

Review of Health Problems among Foreign Travelers Presenting to the Hospital for Tropical Diseases, Bangkok, Thailand between 2009 and 2014

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Objective: Because of the increasing number of international travelers in Thailand and the different characteristics of people from different geographic areas, the present study aimed to determine the spectrum of health problems among foreign travelers who came to Thailand.

Materials and Methods: The medical records of the foreign travelers that attended the Travel and Fever Clinics at the Hospital for Tropical Diseases, Bangkok, Thailand between October 2009 and October 2014 were retrospectively reviewed to determine the health problems among foreign travelers. It was a cross-sectional descriptive study.

Results: Among the 339 eligible foreign patients, 63.4% were male, 61.9% were Europeans/North Americans, and 55.8% visited Thailand for tourism. Sixty-one various health problems were encountered. The three most common health problems were acute diarrhea, dengue infection, and febrile viral infection. Europeans/North Americans and Australians/New Zealanders had twice the number of gastrointestinal disorders than Asians. Tourists were more likely to have diarrhea than expatriates ($p=0.044$), while Australians/New Zealanders were more likely to have diarrhea than Asians ($p=0.012$). Europeans/North Americans and Australians/New Zealanders were less likely to have dengue than Asians ($p=0.033$ and 0.035 , respectively). Dengue was also less commonly found in the research/education group than expatriate group ($p=0.031$).

Conclusion: Most diseases among study subjects were similar to diseases commonly found in Thailand. Geographical origin and travelling purpose of the travelers were associated with some disease incidences.

Keywords: Travel, Thailand, Fever, Dengue, Diarrhea

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Nowadays, people can easily travel around the world very fast. Therefore, the number of people traveling internationally has continued to grow substantially in the past decades. From 25 million international tourist arrivals in 1950, the number has reached 1,186 million in 2015 globally⁽¹⁾. More than 50 million persons travel from industrialized countries to tropical countries annually and approximately 8% to

19% of travelers to tropical countries require medical care during or after the journey⁽²⁾. Approximately 20% to 70% of travelers to tropical countries fall ill⁽³⁾. Illnesses include potentially life-threatening diseases, such as malaria, dengue, and typhoid⁽⁴⁾. Although many infections may be acquired during travel, some may be imported from their countries of origin. Some travelers with pre-existing illness may seek medical care for their diseases during their journey. People from different regions also differ in characteristics, culture, and behaviors⁽⁵⁾. There is limited data about the effects of the nationality of travelers to their illnesses. Thailand is a tropical country and one of the top ten tourist destinations in the world, having 24.8 million of international travelers in 2014⁽¹⁾. However, there are

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few studies of the diseases among foreign travelers in Thailand. Hospital for Tropical Diseases (HTD) has operated since 1961 under the administration of the Faculty of Tropical Medicine, Mahidol University, Bangkok, Thailand. Travel Clinic, also known as the Thai Travel Clinic, was set up in HTD in 2004 in response to the increasing number of travelers who need consultation about travel-related diseases. Fever Clinic was later setup in 2012 to provide a one-stop service for febrile patients and acts as an emergency room, thus also serving ill foreigners. The present study aimed to provide preliminary information on the spectrum of health problems among foreign travelers from different geographic regions who seek medical care in the travel clinic and fever clinic.

Materials and Methods

Study design

The present study was a cross-sectional descriptive study. The authors retrospectively reviewed the medical records of foreign travelers of all age groups seeking medical care at the Travel Clinic and Fever Clinic at the HTD, Bangkok, Thailand, between October 2009 and October 2014. The data collection started between November 2014 and January 2015. The eligible criteria were all age group of foreign travelers seeking medical care at the Travel Clinic and the Fever Clinic, HTD, between October 2009 and October 2014. Demographic data, travel information, clinical presentations, and final diagnoses were recorded. Travel information included type of lodging, season presenting to the hospital, purposes for visiting Thailand, and history of pre-travel health advice before departing from their home countries, including pre-travel vaccinations and anti-malaria prophylaxis. Travel purposes were categorized into tourist, expatriate, research or education, visiting friends and relatives, volunteer, missionary, and other reasons. A traveler was defined as someone who moved between different geographic locations, for any purpose and any duration⁽⁶⁾. A tourist was defined as someone who traveled to a foreign country mainly for pleasure⁽⁷⁾. An expatriate was defined as someone who resided in a foreign country for more than three months for vocational purposes⁽⁸⁾. The final diagnosis of acute febrile illness without specific cause was assumed to be febrile viral infection. The authors excluded foreign travelers who visited the study clinics for the purpose of vaccination or anti-malaria prophylaxis, and travelers who had missing or incomplete major data (country of origin or final diagnosis). Immigrants are known to have different

