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Prophylaxis of infectious diseases among Polish population travelling abroad

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Abstract

Introduction and purpose of the study: With the gradual increase in travel, new challenges are arising in the health sector, especially with regard to infectious diseases. Growing number of Poles choose countries on other continents as their holiday destination. The aim of this study was to examine the health behaviour of Poles in relation to their travel destinations within Europe, Asia and Africa. Of particular importance were pre-travel consultations, awareness of recommended and mandatory vaccinations and malaria prevention.

Material and method: The study was based on an analysis of data from a specially constructed, online questionnaire. It was completed by 237 people. Pearson's $\chi 2$ test, T-student and ANOVA were used to analyse the survey results. The processing of the data obtained, statistical calculations and graphs were performed using the R programme.

Results and conclusions: Travellers to Asian or African countries were significantly more likely to seek information on the infectious diseases their travel destination was at risk of than travellers to European countries. In addition, recommended vaccinations were significantly more frequently administered prior to travelling to Africa or Asia than before travelling within Europe. No statistically significant differences were found between travellers to Asia or Africa in terms of seeking information on the infectious diseases, having a pre-travel consultation or being administered recommended vaccinations. With regards to malaria-prone regions, travellers to Africa were more than twice as likely to take antimalarial drugs than travellers to Asia. Mandatory vaccinations were significantly more common than recommended vaccinations, although despite the obligation some travellers still chose not to receive them.

Keywords: Travel medicine; International travel; Immunization; Vaccination; Malaria prophylaxis

Introduction

In the first three months of 2023, an estimated 235 million people traveled abroad, with international arrivals reaching 80% of pre-pandemic levels. [1] Poles perform above average in willingness to travel, with as many as 77% saying they will travel during the summer months. It is estimated that nearly 9 million Poles plan to travel abroad. [2] Although the most popular travel destinations still consist mostly of countries within the old continent, as many as 12% of those surveyed plan to travel outside Europe. [3] The biggest motivation for traveling is the belief that it has a positive effect on mood and well-being. [4] The positive impact of travel on mental health has been repeatedly proven by scientific research, not only does it reduce depression and anxiety, [5] but also results in increased life satisfaction. [6] With the increase in travelers, however, new healthcare challenges arise.

Depending on the destination chosen, 22 to 64% of travelers report some illness; most of them are mild and self-limited, such as diarrhea, respiratory infections, and skin disorders. [7] Almost 20 percent of them remained ill after their return home, and 10 percent sought medical care for their illnesses. [8] Some travelers however develop life-threatening conditions, which could have been avoided with proper pretravel preparation. [9]

In order to prevent infectious diseases, it is recommended that travelers see a doctor before a planned trip. Pre-travel consultations are designed to assess the risk of a number of diseases, inform about these risks, and then provide individualized recommendations and interventions to prevent them.[10] Advising the traveler about vaccine-preventable diseases is a cornerstone of the pre- travel consultation. [11] A comprehensive pretravel medical consultation should include an individualized risk assessment; a review of immunizations; and a discussion of arthropod protective measures, malaria prophylaxis and other travel-related education. Although consulting a clinician is beneficial to patients at any time before international travel, pretravel visits should ideally occur at least six weeks before departure to maximize benefit of preventive measures.[9], [12] The correlation between lack of pre-travel consultation and the development of diseases such as malaria has been proven.[13] Despite this, up to 80% of travelers do not consult a doctor before a vacation. [7]

One of the most effective methods of preventing infectious diseases is vaccination. It is considered to be one of the greatest achievements of public health.[14] According to the Polish immunisation programme, people reaching the age of majority in 2023 should be vaccinated against tuberculosis, hepatitis B, diphtheria, tetanus, pertussis, polio, measles, mumps and rubella.[15] Furthermore vaccination against haemophilus influenza type B was

introduced to the compulsory vaccinations in 2007, against pneumococci in 2017 and against rotavirus from 2021.[16] This means that the Polish immunisation programme is fully in line with WHO recommendations, with the exception of the HPV vaccination, which in Poland remains recommended and free of charge, but is not mandatory. [17] In addition, in Poland, vaccinations against meningococcus, influenza, smallpox, hepatitis A and tick-borne encephalitis are among the recommended vaccinations. [18]

The mandatory Polish immunization program does not include some of the vaccinations recommended for foreign travel. Hepatitis A vaccination, as well as vaccination against rabies in some cases, is recommended when travelling to all European countries. Hepatitis A and typhoid vaccination is recommended for travel to all African countries. Moreover cholera, meningococcal, yellow fever and rabies vaccination is advised for travel to some African countries, with meningococcal and yellow fever vaccination being mandatory depending on the destination (with proof of vaccination necessary). Within Asia it is recommended to be vaccinated against hepatitis A, typhoid, cholera, poliomyelitis, yellow fever, rabies, Japanese encephalitis and tick-borne encephalitis depending on the country. Vaccination against yellow fever remains mandatory in Asia for travellers from disease-endemic regions. Furthermore it is compulsory for those going on pilgrimage to Saudi Arabia to be vaccinated again meningococcal infections. [19] [20] [21]

In case of transcontinental travel, malaria also remains another very significant health risk. It is the most frequently imported acute, life-treating, tropical disease in international travellers. [22] Although the malaria vaccine is not yet available to travellers [23] there are other methods of preventing infection consisting of a combination of mosquito avoidance measures and chemoprophylaxis. [24] To prevent contact with mosquitoes, travellers can use Environmental Protection Agency (EPA)-registered insect repellents, right clothing, mosquito nets, mosquito screens and insecticide (Pyrethroid) products. [25] Atovaquone–proguanil, doxycycline, chloroquine, mefloquine or tafenoquine are recommended as chemoprophylaxis for both short and long-term travelers. [26] [27]

Purpose of the study:

The aim of our study was to examine the health behaviour of Poles in relation to their travel destinations. Of particular importance were pre-travel consultations, awareness of

recommended and mandatory vaccinations and malaria prevention. The survey examined travel across Europe, Africa and Asia.

