COVID-19 vaccines receiving, barriers and encouraging factors among chronically ill patients in Al-Qassim region, Saudi Arabia

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Abstract

Objectives: The study aimed to determine the COVID-19 vaccine acceptance, barriers, and encouraging factors among chronically ill patients in the Qassim population, Saudi Arabia.

Method: This cross-sectional study was conducted between July 1, 2021 and March 1, 2022 using a validated and pretested interview-based questionnaire and included adult patients aged ≥ 18 years visiting health care centers. A total of 551 responses were included

Result: In total, 19.2% of participants suffered from one or more chronic diseases. 27.3% were infected with COVID-19, and 96.2% were vaccinated against COVID-19. The knowledge related to COVID-19 was moderate among our participants (Mean score 12.3 ± 3.0). Participants who were divorced or had higher educational levels had significantly higher knowledge scores (p=0.038, p=0.027). The most strongly agreed-upon barrier factors that increase vaccine receiving hesitancy are concerns about its safety and adverse events. The fear of spreading the sickness to their family was the most common motivator, followed by the lack of adequate vaccination information. Participants who had received the COVID-19 immunization had a substantially higher attitude score (p = 0.005). When compared to non-chronically ill participants, chronically ill patients' knowledge and attitude toward vaccination exhibited no statistically significant changes.

Conclusion: This research gives an early look at Saudi people's understanding and views concerning COVID-19 vaccinations. The participants mostly report their concerns about vaccination safety and potential adverse effects as a valid explanation for their reluctance to receive the immunization. These findings might help health officials prevent future drops in vaccination rates by increasing public awareness.

Key words: COVID-19 vaccines, vaccinations barriers, chronic ill patients, Qassim, Saudi Arabia

Introduction

The seventh human coronavirus COVID-19, was discovered in Wuhan, Hubei Province, China, during the recent pneumonia epidemic in January 2020. Since then, the virus rapidly spread throughout the world, infecting 4,806,299 people and killing 318,599 people as of May 20, 2020 [1]. COVID-19 vaccines have an important role in the protection against this pandemic. They will reduce the risk of developing the illness and its consequences. Hence, it will decrease the spread of the disease [2]. Chronic disease is an umbrella term that includes any condition that lasts 1 year or more and requires ongoing medical attention or limits activities of daily living or both. Heart disease, stroke, cancer, and diabetes are examples of chronic diseases [3]. The combination of a chronic disease and a severe infection like COVID-19 is a tough challenge to doctors since those patients with underlying chronic diseases are more likely to develop serious complications [4]. A meta-analysis study that enrolled 1,558 samples from 6 retrospective studies shows that patients with chronic diseases had a higher risk of exacerbation [5]. Moreover; Saudi Arabia (SA) is one of the leading countries with increased prevalence of chronically ill patients [6]. 25% of the population suffers from hypertension and one third of adults has either diabetes or suffers from obesity [7,8]. According to a recent study carried in Al-Qassim, the majority of the Saudi elderly have one or more chronic diseases [9]. Studies showed patients with diabetes, hypertension and obesity are prone to severe illness [10]. Also, they are more likely to need hospitalization, intensive care, and mechanical ventilation if they develop COVID-19, compared with normal patients, and have a higher case fatality rate and increase the chance of in-hospital COVID-19 related death [11]. Moreover; obese patients who develop COVID-19 are also at higher risk for venous thromboembolism and dialysis [12,13]. Studies also showed that uncontrolled asthma patients on oral corticosteroids or in three different classes of medications are at increased risk of hospitalization, intensive care admission, and death from COVID- 19 [14,15].

