Factors associated with risk behavior in travelers to tropical and subtropical regions.

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ABSTRACT

Background: Recent decades have seen a rise in population movements and, therefore, the spread of tropical diseases and changes in the epidemiology of global disease patterns. Only 50% of travelers to tropical areas receive pre-travel advice and most of them present risk behaviors for acquiring infections. The aim of this study was to describe the clinical and epidemiological characteristics of travelers and identify factors associated with risk behaviors.

Methods: We made a retrospective, descriptive and analytical study of 772 travelers consulting a tropical medicine clinic in 2010. Data on demographic and clinical variables, travel characteristics and risk behaviors were collected.

Results: 66% of travelers received pre-travel advice and 31% took malaria prophylaxis. At least one risk behavior was reported by 82.6% of travelers. People travelling for 1-6 months had a 3-fold higher likelihood of experiencing risk behaviors than people travelling for <1 month (95%CI 1.54-5.81, p=0.001), and those travelling for >6 months had a 13-fold higher likelihood (95%CI 3.11-56.14, p<0.001) compared with the same group. Increasing age was associated with presenting less risk behaviors.

Conclusions: Younger travelers and those making longer trips have a higher number of risk behaviors. Strategies emphasizing advice on risk behavior should focus on these groups.

Key words: Risk behavior, travel, tropical medicine, emigration and immigration.

INTRODUCTION

Recent decades have seen an explosion in population movements, mainly due to tourism and migration. It is estimated that, in 2009, international tourist arrivals reached 880 million [1] and new destinations are constantly emerging [2]. In 2010, about 214 million people were living outside their country of birth, representing around 3% of the world's population [3]. According to the United Nations, 37% of global migration occurs from developing to developed countries [4] and Europe receives one in three international migrants [3].

It is estimated that 15-64% of travelers to tropical and subtropical areas suffer health problems during or after traveling [5-7]. Infections are the leading cause of morbidity [8], with diarrhea being the most-frequently diagnosed disease (20-60% of cases) [7,9].

Population movements suppose a risk for both individual and public health, as travel facilitates the spread of infectious diseases from endemic regions. This may involve the reintroduction of infections in previously unexposed populations and an increased incidence of infections already existing in the host countries [10-13].

The risk of illness in travelers varies widely due to factors such as the region visited, the time of year, the length, characteristics and reason for the trip, risk behaviors adopted and individual susceptibility, among others [5-8]. Studies have shown that immigrants living in developed countries who travel to their countries of origin to visit friends and relatives (VFRs) have an increased risk of some diseases, including malaria, HIV, sexually transmitted diseases, tuberculosis and viral hepatitis [14-18]. In most cases, the disease risk can be reduced by preventive measures, underlining the importance of medical advice [19]. Studies have shown that about 50% of travelers have received pre-travel advice [14,20-23,] although this figure varies depending on the reason for travel, ranging from 60-70% in tourists to around 20% in VFRs [15,17,18]. It is also estimated that

almost 80% of travelers do not follow recommendations about food consumption, an important route of disease transmission [19], and that 4-51% have casual sexual relationships during their trip, of whom around half do not use condoms [7,24-26].

The aim of this study was to describe the clinical and epidemiological characteristics of travelers to developing countries, and determine the factors associated with risk behaviors.

MATERIALS AND METHODS

We carried out a retrospective descriptive, analytical study of all travelers aged > 18 years attending the Tropical Medicine Unit, Hospital Clínic of Barcelona between January and December 2010, after international travel. Both patients who consulted due to symptoms during and after travel and symptomless patients who came for a check-up were included. Newly-arrived immigrants who attended the Tropical Medicine Unit were not included because, as they were living in tropical and subtropical regions, they were not asked for risk behaviors.

The following variables were collected using a computerized form: age, sex, date and reason for consultation, travel characteristics (countries visited, length of trip, reason for trip, date of end of trip), preventive measures, risk behaviors and final diagnosis.

The variable *reason for consultation* was divided into seven categories: fever, diarrhea, skin lesions, eosinophilia (patients referred from another center for evaluation of eosinophilia), asymptomatic check-up and others.

The countries visited were grouped into 7 geographical regions, according to the GeoSentinel classification (global travel-related disease-reporting network) [20], as shown in Figure 1. Patients who had traveled to more than one region were classified as "more

than one region". Travelers to regions other than the study regions (North America, Europe, Russia, Australia and New Zealand) were not included.

The length of the trip was categorized into 3 groups (≤ 30 days, 31-179 days and ≥ 180 days) and the reason for traveling into 5 groups: tourism, business, aid work, VFRs and others.

Information was collected on whether travelers had received preventive advice from an accredited vaccination center, whether they had received malaria chemoprophylaxis and whether they had completed the course.