characteristics and diseases from other travelers^(9,10). People from Laos, Myanmar, and Cambodia, who are mainly immigrants in Thailand, were not enrolled in the present study. Travelers were categorized based on their nationalities into five groups, European/North American, Asian, African, South American, and Australian/New Zealander. The present study was approved by the Ethics Committee of the Faculty of Tropical Medicine, Mahidol University, Thailand (Approval No. MUTM 2014-063-01)

Statistical analysis

Statistical analysis was conducted using SPSS, version 16.0. Continuous data were presented as medians with interquartile ranges (IQR). As age is one of the factors that can have effect on traveller's behavior, activity, and disease, patients' ages were categorized into 20-year age groups to see the numbers of patients roughly presenting teenage (younger than 20), young adulthood (21 to 40), middle adulthood (41 to 60), and elderly (older than 60).

Categorical data were presented as numbers and percentages for inferential analysis, chi-square and Fisher's exact test with corresponding p-values were used to compare categorical data and odds ratios (OR) were calculated from a 2×2 table. Logistic regression analysis was used to identify factors associated with medical problems among foreign travelers. A p-value less than 0.05 was considered statistically significant.

Results

Four thousand four hundred sixteen foreign patients visited the Travel Clinic and 378 foreign patients visited the Fever Clinic during the study period. From the Travel Clinic, 3,527 patients were excluded due to vaccination purpose, 560 due to antimalarial prophylaxis, and 89 due to incomplete data. From the Fever Clinic, 250 were excluded due to nationalities (75 Laos, 105 Myanmar, 70 Cambodia) and 29 due to incomplete data. Only 240 patients from the Travel Clinic and 99 patients from the Fever Clinic were eligible for analysis, giving 339 study patients of which 63.4% were male and the median age was 31 years. European/North American group comprised 61.9% of the study subjects. Tourism was the most common purpose for coming to Thailand (55.8%). A summary of the demographic data is shown Table 1.

Among the 172 patients whose pre-travel healthcare information were recorded, the groups with the highest proportion seeking pre-travel advice were the Australians/New Zealanders (92.3%), followed by Europeans/North Americans (78.2%), Asians (23.5%),

Table 1. Demographic characteristics of patients

Variables (n=339)	n (%)
Age (years), Median (IQR)	31 (25 to 43)
Age group	
Less than 20	18 (5.3)
21 to 40	224 (66.1)
41 to 60	75 (22.1)
More than 60	22 (6.5)
Sex	
Male	215 (63.4)
Female	124 (36.6)
Nationalities	
European/North American	210 (61.9)
Asian	74 (21.8)
African	28 (8.3)
South American	3 (0.9)
Australian/New Zealander	24 (7.1)
Type of lodging (n=337)	
Bangkok	300 (89.0)
Outside Bangkok	37 (11.0)
Season presenting to the hospital	
Rainy season (June to October)	142 (41.9)
Cool season (November to February)	100 (29.5)
Hot season (March to May)	97 (28.6)
Purpose of visiting Thailand	
Tourist	189 (55.8)
Expatriate	67 (19.8)
Research or education	36 (10.6)
Visiting friend and relative	12 (3.5)
Volunteer	4 (1.2)
Missionary	2 (0.6)
Other reasons	29 (8.6)

IQR=interquartile range

and Africans (22.2%) (Table 2).

Most of the travelers (59%) visited other countries before coming to Thailand. Southeast Asian countries were the most popular countries visited among European/North American, Asian and Australian/New Zealander travelers. South American travelers most frequently visited European countries. In contrast, most of the African travelers visited countries within Africa (Table 3).