Material and method:

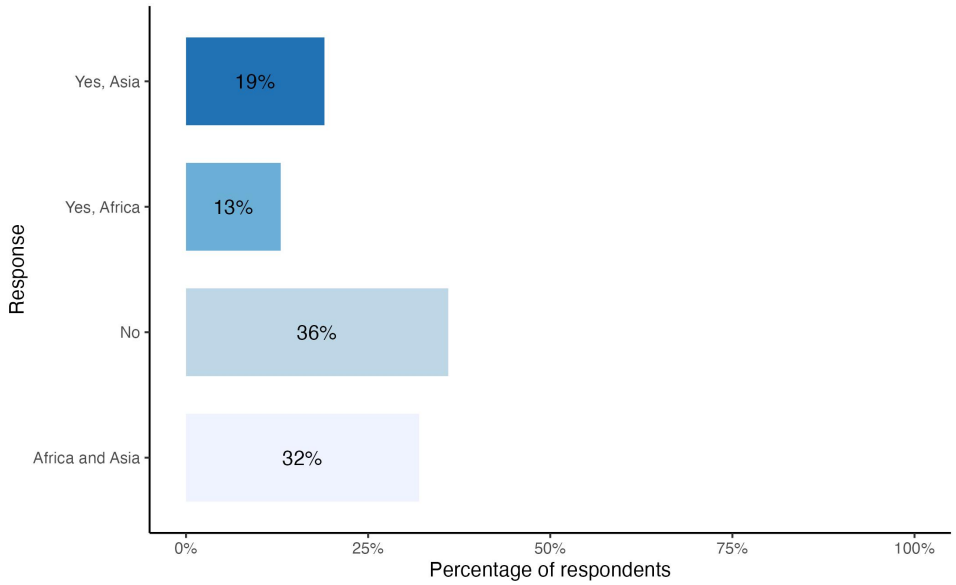
The study was based on an analysis of data from an original questionnaire distributed on social media groups for Polish travellers. The questionnaire included a respondent's particulars and questions on the prevention of infectious diseases before and during travels in Europe, Asia and Africa, with a separate sections for each continent. It was completed by 237 people.

Pearson's $\chi 2$ test, T-student and ANOVA were used to analyse the survey results. The processing of the data obtained, statistical calculations and graphs were performed using the R programme.

Results

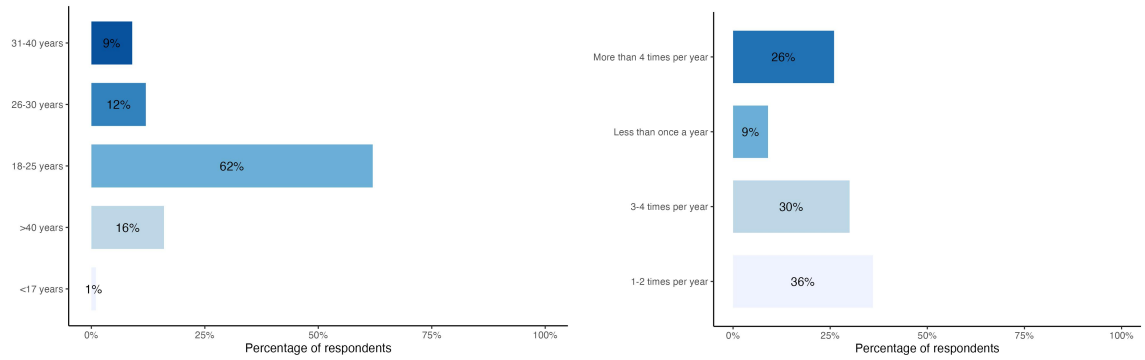
A total of 175 women participated in the study, which makes 75.1% of the respondents. 98.7% of the surveyed had been vaccinated with the mandatory vaccinations in Poland. 233 respondents (98.3%) had travelled outside Poland, with almost two thirds visiting countries in Africa, Asia or both continents.

Figure 1. Characteristics of the study group: travel to Asia or Africa.



The majority of survey participants were aged 18-25 years (61.6%). 216 respondents (91.1%) travelled more than once a year.

Figure 2;3. Characteristics of the study group: age and frequency of travel.



Analysis of the association between gender and age in relation to interest in prevention of infectious diseases

Respondents who had travelled within Europe were asked whether, prior to their trip, they had checked for recommended and mandatory vaccinations in the country they were planning to travel to. At the same time, they were asked whether they had sought medical advice on mandatory and recommended vaccinations before travelling. As many as 40% of women had checked for recommended and mandatory vaccinations before travelling, compared to 32% of men. Men, on the other hand, were more likely than women (25% of male respondents compared to 18% of female respondents) to have sought medical advice on this topic. In both cases, the analysis showed that there was no statistically significant correlation ($p > 0.05$) between gender and interest in preventing infectious diseases while travelling in Europe.

