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Coronavirus Pandemic

Acceptance and barriers of COVID-19 vaccination among people with chronic diseases in Saudi Arabia

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Abstract

Introduction: Coronavirus Disease 2019 is a life-threatening disease, especially for people suffering from chronic diseases. As the vaccine is considered an essential tool to confront pandemics, many international medical institutions have developed vaccines. Countries around the world started immunizing their citizens. This study aims to assess the acceptance and barriers of COVID-19 vaccine uptake among Saudi Arabian people who suffer from chronic diseases.

Methodology: In February-March 2021, a cross-sectional study of Saudi Arabian people who have chronic diseases was undertaken. It was based on an Arabic self-administered online questionnaire and used a convenience sampling technique. 310 people were invited. The response rate was 97%.

Results: 51.95% of the participants agreed to take the COVID-19 vaccine, 33.5% were unsure about being vaccinated, and 14.5% refused. The most frequent concerns between participants and receiving the vaccine were about the side effects and the perceived misconception that following preventative measures is enough to protect against the virus. Significant associations between age, education, and occupation with acceptance rate were found ($p < 0.05$).

Conclusions: Although a higher acceptance for the targeted group was expected, the participants showed a moderate acceptance of the COVID-19 vaccine. Addressing the barriers in the current study regarding vaccine uptake and focusing on building trust in the safety and efficacy of the vaccine will aid in hesitancy and resistance toward the vaccine, specifically if these measures were undertaken by an authority such as the Saudi Ministry of Health.

Key words: COVID-19; vaccine; acceptance; barriers; Saudi Arabia; chronic diseases.

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Introduction

Background information

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a virus that causes a respiratory infectious disease called coronavirus disease 2019 (COVID-19). The first identified case was in Wuhan, China, in December 2019. The disease then spread globally and became a pandemic [1].

The main route the COVID-19 transmits is through droplets that spread when an infected person coughs or sneezes. In contrast, social distancing, wearing masks, washing hands, and using a hand disinfectant (at least 60% alcohol) could be effective precautions to prevent the disease [2].

Chronic diseases such as heart disease, diabetes, and cancer are defined as; conditions that last more than one year, cannot be cured, and require continuous medical attention [3]. The World Health Organization (WHO) indicates that the most vulnerable people to get severe complications from the COVID-19 have chronic diseases [4].

According to the Center for Disease Control and Prevention (CDC), "Vaccination is the act of introducing virus into the body to produce immunity to a specific disease" [5] Vaccines save millions of lives by protecting people from more than 20 life-threatening infectious diseases [6]. Several vaccines received emergency use authorization, such as Pfizer-BioNTech, Moderna, and Oxford/AstraZeneca. They could prevent severe complications of the COVID-19 infection that might lead to death [7].

Two doses of the Pfizer-BioNTech vaccine should be taken separated by 21 days. Furthermore, the efficiency of the Pfizer-BioNTech vaccine reaches up to 95% after seven days from getting the second dose, noting that it only should be provided for people aged 16 years or higher [8]. Comparatively, the efficacy of the Oxford/AstraZeneca vaccine was 76% against

COVID -19 disease and can increase to 82% after the second dose [9]. The interval between the two doses is from 4 to 12 weeks and is recommended for people aged 18 and above. In addition, Oxford/AstraZeneca vaccine is distinguished because it works against the viral variants of COVID-19 [10].

The Saudi Food & Drug Authority has approved Pfizer-BioNTech and Oxford/AstraZeneca vaccine against the COVID-19 [11,12]. More than 1.7 million citizens and residents have received the vaccine [13].

The confirmed cases of COVID-19 have been reached up to more than 119 million worldwide, while the number of deaths has crossed two million [14].

In Saudi Arabia, positive cases were in excess of 382 thousand, with more than 6,556 deaths [15]. A study conducted in China indicated that 91.3% of the participants accepted the COVID-19 vaccination as it had been developed and approved successfully [16]. A study conducted in Saudi Arabia by Rania and Fatemah (2020), detailed that 44.7% of the participants intend to take the vaccine [17]. Another study by Bijaya and Mohammed (2020) stated that more than half of the participants in Saudi Arabia are willing to be vaccinated [18].