Table 2. Numbers of travelers who had pre-travel health advice before visiting the Hospital for Tropical Diseases according to each nationality

Nationality	Having pre-travel health advice, n (%)		Total
	Yes	No	
European/North American	104 (78.2)	29 (21.8)	133 (100)
Asian	4 (23.5)	13 (76.5)	17 (100)
African	2 (22.2)	7 (77.8)	9 (100)
Australian/New Zealander	12 (92.3)	1 (7.7)	13 (100)
Total	122 (70.9)	50 (29.1)	172 (100)

The 339 patients were categorized with 61 different health problems, divided into six main groups, systemic febrile illness, respiratory disorders, genitourinary and sexually transmitted infections, gastrointestinal disorders, dermatological disorders and others. The three most common health problems in the studied patients were acute diarrhea (n=63, 18.6%), dengue infection (n=47, 13.9%), and febrile viral illness (n=34, 10%). In the present study, malaria was diagnosed in seven patients (2.1%), including six with *Plasmodium vivax* and one with *Plasmodium falciparum* infection (Table 4).

The health problem groups by nationalities are shown in Figure 1 and Table 5. The difference in the incidence of health problems between Asian and European/North American patients was significant (p=0.001) and the difference in the incidence of health problems between Asian and Australian/New Zealand patients was also significant (p=0.003). However, there was no significant difference in the incidence of health problems between Asian and African patients (p=0.065).

Factors associated with acute diarrhea (Table 6) and dengue infection (Table 7), which were the 2 most common health problems among the foreign travelers, were evaluated by multiple logistic analysis. Nationality and purpose of travel were associated with acute diarrheal disease in the present study. Travelers from Australia/New Zealand had a greater chance of getting acute diarrhea than travelers from Asia (adjusted OR 8.23; 95% CI 1.64 to 41.25) and the tourists had a greater chance of getting acute diarrhea than the expatriates (adjusted OR 4.51; 95% CI 1.03 to 20.13). Travelers from European/North American and Australian/New Zealander had less chance to get dengue than travelers from Asian (adjusted OR 0.27, 95% CI 0.11 to 0.64 and adjusted OR 0.09, 95% CI 0.01 to 0.75, respectively), and the research or

Table 3. Details for frequency of visited countries within six months before coming to Thailand according to nationality

Nationality	Frequency of visited countries within six months						
	SEA	AS	EU	AF	NA	SA	OC
European/North American (n=210)	173	67	19	14	9	7	6
Asian (n=74)	15	10	0	0	0	0	0
Australian/New Zealander (n=24)	24	1	3	0	1	0	0
African (n=28)	0	1	0	8	0	0	0
South American (n=3)	2	0	8	0	0	0	0

SEA=Southeast Asian countries; AS=Asian countries (except SEA); EU=European countries; AF=African countries; NA=North American countries; SA=South American countries; OC=Oceania countries

Table 4. Groups and details of health problems among studied patients (n, %)

