

# Measuring the Factors Influencing the Acceptance of COVID-19 Vaccines in the Western Region of Saudi Arabia

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## Abstract

Understanding key factors of the acceptance of COVID-19 vaccines by the community could aid governmental agencies, medical practitioners, and other entities in reducing the impact of vaccine avoidance. The study aimed to assess the factors influencing people's acceptance and refusal to receive the COVID-19 vaccination in the Western Region of Saudi Arabia. A cross-sectional study using an e-questionnaire was used to collect responses from consenting participants aged over 12 who are residents in the Western Region of Saudi Arabia. A validated and pre-tested questionnaire was used that recorded socio-demographic details, awareness about COVID-19 vaccines, attitudes toward vaccination in general, and factors influencing the decision of COVID-19 vaccine compliance.

The COVID-19 vaccine administration rate was 96.5%, and the most commonly administered vaccine was Pfizer-BioNTech (78%). The most widely reported influencing factor was intrinsic influences. Vaccine administration was significantly higher among those who believed COVID-19 vaccines are safe ( $p < 0.001$ ) and those who believed vaccines could help in controlling in pandemic ( $p < 0.001$ ). The public's trust in vaccines can be increased by distributing information about the vaccine's safety and undertaking health education initiatives.

**Keywords:** COVID-19 vaccine, Public's trust, Vaccine's safety, Factors influencing, Saudi Arabia

## INTRODUCTION

Vaccinations are one of the critical measures used by public health authorities to control the spread of vaccine-preventable communicable diseases. Many vaccines nowadays have been authorized around the globe as an attempt to manage the pandemic of COVID-19. The public's response to these vaccines has been divided into different views. Equitable access to safe and effective vaccines provides the best chance to control this pandemic, both nationally and internationally. However, providing these vaccines alone does not mean that individuals could be less careful and put themselves and others at risk, particularly because the vaccine's effectiveness is still under active research. For instance, to develop herd immunity, which is the level of protection that prevents the transmission of infectious disease among the population, variations of COVID-19 that are more transmissible or less influenced by the vaccination will require a higher degree of immunity in the population [1].

Current studies have shown vaccinations to be the most effective way to stop the accelerated spread of infectious diseases [2]. On the other hand, vaccine hesitancy, *which relates to vaccine impediment of compliance or rejection regardless of vaccine availability*, is becoming a rising immunization challenge [3]. Apprehension of vaccines is complicated and context-dependent and varies by time, region, and type of vaccine [4].

Pharmaceuticals have developed multiple COVID-19 vaccines, such as mRNA-based vaccines like BNT162, developed by Pfizer/BioNTech, and mRNA-1273, developed by Moderna [5]. Although effective vaccines are attainable, vaccine hesitancy is hindering the containment of the COVID-19 pandemic because of the misleading information and false rumors circulating these vaccines [6].

Studies have shown how the public's opinion is generally affected by what is presented in the media. Indeed, in 2021, research done in the US showed that the credibility of public health agencies had been weakened by politics influencing their decision to award the Emergency Use Authorization (EUA) for hydroxychloroquine and convalescent plasma.

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These agencies had to authorize the use of COVID-19 vaccines, establish vaccine recommendations, and start a vast immunization campaign that reached nearly every American to regain the public's trust. By late fall, as the US media reports widely addressed the 95% vaccination efficacy, the percentage of US adults indicating the intent to vaccinate against COVID-19 had risen to above 60%. Receiving a provider recommendation and having a higher fear of COVID-19 were linked to a higher intention to vaccinate. Nonetheless, younger age, African American race, poorer education, and conservative political ideology were all linked to a lower desire to vaccinate [1].

As a result, several studies have discovered that vaccine apprehension is linked to a variety of factors, including vaccine side effects, misconceptions about the need for vaccination, vaccination history, lack of trust in the health system, lack of vaccine and disease literacy, and disease severity, and so on. Additionally, the vaccination's safety and efficacy, as well as the provision of vaccines free of charge by the government, were strong indicators of vaccine compliance [7-9].

The spread of misinformation, fake news, hesitancy, and conspiracy theories have eroded the public's faith in vaccinations and consequently created a considerable problem for public health scientists and policymakers worldwide as those factors have influenced the public's attitude and decision regarding being vaccinated. An example is the 2003–2004 Nigerian polio vaccine boycott, which resulted in an outbreak of the illness. That is why communal agreement and efforts regarding COVID-19 hesitation are required to establish confidence between the public, health scientists, and policymakers, resulting in better handling of the pandemic and reducing morbidity and mortality [2].