The studies that have been done to assess the acceptance of the COVID-19 vaccine among the general population in Saudi Arabia are limited [17,18].

This study aims to assess the acceptance and barriers of the COVID-19 vaccine uptake among people suffering from chronic diseases in Saudi Arabia, as they are at an increased risk of suffering from severe complications of COVID-19. The Saudi Ministry of Health (MOH) have made efforts in raising awareness towards the COVID-19 vaccine by conducting campaigns like (take a step) campaign [19]. The critical information from this study regarding the acceptance and barriers of COVID-19 vaccine uptake will assist in planning a suitable and targeted approach for applying for a mass vaccination program.

Objectives

- Examine the acceptance of COVID-19 vaccine uptake among people with chronic diseases in Saudi Arabia.
- Identify the barriers associated with COVID-19 vaccine uptake among people with chronic diseases in Saudi Arabia.
- Investigate the association between sociodemographic factors and COVID-19 vaccine acceptance rate among people with chronic diseases in Saudi Arabia.
- Measure the validity and reliability of acceptance and barriers of COVID-19 vaccine among people with chronic diseases questionnaire.

Methodology

Study design / Place of study / Study population

A cross-sectional study was conducted among people with chronic diseases. The ultimate sample size was collected using a convenience sampling technique. An online questionnaire was distributed through social media apps like; WhatsApp and Twitter in Saudi Arabia from February-March 2021. This excluded people less than 15 years old as the vaccine is not provided for this age category.

Sample size

Using the Epitools website, the calculated sample size was 246, where the proportion was set at 50% (maximum sample size), with a 0.05 degree of accuracy.

Data collection

A structured self-administered online questionnaire was designed based on a literature review, and guided by, Rania and Fatemah's (2020) study [17]. The questionnaire included 27 questions divided into two sections. The first section deals with the demographic characteristic. It consists of 19 questions (age, gender, marital status, educational level, mothers education, fathers education, occupation, income, having a chronic disease, name of the disease, COVID-19 infection, relative with COVID-19, seasonal influenza vaccine uptake, and smoking). The second section is about the acceptance and barriers of the COVID-19 vaccine and consists of 9 questions. The researchers completed the questionnaire for illiterate people.

Validity and reliability of acceptance and barriers of COVID-19 vaccine among people with chronic diseases questionnaire

The Average Congruency Percentage (ACP) and Index for Individual Item (I-CVI) was applied by three experts. The obtained ACP for the questionnaire was 97%, while the I-CVI was 91%.

Face validity of the questionnairewas tested based on a pilot study carried out on 21 participants with chronic diseases divided into 3 age groups. Youth (16-24 years), adults (25-64 years), and seniors (65 years and over) [20]. In addition, the internal consistency of the questionnaire was 0.8 using the Cronbach alpha and

based on a pilot study. However, the data collected from pilot study was excluded from this study.

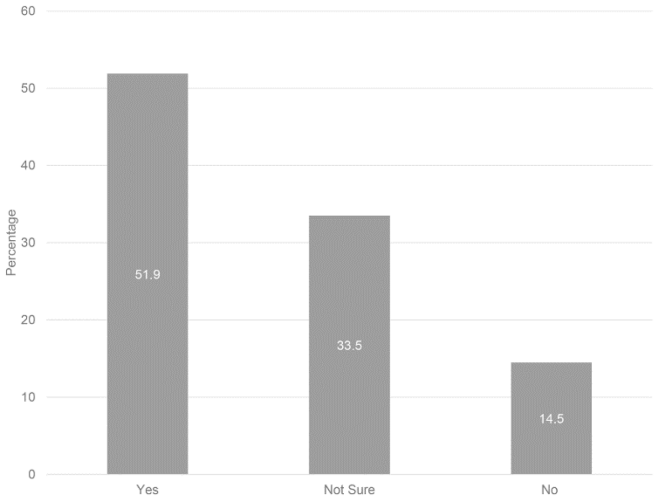
Statistical analysis

The data was coded and entered using JMP software version 14.2. For descriptive statistics, frequencies, percentages, mean, and standard deviation were used as appropriate. The Pearson chi-square test and Kruskal (a non-parametric test where the data is not normally distributed) was used to measure the association between variables, and p-value ≤ 0.05 was considered statistically significant.