All of these studies and evidence indicates an urgent and continued need to mitigate COVID-19 infection risk in patients with chronic disease [16]. Taking the COVID-19 vaccines has many barriers. One of them is the lack of knowledge about the virus risk and complications. Another important barrier is the confidence which denotes trust in vaccination safety, effectiveness, and competence of Saudi healthcare systems along with the availability, affordability, and delivery of vaccines in a comfortable environment [17]. People having concern about the country where the vaccine is manufactured, the safety, the anti-vaccine movements, and the belief of rushed vaccine trials, along with the conspiracy theory rumours and the misinformation, are all important COVID-19 vaccination barriers [18]. A recent study outlined that COVID-19 vaccination hesitancy is a global issue, furthermore SA is expected to face higher hesitancy towards COVID-19 vaccinations as a consequence of a previous seasonal influenza vaccination on program hesitancy [19-21]. The hesitancy poses dangers for the success of COVID-19 vaccine [22]. Although there are current studies that have been carried out in SA that address the barriers, concerns, and encouraging factors of the public towards the vaccine, there is significant negligence towards chronically ill patients. There is a paucity of studies carried out in SA to assess the willingness of chronically ill patients towards obtaining the vaccine against COVID-19 in conjunction with the barriers and encouragement. This study investigated our populations' perspectives about COVID-19 immunization acceptability, hurdles, and encouraging factors among chronically ill patients in Qassim, SA.

Method

Study Design and Setting

This study is an observational convenient cross-sectional study that was conducted between (1 July 2021 - 1 March 2022) to explore the COVID-29 vaccines acceptance and determine itsbarriers and motivation factors. Ethical approval was taken from the Regional Research and Ethics Committee of Qassim province (IRB# 1443-276192).

Participant Recruitment and Consent

Participants who were above 18 years old with no gender discrimination and who visited health care centers in the Al-Qassim region of SA during data collection were invited to participate after taking consent from them.

Instrument

A pretested interview-based questionnaire was used to collect the data from the participants. There were two language versions of the questionnaire (Arabic and English), and participants were given the choice of selecting one of the versions of the questionnaire. Two experts proficient in both languages performed a back translation validation process. The reliability of the questionnaire was checked using Cronbach's alpha and interclass correlation coefficient. The questionnaire had three sections, Section A had a statement of anonymity and confidentiality explaining the purpose and benefits of the study. It also recorded the participants' sociodemographic characteristics (age, gender, marital status, educational qualification, occupation, monthly salary, whether diagnosed with chronic disease or not, infected with COVID-19, vaccination status and having hypersensitivity). Section B was about knowledge which contained 7 items with a total of 20 possible responses. These items are transmission method, recommended isolation period, symptoms of COVID-19, most susceptible group, vaccination approved in Saudi, doses need for vaccination and COVID-19 causes mortality and the C section enquired about attitudes regarding COVID-19 vaccine barriers and motivation factors.

Study Sample

Sample size of more than 384 subjects was planned to be collected. Sample size calculation on descriptive study was done using EpiInfoTM.

Data analysis plan:
The data collected from the survey were downloaded and transferred to a Microsoft Excel sheet, and data cleaning was done before statistical analysis. IBM Statistical Package for Social Sciences, Version 23 (SPSS Inc., Chicago, IL, USA) was used for Statistical analysis. Categorical data were presented using appropriate tables and figures, with frequencies and percentages. A normality test was performed for all the continuous variables before choosing the appropriate test of significance. Continuous variables that showed normality were compared between categorical variables using Student's 't-test' and/or Analysis of variance (ANOVA), whereas Mann-Whitney U and /or the Kruskal-Wallis H were utilized for those that didn't show normality. Correlation of the continuous variables was done using Pearson correlation coefficient (r). A p-value less than 0.05 was considered statistically significant.

Results

Our survey received a total of 689 responses, where only 551 were included that satisfied the eligibility criteria (participants residing in Al-Qassim province only). The baseline characteristics showed that 38.5% belonged to the age group of 18-25 years, 55.4% were females, 51% were married, 68.6% had a graduate level of education, 41.9% were employed, 50.6% had salaries less than 5000 Saudi Riyals per month, 19.2% suffered from one or more chronic disease(s), 27.3% had been infected with COVID-19, and 96.2% were vaccinated against COVID-19 [Table 1].

Out of 551, only 516 answered the questions related to the COVID-19 vaccine. The responses of the knowledge items are given in Table 2. The total knowledge score was calculated by adding the scores of correct responses for each item. The total maximum score for each participant was 20. The analysis showed that the mean knowledge score was 12.3 ± 3.0. The comparison of knowledge scores was made for each of the sociodemographic characteristics is given in Table 3. There were no statistically significant differences observed for knowledge scores between the two genders (p=0.484). The scores were comparatively lesser in participants aged >55 years (p=0.041). Participants who were divorced showed significantly higher knowledge scores than others (p=0.038). Participants who had educational levels at the graduate and post-graduate level had significantly higher knowledge scores than those with lower qualifications (p=0.027) [Table 3].