Figure 4. Checking recommended and mandatory vaccinations at travel destination within Europe by gender of respondents.

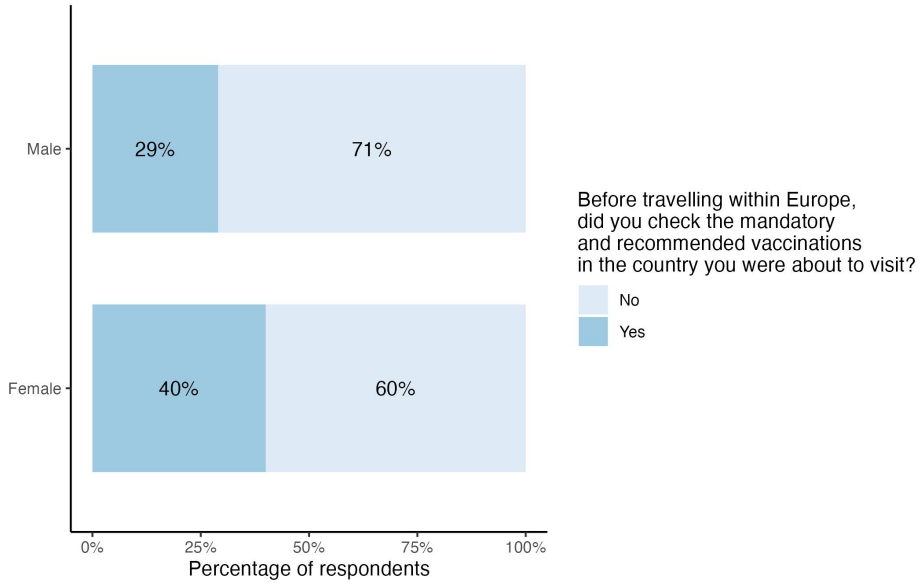
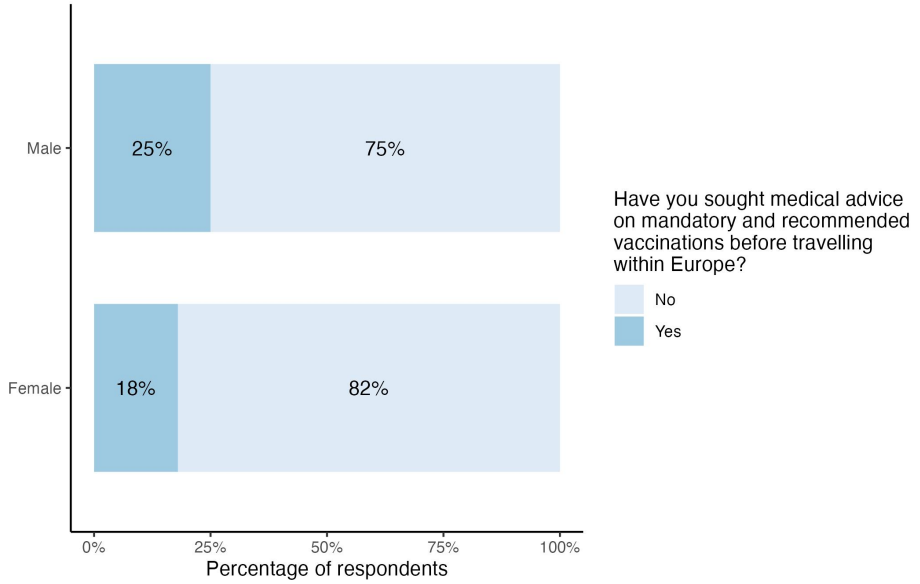


Figure 5. Seeking medical advice on recommended and mandatory vaccinations before traveling in Europe by gender of respondents.



When examining the correlation between age and interest in infectious disease prevention using the $\chi 2$ Pearson test, no correlation was found. For both the question on checking of recommended and mandatory vaccinations and the question on pre-travel consultation, respondents over 40 years of age showed the highest interest (due to the small sample size, it was decided not to include respondents <17 years of age).

Figure 6. Checking recommended and mandatory vaccinations at travel destination within Europe by age of respondents.

