Identikit of the Umbrian traveller: analysis of clinical activity in a travel medicine unit, Italy

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Abstract
A travel medicine clinic is the proper medical centre aimed to provide updated recommendations before any journey. The study aim was to assess the number of accesses during 2016 at the Travel Medicine Clinic of the Local Health Unit in the Umbria Region. An electronic *ad hoc* database was developed. Paper-based data referring to 2016 were recorded in this electronic registry, developed on Microsoft Office Access®. In 2016, 891 subjects came in our clinic in order to get information before travelling. In our sample, 53.3% were male and the mean age was 35.33 years ± 0.58. Almost half had a higher education, and 20% were foreign. Vaccines against food- and water-borne diseases were the most frequently administered. Approximately, 74% of the attenders were suggested to do an anti-malaria prophylaxis (Mefloquine in one-half, approximately). Every traveller received a pre-travel counselling. Performance activity of our clinic and the adherence to preventive protocols in case of international travels, have been assessed.

INTRODUCTION

Over time, the rapid circulation of people and the low cost of travelling are increasing the chances of travelling. In particular, according to the World Economic Outlook of October 2017 by the International Monetary Fund, the improvement of economic conditions plays a role in increasing both the business and leisure travels [1]. World Tourism Organization data have shown a growth in the number of international travels with 1,237 million in 2016 and an estimated increase between +3/+4% for 2017 [2]. However, international travels can represent a potential health risk depending on the duration, type of travel, destination and health status. Health risks associated to travelling are both infective and traumatic [3] including poisoning [4]. Actually, accident is the first cause of death among travellers, whilst infectious diseases, contracted while travelling, could represent a risk of disease spread also in the country of origin. This is particularly true considering both incubation and emerging/re-emerging of new diseases, such as Ebola [5], Zika [6] or Plague [7]. In the majority of cases, these risks are behaviour related and preventable. Prevention could be obtained both reducing the exposure to risk factors and through vaccination.

Periodically, WHO provides and updates data on the distribution of the diseases in the world and, simultaneously, the countries where the vaccine against yellow fever is mandatory, as well as all the vaccinations recommended for each country [8].

A travel medicine clinic is the proper medical centre aimed to provide updated recommendations before any journey. According to WHO guidelines, medical consultation before travelling must identify any possible traveller's health need related to the destination and duration of the journey. In particular it should provide vaccination recommendations and anti-malaria prophylaxis. The physician, with the travellers, should investigate the sanitation conditions of the destination and empower the travellers on how to best protect themselves from the risk of acquiring diseases. Moreover, vaccination schedules should be tailored according to the immunization status, destination and type of the journey.

In Italy, the National Institute of Statistics (Istat) estimates that the trips made by Italian citizens amounted to about 66 million, in 2016 [9]. In 17.2% of the cases, trips were in foreign countries. Looking at the extra-European destinations, United States, Tunisia and China were the most visited countries in 2016 [9].

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Analysing the travel reasons, 90% of all trips took place for holidays while 10% for business. Nevertheless, trips abroad are carried out mainly for cultural, monumental and archaeological reasons (30.6%) [9].

We analysed data of the Travel Medicine Clinic of the Local Health Unit 1 (LHU) in Umbria Region, authorized by Ministry of Health. In particular, the study aim was to assess the number and type of accesses during the year 2016. Moreover, travellers' demographics characteristics, travel and health information were collected.

METHODS

Travel medicine clinic LHU1, located in Perugia, provides medical advices and vaccination counselling before travelling for a catchment area of 497 381 people. During the consultation, the physician collects information related both to the travel and the individual, regarding immunization status, health condition, and pharmacological history. In particular: i) demographic characteristics (age, sex, educational level, job and country of origin); ii) travel information (date of departure, duration, destination, purpose, type of accommodation); iii) health history (chronic diseases if any, allergies, adverse events associated to food, antibiotics or other vaccines, pregnancy, breastfeeding and pharmacological therapy); iv) immunization status (vaccination performed in the past). Moreover, the physician provides information related to the most important health risks associated to the travel. In particular, specific factors are taken in account such as destination, duration of travel, purpose of travel, level of sanitation in the accommodation area and health status of subjects, according to WHO recommendations. Informative sheets on vector-borne diseases, such as food- and water-borne diseases are offered to all the travellers. Different types of anti-malaria prophylaxis, if needed, are discussed with the subjects. Until this study, all the data were collected on paper. We then developed an electronic database, which has been designed and organized *ad hoc*. Paper-based data referring to 2016 were recorded in this electronic registry, developed on Microsoft Office Access®. Statistical analysis was performed using STATA SE/12®. In order to facilitate the occupational comparability, we classified our sample according to the International Standard Classification of Occupations 2008 (ISCO-08). In Italy, there are no national data related to travellers: that means no information available on total people who go on a journey per year. Due to the absence of an established denominator, we calculated the rate of access considering the inhabitants, disaggregated for age class and gender, living in catchment area of our clinic. In order to evaluate the yellow fever vaccination adherence, according to the WHO country list, we considered as countries with required vaccination certificate the following [8]: Angola, Benin Burkina Faso, Cameroon, Congo, Democratic Republic of the Congo, Côte D'Ivoire, French Guiana, Gabon, Ghana, Guinea Bissau, Liberia, Mali, Niger, Rwanda, Central African Republic, Sao Tome, Togo.