Table 1. Sociodemographic characteristics of the participants.

Variable	N (%)
Age (Mean ± SD (years))	41.0 ± 14.3
Gender	
Female	194 (62.6)
Male	116 (37.4)
Marital status	
Married	199) 64.2)
Single	91 (29.4)
Divorced	8 (2.6)
Widowed	12 (3.9)
Chronic diseases	
Diabetes	109 (35.0)
Hyper/Hypotension	78 (25.0)
Colon diseases	69 (22.2)
Cardiovascular	33 (10.6)
Allergy	64 (20.6)
Respiratory diseases	51 (16.4)
Immune system diseases	13 (4.2)
Mental illness	13 (4.2)
Cancer	8 (2.6)
Kidney diseases	2 (0.6)
Other	23 (7.4)
Living region	
Central	240 (77.1)
Northern	7 (2.3)
Western	34 (10.9)
Eastern	10) 3.2)
Southern	20 (6.4)
Educational level	
Illiterate	8 (2.6)
Intermediate or low	40 (12.9)
High school	72 (23.2)
University	168 (54.1)
Postgraduate	23 (7.4)
Occupation	
Employer	128 (41.8)
Student	45 (14.7)
Unemployed	93 (30.0)
Retired	40 (13.1)
Family income	
Less than 5000	69 (22.5)
5000 – 10,000	108 (35.2)
More than 10,000	130 (42.3)
Smoking status	
Smoker	49 (15.9)
Non-smoker	259 (84.1)

Figure 1. Intention to uptake COVID-19 vaccine.



Ethical consideration

The institutional review board at Princess Nourah Bint Abdulrahman University approved the study. Informed consent was obtained from participants toguarantee the anonymity and confidentiality of their information. Moreover, they were informed that they could withdraw from the study at any time.

Results

Table 1 demonstrates the distribution of sociodemographic characteristics among the participants. The mean age of participants was 41.0 ± 14.3. More than half (62.6%) of the respondents were female. Furthermore, the participants who live in the central region comprise 77.1% of the total. The participants' highest proportion of chronic diseases was diabetes at 35.0%, hyper/hypotension at 25.0%, and cardiovascular diseases at 10.6%. Nearly half of the participants (54.1%) were university educated. The majority of participants (84.1%) were non-smokers.

Table 2 illustrates COVID-19 Infection status among the targeted group. The majority of participants (87.1%) were not infected with COVID-19. Among those who contracted the disease, 37.5% had moderate symptoms. The table also shows that 65.3% of the participants had one of their relatives diagnosed with COVID-19.

Figure 1 shows the distribution of COVID-19 vaccine acceptance among the participants. Nearly half (51.9%) of the participants accepted the vaccine of COVID-19, while 33.5% of the total participants were not sure. However, a small percentage (14.5%) revealed that they did not intend to have the vaccine.

Table 3 shows the barriers among the participants who refused the COVID-19 vaccine.

Table 2. COVID-19 Infection among People with Chronic Diseases in Saudi Arabia.

Variable	Distributions n(%)
Have you been diagnosed with COVID-19?	
Yes	40 (12.9)
No	271 (87.1)
If you have got a COVID-19 infection, how was the severity of symptoms?	
Without symptoms	4 (10.0)
Mild symptoms	12 (30.0)
Moderate symptoms	15(37.5)
Severe symptoms	9 (22.5)
Do you have one of your relatives diagnosed with COVID-19?	
Yes	201 (65.3)
No	107 (34.7)

Table 3. Associated barriers of COVID-19 vaccine uptake, n (%).