The participants were asked about the barriers and motivating factors for taking the COVID-19 vaccine and were recorded using a 5-point Likert scale. The analysis of barriers to vaccinating against COVID-19 showed that "Covid-19 is global conspiracy to reduce the population" was the most commonly strongly disagreed statement, which was followed by "Covid-19 is a hoax". Whereas the most strongly agreed factor was "Covid vaccine is generally not safe" followed by "Covid vaccine causes symptoms or side effects" [Figure 1].

The most strongly agreed motivating factor was 'fear of transmitting the infection to my family, especially my parents,' followed by 'take vaccine only if given enough information about it.' And the most strongly disagreed statement was "Receive the vaccine if it is available for free," followed by "Receive the vaccine only if taken by the majority of the population" [Figure 2].

The scores for both barriers and motivators were added based on the responses given, which were then used to assess the total attitude towards COVID-19 vaccination. A higher score showed a positive attitude and a lower score negative attitude. Thus the maximum score one participant could obtain was 75 and the minimum 15. The analysis showed that males had significantly higher scores than females (p=0.027). No statistically significant differences in attitude scores were observed for age, education, monthly income, employment, those infected with COVID-19, those who developed hypersensitivity reaction after vaccination, and those who had chronic disease(s). The attitude score was found to be significantly higher in participants who had taken the COVID-19 vaccine (p=0.005) [Table 4].

There were 106 participants with one or more chronic illnesses; the majority of them (83.9%) were younger than 45-years. Fifty-nine (55.6%) of them were female and 47(44.3%) were male. Subgroup analysis showed no statistically significant difference in regard to knowledge and attitude in comparison to non-chronic disease participants.

Table 1: baseline characteristics

		Frequency	Percent
Age in years	18-25	212	38.5
	26-35	110	20.0
	36-45	112	20.3
	46-55	85	15.4
	>55	32	5.8
Gender	Male	246	44.6
	Female	305	55.4
Marital status	Single	250	45.4
	Married	281	51.0
	Divorced	8	1.5
	Widow	12	2.2
Education	Primary	9	1.6
	Middle	24	4.4
	Secondary	121	22.0
	Graduate	378	68.6
	Post-graduate	19	3.4
Occupation	Employed	231	41.9
	Retired	49	8.9
	Student	165	29.9
	Unemployed or Housewife	106	19.2
Salary	<5000	279	50.6
	5000 - 9999	94	17.1
	10000-14999	111	20.1
	15000 - 20000	45	8.2
	>20000	22	4.0
Infected with COVID-19	Yes	151	27.4
	No	371	67.3
	Not sure	29	5.3
Vaccinated	No	21	3.8
	Yes	530	96.2
Hypersensitivity	No	512	92.9
	Yes	39	7.1
Chronic disease	No	35	6.4
	Yes	516	93.6

Table 2: Knowledge related responses to COVID-19 and vaccine among chronical ill patients (n=516)

		N	%
Transmission method	By touching surfaces contaminated with the virus	396	71.9
	Through contact with animals	13	2.4
	Through droplets while talking or coughing	344	62.4
	Blood transfusion	18	3.2
	I don't know	92	16.7
Recommended isolation period for COVID-19 infected people	1-2 days	1	.2
	1-5 days	10	1.9
	1-10 days	386	74.8
	1-20 days	105	20.3
	I don't know	14	2.7
Symptoms of COVID-19	Dry cough	331	60.1
	Body weakness	318	57.7
	Diarrhea	155	28.1
	Nausea/vomiting	159	28.9
	Loss of sense of smell and taste	442	80.2
	Shortness of breath	426	77.3
	Headache	378	68.6
	Nerve inflammation	20	3.6
	Urinary tract infection	11	2.0
Most susceptible group	Children	85	15.4
	Old age	438	79.5
	Those with chronic diseases	353	64.1
	Pregnant woman	86	15.6
	Youth	86	15.6
Vaccines approved in Saudi Arabia	Pfizer-BioNTech	497	90.2
	AstraZeneca Oxford	434	78.8
	Moderna	286	51.9
	Johnson and Johnson	47	8.5
	Sputnik V	50	9.1
	Novavax	7	1.3
	Sinopharm	9	1.6
Doses need for vaccination	One dose	10	1.8
	Two doses	466	84.6
	Three doses	53	9.6
COVID-19 causes mortality	I don't know	69	13.4
	No	42	8.1
	Yes	405	78.5