Groups of health problems	Details	Groups of health problems	Details
(a) Systemic febrile illness (90, 26.5)	<ol style="list-style-type: none"> Dengue <ul style="list-style-type: none"> Dengue fever (41, 12.1) Dengue hemorrhagic fever (6, 1.8) Malaria <ul style="list-style-type: none"> <i>Plasmodium falciparum</i> (1, 0.3) <i>Plasmodium vivax</i> (6, 1.8) Sepsis (2, 0.6) Viral infection (34, 10.0) 		<ol style="list-style-type: none"> Cutaneous leishmaniasis (1, 0.3) Dermatitis (6, 1.8) Fungal infections (4, 1.2) Impetigo (3, 0.9) Insect bite (11, 3.2)
(b) Gastrointestinal disorders (89, 26.3)	<ol style="list-style-type: none"> Acute diarrhea <ul style="list-style-type: none"> Parasitic (6, 1.8) Salmonella (2, 0.6) Unspecified (55, 16.2) Chronic diarrhea <ul style="list-style-type: none"> Parasitic (6, 1.8) Salmonella (1, 0.3) Unspecified (4, 1.2) Non-diarrhea disorders <ul style="list-style-type: none"> Acute appendicitis (1, 0.3) Amebic liver abscess (2, 0.6) Chronic abdominal pain (1, 0.3) Constipation (3, 0.9) Gastritis (4, 1.2) Gastroesophageal reflux disease (1, 0.3) Splenic abscess (1, 0.3) Splenic cyst (1, 0.3) <i>Taenia saginata</i> (1, 0.3) 	(e) Genitourinary and sexually transmitted infections (STI) (9, 2.7)	<ol style="list-style-type: none"> Cystitis (2, 0.6) Human immunodeficiency virus infection (HIV) (1, 0.3) Pyelonephritis (1, 0.3) Urinary tract infections (4, 1.2) Vulvitis (1, 0.3)
(c) Respiratory infections (57, 16.8)	<ol style="list-style-type: none"> Acute bronchitis (5, 1.5) Acute pharyngitis (12, 3.5) Acute sinusitis (1, 0.3) Acute tonsillitis (4, 1.2) Chronic cough (1, 0.3) Common cold (10, 2.9) Influenza (7, 2.1) Pneumonia (3, 0.9) Upper respiratory tract infections (10, 2.9) Viral respiratory infection (4, 1.2) 	(f) Others (66, 19.4)	<ol style="list-style-type: none"> Accident and injury (4, 1.2) Chronic disease <ul style="list-style-type: none"> Hypertension (2, 0.6) Gout (1, 0.3) Psychological problems (3, 0.9) Others <ul style="list-style-type: none"> Abscess (3, 0.9) Acute otitis media (2, 0.6) Autoimmune thyroid disease (1, 0.3) Benign positional vertigo (1, 0.3) Bleeding from liposuction wound (1, 0.3) Deep vein thrombosis (1, 0.3) Dizziness (1, 0.3) Filariasis (1, 0.3) Gnathostomiasis (3, 0.9) Tension headache (5, 1.5) Helminthiasis (unknown tissue parasite) (1, 0.3) Hypertrophic obstructive cardiomyopathy (1, 0.3) Infected wound (3, 0.9) Musculoskeletal pain (4, 1.2) Non-ST segment elevation myocardial infarction (1, 0.3) Nephrotic syndrome (1, 0.3) Osteoarthritis (1, 0.3) Ophthalmologic disorders (2, 0.6) Rabies exposure (17, 5.0) Screening for disease (6, 1.8)
(d) Dermatological disorders (28, 8.3)	<ol style="list-style-type: none"> Allergic skin reaction (2, 0.6) Cellulitis (1, 0.3) 		

Table 5. Health problems among travelers from different nationalities

Nationality	Diagnosis, n (%)						Total
	SF	RD	GID	GU & STD	DO	Others*	
Asian	38 (51.4)	11 (14.9)	11 (14.9)	2 (2.7)	3 (4.1)	9 (12.2)	74 (100)
European/North American	44 (21.0)	30 (14.3)	64 (30.5)	5 (2.4)	20 (9.5)	47 (22.4)	210 (100)
African	6 (21.4)	10 (35.7)	3 (10.7)	1 (3.6)	2 (7.1)	6 (21.4)	28 (100)
Australian/New Zealander	1 (4.2)	6 (25.0)	9 (37.5)	1 (4.2)	3 (12.5)	4 (16.7)	24 (100)
South American	1 (33.3)	0 (0.0)	2 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100)
Total	90 (26.5)	57 (16.8)	89 (26.3)	9 (2.7)	28 (8.3)	66 (19.5)	339 (100)

SF=systemic febrile illness; RD=respiratory disorders; GID=gastrointestinal disorders; GU & STD=genitourinary and sexually transmitted diseases; DO=dermatological disorders

* Rabies exposure, chronic diseases, psychological disorders, accident, and injury

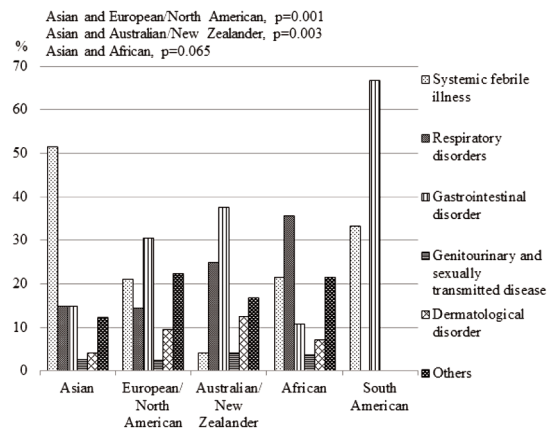


Figure 1. The proportions of health problem groups among travelers from different nationalities.

education group had less chance to get dengue than the expatriate group (adjusted OR 0.17, 95% CI 0.03 to 0.87).

Discussion

International travel is now commonly practiced, thus increasing the chance for doctors to treat foreign patients. The authors determined the diseases and health problems among international foreign travelers that attended the Travel and Fever Clinics of the HTD, Bangkok, Thailand between 2009 and 2014.

