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Original Article

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Vaccine Passport Use and Travel Health Status Among Turkish Travelers at an International Airport

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Abstract

Introduction: Even though Istanbul is one of the centers of the world's fastest-growing tourism and travel sector, there are limited statistics on the knowledge, attitudes, and practices (KAP) of travelers from this region regarding travel-related infectious diseases. This study aimed to determine the passengers' KAP about contagious diseases and contribute to developing new solutions for the problems people face while traveling abroad.

Methods: A questionnaire was administered to 182 Turkish travelers planning on traveling abroad and applied to the Istanbul Travel Health Center and the Istanbul Airport Health Control Center between January and March 2019.

Results: The proportion of carrying a vaccination certificate was statistically higher in those who received healthcare services at international terminals ($P=0.002$), especially those who had yellow fever ($P<0.001$) and meningococcal vaccine ($P=0.011$). More than half of the vaccinated passengers did not carry their vaccination certificates, while around half (53.8%) were traveling to Africa. When compared to travelers flying to Europe, vaccination checks were 6.7 times (95% CI: 2.5-17.9) higher in passengers traveling to Africa, 6.1 times (95% CI: 1.5-24.3) higher in passengers traveling to Asia, and 14.8 times (95% CI: 1.3-164.3) higher in passengers traveling to South America. In addition, the vaccination certificate carrying proportion was significantly higher in those with a travel duration of 15 days or more ($P=0.028$), those who received health services at international terminals ($P=0.002$), and those vaccinated ($P<0.001$).

Conclusion: Improved knowledge of travel-related infectious diseases and increased adoption of pre-travel health advice and vaccines are urgently needed among Turkish travelers.

Keywords: Travel, Travelers' Health, Travelers' Behavior, Risk Factors, Vaccinations

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Introduction

With globalization, population growth, increase in economic relations, development of technology, and expanded transportation facilities, relations between countries and societies have improved, leading to a higher number of business and leisure travelers. Air transport is the most preferred type of travel because of the shortened travel durations.[1,2] In 2019, 2.28 billion people in the world traveled abroad.[3] In the same year, 59% of the total number of passengers traveled with airlines.[4]

Travelers play an essential role in spreading contagious diseases with travel patterns and behaviors. Traveling is also a crucial risk factor in the resurgence of infectious diseases, particularly vaccine-preventable ailments, such as yellow fever, hepatitis A, typhoid fever, polio, and measles. It is also a significant risk factor for the recurrence of well-controlled infectious diseases in the travelers' country of residence.[5] Understanding the travelers' attitudes and behaviors towards various contagious diseases can provide policies to protect the passengers, their contacts, and communities.[6]

The spread of transmittable diseases is a global threat and therefore constitutes a priority on the International Public

Health Agenda. International Health Regulation (IHR) has entered into force in June 2007. It offers a legal framework that the 196 Member States of the World Health Organization (WHO) agreed to comply with.[7] These regulations include implementing protective measures that aim to prevent or limit the spread of all diseases at their entry points (i.e., land and sea borders and airports). Taking this into account, yellow fever represents a special section in the WHO's international health regulations. Accordingly, vaccination certificates can be requested as a condition to enter the country, and precautions and sanctions can be taken if the passenger does not have the necessary documents.[8,9] However, an international vaccine or prophylaxis certificate is only required for yellow fever disease. Tracking over the internet is not currently available, and there is also no control at the airports. Today, many ailments with high morbidity and mortality still exist, such as the plague, Ebola, hepatitis A and B, Japanese encephalitis, cholera, meningitis, typhoid fever, poliomyelitis, yellow fever, malaria, MERS, West Nile fever, Zika, traveler's diarrhea, and COVID-19. Hence, we should draw attention to the need to take further measures and follow-up methods.[10] Fortunately, the concept of a vaccination passport has been raised with the recent COVID-19 pandemic. The goal is to create a vaccine passport accessible to everyone, portable, adaptable to technology, and following legal and ethical standards, ensuring international standardization and protecting the health of the passengers and the people of the traveled region.[11-13] However, this passport is only discussed for COVID-19; travel health measures for other diseases are not yet in question.

