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FACTORS INFLUENCING COMPLIANCE WITH HEALTH REQUIREMENTS AMONG TRAVELERS COMING FOR UMRAH AT PRINCE MOHAMMED BIN ABDULAZIZ INTERNATIONAL AIRPORT, MEDINA, SAUDI ARABIA, 2023.

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Abstract

Background: Saudi Arabia has recently witnessed an unprecedented increase in international visitors to the country. As a result, the risk of transmission of infectious diseases has also risen, especially during the Hajj and Umrah seasons. Despite the implementation of health measures for Umrah/Hajj travellers, concerns persist regarding visitor adherence to vaccination requirements. **Aim:** This study was conducted to explore the factors influencing visitors' compliance with Umrah health requirements during the 2023 Umrah season. **Methods:** A cross-sectional survey study was carried out among Umrah visitors at Prince Mohammed bin Abdulaziz International Airport from October 2023 to January 2024. **Results:** A total of 400 visitors had completed the survey, 70.25% of whom were male. A total of 49% of respondents were complied with all required Umrah vaccinations. The proportion of respondents who complied with Umrah vaccinations increased significantly in correlation with gender and the level of education. Additionally, survey respondents who were performing Umrah and/or Hajj for the first time, and who had been instructed about Umrah health requirements by a general practitioner (GP) or a travel medicine specialist, were more in compliance with Umrah vaccinations. **Conclusion:** Out of total respondents, 51% did not comply with Umrah vaccinations. Factors such as gender, education level, prior participation in Umrah/Hajj, and trusted source of Umrah health instructions were found to play a significant role in respondents' compliance with Umrah vaccinations. Findings suggest the need for education programs led by traveller health experts targeted at Umrah/Hajj visitors to enhance visitors' compliance with Umrah health requirements.

Introduction

After the significant decline in international travel due to the travel restrictions imposed during the COVID-19 pandemic, the demand of international air travel has seen unprecedented growth since

2022. In 2023, an estimated 1.3 billion tourists traveled internationally, almost 89% of the prepandemic level [1]. According to the United Nations World Tourism Organization (UNWTO) [2], the number of international travelers is expected to reach, and exceed, an estimated 1.8 billion by 2030.

The growth in international air travel has heightened the risk of transmission of infectious diseases. In recent decades, the transmission of many infectious diseases (e.g., severe acute respiratory syndrome (SARS), Middle East respiratory syndrome coronavirus (MERS-CoV), and COVID-19) across international borders has been associated with air travel and travellers' behaviors [3-5]. Furthermore, travel for the purpose of attending mass gathering events, such as religious, musical, or sports events, exacerbates the risk of infectious disease transmission. According to Hoang and Gautret [6], most recent mass gathering events have resulted in outbreaks of many vaccine-preventable communicable diseases such as measles, mumps, and influenza.

Recently, the number of international visitors certified by Saudi Arabia has grown exceptionally. In 2023, over 27.4 million travelers visited Saudi Arabia, representing an increase of 56% compared with the prepandemic level [7]. This number is expected to increase based on the 2030 vision, whereby Saudi Arabia plans to host more than 100 million visitors [7].

Annually, Saudi Arabia hosts millions of Muslims coming from numerous countries worldwide during the Hajj and Umrah seasons. During these seasons, visitors perform the Islamic rituals mainly in two cities, Makkah, and Medina, in overcrowded conditions that might increase the risk of exposure to and transmission of infectious diseases. In 2023, over 15 million travelers from 180 countries visited Saudi Arabia during the Umrah and Hajj seasons [8].

The Saudi Ministry of Health introduced many restricted measures targeted international arrivals to these cities during Hajj and Umrah to minimize the risk of infectious diseases. One of these measures was a set of vaccinations, introduced based on the traveler's resident country and the recommendations of the World Health Organization (WHO) [9]. However, A concern remains about the overall compliance of travelers with required Umrah and Hajj vaccinations. There is still much uncertainty about the factors that enhance Hajj and Umrah visitors' compliance with required vaccinations. Understanding traveler behaviors and the roles of Umrah agents and health authorities in travelers' origin countries regarding the required Umrah and Hajj vaccinations can inform policy intended to protect visitors and the community. Therefore, the purpose of this study was to explore the factors that enhance visitor compliance with required Umrah vaccinations during the Umrah 2023 season, thereby minimizing the risks of acquiring and importing infectious diseases.

