

Survey of the Characteristics of Travel Medicine Clinic Clients at a Medical Centre in Northern Taiwan

H-L Lo, H-L Huang, M-Y Hsieh, L-T Lee, T-Y Chiu, K-C Huang

Abstract

Background. An increasing number of travelers are visiting foreign locations around the world, and health care during travel has become an important issue to world health. Very few studies have surveyed travel medicine clinics in Asian countries. Here, we aimed to study the characteristics of clients at a medical center in Northern Taiwan.

Methods. In this cross-sectional survey, medical charts were retrospectively reviewed. The data, including age, gender, nationality, destination, purpose of travel, vaccination status, malaria chemoprophylaxis, and medical acclimatization for high altitude sickness, of 2,279 consecutive clients from January to December 2009 were collected. Statistical analysis was per-formed using SPSS version 11 software for Windows.

Results. Among the 2,279 subjects, 1,137 (49.9%) were men, and 1,142 (50.1%) were women. The mean age was 34.51 years (range, 1-82 years). Most clients were between 21 and 40 years of age (59.4%), traveling to the United States of America (34.9%), and were travel-ing to study abroad (31.4%). Most of these patients presented for yellow fever vaccination(40.9%), and about one-third of clients (32.2%) received malaria chemoprophylaxis. Four per cent of the patients were prescribed acetazolamide to prevent high altitude sickness. More women than men were studying abroad (17.9%), going on a group tour (13.6%), and traveling to the United States of America (19.9%), while more men were traveling abroad for conferences and business (19.4%). Only 2.7% of clients were attending the clinic for a post-travel consultation.

Conclusions. The results demonstrated the unique pattern of the clients' characteristics of travel medicine clinic in Taiwan compared to that of western countries. Most of the travelers did not have pre-travel consultations in Taiwan. Travel medicine education pro-grams should be promoted in the future. Further studies of travel medicine clinics are recommended for Chinese populations.

Keywords: Taiwan, Travel medicine, data collection **Introduction**

In the first half of 2010, traveling around the world and within Asia increased by 7% and 14%, respective-ly.¹ Outbound departures of Taiwanese citizens in 1984 and 2009 were 750,404 and 8,142,946, respectively.² The growth rate of visitor arrivals to Taiwan was 123.43% in 2009.³ Moreover, from January to August 2010, 6,476,780 Taiwanese citizens left the country for travel purposes, an increase of 18.88% compared to the same period in 2009.⁴ The spread of infectious diseases by travelers is becoming a more important issue than in previous years.⁵⁻⁷ Travelers also encounter health risks other than infectious diseases, including exposure to radiation, injury, vehicle-related problems, high altitude diseases, etc.⁸⁻¹² Travel medicine clinics provide specialized care for the health of trav-ellers.¹³ There are very few studies that have surveyed the travel medicine clinics in Asian countries.

Taiwan is an area endemic for tuberculosis. According to the Taiwan Tuberculosis Control Report in 2009, published by the Taiwan Center of Disease Control, the incidence and estimated prevalence of tuberculosis in 2007 were 63.2 and 111 per 100,000 per-sons, respectively. Because of this, visitors from Taiwan to western countries are recommended to have a tuberculin skin test and chest X-ray in travelers with positive skin tests. The travel medicine clinic at the National Taiwan University Hospital was established in 2008 through collaboration with the Taiwan Control Disease Center and the National Taiwan University Hospital. It serves travelers from Monday to Friday, 9 AM to 5 PM and provides pre-travel counseling, vaccinations, education concerning routine prevention, and post-travel consultations. We aimed to study the characteristics of clients at this travel medicine clinic in 2009.