Barriers	Yes	No	Not sure	I don't take medication
Concerned about the vaccine's side effects	65 (55.0)	10 (8.4)	43 (36.4)	
The vaccine is not safe	43 (37.0)	29 (25)	44 (37.9)	
The vaccine will not prevent the infection	51 (43.9.0)	25 (21.6)	40 (34.5)	
The preventive precautions is enough	56 (48.3)	26 (22.4)	34 (29.3)	
COVID-19 is not a dangerous disease	14 (11.9)	67 (57.3)	36 (30.8)	
The vaccine is not effective	21 (17.9)	45 (38.5)	51 (43.6)	
Fear of needles	16 (13.6)	83 (70.3)	19 (16.1)	
Better to leave the immune system working without manipulation	55 (46.6)	31 (26.3)	32 (27.1)	
I will not take the vaccine because I think it will overlap with my medications	25 (21.2)	22 (18.6)	36 (30.5)	35 (29.7)

Table 4. Association between sociodemographic factors and COVID-19 vaccine acceptance rate among people with chronic diseases in Saudi Arabia.

Variable	COVID-19 vaccine acceptance			*p*-value
	Yes	No	Not sure	
Age, (mean ± SD)	44.2 (±14.0)	41.4 (±13.2)	36.1 (±14.0)	>.0001*
Education level, N (%)				
Not educated	6 (3.7)	0 (0.0)	2 (1.9)	
Intermediate and below	30 (18.6)	4 (8.9)	5 (4.8)	
High school	36 (22.4)	11 (24.4)	25 (24.0)	0.0132*
Bachelor's degree	81 (50.3)	23 (51.1)	64 (61.5)	
Post graduate	8 (5.0)	7 (15.6)	8 (7.7)	
Occupation, N (%)				
Student	15 (9.4)	6 (13.6)	24 (23.5)	
Employee	70 (44.0)	21 (47.7)	37 (36.3)	0.0216*
Unemployed	50 (31.5)	9 (20.5)	33 (32.4)	
Retired	24 (15.1)	8 (18.2)	8 (7.8)	
Smoking, N (%)				
Yes	27 (17.0)	9 (20.0)	13 (12.6)	0.4660
No	132 (83.0)	36 (80.0)	90 (87.4)	
COVID-19 infection, N (%)				
Yes	20 (12.4)	4 (8.9)	16 (15.4)	0.5337
No	141 (87.6)	41 (91.1)	88 (84.6)	
Chronic diseases, N (%)				
Diabetes	69 (42.9)	14 (31.1)	26 (25.0)	0.0100*
Hypertension	40 (84.4)	11 (24.4)	27 (26.0)	0.9723
Cardiovascular disease	15 (9.3)	5 (11.1)	13 (12.5)	0.7100
Cancer	6 (3.7)	1 (2.2)	1 (1.0)	0.3775
Chronic kidney disease	2 (1.2)	0 (0.0)	0 (0.0)	0.3940
Mental illness	6 (3.7)	2 (4.4)	5 (4.8)	0.9085
Autoimmune disease	5 (3.1)	2 (4.4)	6 (5.8)	0.5701
Chronic respiratory disease	29 (18.0)	6 (13.3)	16 (15.4)	0.7083
Allergic diseases	25 (15.5)	9 (20.0)	30 (28.9)	0.0325*
Colon diseases	30 (18.6)	8 (117.8)	31 (29.8)	0.0754
Other	15 (9.3)	4 (8.9)	4 (13.9)	0.2324

Fifty Five Percent of the participants do not want to take the COVID-19 vaccine because they are concerned about the side effects while 48.3% do not want to be vaccinated because they believe that preventive precautions will suffice. Over half of the participants emphasized that their fear of needles was not why they would not take the vaccine. 57.3% of participants state the reason for not taking COVID-19 vaccine is that COVID-19 is not a dangerous disease.

Table 4 shows the association between participants' demographic characteristics and acceptance of the vaccine. It found a significant association between the acceptance of COVID-19 vaccine with age (p-value > 0.0001), educational level (p-value = 0.0132), and occupation (p-value =0.0216). In addition, a significant relationship was observed between diabetes (p-value = 0.0100) and allergic diseases (p-value = 0.0325) with the acceptance of the COVID-19 vaccine.

