellers (Hill *et al*, 2006). The risk for travel-related infections depends on destination, length of the trip, planned activities and the traveller's personal risk profile (van Herck *et al*, 2003). The main determinants of a travellers' health risk are their knowledge, attitudes and practices (KAP) regarding prevention of travel-related infectious diseases (Al-Abri *et al*, 2016). Knowledge is the traveller's knowledge about travel related health risks, attitude is the traveller's belief about whether their behavior can reduce travel related health problems or not and practices is the behavior of the traveller to prevent travel-related infections (van Herck *et al*, 2003).

A previous study found a large proportion of travellers are unaware of travel related health risks (Al-Abri *et al*, 2016). Travel medicine is a newer discipline in Asia than in Western countries, which have a longer history of well-established travel health services (Wilder-Smith *et al*, 2004). Public health can be affected by travel related diseases (Vendetti, 2010). Travellers should seek pre-travel health advice and appropriate vaccinations in order to reduce their risk for illness.

Despite the large number of Ma-

laysian international travellers, little is known about their KAP regarding travel health. This information is needed to inform travel health services in Malaysia. Therefore, we aimed to determine the KAP of Malaysian international travellers departing from two airports in Malaysia in order to inform travel health programs.

MATERIALS AND METHODS

We conducted a cross sectional study of international travellers at the Kuala Lumpur International Airport (KLIA) and Sultan Abdul Aziz Shah Airport (SAASA). Both the KLIA and SAASA are located in Klang Valley. A total of 316 travellers were included in the study conducted from July to September 2014. The sample size was calculated using Epi Info 6.0, based on the prevalence of good travel knowledge in a study, which was 78% (Al-Abri *et al*, 2016), giving the required sample of 265 with a 95% power, 95% confidence interval and statistically significant level of 5%. Inclusion criteria were internationally departure travellers aged ≥ 18 years. Face-to-face interviews were conducted using a structured questionnaire. Written informed consent was obtained from each participant prior to inclusion in the study. Data obtained for the questionnaire included travellers' socio-demographics, past health history, KAP regarding travel health, malaria prophylaxis, vaccinations and self-care. The classification of malaria risk profile for each country was obtained

from the Centers for Disease Control and Prevention (CDC), USA (CDC, 2018). This is classified into 5 categories: high, moderate, low, very low and no risk for contracting malaria (CDC, 2018). A good knowledge and good practice level for travel health was defined as getting more than 60% of the questions regarding travel knowledge and practices correct on the questionnaire (Al-Abri *et al*, 2016). A pilot study was conducted among 30 travellers to pre-test the questionnaire prior to the main study. Statistical analysis was performed using the Statistical Package for Social Science (SPSS), version 21 (IBM, Armonk, NY). Continuous data were described as means and standard deviations (SD) if the distribution was normal. Categorical data were reported as proportions (percentages). The chi-square test and Fisher exact test were used for categories or dichotomous predictors. Multivariate logistic regression analysis was used to look for predictors of good knowledge and practices regarding travel health. All analyses were done with 95% confidence intervals (CI), and significance was set at $p < 0.05$.

RESULTS

Three hundred sixteen respondents were included in this study. Table 1 shows the characteristics of the respondents. The mean age was 34.9 (range: 18-81) years: 57.6% were males, and 55.4% were Malaysians. Seventy-nine point seven percent had a tertiary, 15.8% a secondary, 3.8% a primary and 0.7% no formal education. Nine point two percent of the subjects had underlying chronic medical conditions, such as diabetes mellitus, hypertension, ischemic heart disease or asthma. Forty point five percent of respondents travelled with family, 32.9% travelled alone, 19.3%

travelled with friends, 6% travelled with a colleague and 1.3% travelled with a spouse or partner. The main travel destination for participants was Asia (71.5%), which consisted of Singapore (14.2%), Indonesia (10.4%), Thailand (9.8%), China (8.2%) and Taiwan (4.7%). Other destinations included Australia (7.0%) and the United States (4.1%). Ten point two percent of respondents travelled for 1-3 days, 57.9% for 4-14 days, 6.3% for 15-28 days and 25.6% for >28 days. Sixty-four point two percent of respondents were travelling on vacation, 20.3% on business and 10.4% for education. The majority of travellers (74%) had prior experience with travel to developing countries.

