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ORIGINAL RESEARCH

Factors Affecting the Uptake of COVID-19 Vaccine among Dubai Airport's Professionals

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Abstract

Aim: Comprehending the elements that influence COVID-19 vaccination acceptability and recognizing expediters for vaccination decisions are critical components of developing effective ways to increase vaccine coverage in the general population. This study aims to investigate the main factors affecting COVID-19 vaccination uptake among Dubai 'Airport's employees. In addition, it seeks to explore the main signs and symptoms that appeared on vaccinated employees after taking the COVID-19 vaccination, hence, track the vaccine's safety.

Methods: Employees at Dubai's airport in the United Arab Emirates (UAE), mainly in Dubai, provided data. To gather data online utilising the Google Forms platform, a questionnaire was used as the main quantitative tool. As 2000 questionnaires got distributed, 1007 employees participated in the survey, yielding a 50.4% response rate.

Results: The results show that employees overwhelmingly agree with the assertion that the factors of accessibility and affordability have a significant effect on their decision to receive the COVID-19 vaccine, followed by a trust in vaccine, knowledge, vaccine safety, advice and information, and beliefs on the vaccine. In this study, the agreement level on factors affecting the COVID-19 vaccine uptake was found significantly to be higher in females (88.6%) who were married (91.6%) and those aged over 60 years (89.2%) at P <.05. In addition, the results show that 53.7% of vaccinated staff was found to have one or more side effects of the vaccine, where none of them was hospitalized after immunization. The binary logistic regression analysis in this study shows that females were two times more likely to have 'vaccine's symptoms after vaccination than males (Exp (B): 1.6; 95%CI: 1.127 - 2.351, P< .01). It further reveals that participants in the age group over 50 were three times more likely to have 'vaccine's symptoms after vaccination than participants in the age group 20-29 (Exp (B): 2.9; 95%CI: 2.497-9.681, P< .001). Finally, it indicates that individuals with previous SARS-CoV-2 infection were 2 times more likely to have 'vaccine's symptoms after vaccination than those without known past infection (Exp (B): 1.9; 95%CI: 1.272 - 2.542, P< .01).

Conclusion: There are several factors that playing a significant role in population's decision to receive the COVID-19 vaccine, where the accessibility and affordability factors were found to have the greatest effect on their decision to uptake the vaccine. The current study concluded that COVID-19 vaccination is safe and that adverse effects from a vaccine are usually modest and affected by several factors such as age, gender, and COVID-19 infection history.

Keywords: *adverse effects, Binary Logistic Regression Model, COVID-19 Pandemic, Dubai Airport, uptake vaccine.*

Conflicts of interest: None declared**.**

Introduction

Since the global pandemic was declared, various corporations and research centres throughout the world have invested in the development of viable COVID-19 vaccination projects (SARS-CoV-2). In this regard, there is now an enormous toolkit of potential vaccines available. By July 2021, there were 184 COVID-19 vaccine candidates in pre-clinical development, 105 in clinical development, and 18 vaccines approved for emergency use by at least one regulatory authority (1). Notably, the developed COVID-19 vaccines are particularly essential to control COVID-19 as immunization is one of the best influential and cost-effective healthcare policies for impeding and controlling communicable diseases (2-5). In addition, to terminate the pandemic, a considerable portion of the population must be immune to the virus (5), with vaccination being the safest option. Vaccines are a method that humanity has used in the past to lessen the number of people who die as a result of infectious diseases (2,3,6). The United Arab Emirates (UAE) has licensed four COVID-19 vaccines for emergency use, including one from Sinopharm CNBG, another from Pfizer-BioNTech, a third from Sputnik V, and the most recent from Oxford-AstraZeneca (6). Most recently, the UAE registered Hyat-vax, a cooperative venture between Sinopharm CNBG and Abu 'Dhabi's G42. The UAE offers its residents vaccines free of charge and on a non-compulsory basis after safeguarding that the individual is eligible for vaccination. Nursing moms, pregnant women, and children as young as 12 years old are included in the eligibility criteria, with the Sinopharm CNBG vaccine given safely to younger children aged 5 years old (7). Indeed, the UAE government's and health officials' concerted efforts, as well as public participation, have resulted in the country's National Vaccination Programme's early success.