Travelers were asked about the following risk behaviors while traveling: Consumption of non-bottled water, local dairy products, raw or undercooked meat or fish, contact with water from rivers or lakes, unsafe sex, blood transfusions, injections with non-disposable material, and contact with soil or mud. From the answers to these questions we created a new dichotomous variable which grouped travelers into those with no risk behaviors and those with one or more risk behaviors, in order to study the associated factors. Transfusions and injections were not included in the new variable as they are involuntary.

The final diagnoses are based on microbiological and other tests performed according to clinical indication, and on clinical and epidemiological criteria in cases in which tests were negative. Diagnoses were divided into 31 categories.

Statistical analysis

Quantitative variables were described using the mean and standard deviation in variables with a normal distribution, and median and interquartile range for variables with non-normal distribution. Qualitative variables were described as valid percentages. The reason for traveling was analysed according to the geographic region visited. The

diagnosis was analysed according to the reason for traveling and the reason for consultation. Risk behaviors were analysed according to the reason and length of the trip. In the analysis of the diagnosis, patients were excluded when not all tests requested to reach a diagnosis were performed. Associations between qualitative variables were assessed using the chi-square test or Fisher's exact test. A logistic regression model was constructed to determine the variables associated with presenting one or more risk behaviors. Variables with some degree of association in the bivariate analysis (p-value of Wald test <0.1) and variables considered relevant according to *a priori* criteria were included in the multivariate model. All analyses were performed using the SPSS v18 statistical package. The study protocol was approved by the Ethics Committee of the Hospital Clínic de Barcelona.

RESULTS

Of all patients seen at the Tropical Medicine Unit during 2010, a total of 1087 patients were initially studied, of whom 308 were excluded because they were newly-arrived immigrants and seven were excluded because they had traveled to regions not included in the study. The final sample consisted of 772 patients: 485 (62.8%) tourists, 122 (15.8%) business travelers, 96 (12.4%) aid workers, 45 (5.8%) VFRs, 15 (1.9%) travelers for other reasons and 9 (1.2%) travelers with an unknown reason for travel. The mean age (SD) was 37.1 years (11.8) and 43.7% (337/772) were male, but there was a predominance of males among business travelers (60.7% [74/122]), and a predominance of females among aid workers (70.8% [68/96]). The most-visited regions were: Sub-Saharan Africa (35.3% [268/759]), South Central Asia (17.7% [134/759]) and Central America and Caribbean (14.9% [113/759]). The median length of the trip (interquartile range) was 21 (15 - 45) days, and was longer in aid workers (60 [30 - 150]

days). The median time between the end of the trip and consultation was 12 (5 - 42) days. A total of 65.8% (466/708) of travelers had received pre-travel advice and 30.7% (209/680) had taken malaria prophylaxis. These percentages were higher in aid workers (78.0% [71/91] and 50.6% [44/87], respectively) and markedly lower in VFRs (17.9% [7/39] and 12.1% [4/33], respectively). Of those receiving prophylaxis, 27.2% (47/173) did not complete the course (Table 1).

The most-frequent reasons for consultation were diarrhea (35.7% [274/767]), and fever (22.0% [169/767]). Figure 2 shows the distribution of reasons for consultation by geographic region visited.

A total of 848 diagnoses were made in the 744 patients who underwent all diagnostic tests requested. The most-frequent diagnosis was diarrhea of infectious origin (confirmed and probable) (36.5% [307/842]), of which 13.0% (40/307) were parasitic in origin, 11.1% (34/307) bacterial, and 75.6% (232/307) of unknown origin. Analysis of diagnoses according to the reason for traveling showed that diarrhea was the most-frequent diagnosis in tourists, aid workers and business travelers, followed by non-infectious diseases. In VFRs, the most-frequent diagnoses were non-infectious diseases (20.7% [12/58]), diarrhea of infectious origin (19.0% [11/58]), together with malaria (17.2% [10/58]), which accounted for no more than 5% of diagnoses in all other groups (Table 2). HIV serostatus of the patients was unknown, and of all tests performed by medical indication none were positive.

Table 3 shows the most frequent diagnoses according to the reason for consultation. In patients consulting for fever, the most-frequent diagnosis was an arbovirus (dengue (n = 31) and Chikungunya (n = 1), 16.5% [32/194]), with malaria representing only 10.3% (20/194) of total fever consultations.

At least one risk behavior was reported by 82.6% (587/711) of travelers. The most-frequent risk behaviors were the consumption of non-bottled water and local dairy products, contact with soil or mud, and with fresh water from rivers or lakes. Table 4 shows the percentage of travelers reporting each risk behavior according to the length of the trip, with all percentages increasing in tandem with longer travel time. There were no significant differences when risk behaviors were analysed according to the reason for traveling.