In our study, 72.8% of the study subjects sought general travel information before their trip. They obtained the information from the internet (39.6%) and family or friends (22.8%). Significantly more ($p=0.015$) females (79.9%) than males (67.6%) sought general information about the destination country prior to travel. Overall, 40.5% of the study subjects sought pre-travel health advice. Of those, only 12.5% sought advice from a health care professional, 39.8% sought it from family or friends, 35.2% from the internet, 7.0% from a travel agency, 3.1% from their company and 2.3% from travel literature. There was a significant association between female gender and seeking travel health advice ($p=0.013$). Forty-eight point five percent of females and 34.6% of males sought travel health advice.

The duration of travel was significantly associated with seeking travel health advice ($p=0.002$). Fifty-three point one percent of travellers who travelled more than 28 days sought travel health advice versus 28.1% of those who travelled for 1-3 days. Thirty-four point two percent of

Table 1
Demographic and travel related characters of study subjects (N = 316).

Characteristic of study subjects	n (%)	Characteristic of study subjects	n (%)
Mean (\pm SD) age in years	34.9 \pm 13.7	Information source	
Gender		Internet	125 (54.3)
Male	182 (57.6)	Family or friends	70 (30.4)
Female	134 (42.4)	Travelling literature	22 (9.6)
Nationality		Travelling agent	12 (5.2)
Malaysian	175 (55.4)	Others	1 (0.4)
Non-Malaysian	141 (44.6)	Seeking travel health advice	
Educational level		Yes	128 (40.5)
No formal education	2 (0.6)	No	188 (59.5)
Primary	12 (3.8)	Source of travel health advice	
Secondary	50 (15.8)	Family or friends	51 (39.8)
Tertiary	252 (79.7)	Internet	45 (35.2)
Comorbidities		Doctor	16 (12.5)
Yes	29 (9.2)	Travelling agent	9 (7.0)
No	287 (90.8)	Company	4 (3.1)
Travel destination		Travelling literature	3 (2.3)
Asia	226 (71.5)		
Europe	33 (10.4)		
Middle East	34 (10.8)		
Oceania	23 (7.3)		
Travel duration in days			
1-3	32 (10.2)		
4-14	183 (57.9)		
15-28	20 (6.3)		
> 28	81 (25.6)		
Travel companions			
Solo traveller	104 (32.9)		
Travel with family	128 (40.5)		
Travel with friend	61 (19.3)		
Travel with colleagues	19 (6.0)		
Others	4 (1.3)		
Purpose of travel			
Vacation	203 (64.2)		
Business	64 (20.3)		
Education	33 (10.4)		
Religious	1 (0.3)		
Others	15 (4.7)		
Seeking general information about travel destination			
Yes	230 (72.8)		
No	86 (27.2)		

SD, standard deviation.

travellers knew the symptoms of malaria. Based on the classification of malaria risk by Centers for Disease Control and Prevention (CDC), no participants in our study travelled to high-risk countries for malaria, 8.2% travelled to moderate risk countries, 28.9% travelled to low risk countries, 12.0% travelled to very low risk countries and 50.9% travelled to countries with no risk for malaria. Twenty-one point two percent of travellers used bed nets and 5.8% used malaria prophylaxis. Forty-six point five percent of travellers were unaware of the availability of malaria prophylaxis medication. Fifty-five point seven percent were incorrect in their perception of malaria risk in their destination countries.

Seventy-eight point eight percent of subjects knew the indications for travel vaccines; 62.4% perceived vaccines as be-

Table 2
Comparison of characteristics of travellers with good and poor travel health knowledge.

Variable	Poor knowledge (<i>n</i> = 145)	Good knowledge (<i>n</i> = 171)	<i>p</i> -value
Mean (\pm SD) age in years	32.3 \pm 12.0	37.2 \pm 14.6	0.001
Gender, <i>n</i> (%)			
Male	75 (51.7)	107 (62.6)	0.052
Female	70 (48.3)	64 (37.4)	
Nationality, <i>n</i> (%)			
Malaysian	79 (54.5)	96 (56.1)	0.768
Non-Malaysian	66 (45.5)	75 (43.9)	
Has underlying health problems, <i>n</i> (%)	9 (6.2)	20 (11.7)	0.092
Sought travel health advice, <i>n</i> (%)	57 (39.3)	71 (41.5)	0.690
Received travel vaccine, <i>n</i> (%)	76 (52.4)	91 (53.2)	0.887

SD, standard deviation.

Table 3
Association between characteristics of travellers with good and poor travel health practice.