Worldwide, the UAE is first regarding vaccine administration rates to its residents, according to WHO and ‘'Our World in Data’' Data' websites (8) that track vaccination rates track by researchers at the University of Oxford. The data shows that as of October 19th 2021, The COVID-19 vaccination has been administered to at least 48.7% of the world's population. Globally, 6.87 billion doses have been administered, with 25.76 million doses being administered every day (8). The UAE registered 86% of the population fully vaccinated and 96% who received at least one dose (8), followed by Portugal at 88%; Chile at 85%; Spain 82%; Singapore 80%; Uruguay 79%; Canada 78% (8). Apart from the concern of a disappointing acceptance rate, the real uptake rate of pandemic immunizations may be significantly lower than the acceptance rate once the vaccine has been released and mass immunization programmes advocated (5,9). Recent articles have revealed certain influential variables on vaccination acceptance to aid in the explanation of vaccination reluctance or delay behaviour, and cultural, socioeconomic, and political differences between countries ought to be taken into consideration during the decision-making process of vaccination (10). In essence, vaccine safety has been cited as a major obstacle to vaccination coverage for new vaccines against developing pandemics, including the 2009 H1N1 pandemic (5,9), while attitudes and past routine immunization history, particularly influenza vaccination history, were the most significant predictor of pandemic vaccination coverage (11). Because the current pandemic is more severe in terms of transmissibility and death than previous influenza pandemics, nations all over the world, including the UAE, are under immense insistence to contain the present pandemic and avoid future devastating epidemic waves. Understanding the factors that influence COVID-19 vaccination acceptability

and discovering enablers for vaccination decisions are key components of designing successful strategies for increasing vaccination coverage among the public at large (12,13). Therefore, this piloting study aims to investigate the main factors affecting COVID-19 vaccination uptake among Dubai 'Airport's employees. In addition, it seeks to explore the main signs and symptoms that appeared on vaccinated employees after taking the COVID-19 vaccination, hence, track the safety of the accepted vaccine.

Methods

In January 2021, a cross-sectional survey was applied selecting Dubai 'Airport's employees using a systematic sampling method. Notably, systematic sampling is defined as a probability sampling method where the researcher chooses elements from a target population by selecting a random starting point and selects sample members after a fixed ‘sampling interval’ (14). Therefore, the researchers in this study selected the first participant in the sample frame as a random starting point where the sampling interval was fixed at 23. In this study, due to the availability of the sample frame, systematic sampling is more applicable than other sampling approaches (14-17). In addition, the financial plan of the study is tenuous and necessitates plainness in accomplishment and comprehending the consequences of a survey. The online poll was performed utilising the Google Forms platform, and the survey URL was distributed and publicised via official emails and social media sites like WhatsApp. The survey was executed between January 10th to 24th, 2021. The survey was open to all Dubai International Airports employees who were COVID-19 vaccinated, living in the UAE, and aged 20 and older. A sample size of 370 was computed utilising RaoSoft sample size calculator, in which we used 5% as a margin of error, 95% as a confidence level. To minimize the sampling error allied with the systematic sampling strategy and increase the accuracy of the sampling consequence including its predictive validity, the present investigation planned for a larger sample size (18). Therefore, out of 46000 vaccinated staff, 2000 respondents were systematically selected at 23 sampling intervals. A total of 2000 questionnaires were distributed, and 1007 employees participated, yielding a 50.4% response rate. The questionnaire was developed using the 5A model "Taxonomy for Vaccine Uptake Determinants" that was self-administered (19) and based upon studies which have been previously conducted and frameworks to observe factors contributing to the vaccine uptake in the case of newly discovered infectious diseases such as COVID-19, H1N1, and Ebola (5,20-25). The contents of the questionnaire included (1) socio-demographic characteristics (6 items), such as age, gender, marital status, educational level, nationality, history of diagnosing for COVID-19; (2) perceived factors affecting the vaccinated participants' decision to receive the COVID-19 vaccine (24 items); (3) main signs and symptoms that appeared on vaccinated staff after immunization (1 item). All of the questions were closed-ended, with response options in the form of tick boxes. Questions related to socio-demographic characteristics and immunization symptoms were treated as categorical variables. Questions related to main factors affecting 'participants' vaccination decision making against COVID-19 included 6 factors and were assessed on a five-point Likert scale (1) perceived knowledge on COVID-19 vaccination (5 items); (2) perceived beliefs on COVID-19 vaccination (4 items); (3) perceived vaccination safety (3 items); (4) perceived accessibility and affordability on vaccination (4 items); (5) perceived advice and information related to COVID-19 vaccination (4 items); (6) trust on vaccination (4 items). The perceived factors in this study