In the different units of the Directorate General of Health Services for Borders and Coasts of Turkey, travel health services are provided to those going abroad in light of the WHO guidelines and entry regulations of countries. The services offered in these health centers include administering the yellow fever vaccine, issuing an international vaccination certificate, pre-trip health examinations, and counseling on health problems that may be encountered during the trip (prevention, vaccination, and medications that may be needed during the trip).[14]

Istanbul is one of the rapidly growing tourism and travel industry centers. According to official data, 50% of the 97 587 056 passengers in 2018 used the Istanbul Atatürk Airport when leaving Turkey.[15] We therefore conducted a descriptive cross-sectional survey at the Istanbul Atatürk Airport Health Inspection Center, which is affiliated with the Turkish Travel Health Directorate, to evaluate the knowledge, attitudes, and practices (KAP) of Turkish people traveling internationally.

This study aimed to evaluate the health status of passengers traveling abroad at their pre-travel vaccination checks concerning carrying a vaccination certificate, the frequency of utilizing technological innovations to improve their travel health experiences, and their KAP on transmissible diseases.

Methods

Research Design and Setting

This research was designed and conducted as a prospective analytical cross-sectional study. A survey was conducted with 182 Turkish passengers who applied to the Istanbul Airport Health Inspection Center affiliated to the Travel Health Directorate during the three-month interval between January and March 2019 and intended to travel abroad. An informed consent form was signed by the participants prior to the interview. Travelers with cognitive dysfunction or psychosis, those under 18, pregnant, puerperal, and breastfeeding women were excluded. To conduct the survey, the validity of the questionnaire was assessed, utilizing face, content, and construct validity methods. Internal consistency was calculated to determine the reliability of the questionnaire. All items were perceived as relevant and comprehendible by participants. Content validity was confirmed by a panel of experts. As measured by Cronbach's alpha coefficient, the internal consistency exceeded the minimum reliability standard. The reporting process of the study was performed according to the rules in the STROBE guideline.[16]

Population and Sampling

A total of 214 passengers applied to the center during the research period. All applicants were offered to participate in the study; no randomization was performed. The data were obtained via face-to-face interviews by the doctors in charge using the data collection form. Interviews with the participants were conducted in the outpatient clinics of the travel health center. Of the travelers, 21 refused to participate, and 11 were excluded because their questionnaires were deemed invalid. Thus, the final sample constituted 182 (85%) participants (Figure 1).

Variables

The data were obtained by face-to-face interviews employing the study questionnaire. The dependent variables in the study were having a vaccination check concerning their previous travels and carrying the vaccination certificate during the trip. The independent variables were variables related to

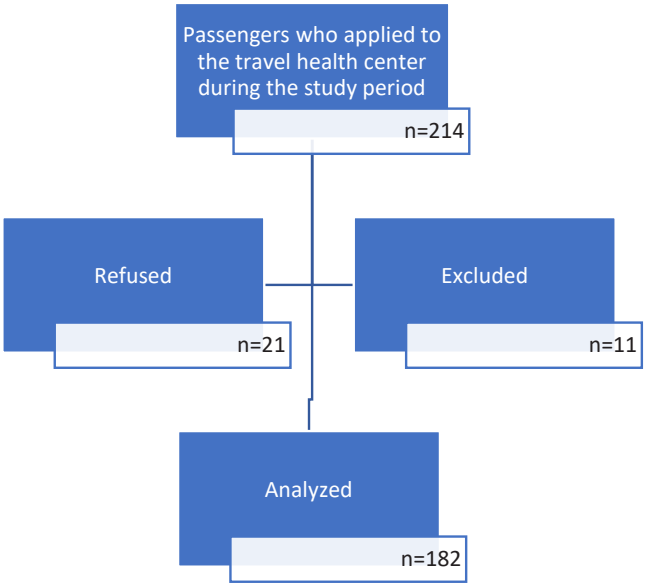

Figure 1. Research Flowchart.

sociodemographic characteristics (age, sex, marital status, educational level, income status, and habits), travel-related variables, region of travel, duration of the journey, the purpose of the trip, having health problems in previous travels, and having searched the internet about diseases or drugs.