Table 3: Comparison of Knowledge based different sociodemographic characteristics

		N	Mean	Std. Deviation	P value
Gender	Male	229	12.1747	2.99782	0.484
	Female	287	12.3624	3.04415	
Age (years)	18-25	201	12.3731	2.90260	0.041*
	26-35	103	12.6505	2.96618	
	36-45	104	12.3654	3.28591	
	46-55	78	12.0128	2.86716	
	>55	30	10.7667	3.13691	
Marital status	Single	235	12.2213	2.95442	0.038*
	Married	266	12.3195	3.06892	
	Divorced	7	14.8571	2.41030	
	Widowed	8	10.3750	2.77424	
Educational level	Primary	9	10.3333	3.67423	0.027*
	Middle	20	11.8000	3.48833	
	Secondary	116	11.7672	3.05702	
	Graduate	355	12.4761	2.95567	
	Post-graduate	16	13.3125	2.54869	
Employment	Employed	216	12.4028	3.14011	0.359
	Retired	47	11.8723	2.68342	
	Student	157	12.4586	2.80908	
	Unemployed or Housewife	96	11.9063	3.23168	
Monthly income (SAR)	<5000	260	12.3308	3.01320	0.060
	5000 - 9999	89	11.2921	3.10499	
	10000-14999	106	12.6792	2.61697	
	15000 - 20000	42	12.8333	3.24538	
	>20000	19	12.7368	3.58767	

* Significant at p value lower than 0.05

Table 4: Comparison of attitudes towards COVID-19 vaccination

		Mean Rank	P value
Gender	Male	274.78	0.027*
	Female	245.51	
Age	18-25	279.46	0.114
	26-35	242.24	
	36-45	255.45	
	46-55	241.22	
	>55	229.42	
Education	Primary	221.56	0.585
	Middle	279.75	
	Secondary	250.57	
	Graduate	258.74	
	Post-graduate	304.91	
Monthly income (SAR)	<5000	268.71	0.327
	5000 - 9999	246.54	
	10000-14999	246.29	
	15000 - 20000	272.08	
	>20000	212.84	
Employment	Employed	249.52	0.082
	Retired	238.23	
	Student	283.76	
	Unemployed or Housewife	247.32	
Infected with COVID-19	No	258.83	0.935
	Yes	257.61	
Taken COVID-19 Vaccine	No	165.83	0.005*
	Yes	262.24	
Developed Hypersensitivity reaction after vaccination	No	259.42	0.112
	Yes	140.50	
Chronic disease	No	260.16	0.619
	Yes	252.09	

* Significant at p value lower than 0.05.