were scored on a 5-point Likert scale, with 1 representing "strongly disagree" and 5 representing "strongly agree," and a score of 3.41 or higher indicating that the identified factor strongly influences respondents' decisions to obtain the COVID-19 vaccine. In essence, the length of each scale that built on a five-point Likert scale can be calculated by dividing the scale extension on the total scale points (18,26). In this study, the scale extension is determined by 5-1= 4, and then the length of each scale is calculated by 4/5=0.8. Accordingly, 0.8 was added to the each scale which resulted in adopting 3.41 as threshold for identifying factors affecting respondents' decisions to obtain the COVID-19 vaccine.

A descriptive content analysis was performed in this study utilising frequency percentages and distribution to analyze 'respondents' socio-demographic characteristics and immunization symptoms in the data. To find any possible associations, the socio-demographic data of respondents was cross tabulated with factors influencing their decision on the adoption of the COVID-19 vaccine. To explore if age, gender, and COVID-19 infection history variables were playing a role in the probability of having adverse effects after COVID-19 vaccination, we used a binary logistic regression model. Reliability was assessed using Cronbach's alpha value, while construct validity was assessed using component loading analysis. In this study, 'Cronbach's alpha coefficient with a value of 0.60 and above will be accepted (26). In terms of factor loading, the Principle Component Analysis (PCA) was used, and the construct loading value of 0.50 was established as the typical cut-off point (26). The Statistical Package for Social Sciences (SPSS) version 25.0 was used to analyse the data.

Results

Participants' Description

The characteristics of respondents are presented in Table 1. In total, 1,007 employees took part in the current investigation, with 79.9% of them being male and the remaining 20.1% being female. The age groups of (20-29) and (30-39) reported for over two-thirds of the sample (79.7%).

Table 1 shows that 53.2% of respondents hold diplomas and bachelor's degrees, and 12% had postgraduate degrees; Married staff accounted for over half of the sample (57.2%). Regarding nationality, the sample consisted of 31.7% Emirati, 23.5% Indian, 27.3% Arab, and 17.5% from other countries. Furthermore, 12.8% of vaccinated employees reported previous infection with COVID-19.

Analysis of Factors Affecting COVID-19 Vaccine Acceptability

The research conducted analyses in accordance with the extracted elements in this study, and the findings revealed that with a mean of 4.4, employees overwhelmingly agree that the factor of accessibility and price has a significant impact on their decision to obtain the COVID-19 vaccine. The influence was followed by the trust in vaccine factor (4.3). The employees also noted that aspects related to their knowledge on the COVID19 vaccine (4.2) also contributed significantly to their decision to get the COVID-19 vaccine, followed by vaccine safety, advice and information related to the COVID-19 vaccine, and beliefs on vaccine factors with means of 4.1, 4.0, and 3.8; respectively. With an overall mean of 4.1, the targeted employees determined the six criteria as key reasons influencing their decision to obtain the COVID-19 vaccine (Table 2).