Methods

Study Design and Setting

A cross-sectional survey study was conducted to meet the study objectives. In order to ensure the survey's validity and reliability, a standardized questionnaire was prepared and revised by five academicians. An online questionnaire and written in English was prepared using Google Forms. A convenience sample of international arrivals were surveyed at Prince Mohammad bin Abdulaziz International Airport, Medina, Saudi Arabia. Surveys were administered from October 2023 through January 2024.

Study Population and Sample Size

Around total of five million Umrah visitors were expected to arrive at Prince Mohammad bin Abdulaziz International Airport during the 2023 Umrah season. As the target population was not precisely known, the minimum sample size was estimated to be a total of 385 travelers, based on a 95% confidence level, a standard deviation of 0.5, and a confidence interval (margin of error) of ± 5%. All non-Saudi Umrah visitors who were of adult age, had good English proficiency, and were resident in a country where all individuals traveling for the purpose of Umrah were required to have one or more vaccinations, based on the 2023 Umrah health requirement, were eligible to participate in this study.

Data Collection

Participate consent was attained from participants, and they were informed about the study's purpose. They answered the questionnaire anonymously and were free to withdraw at any time. To ensure a representative sample of the target population, only one survey was collected from each group or family.

The survey comprised of two questionnaires: a screening questionnaire and the main study questionnaire. The screening questionnaire was designed to collect respondents' demographic characteristics, and to assess their eligibility based on nationality, age, gender, country of residence, and education level. The main study questionnaire consisted of two distinct sections. Part One assessed respondents' attitudes toward the health requirements for Umrah through a set of targeted questions. Part Two focused on determining the types of vaccines taken by respondents to evaluate their compliance with the vaccination requirements for Umrah, based on their country of residence.

Strategy for data analysis

Survey data were retrieved from Google Forms and analyzed using IBM SPSS Statistics (Version 27). Chi-square tests were used to test for significant differences between groups as appropriate. Logistic regression analysis was performed to analyze associations between the following factors: age, gender, performing Umrah for the first time, educational level, source of Umrah health instructions, the reason for compliance with Umrah health requirements, and likelihood of compliance with required Umrah vaccinations.

Ethical Approval

No ethical implications were expected based on the study design, as participant consent was attained from participants and all data were administered confidentially. Ethical approval was obtained from General Directorate of Health Affairs in Madinah, on 11 September 2023, with an approval number (23-083).

Results

Participant demography

A total of 400 travelers met the inclusion criteria and completed the survey. As Table 1 shown, a total of 281 survey respondents (70.25%) were male. The mean age of the survey respondents was 39.64 years (Sd = 12.1). More than half of the survey respondents (n = 243, 60.75%) had attained a bachelor's degree or higher, 137 respondents (34.25%) had attained a high school degree, and 20 respondents (5%) had completed no formal education. Half of respondents were coming to performing Umrah or hajj for the first time (n = 199, 49.75%). The mean of number of days respondents intended to stay was 14.63 days (Sd = 5.32). Almost half of respondents (n = 196, 49%) were compliance with all required Umrah vaccinations.

Participants' attitude toward Umrah vaccination

The result of the chi-square test (Fisher's exact test) indicated that the proportion of people who complied with Umrah vaccinations differed significantly based on gender ($p < 0.001$). More than half of female respondents (61.34%) complied with Umrah vaccinations, compared to only 43.77% of male respondents.

Similarly, the result of the Pearson chi-square test indicated that the proportion of people who complied with Umrah vaccinations differed significantly based on education level ($x^2 = 11.7$, $df = 2$, $p = 0.003$). Among the 49% of respondents who complied with Umrah vaccination requirements, a significant proportion had attained a relatively high education level, indicating a correlation between education level and compliance with health requirements.

The result of the chi-square test (Fisher's exact test) indicated that the proportion of people who complied with Umrah vaccination requirements differed significantly between those who had and had not previously performed Umrah ($p < 0.001$). Specifically, the level of compliance with Umrah

vaccination requirements was higher among respondents who were performing Umrah or Hajj for the first time compared with those who had previously performed Umrah or Hajj (58.79% and 39.3%, respectively).

Moreover, the Pearson chi-square test demonstrated that the source of Umrah health requirements had a significant role in visitors' compliance. The result showed that compliance with Umrah vaccinations differed significantly among survey respondents based on their trusted source for Umrah health requirements ($x^2 = 13.57$, $p < 0.001$). A total of 54.85% of respondents who received instruction from a GP or a travel medicine specialist complied with Umrah vaccinations, 51.89% of respondents who received instruction from Umrah agents or another governmental source complied with Umrah vaccinations, and only 31.82% of respondents who received instruction from a friend or family member complied with Umrah vaccinations.