Figure 1: The barriers reported by the participants against COVID-19 vaccination

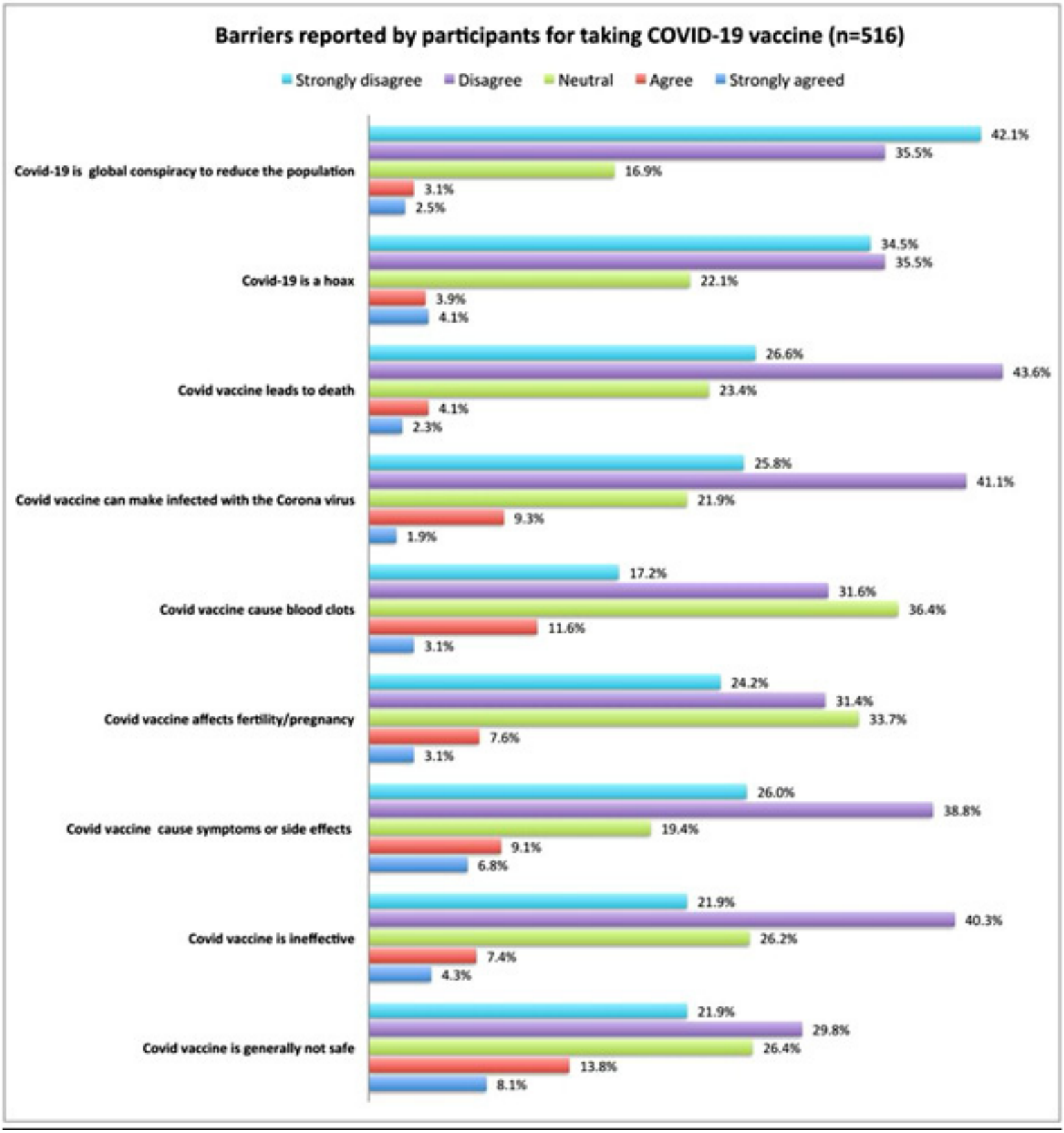
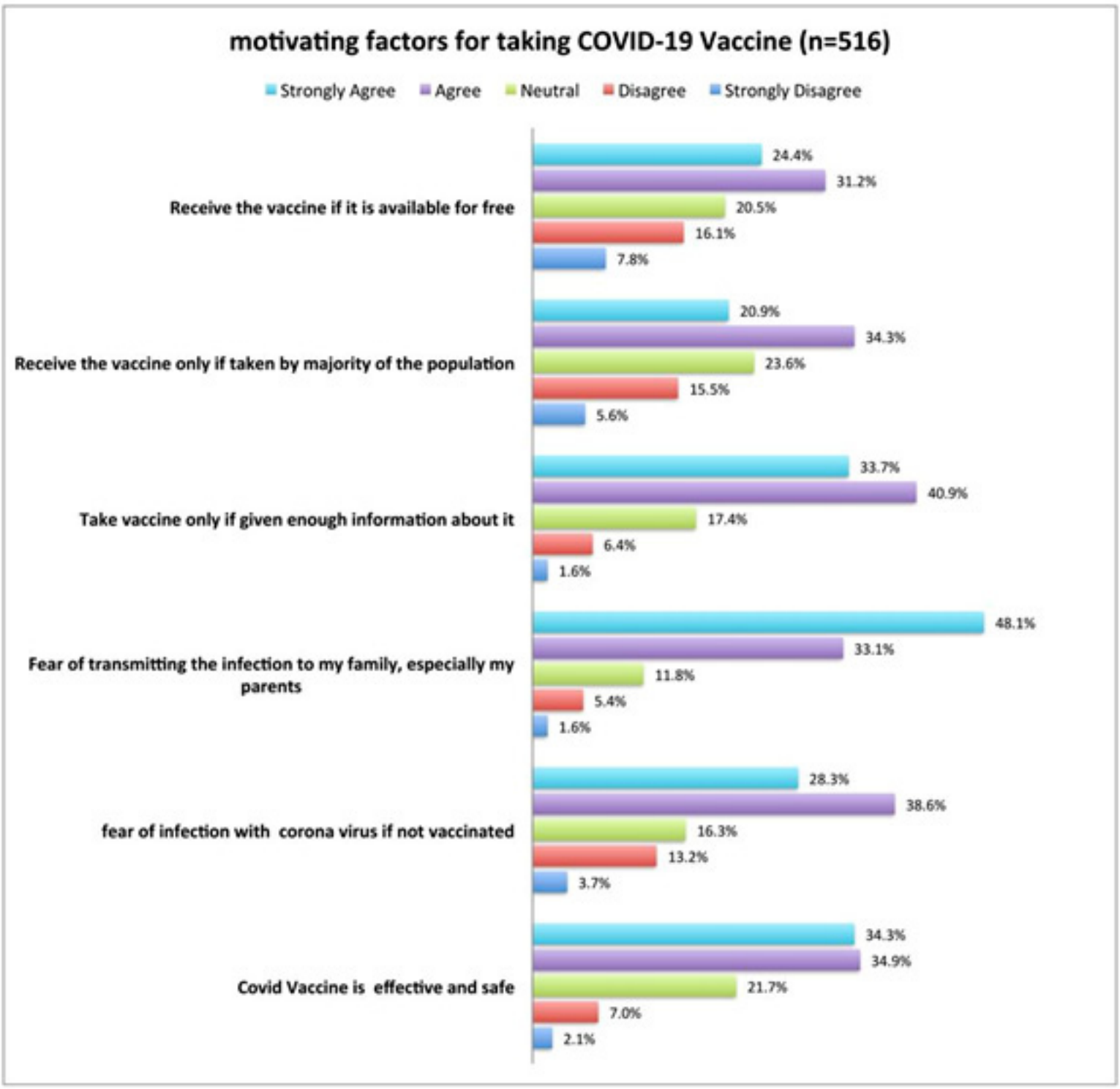