Variable	Poor practice (<i>n</i> = 218)	Good practice (<i>n</i> = 98)	<i>p</i> -value
Mean (\pm SD) age in years	34.4 \pm 13.7	36.0 \pm 13.4	0.320
Gender, <i>n</i> (%)			
Male	136 (62.4)	46 (46.9)	0.010
Female	82 (37.6)	52 (53.1)	
Nationality, <i>n</i> (%)			
Malaysian	126 (57.8)	49 (50.0)	0.197
Non-Malaysian	92 (42.2)	49 (50.0)	
Has underlying health problems, <i>n</i> (%)	18 (8.3)	11 (11.2)	0.398
Sought travel health advice, <i>n</i> (%)	78 (35.8)	50 (51.0)	0.011
Received travel vaccine, <i>n</i> (%)	106 (48.6)	61 (62.2)	0.025

SD, standard deviation.

ing unnecessary. Of those who received a travel vaccine, 52.8% received it from a nearby clinic. However, only 12.5% of subjects obtained specific travel health advice from a doctor. The two most frequent travel vaccinations given were for hepatitis A (34.5%) and hepatitis B (35.1%). There was

a significant association between female gender and knowing the indication for receiving vaccination ($p = 0.02$). Ninety point three percent of female subjects were aware that their immune system could be boosted against the pathogen by receiving a vaccine versus 80.8% of male subjects.

Table 4
Factors associated with good knowledge about travel health.

Variable	Adjusted OR	95% CI	<i>p</i> -value
Each 1 year increase in age	1.03	1.01-0.93	0.009
Gender			
Male	1.48	0.66-1.05	0.097
Female	1.00		
Nationality			
Malaysian	1.05	0.82-0.58	0.844
Non-Malaysian	1.00		
Has underlying health problems	1.43	1.05-2.36	0.432
Sought travel health advice	1.32	1.66-3.48	0.250
Received travel vaccine	0.93	2.13- 1.47	0.739

Table 5
Factors associated with good practices regarding travel health.

Variable	Adjusted OR	95% CI	<i>p</i> -value
Each 1 year increase in age	1.01	0.99-1.16	0.198
Gender			
Female	1.92	0.85-0.56	0.011
Male	1.00		
Nationality			
Non-Malaysian	1.39	1.06-0.98	0.195
Malaysian	1.00		
Has underlying health problems	1.35	1.03-3.18	0.509
Sought travel health advice	1.77	2.29-3.25	0.028
Received travel vaccine	1.62	2.95-2.68	0.062

The mean standard deviation (SD) knowledge score for travel health was 5.3 (\pm 2.4) and the mean practice score for travel health was 4.3 (\pm 2.2). Fifty-four percent of subjects had good travel health knowledge and 31.0% had good travel health practices. Fifty-four percent of subjects had good knowledge about malaria symptoms, the availability of treatment and the indications for travel vaccinations. Thirty-one percent of the subjects had good practices regarding malaria and food poisoning prevention.

Tables 2 and 3 show the comparison of subjects with good and poor travel health knowledge and practices, respectively.

Tables 4 and 5 show the results of multivariate logistic regression analysis. Age was the main factor associated with good travel health knowledge. Older age was associated with better travel health knowledge (OR=1.03; 95%CI: 1.01-1.05; $p = 0.009$). Female gender and those who sought travel health advice were the main factors associated with good practices regarding travel health. Females were more

likely to have good practices for malaria and food poisoning prevention (OR=1.92; 95%CI: 1.16-3.18; $p = 0.011$). Travellers who sought travel health advice were significantly more likely to have better travel health practices than those who did not (OR=1.77; 95%CI: 1.06-2.95; $p = 0.028$).

DISCUSSION

More than half of this study subjects (54.1%) had a good level of travel health knowledge. This is similar to a study from Oman where 77.5% of the respondents had a good level of travel knowledge (Al-Abri *et al*, 2016). This may be because the age of the subjects in both studies was relative quite young. In Oman, the average age of study subjects was 36.7 years versus 34.9 years in our study. There is room for improvement as literature showed that older age subjects tend to have better travel health knowledge (Jang and Wu, 2006).

Thirty-one percent of our study subjects had good travel health practices. This is higher than the 6.9% reported in a study from Oman (Al-Abri *et al*, 2016). This could be because 72.5% of the subjects in the study from Oman were males versus 42.4% in our study and females had better travel health practices in our study (OR=1.92; 95% CI: 1.16-3.18; $p = 0.011$). In our study, females were significantly more likely to seek general information regarding destination countries ($p = 0.015$) and seek pre-travel health advice ($p = 0.013$). In our study, more females than males correctly knew the indications of vaccinations ($p = 0.02$). This could be because females prefer take smaller risks in life than males. Females are more aware of and cautious about their health and have better health seeking behavior than males (Hibbard and Pope, 1986; Mackenzie *et al*, 2006).