A meta-analysis of 126 studies on the moderating factors of China's influenza vaccination program found that having a higher school education, believing vaccines are safe and effective, considering the severity of disease, receiving advice from healthcare workers, and previously having obtained influenza vaccination were all linked to higher vaccination coverage. Furthermore, past research has linked lower depression symptoms and higher anxiety symptoms to increased vaccine uptake. Contagion is more likely in specific subpopulations, such as college students who usually live and study in crowded areas, than others. Regarding college students, who are more knowledgeable, more accessible, and respond promptly to public health issues than other subpopulations, the perspective toward COVID-19 vaccines is likely to be different. Be that as it may, vaccination safety/efficacy concerns were associated with vaccine acceptability in a study of medical students in the United States. In comparison, little is known about how students in other fields feel about the COVID-19 vaccination [10].

Recent studies found that vaccine hesitancy in Italy is 41% [11]. On the other hand, recent studies have shown that the

acceptance of the COVID-19 vaccine reached 69% of adults who are willing to take the vaccine [12]. Likewise, about half of adults in the United States (51%) indicated they would or probably accept the vaccine [13].

A study conducted in Saudi Arabia in 2020 showed the prevalence of COVID-19 vaccine compliance and its determinants among people in Saudi Arabia. It included four major Saudi cities (Riyadh, Jeddah, Dammam, and Abha) along with some other minor ones in the country. In this study, the percentage of people accepting the vaccination was 64.7%. The ones who refused COVID-19 vaccination were 7.0%, and the rest (28.2%) said "not sure" about taking the vaccine when it is available [14].

A literature review has shown limited evidence of studies measuring the factors influencing the acceptance of COVID-19 vaccines in the Western Region of Saudi Arabia. Our study aims to assess the factors that affect people's acceptance and refusal to receive the COVID-19 vaccination in the Western Region of Saudi Arabia to guide them in achieving the goals of the Saudi vaccination program.

## MATERIALS AND METHODS

A Cross-Sectional study was done in the Western Region during the period from 1 September 2021 to 31 May 2022. Our study population was people who lived in the Western Region of Saudi Arabia. A sample size of 855 individuals aged 12 and above living in the Western Region of both genders was included in the study.

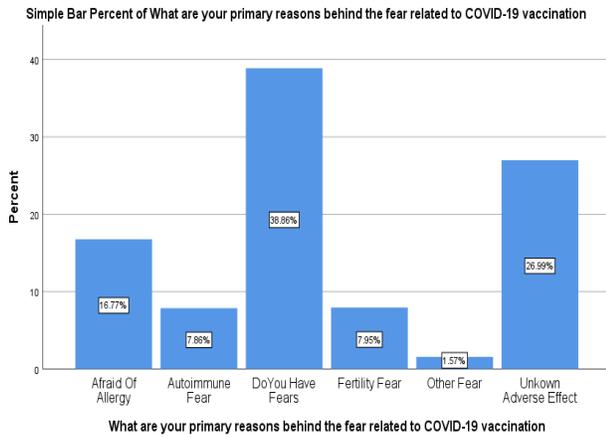
People who do not live in the Western region and anyone younger than 12 years old were excluded from this study.

The questionnaire was adopted from several studies [2, 15-17] and validated by two experts. After that, a piloting study was conducted on 14 individuals, and needed changes were adopted in the finalized questionnaire. The survey was conducted using an electronic questionnaire written in Arabic and English where socio-demographic information, awareness about COVID-19 vaccines, attitudes toward vaccination in general, and factors influencing the decision of COVID-19 vaccine compliance were addressed.

Data entry was performed using Microsoft Excel 2010, and statistical analysis was conducted via SPSS V21.

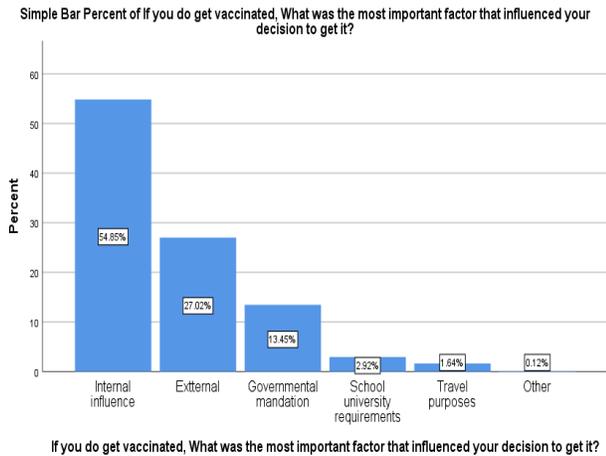
An ethical approval form was sent, and we got approval from November 2021 to November 2022 with the letter number (34-046).

## RESULTS AND DISCUSSION



**Figure 1.** The main reasons for fear of taking the covid-19 vaccine.

**Figure 1** shows that 38.86% of people are afraid of taking the covid vaccine, while 7.66% have Autoimmune fear.



**Figure 2.** The important factors influencing the decision to take the covid-19 vaccine.

**Figure 2** shows that 54.85% of people had internal influences, while 1.64% of people’s influences were for travel purposes.