RESULTS

During the time period from 1st January 2016 to 31st December 2016, 891 subjects came to our travel medi-cine clinic in order to get information before travelling. In our sample, 53.3% were male and the mean age was 35.33 years ± 0.58. *Supplementary material 1 (available online)* shows socio-demographic characteristics of the individuals. *Supplementary material 2 (available online)* represents access rate x 1,000 inhabitants, according to age and gender. Almost half (48.2%) of the subjects were either graduated or took a postgraduate licence (higher education). In our sample, 179 people out of 891 had at least one chronic disease and the most frequent was cardio-vascular disease (62 travellers, data not shown). Twenty percent of the people were foreign. Ivory Coast, Cameroon and Nigeria were the most common countries of origins among the foreign travellers attending our clinic, in 2016. *Figure 1* details the countries of origin, while *Supplementary material 3 (available online)* specifies the travel reasons. Actually, the first three reasons are tourism, business and visiting friends and relatives, respectively in 29.41%, 18.07% and 17.06% of cases. Other characteristics of journeys are shown in *Supplementary material 4 (available online)*. *Table 1* shows the type of vaccination and the respective dosage, according to the vaccine schedules. Moreover, we performed 214 yellow fever vaccines in people travelling to destinations with no requirement of yellow fever vaccination certificate. Approximately, 74% of the attenders were suggested to do an anti-malaria prophylaxis. Looking at the chemoprophylaxis, in the majority of cases (47.9%), travellers preferred Mefloquine, followed by Atovaquone-Proguanil (11.7%). However in the 21.4% only a behavioural prophylaxis was suggested and in 10.2% both behavioural and auto medication (data not shown). The highest flow of people attending the clinic, as expected, was during the summer (May, June and July) and before the Christmas period (December), with a mean access of 97 people per month, compared to 63 people/month during the remaining months (data not shown).

DISCUSSION

In this retrospective study, we present data available at the Travel Medicine Clinic in LHU Umbria 1, Perugia. Data presented in this paper display the picture of travellers attending the travel medicine clinic and the activity performance of the clinic. In our study, the regular users are young people, male, and with higher education. Moreover, we moved paper-based data to a more efficient electronic archive. About 20% of our population is foreign, in accordance with previous studies, also conducted in Italy [10, 11]. Approximately 49% of attenders were 21-40 years old. These data are in line with the previous publication referred to the Italian population [9]. Actually, people aged 21-60 years were also the users with the highest number of accesses per year. Among 66 users who attended the clinic twice during 2016, 49 were 21-60 years. More in detail, 24 subjects were aged 21-40 years, while 25 were aged 41-60 years. Regarding the health status, the majority of travellers were healthy, however approximately 20% had at least one chronic disease, whilst 3.5% had an allergy and 2 women were pregnant. The average length of stay was 58.06 days. Students, Professionals
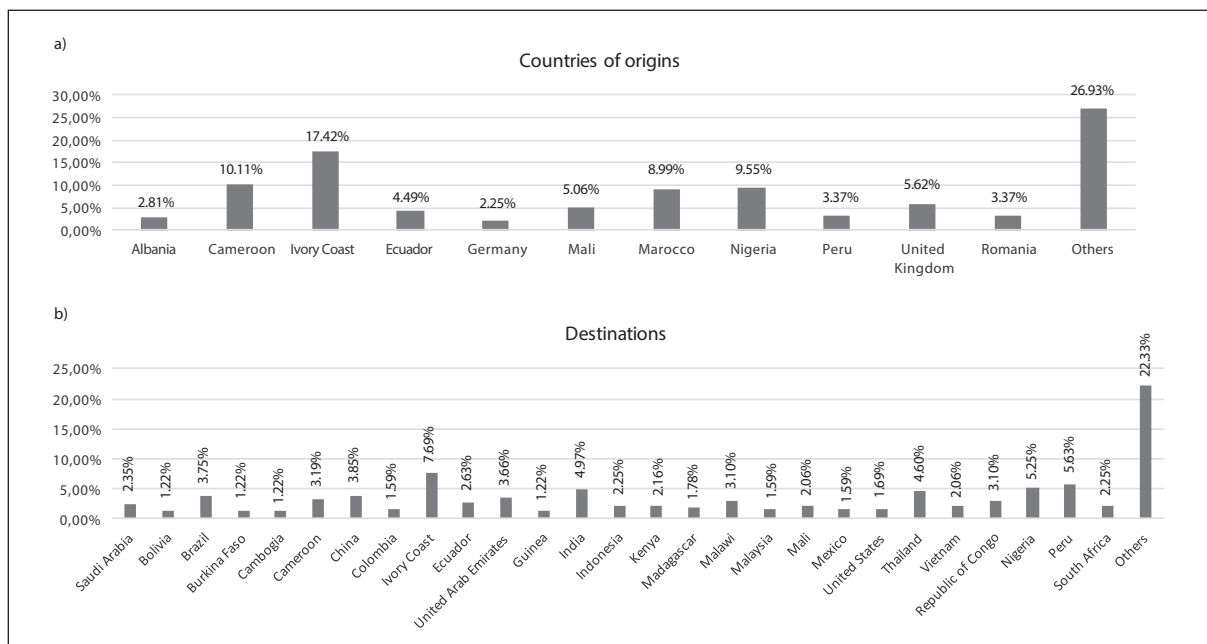
Figure 1
a) Countries of origins of travellers attending the Travel medicine clinic LHU1, Perugia. The figure shows the most common countries among the 178 foreigner travellers, in 2016.
b) Countries of destination.