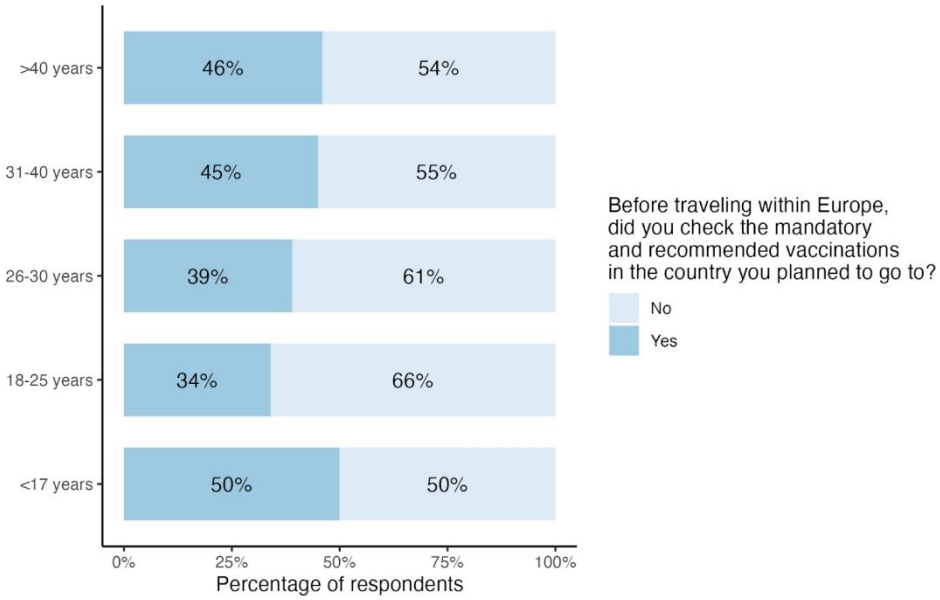
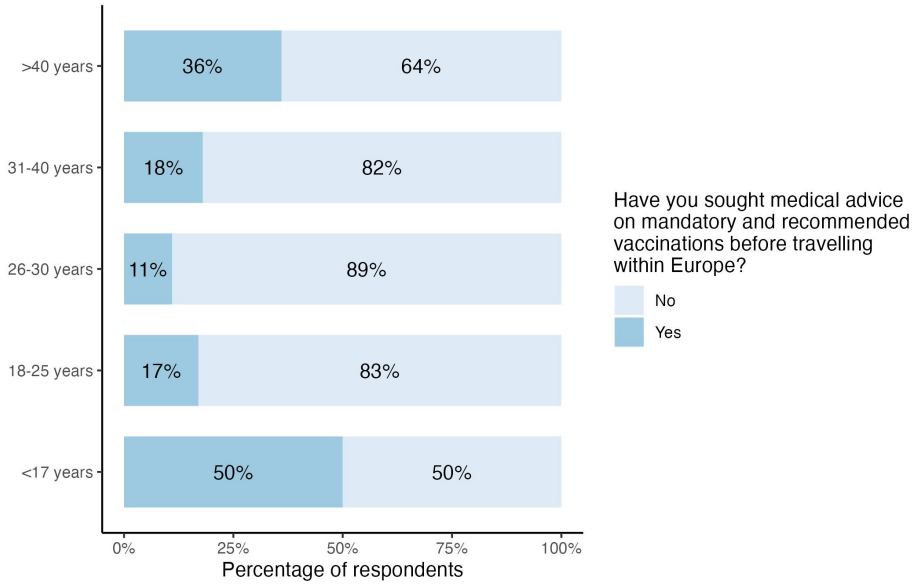


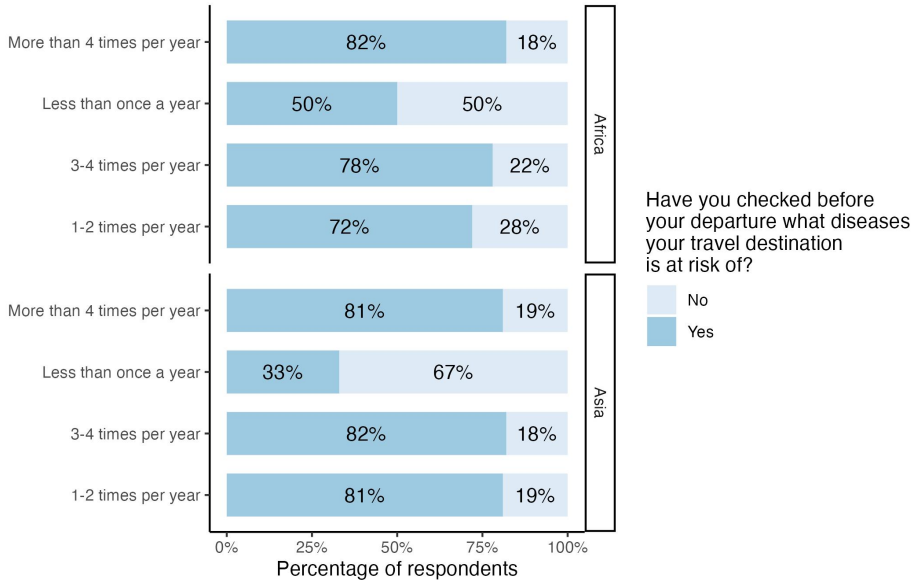
Figure 7. Seeking medical advice on recommended and mandatory vaccinations before traveling in Europe by age of respondents.