Variables associated with one or more risk behaviors in the bivariate analysis and therefore included in the multivariate logistic regression model were age and length of the trip. Likewise, the variable *reason for traveling* was included because some studies suggest it plays a role in increasing risk behavior in travelers. In the multivariate analysis, the variable *length of the trip* had the closest association with risk behaviors. People who traveled for 1-6 months had a 3-fold higher likelihood of experiencing risk behavior than those traveling for < 1 month (OR 2.99, 95% CI: 1.54 to 5.81, P = 0.001) and those who traveled for > 6 months had a 13-fold higher likelihood (OR 13.20, 95% CI: 3.11 to 56.14, P <0.001). Travelers for business reasons were less likely to have risky behaviors than tourists (aOR 0.52, 95% CI: 0.29 to 0.93; p = 0.028), while no significant associations were found for other categories of the variable *reason for traveling*. There was a non-significant trend toward less risk behaviors with age, especially in people aged > 50 years (Table 5).

Sex, geographic region visited, reason for traveling and receiving pre-travel advice were not associated with risk behaviors (Table 5).

DISCUSSION

We determined the characteristics of travelers consulting a Tropical Medicine Clinic and the factors associated with risk behavior during traveling. The results show that the percentage of travelers receiving pre-travel advice was slightly higher than in other studies [14,20-23], while the percentage receiving malaria chemoprophylaxis was similar to that of other reports [8,16,23,27]. These percentages were lower among VFRs, as found by other authors [15-18,27]. This is particularly relevant if we consider that the main destination for travelers of this type is Sub-Saharan Africa, where malaria is endemic. On the other hand, it seems that VFRs receiving chemoprophylaxis complete it in similar proportions to tourists.

The low perception of risk among VFRs, shown by the smaller number seeking medical advice, is one of the main factors in the increased risk of disease in this group. As previously reported [14-18], we also observed a higher proportion of cases of malaria among VFRs compared with other groups. Studies suggest that other factors influencing increased susceptibility in VFRs may include the wide age-range (including infants and the elderly, who are more susceptible to illness) and living in the same conditions as the local population in the countries of origin visited [28-31].

Conversely, we did not find that VFRs had more risk behaviors than other groups of travelers for the variables studied. However, we did not study the use of mosquito nets or mosquito repellent, which are the malaria-related behaviors. A possible explanation could be that, living in developed countries, VFRs acquire hygienic and alimentary habits that place them in the same situation as other groups of travelers with respect to risk behaviors. However, the small number of VFRs in the study population hinders results' interpretation.

Independently of the reason for traveling, more than 80% of travelers reported one or more risk behaviors during the trip, a percentage similar to other studies [19]. However, this percentage could be higher, because we haven't taken into account other risk behaviours such as the consumption of salads or uncooked vegetables, as it was not registered in the clinical records of the patients. Moreover, we have to take into account that adopting non-risky behaviours does not always mean having no risk. An example would be drinking bottled water, that sometimes may not be safe.

The length of the trip was the factor that most-influenced the presence of risk behaviors. People traveling for more than one month had a 3-fold higher likelihood of risk behavior, and those traveling for more than 6 months a 13-fold higher likelihood. This may reflect the difficulty of maintaining desirable behaviors that may require an effort over time. There was also a trend to less risk behavior with greater age, as reported by other studies [19,32], and in people traveling on business compared with tourists, possibly because business travelers have less leisure time and less contact with the local population.

Unexpectedly, receiving preventive advice before traveling had no effect on risk behavior. This could be due to the difficulty in changing behavior despite recommendations [33]. However, these results also suggest that preventive advice probably concentrates on vaccination and malaria prophylaxis, with less emphasis on advice about risk behavior.

We also found that dengue was the main cause of fever in the study population and not malaria, as reported by other studies [14,16,20,21]. A possible explanation is the steep rise in cases of Dengue fever in the last decade, especially in South and Southeast Asia, and the Pacific West (regions which accounted for almost 60% of the cases of Dengue fever found in this study), but also in South America [34-36].

Limitations

One limitation of the study is that patients attended by the Tropical Medicine Clinic may not be representative of all travelers to developing countries. Firstly, travelers without health problems are not represented, unless they attend for a check-up. Secondly, some travelers may consult their general practitioner, and if there is no referral to a specialist it is probably because any disease is mild and self-limiting. Therefore, in our population, travelers with mild disease are probably underrepresented, as are those who had diseases with a short incubation period that occurred during the trip.