However, the result of the Pearson chi-square test also showed that visitor compliance with Umrah vaccinations did not significantly differ between survey respondents based on their main reason for vaccination ($p = 0.244$).

Table 1. Characteristics of survey respondents

	n (%)	***p*-value**
Number of respondents	400 (100%)	
Gender		<0.001
Male	281 (70.25%)	
Female	119 (29.75%)	
Age (mean, Sd)	39.64 (12.1)	
Education level		0.003
No formal education	20 (5%)	
High school degree	137 (34.25%)	
Bachelor's degree or higher	243 (60.75%)	
Performed Umrah/Hajj previously? (yes)	199 (49.75%)	<0.001
Days intended to stay (means, Sd)	14.63 (5.32)	
Received the required Umrah vaccinations? (yes) [1]	196 (49%)	
Source of the Umrah health requirement [2]		<0.001
Friends or relatives	88 (22%)	
A general practitioner (GP) or a travel medicine specialist	206 (52.5%)	
Umrah agent or another governmental source	106 (26.5%)	
Purpose for considering Umrah health requirement [3]		0.244
Prevention against infectious diseases	270 (67.5%)	
Based on recommendations introduced by Saudi Arabia	127 (31.75%)	
Based on recommendations introduced by the resident country	3 (0.75%)	

[1] Each respondent reported the types of vaccinations they had received. Their country of residence was then used to determine whether they had met the vaccination requirements for Umrah.
[2,3] respondents allowed to choose only one answer.

The result of the multivariate analysis demonstrated that visitor compliance with Umrah vaccination requirements was associated with several factors ($p < 0.001$). As shown in Table 2, having attained a high school degree, performing Umrah for the first time, and having been instructed by a GP or a

travel medicine specialist each predicted higher odds of being compliant with Umrah vaccinations, after controlling for other variables.

Table 2. Multivariate analysis of factors associated with compliance with Umrah vaccinations.

Factors	OR (95%CI)	*p*-value
Gender (female)	1.68 (1.047–2.69)	0.03
Education level		
High school degree–No formal education	2.99 (1.07–8.40)	0.04
Bachelor's degree or higher–No formal education	1.92 (0.70–5.30)	0.21
Performed Umrah/Hajj previously? (No)	1.84 (1.21–2.81)	0.01
Source of the Umrah health requirement		
A general practitioner (GP) or a travel medicine specialist	2.38 (1.39–4.09)	0.002
Umrah agent or another governmental source–Friends or relatives	1.89 (1.02–3.53)	0.04

Discussion

During the Umrah and Hajj seasons, Saudi Arabia hosts millions of Muslims from all over the world. The presence of a great number of visitors from various geographical areas considerably heightens the risk of transmit infectious diseases. Hence, the Saudi Ministry of Health has introduced a set of Umrah/Hajj health requirements for visitors traveling for the purpose of participating in Umrah and/or Hajj based on the latest WHO recommendations. One of the fundamental measures is vaccinations against the infectious diseases endemic to visitors' countries of residency.

The findings of the present study revealed a significant deficiency in respondent compliance with Umrah health requirements. Although the majority of survey respondents (78%) were instructed about Umrah health requirements, either by a health specialist or by an Umrah agent, less than half (49%) were compliant with Umrah vaccinations. This finding aligns with previous evidence that although travelers had accurate risk perceptions prior to travel, their compliance with preventive measures was not compatible with those perceptions [10, 11].

Furthermore, findings indicated that a number of independent factors, including gender, level of education, prior participation in Umrah or Hajj, and trusted source of health instructions, significantly predicted respondent compliance with Umrah vaccination requirements. These findings highlight the necessity for efforts to enhance awareness of the risk associated with travel for the purposes of Umrah and Hajj among visitors.

This study's major limitation is its online survey research design, which may expose the study to selection and recall biases. Additionally, factors such as the socioeconomic status of country of residence and level of access to healthcare services were not considered in the study questionnaire, which may lead to variations in results.

Conclusions

A more in-depth understanding of visitor compliance with current Umrah vaccination requirements, and the factors that enhance compliance, may inform policies for better strategies to ensure traveler health and safety. Among the study respondents, compliance with Umrah vaccination requirements was not optimal, and factors such as gender, level of education, prior performance of Umrah or Hajj, and their trusted source of health instructions probably influenced their compliance. Provision of advanced health instructions about Umrah health requirements by expert travel-health specialists in the country of origin and the airport, as well as during the visit, might be productive in improving visitors' compliance with Umrah health requirements.

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