Table 1. The Characteristics of respondents

	Frequency	Percent (%)
Gender		
Male	805	79.9
Female	202	20.1
Age		
20-29	239	23.7
30-39	564	56.0
40-49	180	17.9
50-59	15	1.5
Over 60	9	0.9
Marital Status		
Single	379	37.6
Married	576	57.2
Widow	7	0.7
Divorced	45	4.5
Education Level		
High School	351	34.9
Diploma	186	18.5
Bachelor Degree	349	34.7
Master Degree	109	10.8
Doctorate Degree	12	1.2
Nationality		
UAE	319	31.7
Indian	237	23.5
Pakistan	57	5.7
Arab	275	27.3
Western	18	1.8
Other	101	10.0
Diagnosed for COVID-19		
Yes	129	12.8
No	878	87.2
Total	1007	100.0

Table 2. Mean Analysis of Vaccine Acceptability Factors

Factors	N	Mean	Std. deviation	Rank-ing
Perceived Knowledge on Vaccine	1007	4.20	.846	3
Perceived Beliefs on Vaccine	1007	3.82	.989	6
Perceived Safety on Vaccine	1007	4.10	.946	4
Accessibility & Affordability	1007	4.42	.678	1
Advice & Information	1007	4.03	.942	5
Perceived Trust on Vaccine	1007	4.31	.899	2
Overall Mean			**4.14**	

In a bid to interpret the results, Employee's demographic data was cross-tabulated with factors influencing their decision to get the COVID-19 vaccine. The X^2 tests listed in Table 3. Table 3 indicated significant results ($p<0.05$) for gender, age, marital status, educational level, nationality, and known infection with Covid-19. The overall agreement was 82.8% (11.7% not sure; 5.5% disagree).

Table 3. Cross-tabulation of Factors Affecting the COVID-19 Vaccine Acceptability with Employees' Demographical Data

Characteristics of Participants	Disagree (0.00-2.60)	Not Sure (2.61-3.40)	Agree (3.41-5.00)	Chi-Square	P
Overall Agreement	5.5%	11.7%	82.8%	NA	
Gender					
Male	5.7%	17.3%	77%	753.305	*(.001)*
Female	5.3%	6.1%	88.6%		
Age					
20-29	7.6%	16%	76.4%	837.596	*(.000)*
30-39	1.6%	15.6%	82.8%		
40-49	8%	11.7%	80.3%		
50-59	7.1%	7.8%	85.1%		
Over 60	3.4%	7.4%	89.2%		
Marital Status					
Single	6.6%	19.4%	74%	767.987	*(.002)*
Married	4.4%	4%	91.6%		
Widow	6.1%	10.2%	83.7%		
Divorced	4.9%	13.2%	81.9%		
Education Level					
High School	7.1%	18.6%	74.3%	872.589	*(.000)*
Diploma	6.2%	12%	81.8%		
Bachelor	6.5%	17.5%	76%		
Master	2.9%	4.7%	92.4%		
Doctorate	4.8%	5.6%	89.6%		
Nationality					
UAE	6.1%	5.5%	88.4%	425.431	*(.043)*

Indian	4.9%	3.8%	91.3%		
Pakistan	7.5%	15.3%	77.2%		
Arab	3.5%	2.8%	93.7%		
Western	4.8%	23.3%	71.9%		
Other	6.2%	19.5%	74.3%		
Diagnosed for COVID-19					
Yes	2.8%	3%	94.2%	613.556	*(.003)*
No	8.2%	20.4%	71.4%		

Analysis on Signs &Symptoms which appeared after Immunization

The results show that 53.7% of vaccinated staff was found to have one or more side effects of the vaccine, where 0% of them were hospitalized after immunization (Table 4). Moreover, the table below reveals that 23.1% of them had symptoms related to the injection site, such as shoulder soreness. The table further shows that 18.5% of them had headaches, where close to 1% had mild allergic reactions such as hives, wheezing, shortness of breath, and tachycardia (Table 4).