CONCLUSIONS

The reason for traveling is an important factor in the decision to seek travel advice and take malaria prophylaxis. VFRs seem to have a lower perception of the risks of traveling to tropical areas. This underlines the importance of all travelers being aware of the risks they face and the need to seek medical advice.

Younger travelers and those making longer trips have a higher number of risk behaviors. Medical advice does not seem to influence risk behavior, and therefore new strategies of health promotion may be needed that place greater emphasis on healthy behaviors.

Authors' contributions

MA, AV and JM conceived the study. MA designed the study protocol which was reviewed by ALGB, AV and JM. JM, JG, EA and AB carried out the clinical assessment. MA carried out the analysis and interpretation of the data, and drafted the manuscript. ALGB and AV critically revised the manuscript for intellectual content. All

authors read and approved the final manuscript. MA and AV are the guarantors of the paper.

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Competing interests

The authors declare they have no conflicts of interest.

Ethical approval

The study procedures were in accordance with the ethical standards of the Helsinki Declaration and the protocol was approved by the Ethics Committee of the Hospital Clínic of Barcelona.

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TABLES

Table 1. Epidemiological characteristics of the study population according to the reason for traveling (N = 763) [a].

Variable	Tourism (n = 485)	Business (n = 122)	Aid work (n = 96)	VFRs (n = 45)	Others (n = 15)
Sex (n,% male)	209 (43.1)	74 (60.7)	28 (29.2)	19 (42.2)	2 (13.3)
Age (years)					
Mean	36.7	39.1	34.4	38.6	45.3
Standard deviation	11.6	10.2	13.8	11.9	11.8
Geographic region visited (n,%)					
Central America and Caribbean	73 (15.2)	17 (14)	17 (17.9)	5 (11.4)	0
South America	46 (9.6)	12 (9.9)	8 (8.4)	18 (40.9)	4 (30.8)
Mediterranean and Middle East	28 (5.8)	7 (5.8)	1 (1.1)	0	0
Sub-Saharan Africa	124 (25.9)	61 (50.4)	56 (58.9)	19 (43.2)	6 (46.2)
South-Central Asia	105 (21.9)	13 (10.7)	10 (10.5)	2 (4.5)	3 (23.1)
Southeast Asia	84 (17.5)	5 (4.1)	1 (1.1)	0	0
Other	5 (1)	2 (1.7)	0	0	0
More than one region	14 (2.9)	4 (3.3)	2.2.1.	0	0
Travel time (days)					
Median	20	33	60	32	37.5
Interquartile range	15 - 28	10 - 185	30 - 150	27 - 60	16,5 – 112,5
Time between end of trip and consultation (days)					
Median	12.5	9	14	14	14.5
Interquartile range	5 - 43	4 - 31	4 - 42	6 - 67	6,25 - 126
Advice to travelers (n,% yes)	310 (68.6)	68 (60.7)	71 (78)	7 (17.9)	6 (75)
Malaria prophylaxis (n,% yes)	129 (29.4)	29 (26.9)	44 (50.6)	4 (12.1)	3 (37.5)
Prophylaxis completed					
Yes	67 (62.6)	12 (50)	18 (48.6)	2 (66.7)	1 (50)
Still taking	16 (15)	7 (29.2)	3 (8.1%)	0	0
No	24 (22.4)	5 (20.8)	16 (43.2)	1 (33.3)	1 (50)

[a] Information on the reason for traveling was available in 763 of the 772 subjects included in the study.

Table 2. Distribution of etiologic diagnoses in travelers consulting a tropical medicine clinic according to the reason for traveling (N = 842).