Systemic febrile illness, diarrheal and respiratory diseases are common causes of fever after travel to Southeast Asia (SEA). Wilson and coworkers demonstrated that systemic febrile illness, diarrheal, and respiratory diseases were causes of fever in 34%, 17%, and 17% of travelers returned from SEA, respectively^(11,12). In the authors' findings, systemic febrile illness, diarrheal, and respiratory diseases also

presented for 26.5%, 21.8%, and 16.8% of health problems in foreign travelers, respectively. Therefore, common diseases among foreign travelers to Thailand are similar to the common diseases among travelers returning from SEA.

Travelers may visit multiple countries in one trip. Information about previous visits to other countries is useful when doctors find the diseases uncommon in local area. Geographical origin of disease or place of contact may also affect treatment decisions. However, determining recent country visit as one of the factors associated with diseases in travelers is complicated. Some diseases are endemic in many countries while some are endemic in only some areas of the country. Complete details about travel schedule, vaccination, chemoprophylaxis, and diseases' incubation period are needed to determine the potential place of disease contraction. In the present study, six patients had vivax malaria and one patient had falciparum malaria. This finding is compatible to the WHO (2014) statistics for Thailand, stating that *Plasmodium vivax* is more common than *Plasmodium falciparum* in Thailand⁽¹³⁾. However, since all of these patients came from malaria endemic areas, it is difficult to determine where the patients contracted their infection and the potential drug resistant patterns of the parasites. Further studies focusing on specific diseases would provide better data on this aspect.

In the present study, systemic febrile illness was the most commonly diagnosed disease group. This is similar to another study⁽¹⁴⁾ where systemic febrile illness was found to be the most common disease group after travel to SEA. Dengue infection was the most common cause of fever among study patients. This is similar to previous studies about fever among travelers returning from SEA^(11,12,14). Hepatitis A

Table 6. Associated factors for acute diarrhea

Variables	Diarrhea	Non diarrhea	OR (95% CI)	Adjusted OR (95% CI)	p-value
Sex					
Male	40 (18.6)	175 (81.4)	1	1	
Female	23 (18.5)	101 (81.5)	0.99 (0.56 to 1.76)	1.07 (0.56 to 2.05)	0.841
Age					
≤60 years	60 (18.9)	257 (81.1)	1	1	
>60 years	3 (13.6)	19 (86.4)	1.48 (0.42 to 5.16)	0.64 (0.16 to 2.56)	0.523
Season presenting to the hospital					
Rainy season	26 (18.3)	116 (81.7)	1	1	
Hot season	19 (19.6)	78 (80.4)	1.09 (0.56 to 2.09)	1.34 (0.62 to 2.86)	0.462
Cold season	18 (18.0)	82 (82.0)	0.98 (0.5 to 1.9)	1.09 (0.51 to 2.37)	0.826
Type of lodging					
Bangkok	57 (19.0)	243 (81.0)	1	1	
Outside Bangkok	4 (10.8)	33 (89.2)	0.52 (0.18 to 1.52)	0.55 (0.17 to 1.78)	0.321
Nationality					
Asian	4 (5.4)	70 (94.6)	1	1	
African	2 (7.1)	26 (92.9)	1.35 (0.23 to 7.79)	2.44 (0.33 to 18.25)	0.392
European/North American	48 (22.9)	162 (77.1)	5.18 (1.8 to 14.93)	3.49 (0.93 to 13.14)	0.072
Australian/New Zealander	7 (29.2)	17 (70.8)	7.21 (1.89 to 27.46)	8.23 (1.64 to 41.25)	0.012
South American	2 (66.7)	1 (33.3)	35 (2.59 to 472.81)	15.38 (0.96 to 245.67)	0.064
Purpose of visit					
Expatriate	4 (6.0)	63 (94.0)	1	1	
Tourist	53 (28.0)	136 (72)	6.14 (2.13 to 17.7)	4.51 (1.03 to 20.13)	0.044
Research or education	4 (11.1)	32 (88.9)	1.97 (0.46 to 8.39)	2.55 (0.52 to 12.64)	0.251
Volunteer	1 (25.0)	3 (75.0)	5.25 (0.44 to 62.6)	5.31 (0.38 to 75.25)	0.223
Others	1 (3.4)	28 (96.6)	0.56 (0.06 to 5.26)	0.48 (0.04 to 5.36)	0.552
Any recent country visited before Thailand					
No	17 (12.2)	122 (87.8)	1	1	
Yes	46 (23.0)	154 (77.0)	0.47 (0.25 to 0.85)	1.23 (0.58 to 2.59)	0.591
Duration of stay in Thailand					
Less than 2 weeks	38 (28.4)	96 (71.6)	1	1	
2 weeks to one month	11 (21.2)	41 (78.8)	0.68 (0.32 to 1.45)	0.76 (0.31 to 1.88)	0.551
One to three months	5 (9.3)	49 (90.7)	0.26 (0.09 to 0.69)	0.36 (0.12 to 1.05)	0.066
Three to six months	4 (10.8)	33 (89.2)	0.31 (0.1 to 0.92)	1.16 (0.27 to 5.03)	0.858
More than six months	4 (8.2)	45 (91.8)	0.02 (0.08 to 0.67)	0.93 (0.19 to 4.53)	0.935