Methods

The medical charts of clients attending the travel med-icine clinic at the National Taiwan University Hospital from January to December 2009 were reviewed. We excluded 190 clients with unknown destinations from the study. A total of 2,279 subjects were enrolled in the study. The data, including age, gender, nationality, destinations and types of travel, purpose of travel, vaccinations, malaria prophylactic drugs, and medical acclimatization for high altitude sickness, were collected. For the purpose of travel category, the indication of "others" meant the patient attended the clinic for post-travel consultation. The tuberculin skin test, given to clients who would be studying abroad, was performed by intradermal injection of 0.1 mL (0.04 Ig) 2TU of Statens Serum Institute tuberculin RT23. The horizontal diameter of skin induration was measured 48-72 h after injection. Chest radiography were recommended for patients with indurations greater than or equal to 10 mm. SPSS version 11 software for Windows was used to analyze the data. The differ

ences between men and women were analyzed and tested by Student's *t*-test or Pearson's chi-squared test.

Results

Most clients visited the clinic from June to August (Figure 1). Some of them received post-exposure rabies vaccinations, and the sources of animal bites were from China and other countries. Client characteristics are shown in Table 1. There were 1,137 (49.9%) men and 1,142 (50.1%) women who attended the clinic. The mean age of these clients was 34.51 years (range, 1-82 years), and most clients (59.4%) were between 21 and 40 years old. Most of them (95.4%) were Taiwanese; foreigners were citizens of the United States of America, Brazil, France, Indonesia, and Bangladesh. The United States of America (34.9%) was the most common destination. The second and third most common destinations were Africa (30.4%) and Latin America (13.8%), respectively. Studying abroad (31.4%) was the most common purpose of travel, while conference/business (25.9%) and group tour (21.5%) were the second and third most common purposes of travel, respectively. There were only 60 subjects who attended the clinic for post-travel consultation.

As shown in Table 2, the most common vaccination was the yellow fever vaccine (40.9%). The second most-common vaccine was the meningococcal vaccine (34.3%). About one-third of clients (32.2%) received malaria chemoprophylaxis. Mefloquine and doxycycline were the most commonly used malaria chemo-prophylaxis agents, given to 15.2% and 14% of the total study population, respectively. Four per cent of the clients were prescribed acetazolamide for prevention of altitude sickness. The 0.5% of the clients who requested pre-exposure rabies vaccinations were mainly workers who expected to have close contact with animals, such as veterinarians.

As shown in Table 3, more women than men were studying abroad (17.9%), going on a group tour (13.6%), and traveling to the United State of America (19.9%), while more male travelers were going abroad for conferences and business (19.4%). The most common destination for male clients was Africa (17.4%). The tuberculin skin test was administered for 109 clients (4.4%) who were studying abroad. Among these clients, more than half (2.7%) underwent chest radiography due to positive skin tests (Figure 2). However, chest radiography results were normal for all of these clients.

Discussion

At a travel medicine clinic in a medical center in Northern Taiwan, we found the unique pattern of the clients' characteristics compared to that of western countries. Very few surveys of outpatient departments for travel medicine have been conducted in Asian countries. Our findings can serve as a reference of clinical services available for pre-travel consultation and post-travel counseling. Pre-travel consultations can be specifically tailored to the health status of the individual, type and purpose of travel, and destination.

Most clients visited the travel medicine clinic prior to studying abroad during the summer vacation period from June to August. As shown in Figure 1 and Table 1, the United States of America ranked first among travel destinations, which may explain why the number of consultations was highest during the summer. Our results suggest that both the government and travel medicine professionals should promote pre-travel consultation for individuals going on group tours and backpacking travelers in Taiwan. However, according to a survey conducted by the Tourism Bureau Ministry of Transportation and Communications in Taiwan in 2009, the most common visiting regions were Hong Kong (2,261,001; 27.8%), mainland China (1,516,087; 18.6%), and Japan (1,113,857; 13.7%). The prevalence of anti-hepatitis A virus (HAV) in mainland China was 72.87%.¹⁴ In addition, rabies is still one of the major causes of mortality from infection in China.¹⁵ However, few travelers receive the HAV vaccine or pre-exposure rabies vaccine prior to traveling. Furthermore, anti-HAV is not highly prevalent among young populations in Taiwan.¹⁶⁻²⁰ Rabies is not endemic in Taiwan, and therefore, the low rate of pre-exposure rabies vaccination and low awareness of the risks of contracting rabies may endanger travelers. Therefore, we should encourage travelers visiting high-risk areas to receive both of these immunizations.