Impact of frequency of travel on the use of infectious disease prophylaxis

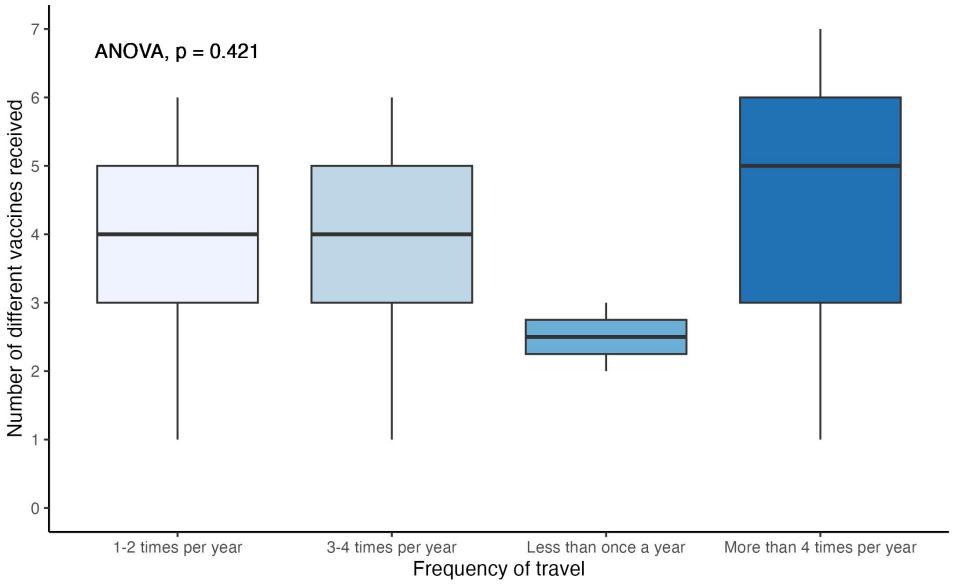
In the analysis performed, the Pearson $\chi 2$ test did not show a correlation between frequency of travel and checking which diseases a region is at risk of when travelling within Asia or Africa. It should be noted that travellers who travelled less than once a year were least likely to pay attention to this topic, but this was a small group of participants.

Figure 8. Checking what diseases the destination is at risk of before departure according to the number of trips taken per year.



There was also no association between frequency of travel and degree of vaccination against various diseases. The group of people who travelled less than once a year was excluded from the analysis due to the small number of participants.

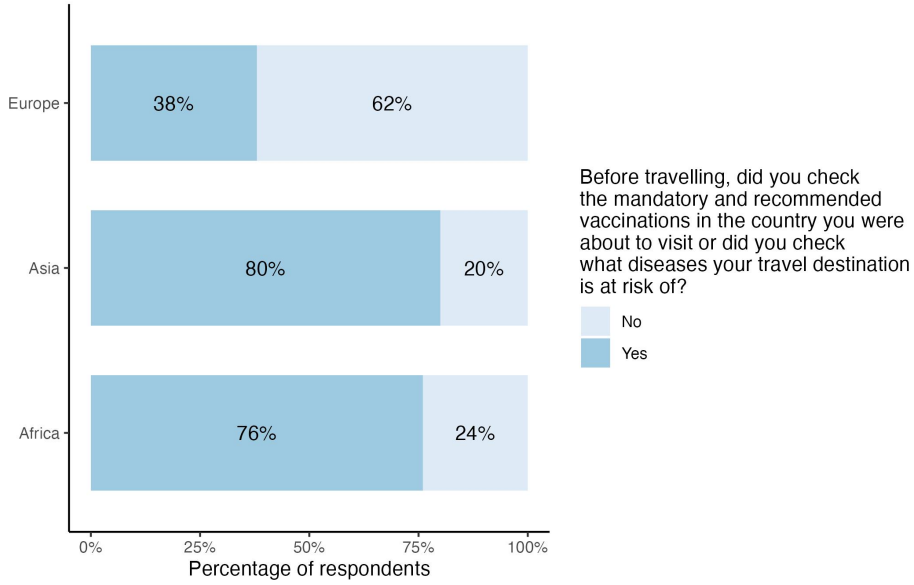
Figure 9. The number of vaccinations received against various diseases according to the number of trips taken per year.



Prevention of infectious diseases according to the continent chosen as destination

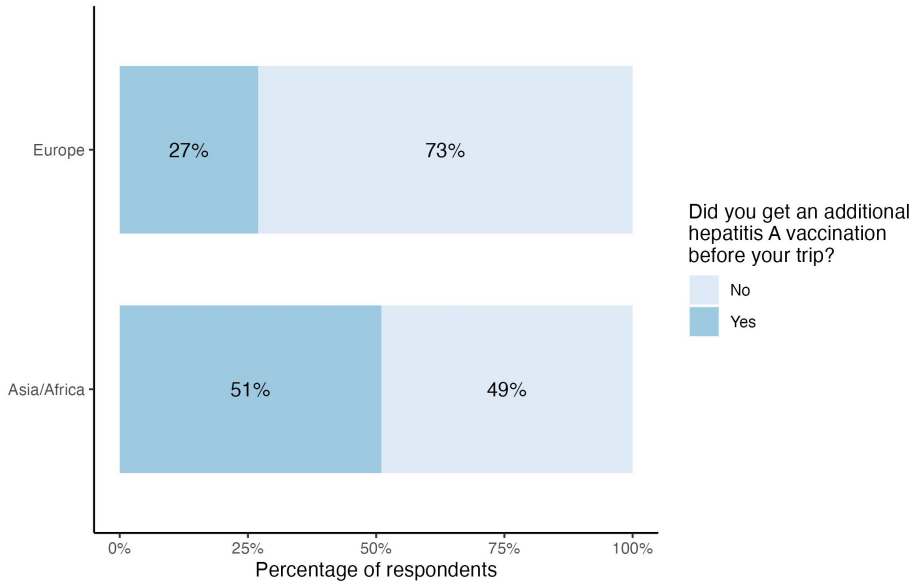
The respondents were divided into three groups: those who travelled to Europe, Asia and Africa. The correlation between checking for recommended and mandatory vaccinations in Europe and checking for diseases the travel destination on another continent was at risk of was examined. A statistically significant relationship was found. Respondents were significantly more likely to be interested in the topic of infectious diseases when travelling to another continent than when travelling within Europe.