Bias Prevention

The participants were briefly informed about the research before the survey, and they were asked not to write their identity information on the questionnaires to ensure correct information declaration. Data collection from all participants was carried out by the same research team. After the collected data were entered into the computer, debugging was performed to check for errors.

Statistical Methods

In descriptive statistics, continuous data were presented as median, minimum, and maximum values, while categorical data were given as numbers and percentages.

In the statistical comparison of the data, the conformity to the normal distribution for continuous variables was evaluated by the Kolmogorov Smirnov test. In the case of two groups, the Mann-Whitney U test was employed to compare continuous data between independent groups. The chi-square test was utilized for statistical comparisons of categorical data. Multivariate logistic regression analysis was performed using the Enter method with variables significant in the univariate analysis and related to causality. The odds ratio and 95% confidence interval were calculated for the independent variables. Finally, the model's fit was evaluated with the Hosmer-Lemeshow goodness of fit test.

A *P* value of less than 0.05 at the 95% confidence interval was accepted as significant. The SPSS v 21.0 program (IBM Inc., Chicago, IL, USA) was used for statistical analysis.

Results

Participants

In this study, the data of 182 passengers were analyzed. The median age of the participants was 27 (18-73), 126 (69.2%) were male, and 160 (87.9%) were university graduates. Participant characteristics are shown in Table 1.

Result Data

Of the participants, 78 (42.9%) were traveling for vacation, 98 (53.8%) stated that their destination was Africa, and 103 (56.6%) would stay in the visited country for 14 days or less. Of the 107 (58.8%) people who had previously been vaccinated for international travel, the most frequent vaccination was yellow fever (n = 89, 48.9%), which is the mandatory vaccine. Distributions of the participants' travel-related information are displayed in Table 1. The participants' median number of countries visited was 7 (1-83).

Among the participants, married ones and smokers had significantly more vaccination checks ($P = 0.047$ and $P = 0.001$, respectively), but no significant difference was found between having a vaccination check and the education or income of the individuals (Table 1).

Those who received health services at international terminals ($P = 0.028$), those who were vaccinated ($P < 0.001$) (yellow fever ($P < 0.001$), typhoid vaccine ($P = 0.005$)), and those who had a disease during travel ($P = 0.006$) applied to a travel health center and had more vaccination checks compared to those who did not (Table 2). Furthermore,

Table 1. Distribution of the Sociodemographic Characteristics and Travel-Related Information of the Participants

		No.	%
Gender	Male	126	69.2
	Female	56	30.8
Marital status	Single	126	69.2
	Married	56	30.8
Educational attainment	Primary/secondary school	12	6.6
	High school	10	5.5
	University	160	87.9
Income	1-3 minimum wages	74	40.7
	4-6 minimum wages	61	33.5
	7-9 minimum wages	25	13.7
	10 minimum wages and more	22	12.1
Tobacco smoking	Yes	64	35.2
	No	118	64.8
Chronic diseases	Present	17	9.3
	Absent	165	90.7
Continuous medication use	Yes	21	11.5
	No	161	88.5
Smartphone usage	Yes	179	98.4
	No	3	1.6
Use of e-nabiz (online health portal)	Yes	63	34.6
	No	119	65.4
Travel site	Africa	98	53.8
	Europe	53	29.1
	Asia	17	9.3
	South America	8	4.4
	North America	3	1.6
	Australia	3	1.6
Travel duration	1-7 days	55	30.2
	8-14 days	48	26.4
	15-30 days	21	11.5
	31 days and more	58	31.9
Travel purpose	Vacation	78	42.9
	Business	97	53.3
	Education	7	3.8
Status of receiving health services at international terminals (Inspection/ Pharmacy, etc)	Yes	21	11.5
	No	161	88.5
Vaccination control status by applying to the travel health center during travels abroad	Yes	107	58.8
	No	75	41.2
Previous vaccination status for overseas travel	Not vaccinated	75	41.2
	Vaccinated	107	58.8