Discussion

The current study aims to examine the acceptance and barriers of the COVID-19 vaccine among people with chronic diseases in Saudi Arabia. The results indicated that nearly half of the participants (51.9%) accepted the COVID-19 vaccine. It was expected to get a higher percentage of acceptance, where the targeted group of the study is people with chronic diseases, as they are at risk of getting severe complications from COVID-19.

Most of the previous studies that have been done to investigate the acceptance of the COVID-19 vaccine among the general population showed a higher acceptance compared to this study. In addition, a systematic review study investigated the hesitancy of the COVID-19 vaccine in 33 different countries. The study showed that the acceptance rate among the general population was considered relatively high [21].

Furthermore, a global study was conducted among 19 countries with 13,426 participants to assess the potential acceptance of the COVID-19 vaccine. It indicated that the vaccine acceptance was ranged from 54.85% to 88.62%. The same study reported that China recorded the highest approval percentage, while Russia recorded the lowest [22]. According to Malik and others, a study done among the population of the United States, showed that 67% of the participants intended to be vaccinated [23]. Moreover, a study conducted in Saudi Arabia by Al-Mohaithef, illustrated that 64% of the participants are willing to take the COVID-19 vaccine [24].

With regards to the investigated barriers among participants who refused the vaccine, the results showed that concern about the side effects of the vaccine was the highest frequent barrier. Similar results were observed in the Magadmi, study where most participants were also worried about the side effects [17]. In medicine, long-term effects are not known in many treatments, similar to the COVID-19 vaccine, where only short-term effects are well addressed, which makes concern and hesitancy among the public regarding the vaccine. Even with limited data, public health professionals recommended the vaccine where the associated complications of COVID19 exceed the risk of COVID-19 [25].

The second highest barrier among the participants is their belief that the preventive precautions are enough to prevent the infection. In contrast, a study done by Edward in Australia proves the opposite. Furthermore, the study showed that the participants who have greater adherence to social distancing, "which is one of the preventive precautions," have a high level of COVID-19 vaccine acceptance [26].

More than half of the participants in this study disagreed with the following statement; COVID-19 is not a dangerous disease. This finding contrasts wit*h* the study by Wang *et al*. in which a small percentage of participants affirmed that COVID-19 is a severe disease [16].

In terms of the association between sociodemographic characteristics of the participants and the COVID-19 vaccine acceptance rate, higher acceptance was observed among people aged 44.17 ± 13.95 compared to younger age groups. Similarly, the study undertaken by Al-Mohaithef, showed that the participants aged 45 years and above are 2.15 times likely to accept the vaccine [24]. In addition, Edwards study revealed that respondents from age 55 and above are more likely to have vaccine [26]. It is good to see a high acceptance rate of older people because aging is associated with experiencing severe complications of COVID-19 and occasionally could lead to death. The vaccine is highly recommended for them especially if they have multiple chronic conditions [25]. Moreover, this study found that getting the infection of COVID-19 is not related to COVID-19 vaccine uptake acceptance, and this was consistent with Edwards study [26].

This study has several limitations where a convenience sampling technique has restricted the generalizability of the results. In addition, it is preferable to use a self-administered questionnaire instead of an online questionnaire. Unfortunately, and due to the current situation of COVID-19 infection, it was better to conduct an online questionnaire to ensure our safety and the safety of the participants.

Despite these limitations, this study was the first to deal with the acceptance of COVID-19 vaccine and the associated barriers among people with chronic diseases. Moreover, this study developed a new questionnaire, and its validity was also tested. One of the study objectives was to ensure the reliability of the questionnaire. Thus, participants were divided into four age groups, and then the reliability of each group was tested so other researchers could use the questionnaire.

Conclusions

To sum up, 51.9% of the participants accepted the COVID-19 vaccine, while 33.5% were in doubt, and 14.5 did not accept the vaccine. The most frequent barriers among participants regarding being vaccinated are concerns about the vaccine's side effects and a wrong belief that preventive precautions are sufficient. Furthermore, addressing the investigated barriers in the current study for COVID-19 vaccine uptake and focusing on building trust in the safety and efficacy of the vaccine from authorization like the Saudi Ministry of Health, will elevate people's hesitancy and resistance toward the COVID-19 vaccine.

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