Figure 10. Checking recommended and mandatory vaccinations or what diseases the travel destination is at risk of, depending on the continent the respondents traveled to.



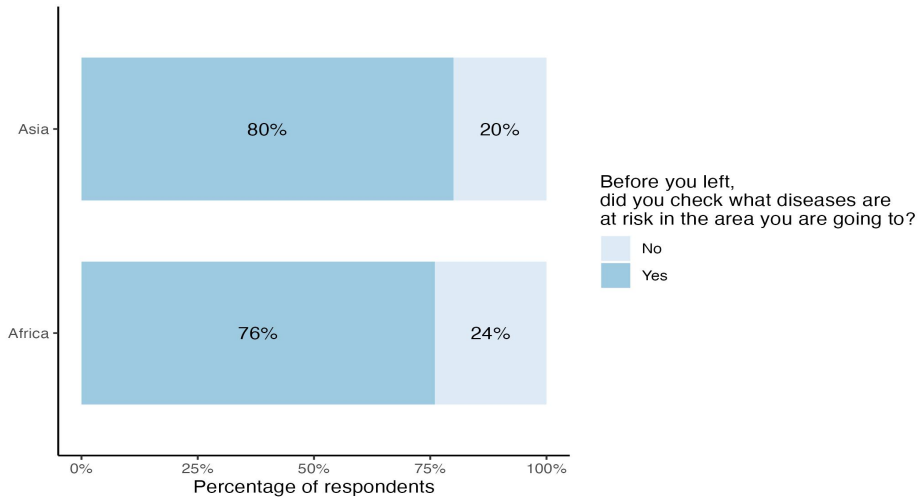
The correlation between the uptake of the recommended hepatitis A vaccination (where it was recommended in the respondents' travel destination) and the continent to which the respondents were travelling was also analysed. A strong correlation between continent and vaccination was shown. Surveyed (as many as 20% more respondents) were significantly more likely to have been vaccinated against hepatitis A when travelling to countries in Asia or Africa than when travelling within Europe.

Figure 11. Reception of the recommended hepatitis A vaccination according to the continent to which respondents traveled.



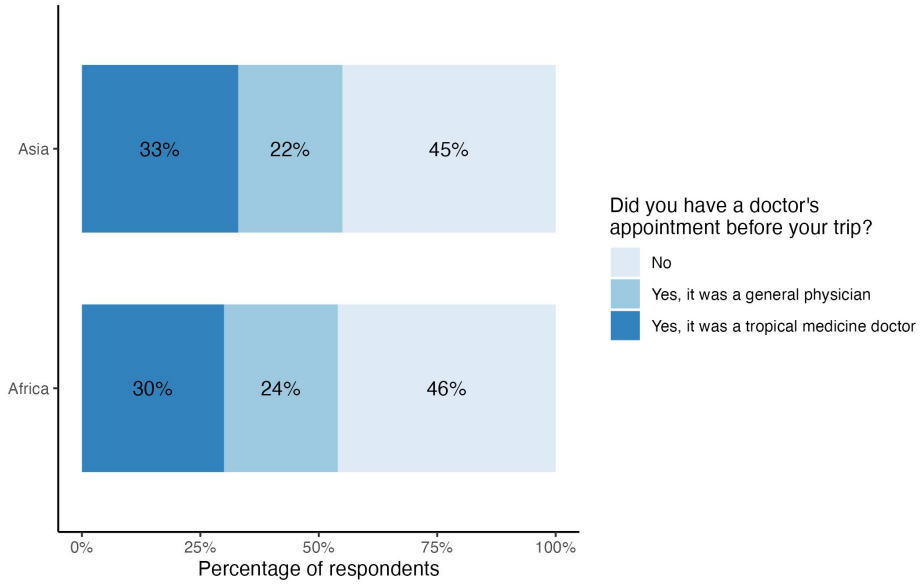
It was also examined whether there was a correlation between travel to Africa or Asia and the degree of interest in infectious diseases. It was analysed how often respondents checked which diseases were at risk in the region they were planning to travel to with regard to travel within Asia and Africa. No statistically significant correlation was found. In the case of travel to Asia, up to 80% of respondents looked for information on infectious diseases in their destination on their own, while for travel to Africa, the percentage was 76%.

Figure 12. Checking what diseases the region is at risk of according to travel within Africa or Asia.