Table 1. Continued

		No.	%
Vaccines given (n = 107)	Yellow fever	89	48.9
	Tetanus diphtheria	18	9.9
	Typhoid	15	8.2
	Meningococcus	8	4.4
	HAV	9	4.9
	Crimean Congo hemorrhagic fever	6	3.3
	Polio	2	1.1
	Rabies	4	2.2
	Other	1	0.5
Carrying an international vaccination certificate	Yes	80	44.0
	No	102	56.0
Previous illness while traveling	Yes	40	22.0
	No	142	78.0
Disease and drug inquiries on the internet	Yes	145	79.7
	No	37	20.3

a significant relationship was found between the travel destination and vaccination check ($P < 0.001$) (Table 2).

Compared to traveling to Europe, those traveling to Asia had 7.0 times (95% CI: 1.9-25.2), those traveling to Africa 8.6 times (95% CI: 3.3-22.4), and those traveling to S. America 16.6 times (95% CI: 1.5-179.4) more likely to have their vaccinations checked. On the other hand, those vaccinated before had 6.9 times (95% CI: 3.1-15.4) more vaccination checks (Table 3).

Those with a travel duration of 15 days or more ($P = 0.028$) had a statistically higher proportion of possessing a vaccination certificate. Meanwhile, the rate of carrying a vaccination certificate was significantly higher in those who received health services at international terminals before ($P = 0.002$), those who had vaccination controls ($P < 0.001$), and those who had vaccinations (especially those who had yellow fever ($P < 0.001$) and meningococcal vaccines ($P = 0.011$)). However, a significant difference was found between the place of travel and carrying a vaccination certificate ($P < 0.001$) (Table 4).

Discussion

In this study, the data of 182 passengers with a median age of 27 (18-73) were evaluated; 126 participants (69.2%) were men, and 160 (87.9%) were university graduates. The majority of participants were young, male, and with a relatively high level of education. Of this population, 53.3% traveled abroad for business and 42.9% for vacation. Of the participants, 79.7% declared that they searched the internet for diseases and drugs before traveling, and 58.8% applied to the travel health center and had a vaccination check.

Seeking health-related information before travel can prepare travelers for health risks at their destination. Various studies have indicated that there is a relationship between taking advice, rational risk perception, and engaging in preventive behaviors.[17,18] Considering the medical information pollution on the internet and that almost all travelers use smartphones, it would be beneficial to establish a platform with a mobile application such as the e-nabiz (English: e-pulse) and/or add the necessary information to this platform to provide accurate and reliable information to passengers.

Of the participants included in our study, 34.6% had used the e-nabiz mobile application (https://enabiz.gov.tr/). This platform was developed by the Ministry of Health of the Republic of Turkey in 2015, and it is one of the popular mobile personal health record systems. As of June 2021, the total number of downloads of the app was over 10 million. Studies show that individuals' opinions about the e-nabiz system are generally positive[19] and the awareness level of health care recipients and health workers for this system is above average.[20] In addition, it has been reported that informatics-based applications in public health management increase service quality, traceability, awareness, self-management skills, and knowledge, while reducing hospital visits, workload, labor loss, cost, data loss, unsuccessful treatment rates, and incomplete treatment proportions. To this end, many medical applications have been made available to individuals on various platforms.[21]

Patients with chronic diseases show significant deficiencies in rational drug use. Of the travelers in Turkey, 9.3% have a chronic illness.[21] Mobile applications can be used as a solution for tracking travelers with chronic diseases (e.g., blood sugar, blood pressure, and medication intake). The advancements in technological devices can be an opportunity to develop preventive and remedial projects through these devices.