Table 4. Main Signs & Symptoms Reported after Immunization

Sign & Symptoms	N	Frequency	Percentage (%)
Signs related to injection site	541	125	23.1%
Body aches	541	56	10.4%
Full-body rash	541	16	2.9%
Fever	541	45	8.3%
Dizziness or fainting	541	8	1.5%
Numbness	541	5	.9%
Difficulty walking	541	54	9.9%
Headache	541	100	18.5%
Allergic reactions	541	7	1.3%
Body aches & Fever	541	21	3.9%
Fever & Headache	541	49	9.1%
Dizziness, Fever & Headache	541	36	6.7%
Headache & allergic reactions	541	9	1.6%

To further analyse the association between the sociodemographic representation (gender, age, and COVID-19 infection history) of the sample and the main symptoms that appeared after vaccination, a multivariate analysis using binary logistic regression analysis was performed. Table 5 shows multivariate results of factors associated with the main symptoms that appeared after vaccination. It reveals that the gender of participants had a significant association with the main symptoms that appeared after vaccination. In this regard, the analysis shows that females were two times more likely to have vaccine's symptoms after dosage than males (Exp (B): 1.6; 95%CI: 1.127 - 2.351, P< .01). Age is another variable that was found to significantly affect the vaccine's symptoms occurrence. Participants in the age group over 50 were 3 times more likely to have vaccine's

symptoms after vaccination than participants in the age group 20-29 (Exp (B): 2.9; 95%CI: 2.497- 9.681, P< .001). Finally, the logistic regression analysis indicates that the COVID-19 infection history of participants had a significant association with the main symptoms that appeared after vaccination. The analysis shows that participants with COVID-19 infection history were twice more likely to have vaccine's symptoms after vaccination than the group who do not have any infection history of COVID-19 (Exp (B): 1.9; 95%CI: 1.272 - 2.542, P< .01). In other words, having a history of COVID-19 is significantly associated with vaccine's signs and symptoms occurrence.

Table 5. Logistic Regression Analysis of Factors Associated with Reported Symptoms after Vaccination

Sociodemographic Factor	Exp (B)	95.0% C.I. for EXP(B)	P
Gender			
Male	Ref (1.00)		
Female	1.637**	1.127 - 2.351	*P< .01*
Age			
20-29	Ref (1.00)		
30-39	.973	.471 - 1.962	----------
40-49	.998	.462 - 2.640	----------
Over 50	2.9423***	1.997- 5.681	*P< .001*
Diagnosed for COVID-19			
No	Ref (1.00)		
Yes	1.879**	1.272 - 2.542	*P< .01*

*p<0.05; **p<0.01; ***p<0.001.

Discussion

Vaccine uptake is determined by the vaccine's accessibility and pricing. This topic is about whether the public can get to the clinic (logistics) and how much the vaccine costs (affordability). In line with this study's results, previous studies show that accessibility and affordability were associated with uptake of the vaccines (5,27). Vaccine uptake necessitates a high level of faith in the vaccine, the country of origin, the provider (particularly healthcare experts), and the policy-maker. In regression analysis of much research that looked at the correlation between trust and vaccination uptake, trust in the vaccine, healthcare providers, and the health system were found to reliably predict vaccine uptake or was found to be significantly associated with retrospective reports of vaccine uptake (28). Not believing or knowing that a vaccine is necessary or recommended was one (and sometimes the most important) cause for vaccine non-adoption (25). Notably, vaccination non-uptake was linked to the belief that COVID-19 is not hazardous. The willingness to get a vaccination is also influenced by a person's perception of or understanding of certain signs of infectious disease. After reading about the symptoms of pertussis in the elderly, for example, more adults aged 65 and up (54 percent) agreed to get the vaccine (21). The belief that herpes zoster causes only temporary pain, on the other hand, was linked to a lower likelihood of vaccination. The ability to understand the properties of a vaccine has an impact on whether or not to get vaccinated. The most common cause provided for the vaccine's