Diagnosis	Tourism (n = 518)	Business (n = 138)	Aid work (n = 108)	VFRs (n = 58)	Others (n = 20)	TOTAL (N = 842) [a]
Parasitic diarrhea	23 (4.4)	7 (5.1)	9 (8.3)	1 (1.7)	0	40 (4.8)
Bacterial diarrhea	27 (5.2)	4 (2.9)	1 (0.9)	0	2 (10.0)	34 (4.0)
Other infectious diarrhea	1 (0.2)	0	0	0	0	1 (0.1)
Diarrhea of probable infectious origin	151 (29.2)	39 (28.3)	28 (25.9)	10 (17.2)	4 (20.0)	232 (27.6)
Malaria	7 (1.4)	6 (4.3)	2 (1.9)	10 (17.2)	1 (5.0)	26 (3.1)
Arboviruses	33 (6.4)	5 (3.6)	2 (1.9)	5 (8.6)	2 (10.0)	47 (5.6)
Typhoid fever / paratyphoid	1 (0.2)	1 (0.7)	1 (0.9)	0	0	3 (0.4)
Rickettsiosis	3 (0.6)	0	0	0	1 (5.0)	4 (0.5)
Chagas' disease	0	0	0	0	1 (5.0)	1 (0.1)
Intestinal nematodes	6 (1.2)	1 (0.7)	0	0	0	7 (0.8)
Other nematodes	9 (1.7)	2 (1.4)	2 (1.9)	0	0	13 (1.5)
Cestodes	0	2 (1.4)	0	1 (1.7)	1 (5.0)	4 (0.5)
Trematodes	3 (0.6)	2 (1.4)	0	2 (3.4)	0	7 (0.8)
Hepatitis	2 (0.4)	1 (0.7)	1 (0.9)	1 (1.7)	0	5 (0.6)
Respiratory tract infection	26 (5.0)	5 (3.6)	4 (3.7)	2 (3.4)	0	37 (4.4)
Pneumonia	9 (1.7)	2 (1.4)	2 (1.9)	0	0	13 (1.5)
Other viral infections	23 (4.4)	6 (4.3)	2 (1.9)	2 (3.4)	1 (5.0)	34 (4.0)
H. pylori infection	10 (1.9)	3 (2.2)	3 (2.8)	2 (3.4)	2 (10.0)	20 (2.4)
Bacterial skin infection	16 (3.1)	1 (0.7)	1 (0.9)	2 (3.4)	0	20 (2.4)
Superficial mycoses	2 (0.4)	2 (1.4)	1 (0.9)	0	0	5 (0.6)
Ectoparasites	5 (1.0)	2 (1.4)	1 (0.9)	0	0	8 (1.0)
Insect bite	23 (4.4)	5 (3.6)	3 (2.8)	1 (1.7)	0	32 (3.8)
Animal bite	7 (1.4)	1 (0.7)	0	1 (1.7)	0	9 (1.1)
Fever of unknown origin	27 (5.2)	2 (1.4)	2 (1.9)	1 (1.7)	0	32 (3.8)
Eosinophilia of unknown origin	2 (0.4)	1 (0.7)	0	0	0	3 (0.4)
No pathology	40 (7.7)	17 (12.3)	20 (18.5)	1 (1.7)	2 (10.0)	80 (9.5)
Other infectious diseases	5 (1.0)	4 (2.9)	0	4 (6.9)	0	13 (1.5)
Other non-infectious diseases	57 (11.0)	17 (12.3)	23 (21.3)	12 (20.7)	3 (15.0)	112 (13.3)

[a] Information on the reason for travelling was available for 842 of the 848 diagnoses.

Table 3. Most frequent diagnoses according to the reason for consultation in travelers attended by a tropical medicine clinic (N = 843) [a].

	Cases	
	n	%
Fever (n = 194)		
Arboviruses	32	16.5
Other viral infections	28	14.4
Fever of unknown origin	27	13.9
Respiratory tract infection	27	13.9
Diarrhea caused by infection (confirmed/probable)	22	11.3
Malaria	20	10.3
Diarrhea (n = 304)		
Diarrhea of probable infectious origin	193	63.5
Parasitic diarrhea	32	10.5
Bacterial diarrhea	30	9.9
Skin lesions (n = 120)		
Non-infectious diseases	35	29.2
Insect bite	29	24.2
Bacterial skin infection	16	13.3
Non-intestinal nematodes	10	8.3
Eosinophilia (n = 5)		
Eosinophilia of unknown cause	3	60.0
Non-infectious diseases	1	20.0
Intestinal nematodes	1	20.0
Other (n = 126)		
Non-infectious diseases	44	34.9
Diarrhea of infectious origin (confirmed/probable)	9	7.1
Arboviruses	9	7.1
No pathology	9	7.1
Asymptomatic check-up (n = 94)		
No pathology	72	76.6
Non-infectious disease	7	7.4
Dengue during travel	4	4.3
Malaria during travel	3	3.2

[a] Information on the reason for consultation was available in 843 of the 848 diagnoses.

Table 4. Percentage of travelers presenting each risk behaviour according to the length of the trip (N = 695).

Risk behavior	≤ 30 days (n = 491)	31-179 days (n = 126)	≥ 180 days (n = 78)	TOTAL [a] (N = 695) [b]	p-value (Fischer)
Consumption of non- bottled water or ice	232 (47.3)	87 (69.3)	63 (80.8)	382 (55.0)	<0.001
Consumption of local dairy products	141 (28.9)	59 (47.2)	46 (59.0)	246 (35.6)	<0.001
Consumption of raw or undercooked meat	39 (8.0)	7 (5.6)	20 (25.6)	66 (9.6)	<0.001
Consumption of raw or marinated fish	68 (14.0)	22 (17.6)	27 (34.6)	117 (17.0)	0.001
Contact with fresh river/lake water	112 (23.1)	49 (39.2)	40 (51.9)	201 (29.3)	<0.001
Risk sex	11 (2.4)	9 (7.4)	12 (15.8)	32 (4.8)	<0.001
Blood transfusions	1 (0.2)	1 (0.8)	1 (1.3)	3 (0.4)	NS
Injections with non-disposable material	14 (2.9)	6 (4.8)	13 (16.9)	33 (4.8)	<0.001
Contact with soil or mud	154 (31.8)	66 (52.8)	45 (59.2)	265 (38.6)	<0.001

[a] Percentage of total travelers who presented each risk behavior. These percentages do not total 100% as a single traveler may report more than one risk behavior.