Figure 2: The motivation factors reported by the participants toward COVID-19 vaccination



Discussion

The findings of our survey showed that the knowledge related to COVID-19 was moderate among our participants, where more than three-quarters of them were aware of the correct transmission possibilities, recommended isolation period for COVID-19, symptoms related to it, most susceptible group, and types of COVID-19 vaccines approved in SA. It is reported that public confidence and trust would become lower if there was uncertainty around the new vaccine developing an infectious disease [23]. In SA, a number of vaccines are approved for its residents and citizens, which include Moderna, Pfizer/BioNTech, Janssen (Johnson & Johnson), and Oxford/AstraZeneca [24]. More than nine vaccines, including the four above, are approved by individuals coming from outside SA [25]. According to the recommendation from the Ministry of Health (MOH), all the vaccines need to be taken in two doses except for Janssen (Johnson & Johnson), which is a single-dose vaccine [25]. In our study the majority of the participants were aware of the minimum doses required for the vaccines. Participants with higher educational qualifications had comparatively good knowledge about COVID-19 vaccines than those who had lower qualifications. According to research, people who are well-educated on vaccines have a better understanding of the role of the vaccine in protecting them from various illnesses [26,27].

Vaccine hesitancy is the next hurdle to overcome as more effective and safe vaccines become accessible. The reluctance or refusal to vaccinate despite the availability of vaccines is considered one of the biggest public health threats. There are several factors that contribute to a person's willingness to be vaccinated, and each has a significant impact [28,29]. The effectiveness of the COVID-19 vaccine in eradicating the disease depends on scientific evidence on the vaccine's safety and social obligation to be vaccinated. Vaccination acceptance is influenced by a variety of factors, including the perceived safety of the vaccine, the perceived efficacy, the perceived hazards, and the quick development of the vaccine [28,30]. The current study findings showed that the two common barriers identified by participants were vaccine safety and side effects from it. Two commonly reported motivating factors were fear of the spread of infection to loved ones at home and being ready for a vaccine if sufficient information is given regarding its safety and effectiveness. Public confidence in vaccines is related to people's information in public health and government [31]. Thus, vaccination acceptance is critically reliant on government and healthcare professionals' assurances, especially in areas with high fear about the disease's nature. Claims of vaccine harm spread fast and wide due to the explosion of health information on the Internet and social media [32,33]. Studies show that accessibility, cost, and time are also reported as barriers relating to the inconvenience of vaccinating, which have a negative impact on vaccination uptake [34,35]. However, in our study, these factors were not reported as significant barriers. This could be because the COVID vaccine is free, easily accessible, and delivered in SA. Even though pharmaceutical corporations and governments make vaccines more readily available, individuals will have different opinions about these vaccines [36]. A study done by Al-Mohaithef in SA in 2020, when vaccines were not available, reported that 64.7% showed interest in accepting the COVID-19 vaccine if it is available, where older age groups and people with higher educational qualifications were significantly higher [37]. Several studies cite vaccination effectiveness as the most critical factor when weighing benefits, risks, and costs [38,39]. Rapid developments of COVID-19 vaccines have allegedly aroused worries about their safety and long-term implications, even among medical professionals [40]. In order for immunization programs to be effective, a majority of people must participate. It's possible that some people are "free-riding" on vaccination programs, enabling others to benefit while they themselves remain unvaccinated in order to keep disease at a tolerable range. In our study, males had a comparatively more positive attitude towards COVID-19 vaccination than females. There were no differences observed in attitude between participants who had chronic disease(s). A study done by Ssentongo et al. showed that individuals with existing chronic diseases have significantly lower acceptance rates than those who are healthy [41].

In order to better comprehend the vaccination and clear up any ambiguities or misinformation, it is necessary to hold regular educational sessions. It's ideal if health education is comprehensive, bilingual, and accessible to the general population. No matter where they live or how technologically ignorant, they are, all residents should be able to hear the critical messages. Additional, to web-based and application-based instructional tools, printed materials, face-to-face public presentations may be beneficial to some segments of the population. Public discussions with religious organizations can be held in places of worship by health professionals and experts.

Study Limitations

One of the study limitations was convenience sampling using social media sites, and the results may not accurately reflect the general population. However, our data shows that there were not many differences observed in age group distribution. 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 provides early insight into the Saudi populations' knowledge and attitudes towards COVID-19 vaccines. Knowledge about COVID-19 vaccines was moderately good among the participants. Some of the barriers identified in many previous studies conducted before the vaccination campaigns or at the early times of vaccine administration were not found as a significant barrier as vaccinating in our study. These findings could help the MOH plan for future attempts to get more people to get vaccines, leading to herd immunity against COVID-19 and its variants.

List of Abbreviations:
SA: Saudi Arabia
ANOVA: Analysis of variance
MOH: Ministry of Health
AMN: Alrashdi Mousa N
ASM: Alrasheedi SM
AA: Ahmad Alkhdairi
AAA: Ahmed Alanoud A
AME: Almutairi Muteb E
AMA: Aldehami Maryam A
AKO: Almutairi Khalid O
ARA: Albahli Rand A
ASA: Alharbi sultan A

Ethical approval:
Permission from Regional Research and Ethics Committee of Qassim province was also obtained (IRB# 1443-276192).

Consent to Participate
Informed consent was obtained from participants at the start of the questionnaire.

Data Availability
The deidentifed data underlying the results presented in this study may be made available upon request from the corresponding author Dr. Alrashdi Mousa N, at Mosa4444@hotmail.com . The data are not publicly available in accordance with participant privacy.

Code Availability
Analysis was conducted using IBM Statistical Package for Social Sciences, Version 23 (SPSS Inc., Chicago, IL, USA).

Conflict of Interest
All authors have no conflict of interest to declare.

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Author Contribution
Conceptualization: AMN, AAA. Data curation: AMN. Funding acquisition: None. Methodology: AMN, ASM, AA, AAA, AME, AMA, AKO, ARA, ASA. Writing – original draft: AMN, ASM, AA, AAA, AME, AMA. Writing – review & editing: AMN, ASM, AA, AAA, AME, AMA, AKO, ARA, ASA. All authors read and approved the final manuscript.

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