limited adoption was a lack of knowledge about its effectiveness and safety (21). In our study, "perceived vaccine safety" was the fourth factor playing a substantial role in up taking the COVID-19 vaccine. In essence, vaccine safety has been identified as a basic impediment to vaccination choices, particularly for newly launched vaccinations that have not been adequately evaluated in the real world (5). The sixth theme in this study that affected vaccine uptake was advice and information. Healthcare practitioners had a positive impact on the population's vaccination rate, as well as their vaccination intentions and commitment. For example, older individuals who got a proficient recommendation had much greater vaccination rates than those who did not. According to one research, government and media information can help people become vaccinated (29). Finally, the participants weighed the apparent benefits and drawbacks before deciding to take the vaccination. Vaccination was viewed as a preventative measure to enhance their health in several studies (4). Consideration of vaccination as smart, vital, or useful were similar ideas that clearly affected or anticipated vaccine acceptance. Other predictors as noted by Tuite et al. (29) included things like safeguarding others and living with others who could be exposed. Vaccine uptake was inversely correlated with perceptions that immunization impairs one's natural defenses, is unpleasant, causes sickness, or is unrelated to one's health (4). In this study, the agreement level on factors affecting the COVID-19 vaccine uptake was found significantly to be higher in females (88.6%) than males (77%) who are married (91.6%), and aged over 60 years (89.2%), while holding a master's degree (92.4%). Although the results in this study don't match previous studies findings (30), during the spread of COVID-19, women were put under more stress and had a larger physiological load than males, and they were also exposed to a greater risk of infection, which compelled them to be vaccinated. Furthermore, women have a greater immunological response to vaccinations than males, which may assist women lessen the long-term consequences of COVID-19 (31). A higher proportion of older participants perceived factors affecting COVID-19 vaccine uptake, which could be related to the fact that they are most at-risk of morbidity and mortality; older people who become ill have more complex medical conditions and higher healthcare needs than younger people who become ill. The findings in this study showed that 53.7% of vaccinated staff was found to have one or more side effects of the vaccine, where 0% of them were hospitalized after immunization. Moreover, the results revealed that 23.1% of them had symptoms related to injection site, where close to 1% had mild allergic reactions. The findings of this study are consistent with WHO recommendations, which said that COVID-19 vaccination is safe and that adverse effects from a vaccine are usually modest and transient, such as a sore arm, headache, or moderate fever, on December 30, 2020. More adverse side effects are possible but extremely rare (13). However, the findings of previous studies match our study findings, as the most common side effect that appeared on vaccinated staff was symptoms related to injection site (23.1%). In a population-based study, the estimated relative incidence of vaccination allergic reactions during the primary risk interval (weeks 2–7) was 1.45 (95% confidence range, 1.05–1.99; P =.02) compared to the control interval (weeks 20–43). This study discovered that influenza vaccination is connected to a small risk of hospitalization due to the vaccine's side effects (32). This result is consistent with our research, which found that following inoculation, 0% of Dubai airport employees were hospitalised. The results in this study indicated that females who are

aged more than 50 years are more likely to have side effects after immunization compared to male and young persons. This result was supported by several studies. Analysis by gender of 14 studies has revealed that elderly females report significantly more local reactions (13). In healthy young adults, placebo-controlled trials demonstrated that inactivated influenza vaccination does not result in greater frequencies of systemic symptoms (e.g., fever, malaise, myalgia, and headache) when compared to placebo injections (33). Systemic adverse effects were more likely in those over 65 years old when a vaccination with a high dosage of 180 mcg of HA antigen (36 per 100 vaccinees) was compared to a usual dose of 45 mcg (24 per 100 vaccinees). The majority of the participants' symptoms were minor and temporary, and they went away within 3 days. (34). Finally, this study indicated that having a history of COVID-19 is significantly associated with vaccine's symptoms occurrence. Several recent studies are in line with the findings of this study. Menni et al. (35) examined the proportion and probability of self-reported systemic and local side effects within 8 days of vaccination in 627383 people in the UK. According to the researchers, individuals who had previously been infected with SARS-CoV-2 exhibited more systemic adverse effects than those who had not. Notably, vaccines have been discovered to have increased immunogenicity in people who have previously been unwell, and these people have greater antibody titres than those who have never been ill (35).

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