[b] Information on travel time and risk behavior was available in 695 of all nonimmigrant travelers (772).

NS. Non-significant.

Table 5. Bivariate and multivariate analysis of factors associated with having presented at least one risk behavior during the trip.

	n	Risk Behaviors [a] One or more (n, %)	Crude OR	95% CI	p-value [b]	Adjusted OR [c]	95%CI	p-value [b]
Sex								
Male	303	247 (81.5)	1	-				
Female	403	336 (83.4)	1.14	(0.77-1.68)	0.520			
Age								
≤ 35 years	397	340 (85.6)	1	-		1	-	
36-49 years	204	164 (80.4)	0.69	(0.44-1.07)	0.029	0.82	(0.51-1.32)	0.263
≥ 50 years	105	79 (75.2)	0.51	(0.3-0.86)		0.64	(0.37-1.10)	
Geographic region visited								
Central America-Caribbean	104	87 (83.7)	1	-				
South America	79	72 (91.1)	2.01	(0.79-5.11)				
Mediterranean- Middle East	33	25 (75.8)	0.61	(0.24-1.58)				
Sub-Saharan Africa	246	201 (81.7)	0.87	(0.47-1.61)	0.289			
South-Central Asia	127	105 (82.7)	0.93	(0.47-1.87)				
Southeast Asia	84	63 (75.0)	0.59	(0.29-1.20)				
Other	7	5 (71.4)	0.49	(0.09-2.73)				
More than one region	19	19 (100.0)	-	-				
Duration of trip								
≤ 30 days	490	383 (78.2)	1	-		1	-	
31-179 days	126	114 (90.5)	2.65	(1.41-5.00)	<0.001	2.99	(1.54-5.81)	<0.001
≥ 180 days	78	76 (97.4)	10.62	(2.57-43.93)		13.20	(3.11-56.14)	
Reason for traveling								
Tourism	462	382 (82.7)	1	-		1	-	
Business	110	88 (80.0)	0.84	(0.50-1.42)		0.52	(0.29-0.93)	
Aid work	92	80 (87.0)	1.40	(0.73-2.68)	0.698	0.78	(0.39-1.57)	0.217
VFR	29	25 (78.1)	0.75	(0.31-1.79)		0.57	(0.23-1.42)	
Others	10	8 (80.0)	0.84	(0.18-4.02)		0.59	(0.11-3.06)	
Advice to travelers								
Yes	443	366 (82.6)	1	-	0.779			
Not	219	179 (81.7)	0.94	(0.62-1.44)				

[a] Includes the consumption of non-bottled water, local dairy products, undercooked or raw meat or fish, exposure to fresh water in lakes and rivers, with earth or mud and unsafe sex.

[b] P value calculated by the Wald test.

[c] ORs adjusted for the variables age, duration and reason for trip. 694 subjects included in the multivariate analysis.

FIGURE CAPTIONS

Figure 1. Geographical distribution of the regions visited by travelers (N = 759) [a].

Footnote: [a] Information on the geographic region visited was available in 759 of the 772 subjects included in the study.

Figure 2. Distribution of the reason for consultation in travelers attending a tropical medicine clinic according to geographic area visited (N = 756) [a].

Footnote: [a] Information on the geographic region visited and the reason for consultation was available in 756 of the 772 subjects included in the study.

Figure 1.