In the studies of LaRocque et al and Van Herck et al., the proportion of seeking health information among travelers was below 50%.[22,23] We found that more than half of all participants (58.8%) sought health information before traveling. Another airport survey reported that only 26% of Asian travelers sought pre-trip health advice, compared to 63% of Western travelers,[24] whereas one study mentioned that only 23.9% of South Korean travelers to India (high risk for many infectious diseases) obtained pre-trip health advice.[25,26]

We realized that trips to more temperate regions such as South America and Africa were associated with higher travel health center referrals and vaccination checks. Yellow fever (which was epidemic, especially in Turkey's south and southeast regions in the 2000s) still poses a high risk in South America and Africa. On the other hand, the WHO Strategic Advisory Group of Experts on Immunization (SAGE) declared that the yellow fever vaccine protects most people for at least 35 years, and possibly for a lifetime, and with a few exceptions, no booster dose is required. These may have a role in the specified relationship.[27,28] In parallel with this, we determined that the most frequently administered vaccine before travel was yellow fever (48.9%). The most commonly reported vaccines were hepatitis A, hepatitis B, tetanus, and typhoid in other traveler surveys.[23,24,29,30] Studies have estimated that between 30%-50% of travelers have become sick or injured during their travel, suggesting it is urgent to raise awareness about travel health.[31] In our study, 22% of the participants declared previously having an illness while traveling.

Table 2. Factors Associated With Applying to a Travel Health Center and Getting a Vaccination Check When Traveling Abroad

		Had Vaccination Check (n=107)		Had No Vaccination Check (n=75)		*P**
		n	%	n	%	
Age, median (min-max)		27 (18-62)		27 (18-73)		0.989**
Gender	Male	76	60.3	50	39.7	0.53
	Female	31	55.4	25	44.6	
Marital status	Single	68	54.0	58	46.0	0.047
	Married	39	69.6	17	30.4	
Educational attainment	Primary/secondary school	8	66.7	4	33.3	0.3
	High school	8	80.0	2	20.0	
	University	91	56.9	69	43.1	
Income	1-3 minimum wages	44	59.5	30	40.5	0.477
	4-6 minimum wages	34	55.7	27	44.3	
	7-9 minimum wages	13	52.0	12	48.0	
	10 minimum wages and more	16	72.7	6	27.3	
Tobacco smoking	Yes	48	75.0	16	25.0	0.001
	No	59	50.0	59	50.0	
Chronic diseases	Present	11	64.7	6	35.3	0.603
	Absent	96	58.2	69	41.8	
Continuous medication use	Yes	14	66.7	7	33.3	0.436
	No	93	57.8	68	42.2	
Travel site	Africa	76	77.6	22	22.4	<0.001
	Europe	9	17.0	44	83.0	
	Asia	11	64.7	6	35.3	
	South America	7	87.5	1	12.5	
	North America	1	33.3	2	66.7	
	Australia	3	100.0	0	0.0	
Travel duration	14 days or less	55	53.4	48	46.6	0.091
	15 days or more	52	65.8	27	34.2	
Travel purpose	Holiday	42	53.8	36	46.2	0.48
	Work	61	62.9	36	37.1	
	Education	4	57.1	3	42.9	
Status of receiving health services at international terminals (Medical inspection/Pharmacy, etc)	Yes	17	81.0	4	19.0	0.028
	No	90	55.9	71	44.1	
Previous vaccination status for overseas travel	Not vaccinated	19	25.3	56	74.7	<0.001
	Vaccinated	88	82.2	19	17.8	
Yellow fever	Not vaccinated	30	32.3	63	67.7	<0.001
	Vaccinated	77	86.5	12	13.5	
Meningococcus	Not vaccinated	102	58.6	72	41.4	0.827
	Vaccinated	5	62.5	3	37.5	
HAV	Not vaccinated	99	57.2	74	42.8	0.06
	Vaccinated	8	88.9	1	11.1	
Tetanus and diphtheria	Not vaccinated	93	56.7	71	43.3	0.085
	Vaccinated	14	77.8	4	22.2	
Crimean Congo Hemorrhagic fever	Not vaccinated	104	59.1	72	40.9	0.656
	Vaccinated	3	50.0	3	50.0	