The number of men and women attending the clinic was similar; however, there were some differences between men and women in terms of purpose of travel, type of travel, and destination. Travelers to the Latin America, the third most common travel destination, should be given the yellow fever vaccine prior to travel, which explains why the yellow fever vaccination was most commonly administered shot. Students traveling to the United States of America, some European countries, and Hajj should receive the meningococcus vaccine, and this was the second most common vaccine administered at the clinic. Malaria prophylaxis therapy is recommended for visitors who are traveling to

countries with endemic malaria for less than 3 months. In many countries, malaria is resistant to chloroquine, making it the least-prescribed drug for chemoprophylaxis. Mefloquine is convenient to administer once per week, and doxycycline is the cheapest drug among prophylactic drugs prescribed for the prevention of malaria in Taiwan. Atovaquone-proguanil (Malarone) is the most expensive drug. Thus, most travelers chose mefloquine and doxycycline for malaria chemoprophylaxis. This was different from other countries. According to a survey conducted by the Center of Travel and Migration Medicine in Italy, the most common medications for malaria chemoprophylaxis were mefloquine (68.7%), followed by chloroquine (12.5%), chloroquine-proguanil (11.3%), and Malarone (6.7%).²¹ A survey in French travelers showed mefloquine (30.2%, n = 1,040), Malarone (26%, n = 892), chloroquine (11.8%, n = 406), and doxycycline (1.4%, n = 53) were the most commonly prescribed drugs for malaria prophylaxis.²² The preference for different malaria chemoprophylactic drugs in Taiwan and European countries may be due to the cost of the medicines and differences in destinations. Results from these studies may have also been affected by the years in which the surveys were conducted. Chloroquine is likely used infrequently in Taiwan due to the increasing rate of chloroquine-resistant malaria worldwide. Moreover, Malarone was not available during the study period in Taiwan.

More than half of the clients who received the tuberculin skin test prior to studying abroad had positive skin tests, with indurations greater than or equal to 10 mm. However, chest radiography results were normal in all clients. Previous reports of Taiwanese populations have demonstrated that about one-third to more than one-half of the population tested positive in the tuberculin skin test, with induration sizes greater than or equal to 10 mm, due to universal Bacillus Calmette-Guerin (BCG) vaccination since birth.^{23,24} Interestingly, the prevalence rates of positive tuberculin skin tests with induration sizes greater than or equal to 10 mm ranges from 0% to 93.4% in some African countries and indigenous peoples of America.^{25,26}

Some surveys of travel medicine clinics have demonstrated that these clinics promote awareness of issues concerning travelers' health.²⁷⁻²⁹ However, some differences in the practices of travel medicine clinics around the world have also been documented.³⁰ No uniform practices for travel medicine in Taiwan have yet been established, and future efforts should focus on instituting practices that are more common. Moreover, Taiwan's National Health Insurance does not reimburse fees for services rendered in travel medicine clinics. While 8,146,946 outbound departures from Taiwan were documented in 2009, it was estimated that only a few of these travelers received pre-travel consultations. Substantial patient and physician education is necessary to improve preventive counseling and travel-related health before and after travel in Taiwan. Moreover, attempts to pay for post-travel and some pre-travel consultations through the National Health Insurance program may encourage travelers to receive counseling. Establishing a health database of travelers may also help promote travelers' health in the future.

In conclusion, the major reasons that travelers visited the travel medicine clinic at the National Taiwan University Hospital in Northern Taiwan were for vaccination and malaria chemoprophylaxis. Most of the travelers from Taiwan did not have a pre-travel consultation. Education for travel medicine should be promoted in the future. Further studies of travel medicine clinics are recommended for the Chinese population.