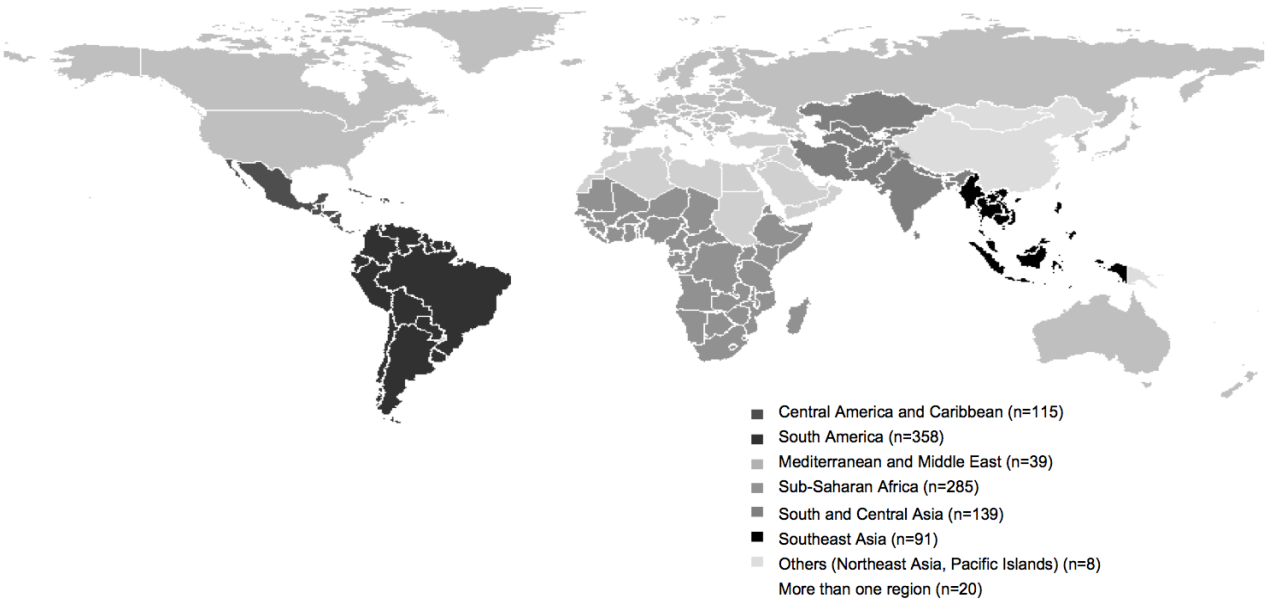
Central America and Caribbean (n=115)
South America (n=358)
Mediterranean and Middle East (n=39)
Sub-Saharan Africa (n=285)
South and Central Asia (n=139)
Southeast Asia (n=91)
Others (Northeast Asia, Pacific Islands) (n=8)
More than one region (n=20)

Figure 2.

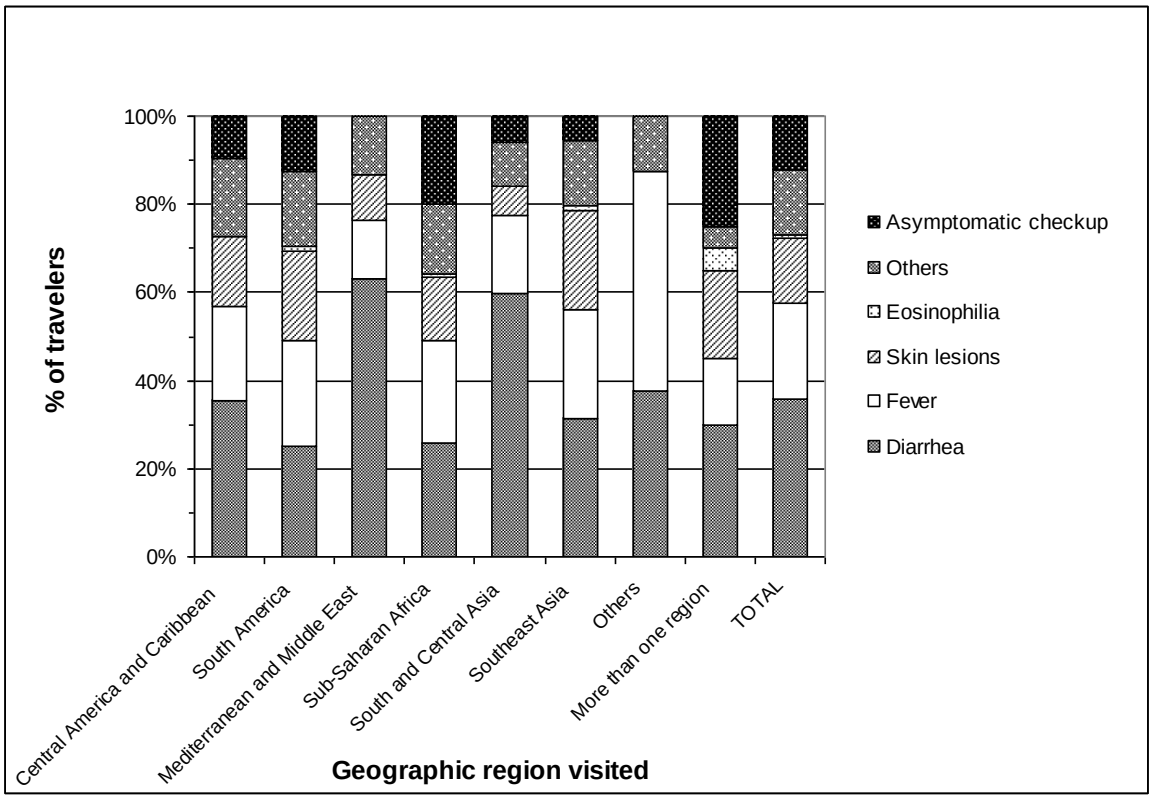
100%
80%
60%
40%
20%
0%
% of travelers
Asymptomatic checkup
Others
Eosinophilia
Skin lesions
Fever
Diarrhea
Central America and Caribbean
South America
Mediterranean and Middle East
Sub-Saharan Africa
South and Central Asia
Southeast Asia
Others
More than one region
TOTAL
Geographic region visited