Table 2. Continued

		Had Vaccination Check (n=107)		Had No Vaccination Check (n=75)		*P**
		n	%	n	%	
Typhoid	Not vaccinated	93	55.7	74	44.3	0.005
	Vaccinated	14	93.3	1	6.7	
Polio	Not vaccinated	105	58.3	75	41.7	0.234
	Vaccinated	2	100.0	0	0.0	
Rabies	Not vaccinated	103	57.9	75	42.1	0.09
	Vaccinated	4	100.0	0	0.0	
Carrying an international vaccination certificate	Yes	72	90.0	8	10.0	<0.001
	No	35	34.3	67	65.7	
Previous illness while traveling	Yes	31	77.5	9	22.5	0.006
	No	76	53.5	66	46.5	
Disease and drug search on the internet	Yes	84	57.9	61	42.1	0.641
	No	23	62.2	14	37.8	

*Chi-square test result.
**Mann Whitney U test result.

Table 3. Multivariate Logistic Regression Analysis of Factors Related to vaccination Control Status by Applying to a Travel Health Center While Traveling Abroad

	OR	95% CI for OR		*P*
Tobacco Smoking	1.668	0.671	4.148	0.271
Travel site (reference: Europe)				0.002*
Asia	6.099	1.531	24.297	0.010*
Africa	6.665	2.478	17.928	<0.001*
S. America	14.820	1.336	164.347	0.028*
N. America	0.664	0.049	9.043	0.759
Australia	-	0.000	.	0.999
Presence of international terminal service history	2.241	0.514	9.763	0.283
Vaccination	7.181	3.041	16.959	<0.001*
Travel disease history	1.790	0.600	5.340	0.297

Hosmer & Lemeshow Model χ^2 (7)=9.74; P=0.204, *P<0.05.

After the COVID-19 pandemic, editorial letters and personal views on vaccination passports have increased.[11-13] Our study is the first to question travel vaccination certificates. Only 44% of the travelers who participated in our study carried their vaccination certificates. The importance of a vaccination certificate or passport is better understood if we consider the mortality, morbidity, and prevalence of infectious diseases. Having these data available through digital applications such as the e-nabiz can provide significant convenience.

Kain et al[32] suggested that the main reason for not seeking or complying with pre-travel health advice was the low perception of infection risk during travel. However, two surveys in South America found that participants lacked travel medicine knowledge.[33,34] Similarly, based on the fact that those who received health services at international terminals (P=0.002) and those who were already vaccinated applied more frequently to travel health centers than those who did not receive such services (P<0.001); we think that the main reason is the inadequacy of information about travel health of the passengers.

Limitations

Compared to similar studies in the literature, the small sample size of this research can be regarded as a limitation. While the short questionnaire design was suitable for maximizing the response rate in high-volume airport surveys, it limited the amount of detail obtained (e.g., time of vaccination). Regional or seasonal differences could also be evaluated if the study had been expanded to include other airports in Turkey and covered longer or seasonally different periods.

Conclusion

Turkish travelers should be informed more about travel health and communicable diseases, and this responsibility falls primarily on travel health centers. Therefore, there is a need for developing mobile applications for travel health. With such applications, carrying a vaccination passport will become more accessible and widespread. In addition, considering the prevalence of smartphones, we think that the use of digital health applications such as e-nabiz may be beneficial in reaching wider populations concerning travel health.

Table 4. Factors Associated With Carrying an International Vaccination or Prophylaxis Certificate