OR=odds ratio; CI=confidence interval

infection, leptospirosis, and rickettsia infections were not seen in the present study although these diseases are common in Thailand^(15,16). A possible reason for this is these diseases have a relatively low incidence in Bangkok and most travelers in the present study stayed in Bangkok while in Thailand.

The health problems differed significantly by nationality groups. This has been reported in a previous study among travelers to Laos⁽¹⁷⁾ and in a study of the epidemiology of travelers' diarrhea (TD) in Thailand⁽¹⁸⁾. The difference in incidence of health problems may be due to differences in behavior,

Table 7. Associated factors for dengue infection

Variables	Dengue	Non dengue	OR (95% CI)	Adjusted OR (95% CI)	p-value
Sex					
Male	25 (11.6)	190 (88.4)	1	1	
Female	22 (17.7)	102 (82.3)	1.64 (0.88 to 3.05)	1.74 (0.86 to 3.51)	0.132
Age					
≤20 years	3 (16.7)	15 (83.3)	1	1	
>20 years	44 (13.7)	277 (86.3)	1.26 (0.35 to 4.53)	0.5 (0.09 to 2.92)	0.495
Season presenting to the hospital					
Hot season	10 (10.3)	87 (89.7)	1	1	
Rainy season	21 (14.8)	121 (85.2)	1.51 (0.68 to 3.37)	2.25 (0.91 to 5.56)	0.085
Cold season	16 (16.0)	84 (84.0)	1.66 (0.71 to 3.86)	1.3 (0.49 to 3.44)	0.597
Type of lodging					
Bangkok	39 (13.0)	261 (87.0)	1	1	
Outside Bangkok	8 (21.6)	29 (78.4)	1.85 (0.79 to 4.33)	1.75 (0.66 to 4.68)	0.263
Nationality					
Asian	23 (31.0)	51 (68.9)	1	1	
European/North American	23 (11.0)	187 (89.0)	0.27 (0.14 to 0.53)	0.27 (0.11 to 0.64)	0.033
Australian/New Zealander	1 (4.2)	23 (95.8)	0.09 (0.01 to 0.76)	0.09 (0.01 to 0.75)	0.035
Purpose of visit					
Expatriate	16 (23.9)	51 (76.1)	1	1	
Tourist	21 (11.1)	168 (88.9)	0.39 (0.19 to 0.82)	0.59 (0.2 to 1.8)	0.365
Research or education	2 (5.6)	34 (94.4)	0.19 (0.04 to 0.87)	0.17 (0.03 to 0.87)	0.031
Visiting friend and relative	3 (25.0)	9 (75.0)	1.06 (0.26 to 4.41)	0.73 (0.12 to 4.96)	0.754
Other reasons	5 (14.3)	30 (85.7)	0.53 (0.18 to 1.59)	0.89 (0.25 to 3.23)	0.874
Any recent country visited before Thailand					
Yes	25 (12.5)	175 (87.5)	1	1	
No	22 (15.8)	117 (84.2)	1.32 (0.71 to 2.44)	0.84 (0.39 to 1.81)	0.653
Duration of stay in Thailand					
Less than 2 weeks	14 (10.4)	120 (89.6)	1	1	
2 weeks to one month	9 (17.3)	43 (82.7)	1.79 (0.72 to 4.44)	1.72 (0.62 to 4.76)	0.291
One to three months	9 (16.7)	45 (83.3)	1.71 (0.69 to 4.24)	1.8 (0.63 to 5.15)	0.276
Three to six months	7 (18.9)	30 (81.1)	2 (0.74 to 5.39)	1.65 (0.44 to 6.21)	0.463
More than six months	6 (12.2)	43 (87.8)	1.19 (0.43 to 3.31)	0.87 (0.23 to 3.35)	0.859