Figure 1
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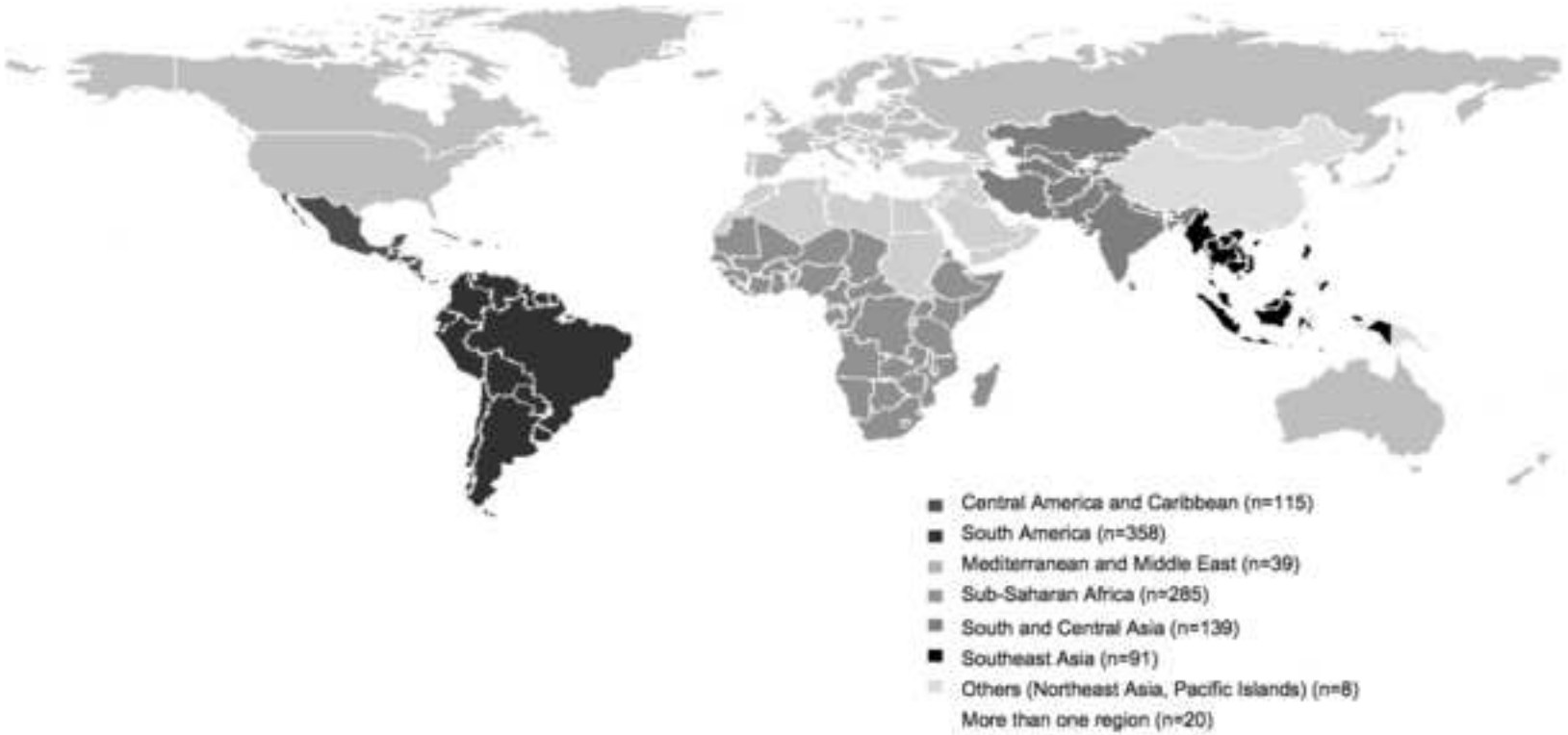

Figure 2
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