		Carries a Vaccination Certificate (n = 80)		Does not Carry a Vaccination Certificate (n = 102)		*P**
		n	%	n	%	
Age, median (min-max)		28 (18-62)		27 (18-73)		0.703**
Gender	Male	59	46.8	67	53.2	0.242
	Female	21	37.5	35	62.5	
Marital Status	Single	54	42.9	72	57.1	0.654
	Married	26	46.4	30	53.6	
Educational attainment	Primary/secondary school	5	41.7	7	58.3	0.915
	High school	5	50.0	5	50.0	
	University	70	43.8	90	56.3	
Income	1-3 minimum wages	28	37.8	46	62.2	0.342
	4-6 minimum wages	27	44.3	34	55.7	
	7-9 minimum wages	12	48.0	13	52.0	
	10 minimum wages and more	13	59.1	9	40.9	
Tobacco smoking	Yes	33	51.6	31	48.4	0.128
	No	47	39.8	71	60.2	
Chronic diseases	Present	8	47.1	9	52.9	0.787
	Absent	72	43.6	93	56.4	
Continuous medication use	Yes	11	52.4	10	47.6	0.408
	No	69	42.9	92	57.1	
Travel site	Europe	10	18.9	43	81.1	**<0.001**
	Asia	5	29.4	12	70.6	
	Africa	56	57.1	42	42.9	
	South America	5	62.5	3	37.5	
	North America	1	33.3	2	66.7	
	Australia	3	100.0	0	0.0	
Travel duration	14 days and below	38	36.9	65	63.1	**0.028**
	15 days and above	42	53.2	37	46.8	
Travel purpose	Vacation	31	39.7	47	60.3	0.525
	Business	45	46.4	52	53.6	
	Education	4	57.1	3	42.9	
Status of receiving health services at international terminals (Inspection / Pharmacy, etc)	Yes	16	76.2	5	23.8	**0.002**
	No	64	39.8	97	60.2	
Do you get a vaccination check by applying to the travel health center during your travels abroad?	Yes	72	67.3	35	32.7	**<0.001**
	No	8	10.7	67	89.3	
Previous vaccination status for overseas travel	Not vaccinated	5	6.7	70	93.3	**<0.001**
	Vaccinated	75	70.1	32	29.9	
Yellow fever	Not vaccinated	11	11.8	82	88.2	**<0.001**
	Vaccinated	69	77.5	20	22.5	
Meningococcus	Not vaccinated	73	42.0	101	58.0	**0.011**
	Vaccinated	7	87.5	1	12.5	
HAV	Not vaccinated	77	44.5	96	55.5	0.51
	Vaccinated	3	33.3	6	66.7	
Tetanus and diphtheria	Not vaccinated	73	44.5	91	55.5	0.648
	Vaccinated	7	38.9	11	61.1	
Crimean Congo hemorrhagic fever	Not vaccinated	78	44.3	98	55.7	0.594
	Vaccinated	2	33.3	4	66.7	
Typhoid	Not vaccinated	70	41.9	97	58.1	0.064
	Vaccinated	10	66.7	5	33.3	

Table 4. Continued

		Carries a Vaccination Certificate (n = 80)		Does not Carry a Vaccination Certificate (n = 102)		*P**
		n	%	n	%	
Polio	Not vaccinated	78	43.3	102	56.7	0.108
	Vaccinated	2	100.0	0	0.0	
Rabies	Not vaccinated	78	43.8	100	56.2	0.805
	Vaccinated	2	50.0	2	50.0	
Travel illness history	Yes	21	52.5	19	47.5	0.218
	No	59	41.5	83	58.5	
Disease and drug search on the internet	Yes	62	42.8	83	57.2	0.519
	No	18	48.6	19	51.4	

*Chi-square test result.
**Mann Whitney U test result.

Research Highlights

What Is Already Known?

- The spread of transmittable diseases is a global threat. Travelers play an essential role in the international spread of contagious diseases with travel patterns and behaviors.
- The "International Certificate of Vaccination or Prophylaxis" was put into effect in 2007 by the World Health Organization.

What Does This Study Add?

- A mobile application should be developed that can be used as a vaccination passport and a health wallet for international travel.

Author' Contributions

Concept and design: MK, OK, CA, FKA and SO. Carried out the studies: IY, EM, AR, AS, EMC, EC, AD, MST and NY. Statistical analysis: MK, HEO and MMO. Writing original draft preparation: MK, EBB and SHBP. Writing review and editing: SO and MAK. Supervision: MAK.

Conflict of Interest Disclosures

The authors have no conflict of interest in this study.

Ethical Approval

Ethical approval for the study was obtained from the Istanbul University Istanbul Faculty of Medicine Clinical Research Ethics Committee (Number: 2018/1068).

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