OR=odds ratio; CI=confidence interval

activities, eating habits, immunity, pre-travel health advice, and vaccination status. To confirm these hypotheses, prospective studies are needed. There were no significant differences in incidence of health problems between Asian and African travelers ($p=0.065$). This could be because many countries in Asia and Africa are in the tropics and developing countries. The people in both regions share a certain

degree of environmental similarity and perhaps developed immunity. Disease incidence between Asian and South American travelers could not be compared because there were only three travelers from South America in the present study. This implied that South American travelers are a small proportion of international travelers in Thailand. According to the Department of Tourism, Thailand, the numbers

of South American travelers are small but rapidly increasing⁽¹⁹⁾. More studies on this group of travelers would be important in the future.

Nationality and purpose of travel were associated factors for TD and dengue infection in the present study. Australian/New Zealander travelers were more likely to get TD than travelers from Asian. This is consistent with the study of epidemiology of TD in Thailand⁽¹⁸⁾. However, Australian/New Zealander and European/North American travelers were less likely to get dengue than travelers from Asian. One possible reason of higher risk of dengue in Asian travelers would be that these people, living in endemic area, might have secondary dengue infection in which clinical presentation is more severe than primary infection⁽²⁰⁾, making them visit the hospital. Tourists were more likely to get TD than expatriates. This finding is similar to a study from Brazil about the epidemiology and impact of TD⁽²¹⁾. Expatriate group, however, was more likely than research or education group to get dengue infection. This could be explained by cumulative disease exposures and reduced preventive measure compliance among expatriates⁽²²⁾.

Important parts of travel medicine include pre-travel consultation, traveler education, vaccination, and chemoprophylaxis discussions. Previous studies have found that Asian travelers are less likely to seek pre-travel health advice, pre-travel vaccinations, and malaria prophylaxis than Australian or Western travelers^(23,24). Approximately 60% to 80% of Western travelers obtain pre-travel health advice^(9,25), while only 24% to 40% of Asian travelers obtain before travel^(26,27). This was also true in the present study. There were about 10 travel clinics in Thailand compared to about 60 travel clinics in United Kingdom⁽²⁸⁾. Limited numbers of travel medicine specialties and travel clinics may also be a barrier for Asian travelers to obtain pre-travel health advice.

The present study had several limitations. Missing data were common due to the study's retrospective nature. Some important data could not be found, including the pre-travel health advice, history of travel to the forest, history of freshwater contact, history of illicit drug use, and eating habits. These missing data and relatively low subject numbers for each disease resulted in difficulty in finding disease associated factors. This single-center study cannot be applied to the general population of travelers visiting Thailand. However, the data may reflect the characteristics of foreign travelers visiting Bangkok as the study site was located in Bangkok. The majority of the subjects also stayed in Bangkok. Further study in different sites or

cities may provide more diverse information.

Although the present manuscript was descriptive in nature and the findings might not be generalized to all travelers, the authors hope that it is a good start to understanding the health problems of foreign travelers visiting Thailand, whose number is continuously increase.

What is already known on this topic?

Thailand is one of the popular travel destinations in SEA and in the world. Systemic febrile illness is the most common disease group in travelers returning from SEA. Dengue infection is the most common cause of fever among this group of travelers. Diarrheal and respiratory diseases are also common causes of fever among travelers travel to SEA. Travel purposes are associated with types and incidences of diseases. While diseases in travelers returning from SEA have been widely studied, there are few studies on the diseases among foreign travelers during their visits in SEA including Thailand.

What this study adds?

Among a variety of health problems detected in foreign travelers visiting Thailand, acute diarrhea, dengue infection, and febrile viral infection were the three most common health problems. These health problems are similar to the common diseases found among returned travelers from SEA. Geographical origins of the travelers and purpose of travelling were associated factors for traveler's diarrhea and dengue infection in the present study.

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Conflicts of interest

The authors declare no conflict of interest.

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