**Table 1.** Socio-demographic characteristics of participants

		Frequency	Percentage
<b>Gender</b>	Male	151	16.8
	Female	704	78.2
<b>Age groups</b>	12-22	94	10.4
	22-31	251	27.9
	32-41	168	18.7
	42-51	195	21.7
	52-61	115	12.8
	61 and above	32	3.6
<b>Marital status</b>	Single	303	33.7
	Married	487	54.1
	Divorcee	41	4.6

<b>Nationality</b>	Widower	24	2.7
	Saudi	783	87.0
	Non-Saudi	72	8.0
<b>Live in</b>	Taif	374	41.6
	Makkah	169	18.8
	Jeddah	262	29.1
	Al-Madina	25	2.8
	Yanbu	22	2.4
	Turbah	1	0.1
	Bahrah	1	0.1
<b>Education (Degree)</b>	Mastorah	1	0.1
	Elementary and middle school	32	3.6
	High school	146	16.2
	Diploma	59	6.6
	Undergraduate	501	55.7
<b>educational (background)</b>	Postgraduate	117	13.0
	Health-related	195	21.7
	Non-health related	543	60.3
<b>Chronic disease</b>	Yes	140	16.4
	No	715	83.6

**Table 1** shows the socio-demographic characteristic: Females were higher than males (78.2%), most of the participants were (22-31years) in age (27.9%), (and 54.1%) were married. Saudi nationality was the majority, with 87%, and most of them were in Taif city (41.6%). Undergraduates took the upper hand (55.7%). Most of our participants had non-health-related education (60.3%), and (83.6%) did not suffer from any chronic disease.

**Table 2.** collected data about covid 19 vaccine and the influenza vaccine

		Frequency	Percentage
Administration of covid vaccine	yes	825	96.5%
	no	30	3.5%
Number of doses	One dose		
	Two doses		
	Three doses		
Type of vaccine	Pfizer	1297	78%
	AstraZeneca	339	20%
Administration of influenza vaccine	Moderna	33	2%
	Yes	169	20%
Sources of information about COVID-19 vaccines	no	656	80%
	Media and internet	326	20%
	Government	658	40%
	Healthcare	325	21%
	Family members	79	5%
	Scientific resources	173	11%
	I don't trust	52	3%

**Table 2** shows that 96.5% of the participants have received the COVID-19 vaccine. Meanwhile, Pfizer had the highest percentage of administered doses (78%). Finally, the table shows that only 20% of the participants received the influenza vaccine. The number one influencing factor in receiving the COVID-19 vaccine was the government (40%), then came healthcare and the media, and the internet (21%) and (20%), respectively. (11%) of the participants trusted scientific

resources, (5%) trusted their family members, and (3%) didn't trust any source of information.

**Table 3.** Factors that may influence the decision-making about vaccines

		Frequency	Percentage
Believe in the safety of the vaccine	Yes	731	81.2%
	No	124	13.8%
Previous witnessed side effects of the vaccine	Yes	325	36.1%
	No	530	58.9%
Medical history has influenced your decision to take the vaccine	Yes	132	14.7%
	No	723	80.3%
Natural immunity from disease is better	Yes	341	37.9%
	No	514	57.1%
	Strongly agree	404	44.9%
The vaccines could control the pandemic	Somewhat agree	231	25.7%
	Nether	166	18.4%
	Strongly disagree	54	6%

**Table 3** shows that the participants who (believed in the safety of the vaccine), (believed that getting natural immunity from the disease is better), and (those who witnessed side effects of the vaccine) were 81.2%, 37.9%, and 36.1%, respectively. Participants who strongly agreed that (a vaccine could control the pandemic) were 44.9%, and those who strongly disagreed were 6%.

**Table 4.** Relationship between taking the vaccine and factors influencing the vaccine

		Administer of vaccine		Chi-Square	P-value
		Yes	No		
The vaccine could control the pandemic	Strongly agree	404 (49%)	0 (0.0%)	80.939 <sup>a</sup>	0.000
	Somewhat agree	226 (27.4%)	5 (16.7%)		
	Nether	153 (18.5%)	13 (43.3%)		
	Strongly disagree	42 (5.1%)	12 (40%)		
Natural immunity from disease is better	Yes	314 (38.1%)	27 (90%)	32.570 <sup>a</sup>	0.000
	No	511 (61.9%)	3 (10%)		
Medical history has influenced your decision to take the vaccine	Yes	126 (15.3%)	6 (20%)	.496 <sup>a</sup>	0.481
	No	699 (84.7%)	24 (80%)		
Previously witnessed side effects of the vaccine	Yes	310 (37.6%)	15 (50%)	1.896 <sup>a</sup>	0.168
	No	515 (62.4%)	15 (50%)		

Believe about the safety of the vaccine	Yes	719 (87,2%)	12 (40.0%)	51.903 <sup>a</sup>	0.000
	No	106 (12.8%)	18 (60.0%)		

**Table 4** shows that the significant factors were the belief that vaccines could control the pandemic (p-value 0.000), the belief that natural immunity from the disease is better (p-value 0.000), and the belief that vaccines are safe (0.000).