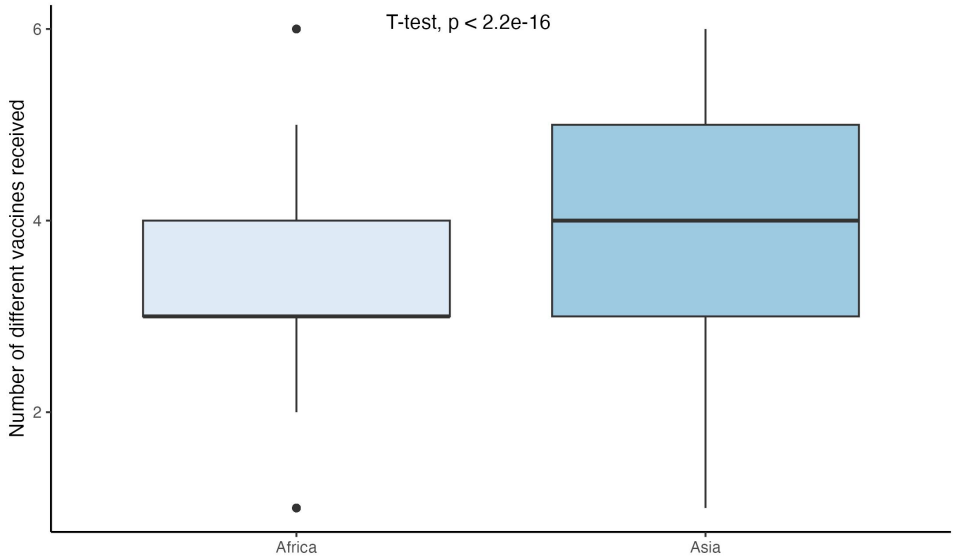
Also in the case of visiting a doctor before travelling to Asian or African countries, there was no correlation between continent and having a consultation. For both continents, almost half of the respondents did not consult a doctor and less than a third visited a tropical medicine specialist (30% of those travelling to Africa and 33% of those revisiting Asia, respectively).

Figure 13. Having a medical appointment according to travel within Asia or Africa.



The relationship between travel within Asia or Africa and the uptake of recommended vaccinations was also investigated. It was found that travellers to Asia were vaccinated against more infectious diseases (mean 3.8) than those going to Africa (mean 3.157895)

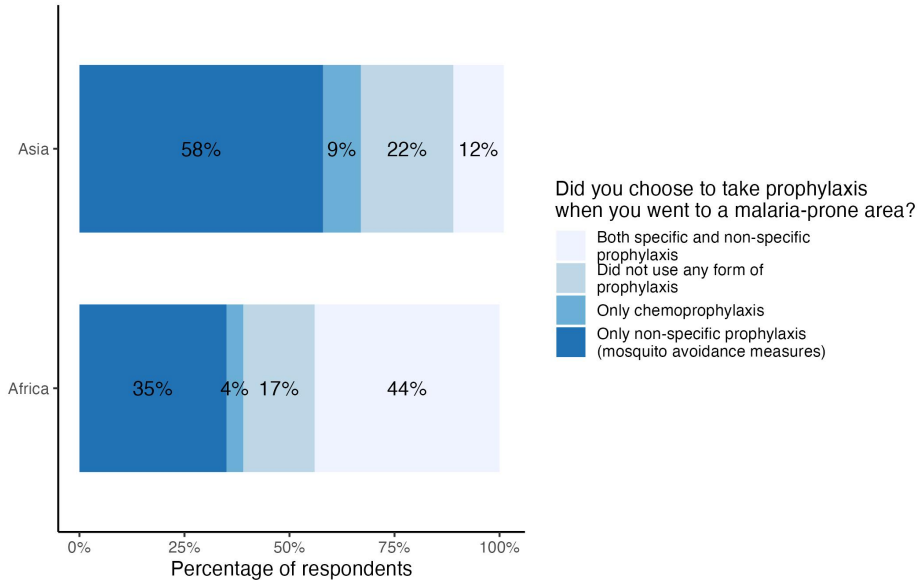
Figure 14. Adoption of recommended vaccinations according to traveling in Asia or Africa.



Malaria prophylaxis during travel to disease-endemic regions in Africa and Asia

Analysis of the use of malaria prophylaxis during travel to disease-endemic regions in Asia and Africa showed a statistically significant correlation. For travellers to Asia, 58% of respondents used only non-specific prophylaxis (mosquito avoidance measures), 9% used chemoprophylaxis and 12% used both forms. For African visitors, the figures were 35%, 4% and 44% respectively. The proportion of travellers who did not use any form of malaria protection was similar for both continents. This means that only 21% of visitors to Asia used antimalarial drugs, while for travel to Africa the percentage was almost double (48%).

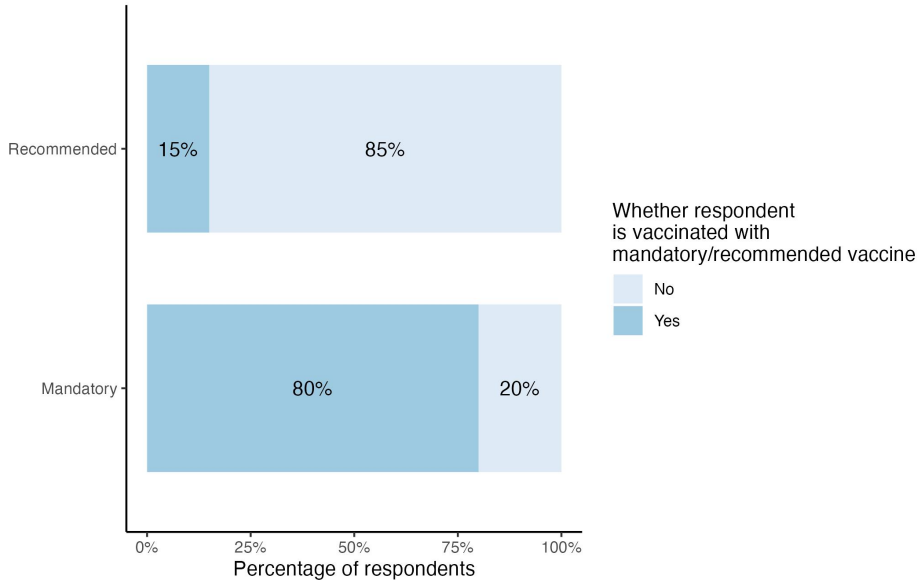
Figure 15. Form of malaria prophylaxis used according to travel in Asia or Africa.