The awareness of travel medicine should be raised and younger males need to be encouraged to seek pre-travel health advice. The importance of seeking pre-travel health advice is further highlighted in our study because those who did so tended to have better travel health preventive measures practices ($p = 0.028$).

In our study, the number of subjects who sought general travel information (72.8%) was more than those who sought travel health advice (40.5%) before their trip. Those who sought general travel information in our study was higher than studies from Qatar (27.7%) (Al-Hajri *et al*, 2011), Australasia (60%) (Wilder-Smith *et al*, 2004), United States (62%) (Hamer and Connor, 2004) but similar to studies from Europe (73%) (van Herck *et al*, 2004), Sweden (74%) (Dahlgren *et al*, 2006) and South Africa (79%) (Toovey *et al*, 2004). This could be because the internet is widely used in Malaysia. A Malaysia Internet User Survey done in 2016 reveals 80% of Malaysian residents had internet access and 90% of internet users sought information online (MCMC, 2016). Travellers could have easily searched online for information regarding their travel destinations as seen in our study where the internet was the main source of information in our study (54.3%).

The duration of travelling to a country in our study was significantly associated with seeking travel health advice ($p = 0.002$). Those who travelled longer were more likely to seek travel health advice, similar to a study from Australasia (Wilder-Smith *et al*, 2004). It is possible travellers with a shorter duration of travel perceived there was a lower risk for contracting travel-related infectious diseases (Rack *et al*, 2005). They may have felt it is not worth the cost of consulting a health care professional when travelling for just

a few days. Good travel health knowledge was found in those with increasing age ($p = 0.009$), meaning interventions should focus on younger travellers.

Seventy-one point five percent of subjects travelled within Asia which is endemic for many travel-related diseases, included malaria (Wilder-Smith *et al*, 2004). Thirty-four point two percent of our study subjects had a good knowledge of malaria symptoms, 21.2% used bed nets and 5.8% used malaria prophylaxis. These show shortcomings in the KAP regarding malaria, which is consistent with the findings of another study showing a low KAP regarding preventing malaria among subjects in Peninsular Malaysia (Al-Adhroey *et al*, 2010). The low percentage of mosquito bed net use may be due to the cost of the nets, the lack of knowledge about mosquitoes being the causative agents for malaria (Minja *et al*, 2001) and in fact that no subjects visit malaria high risk areas in our study. Fear of the side effects of anti-malarial medication is the most common reason why travellers to malarious areas do not take it (Piyaphanee *et al*, 2009). Greater travel health education is needed to raise public awareness of these issues.

In our study, 78.8% of travellers knew about the indications of vaccine use and 52.8% were vaccinated with a travel vaccine. Hepatitis A and B vaccines were the most common vaccines received by our study subjects, probably because Asia is endemic for hepatitis A and B (Andre, 2000). However, only 12.5% of our study subjects received specific travel health advice from a doctor. This could be because most subjects in our study obtained travel health information online, rather than consulting a health care professional which would cost more. Travellers may have thought that the various sources of

travel health advice are equally reliable, seen in a study from Australasia (Wilder-Smith *et al*, 2004). Our subjects had a lower rate of seeking travel health advice from health care professionals (12.5%) than other studies (Hamer and Connor, 2004; Cabada *et al*, 2005; Al-Hajri *et al*, 2011). From the United States (Hamer and Connor, 2004), Sweden (Dahlgren *et al*, 2006) and South Africa travellers (Toovey *et al*, 2004). This shows a lack of awareness regarding the importance of receiving travel health advice from healthcare professionals in our study. This could be due to the lack of availability of travel health services in Malaysia since there are no specific travel medicine clinics in Malaysia (Taha *et al*, 2016). Internet, family members and friends may provide inadequate or incorrect travel health advice (Gottlieb, 2000). A survey of health advice on the internet found more than half of the websites surveyed gave inaccurate advice (Cline and Haynes, 2001). Obtaining travel health advice from a health care professional, especially travel health specialists should be promoted for Malaysia. There is a need for travel health training programs for health care providers.

In summary, our study found inadequate KAP regarding travel health, vaccinations and malaria prophylaxis in our study subjects. It is important to increase awareness about the availability about travel health services and vaccinations. Female travellers were more likely to seek travel health advice and have better health seeking behavior. Attention should be given more toward younger males. Increased media attention and public health education are necessary to improve this situation. Carrying out or practicing this travel health advice given by the healthcare professionals is inadequate. Involving travel agents in referring travellers

to travel health clinics or specialists may improve the KAP of travellers regarding travel related health.

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