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Declaration of interest

The authors state that they have no conflicts of interest to declare

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Table 1: Demographic characteristics of visitors to the clinic

Characteristics		%	N
Gender	Male	49.8	1,137
	Female	50.1	1,142
Age (years)			
Mean	34.51		
Median (range)	29 (1-82)		
Age groups	0-20	11.4	259
	21-40	59.4	1,354
	41-60	22.6	514
	61-80	6.5	149
	> 80	0.1	3
Nationality	Taiwanese	95.4	2174
	Foreigner	4.6	105
	Southeast Asia	8.2	187
	India	4.3	97
	Africa	30.4	692
	USA	34.9	795
	Europe	1.0	23
	Latin America	13.8	315
	Australia/ New Zealand	0.3	7
	Japan	1.4	32
	Mainland China	2.5	58
	Others	3.2	73
Purpose of journey	Group tour	21.5	490
	Backpacking	5.7	130
	VFR	4.0	93
	Study	31.4	716
	Hajj	4.3	97
	Volunteering	4.5	103
	Conference-business	25.9	590
	Others*	2.7	60

*Post-travel consultation

VFR: Visiting friends and relatives

Table 2: Medications used in the outpatient department for travel medicine

Medication	%	N
Vaccines		
Meningococcus	34.3	781
Yellow fever	40.9	932
Hepatitis A	15.4	352
Hepatitis B	1.2	27
Twinrix	1.6	37
Varicella	2.1	48
Japanese encephalitis	1.8	40
MMR	12.0	273
Td	14.4	329
Rabies	0.5	12
Malaria prophylaxis		
Total	32.2	733
Chloroquine	0.8	19
Doxycycline	14.0	318
Mefloquine	15.2	348
Malarone	2.2	50
Prevention of altitude sickness		
Acetazolamide	4.0	92

Table 3: Differences between male and female clients

	<i>Male</i>		<i>Female</i>		<i>p-value</i>
	%	N	%	N	
Destination					< 0.001
Southeast Asia	4.6	104	3.6	83	
India	1.9	43	2.4	54	
Africa	17.4	397	13	295	
USA	15	342	9.9	453	
Europe	0.5	11	0.5	12	
Latin America	7.1	163	6.7	152	
Australia/ New Zealand	0.1	3	0.2	4	
Japan	0.6	14	0.8	18	
Mainland China	0.7	18	1.8	40	
Others	1.8	43	1.4	31	
Purpose of Journey					0.001
Group tour	7.9	181	3.6	309	
Backpacking	2.5	58	2.4	72	
VFR	1.6	37	13	56	
Study	13.5	309	19.9	407	
Hajj	1.7	38	0.5	59	
Volunteer	1.9	44	6.7	59	
Conference- business	19.4	443	0.2	147	
Others*	1.2	27	0.8	32	
Vaccines					
Meningococcus	17.9	408	16.4	373	0.105
Yellow fever	22.2	505	18.7	427	0.001
Hepatitis A	7.8	178	7.6	174	0.782
Hepatitis B	0.6	14	0.6	13	0.838
Twinrix	0.8	19	0.8	18	0.858
Varicella	1	23	1.1	25	0.782
Japanese Encephalitis	0.8	19	1	21	0.76
MMR	4.9	111	7.1	162	0.001
Td	6.6	151	7.8	178	0.117
Rabies	0.3	7	0.2	5	0.558
Malaria Prophylaxis					
Total	17.5	397	14.7	336	0.005
Chloroquine	0.5	12	0.3	7	0.245
Doxycycline	7.1	161	6.9	157	0.776
Mefloquine	8.4	194	6.8	154	0.018

*Malarone 1.5 33 0.7 17 0.021 *Post-travel consultation. **P-values were calculated using the chi-square test to analyze differences between men and women. MMR: measles-mumps-rubella, Td: tetanus-diphtheria. VFR: visiting friends and relatives.