Difference between uptake of recommended and mandatory vaccinations

In order to investigate whether there is a correlation between uptake of vaccinations and their recommendation or obligation, the following group of respondents was identified. These were people who had travelled to countries where rabies vaccination is recommended and also who had travelled to countries where certain vaccinations are mandatory for entry. The analysis showed a statistically significant correlation. Respondents were significantly more likely to be vaccinated when there was an obligation to do so. Recommended vaccination was quite significantly ignored (85% of respondents in this group did not undergo it).

Figure 16. Frequency of receiving recommended and mandatory vaccinations.



Discussion

Our survey was deliberately addressed mainly to people who have travelled within Asia or Africa. These are individuals who have often travelled extensively and thus have encountered various health challenges and have already accumulated some knowledge in this area. With this in mind, it is important to note that the results of our study may not translate to those planning a transcontinental trip for the first time.

Analysis of the correlation between gender and age and interest in the topic of infectious diseases when travelling within Europe did not reveal any statistically significant associations. Interestingly, women were more likely than men to check recommended vaccinations before travelling on their own, while men were more likely to go to the medical practitioner; however, in both cases, regardless of gender, the vast majority of people had no interest in this subject. Also in each age group surveyed, more than half of the participants showed no interest in this issue. This may indicate insufficient awareness of the infectious diseases threatening different regions of Europe and lack of knowledge of the benefits of pre-travel consultation and prevention methods. There were also no statistically significant differences between checking which diseases the destination on another continent is at risk of and the frequency of travel per year. This may indicate that regardless of how often Poles travel, they will exhibit health-oriented behaviour to a similar degree.

Our study was deliberately divided into sections for the three continents in order to investigate differences in health behaviour and infectious disease prevention depending on

travel within Europe, Asia and Africa. Respondents travelling to countries in Asia or Africa were almost twice as likely to be concerned about diseases in their region of travel as those travelling to the old continent (80% for Asia and 76% for Africa against 38% for Europe); the pattern was similar for recommended vaccinations. Regarding travel within Europe, 27% of respondents were vaccinated against hepatitis A, compared to 51% of travellers to Asia or Africa. Interestingly, the differences in pro-health behaviour between African and Asian travellers were minor and not statistically significant. Travellers going to Asia statistically had a marginally higher number of recommended vaccinations. For travel to both Asia and Africa, the most popular vaccinations were the same, i.e. tetanus (68.4% of those going to Africa and 67.9% of travellers to Asia) and hepatitis B (67% in both continents). Only one-third of travellers went to a tropical medicine specialist before departure, and only half of the respondents visited any doctor. This indicates insufficient public awareness of the benefits of consulting a travel medicine specialist. Adequate patient education is particularly important with tourism returning to pre-pandemic levels, especially as as many as 12% of Poles are planning transcontinental travel as part of their holidays.

The use of malaria prophylaxis among travellers to malaria-prone areas in Asia and Africa was also analysed. Statistically significant differences were found. Knowledge of the importance of taking protective measures was found to be widespread, with a minority, i.e. 22% of travellers in Asia and 17% in Africa, not using any form of prophylaxis. Travellers in Asia used only mosquito avoidance meassure almost twice as often as those going to Africa (58% for Asia versus 35% for Africa). In addition, surveyed Poles were significantly more likely to use antimalarial drugs when travelling to malaria-prone African countries (44% used both chemoprophylaxis and mosquito avoidance meassures, with 4% using medication only) than when travelling to such areas in Asia (12% using both forms of prevention and 9% using chemoprophylaxis alone). This may indicate that travellers going to Africa are more aware of the advantages of using antimalarial drugs.

Adherence of Poles to recommended and mandatory vaccinations was also investigated. Recommended vaccinations were significantly less frequently undertaken by respondents, but interestingly 20% of respondents evaded the obligation to vaccinate even when it was required for entry into the country. This indicates that public awareness of the advantages of vaccinating before travelling is insufficient and that education in this area is needed.

Conclusions

Travellers to Asian or African countries are significantly more likely to seek information on the infectious diseases their travel destination is at risk of than travellers to European countries. In addition, recommended vaccinations are significantly more frequently administered prior to travel ling to Africa or Asia than before travel within Europe. With regards to malaria-prone regions, travellers to Africa are more than twice as likely to take antimalarial drugs than travellers to Asia. Mandatory vaccinations are significantly more common than recommended vaccinations, although despite the obligation some travellers still choose not to receive them.

All authors have read and agreed with the published version of the manuscript.

Author's contribution:

Concept and design [IM] [EU], analysis and interpretation of data [MG] [MO], intellectual content and data research [DG] [RB], work integrity and coherence [MO] [IM], project supervision and final revision [IM], writing of manuscript and first revision [MG] [EU], drafting of manuscript, data research and analysis [DG] [RB] [IM]

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Conflict of interest: The authors declare no conflict of interest.

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