The findings of our study showed that about 96.5% of the participants had taken at least two doses of COVID-19 vaccines, whereas only 20% had taken the influenza vaccine. The difference in the percentage of intake between these two vaccines could be attributed to the severity, mortality rate, societal disruption, and resultant media coverage that the COVID-19 pandemic has created compared to influenza. A global survey conducted among participants from 19 countries showed that COVID-19 vaccine acceptance ranged from 54.9% to 88.6%. Chinese participants had the highest positive response, and those from Russia had the lowest positive responses [18]. Pfizer-BioNTech was the first approved SARS-CoV-2 vaccine in the Kingdom of Saudi Arabia (KSA). In KSA, AstraZeneca, Pfizer-BioNTech, and Moderna are the only three approved SARS-CoV-2 vaccines for use [19].

Reluctance or unwillingness to vaccinate despite vaccine availability is considered one of the most serious public health issues. Various factors influence an individual's willingness to be vaccinated, and each has a substantial effect [20, 21]. Our findings showed that 13.8% believed that COVID-19 vaccines are not safe, and 36.1% had witnessed some side effects from these vaccines. Evidence suggests that building trust in COVID-19 vaccines is crucial to vaccine acceptance by the public, and there is a need for transparency regarding vaccine development's speed and safety [22]. However, our study's acceptance level is higher than another study done in the southern region of KSA [23]. The higher acceptance levels in our study are evidence of the significant benefits and outcomes of COVID-19 vaccines despite the anti-vaccination movements' baseless and unscientific propaganda.

The current study findings showed that participants who agreed to administer vaccines could control the pandemic were the ones who took the vaccines comparatively more than those who didn't agree. The low acceptance of the COVID-19 vaccine (57–69 %) can be attributed to a lack of trust and misleading information [24, 25]. In KSA, COVID-19 vaccines are administered free of cost to the citizens and residents, and the Saudi Government is aiming for 100% uptake of the COVID-19 vaccine by its citizens and residents [26].

The methods to inform the public about vaccination should be suitable and accessible to people with less health literacy and education and culturally and linguistically diverse

groups, including indigenous peoples. Primary-care physicians are anticipated to be at the forefront of COVID-19 vaccine education and administration. Given their status as a trusted source, they must be supported in making recommendations regarding the COVID-19 vaccination while assuaging fears if we are to meet the vaccine uptake target in the KSA.

In our study, participants who believed COVID-19 vaccines were safe were the ones who took vaccines more than others who didn't believe. Immunization campaigns can only be successful if the vaccines are believed to be both safe and effective [27]. Among those vaccinated, intrinsic influences were the most cited factor that made them take the vaccine.

Vaccination effectiveness is the most critical factor that needs to be considered when weighing benefits, risks, and costs [28-31]. The fast-track developments of COVID-19 vaccines have purportedly sparked fears about their safety and long-term implications, even among medical professionals [24, 32-34].

The majority of the population in a country must participate in immunization programs for them to be successful. Some individuals are probably "free-riding" on vaccination initiatives, allowing others to benefit while remaining unvaccinated to maintain disease below tolerable limits. Given the prospect of varied efficacy rates among the COVID-19 vaccines now under development and the necessity for revaccination, public health professionals may wish to acknowledge this possibility ahead to prevent additional loss of trust. Our findings revealed that the COVID-19 vaccine acceptability was comparatively higher despite vaccine hesitancy. The higher acceptability rate could be attributed to many factors, such as strict governmental mandates, fear of getting infected and hospitalized, and transmitting to others.

One of the study limitations was convenience sampling using the online survey method, and the results may not have accurately reflected the western KSA region's general population. Another limitation of this study is that vaccinating factors were measured by self-reported assessment rather than objective measurement, leading to social desirability bias.

## CONCLUSION

This study showed higher COVID-19 vaccine acceptability amid the fears the participants had. The most influential factor for accepting the COVID-19 vaccine was the intrinsic influence, followed by the external influence and governmental mandates. Vaccine administration was significantly more among those who believed it could control the pandemic and those who believed that these vaccines were safe. Engaging vaccine communication specialists and the public in developing communication and long-term

vaccine strategic planning is crucial for achieving herd immunity.

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