and Agricultural, Forestry, Fishery and Craft workers were the categories of workers who spent more time abroad. In particular, 53 students stayed abroad more than one month, as well as 35 Professionals and 25 of the Agricultural, Forestry, Fishery and Craft workers. Furthermore, the same three groups are those who came to the travel clinic earlier, related to the date of departure: 61 students, 45 professionals and 32 among agricultural, forestry, fishery and craft workers consulted the clinic at least 30 days before the departure. In our analysis, people attended the travel clinic 38 days before the departure, according with the WHO recommendation that suggests the consultation 4-8 weeks before any journey. Ivory Coast, Peru, Nigeria and Thailand are the preferred destinations. In addition, China and Brazil are chosen respectively in the 3.85% and 3.75% of our travellers. These results are slighting different compared to the national data, where China, Tunisia and United States are the three preferred countries among Italian people [9]. Comparing the travel's

Table 1
Vaccines' injections and appropriate dosage according to schedules

Vaccine	Dosage				
	1st dose	2nd dose	3rd dose	4th dose	5th dose
HAV	516	118	5		
HAV + HBV	56	46	30		
HBV	29	15	15	3	
Yellow fever	325	11			
Rabies	15	11	10	5	3
Men B	18	14			
Men C	2				
Men ACWY	207	6			
Japanese encephalitis	3	3			
Typhus (oral)	560	65	17	6	1
Typhus (i.m.)	10	1			
Cholera	568	26	4		
Diphtheria-Tetanus	143	9	3		
Poliomyelitis	34	3	3	3	

reasons obtained in our study with Istat data, we also confirm the prevalence of travels due to tourism, followed by business [9].

In May 2014, the WHO's Strategic Advisory Group of Experts on immunization stated the life-long protection of one dose of yellow fever vaccine. However, the legal application of this amendment was on 11 July 2016. After this, we stopped performing the booster doses of yellow fever vaccine every 10 years. Actually, our immunization data reflect this change, with only 11 doses of yellow fever booster performed before July 2016 [12]. Among the destinations chosen by our travellers, even though 214 did not have the requirement for yellow fever vaccination, travellers accepted the yellow fever vaccine. In particular, travellers directed to Peru (32 subjects, 14.95%), Brazil (28 people, 13.08%) and Niger (28 subjects, 13.08%) performed the vaccine.

Regarding Malaria, in Italy approximately 2/3 of imported cases occurred among immigrants visiting friends and relatives [13, 14]. Often, immigrants underestimated the risk of malaria infection during travels in their own countries, especially in Africa [15]. In order to prevent imported cases, we suggested a prophylaxis in more than 70% of our sample. During the counselling, we stressed the importance to combine chemoprophylaxis with personal protective measures due to the fact that antimalarial drugs do not guarantee 100% protection. Even though malaria prevention is country-specific, also the drugs interactions and the patients' preference need to be taken into account. The majority of travellers in our sample preferred Mefloquine, in contrast with a previous study, where the preferred drug was Atovaquone-Proguanil [10]. Probably this difference could be due to the longer average length of stay: in the study performed by Troiano et al. the average length of stay was 36.17 days compared to our study, where it was 58.06 days [10]. According to the Centers for Disease Control and Prevention (CDC), Mefloquine should be preferred for long trips. In our case, people favoured a weekly drug assumption instead of a daily one. Moreover, Mefloquine is the cheapest alternative, especially if compared to Atovaquone-Proguanil. On the other hand, Doxycycline was not the first choice probably because in the majority of the cases travellers had planned a sun exposure, and this drug can increase the risk of sun sensitivity; moreover Doxycycline cannot be prescribed in children and needs to be taken daily for 4 weeks after returning home.

CONCLUSION

In conclusion, our results present data on the sociodemographic characteristics of Umbrian travellers, information about the destinations and type of journeys. This analysis allowed to assess the performance activity of our clinic, and to measure the adherence to the preventive protocol in case of international travels. The high number of yellow fever vaccines performed in travellers without compulsory indication, suggests the importance of the travel medicine clinic. In particular, these data highlight the central role played by the counselling for immunization and for all the behavioural prophylaxis. Nevertheless, some issues have to be taken into account when interpreting these results. Actually, due to the absence of an established denominator (total number of travellers), we could not estimate the realistic impact of our clinical activity.

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BRIEF NOTES