

Assessment of concerns about vaccination among recovered COVID-19 patients in Saudi Arabia

Mohammed Alrowaily,^{1,4} Turkey Alkhatlan,¹ Abdulrahman Alaql,¹ Ibrahim Almesned,¹ Hadeel Alrowaily,² Nada Alayed² and Mostafa Abolfotouh^{3,4}

¹Department of Family Medicine, King Abdulaziz Medical City, Ministry of National Guard-Health Affairs, Riyadh, Saudi Arabia; ²College of Dentistry, Princess Noura Bint Abdulrahman University, Riyadh, Saudi Arabia; ³King Abdullah International Medical Research Center, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia; ⁴King Saud Bin-Abdulaziz University for Health Sciences, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia. (Correspondence to Mostafa A. Abolfotouh: mabolfotouh@gmail.com).

Abstract

Background: Vaccine hesitancy re-emerged as a critical public health issue during the COVID-19 pandemic.

Aims: This study assessed the concerns of recovered COVID-19 patients about vaccination and the predictors of vaccine hesitancy.

Methods: This was a cross-sectional study of 319 adult patients who recovered from COVID-19 in Saudi Arabia. It was conducted during 1 May to 1 October 2020 at King Abdulaziz Medical City, Riyadh. Each participant was interviewed 6–12 months post-recovery using the vaccination attitude examination scale. Data were collected on COVID-19 illness severity, sociodemographic characteristics, history of chronic disease, and post-COVID-19 vaccination. Level of vaccination concern was assessed based on the percentage mean score (PMS).

Results: Most (85.3%) of the patients who recovered from COVID-19 expressed moderate overall concern (PMS = 68.96%) about vaccination. Concern was highest for mistrust in vaccine benefits (PMS = 90.28%), followed by natural immunity preference (PMS = 81.33%) and worries about the vaccine side-effects (PMS = 60.29%). Concern over commercial profiteering was low (PMS = 43.92%). The overall PMS for concern about vaccination was significantly higher among patients aged 45+ years ($t = 3.12, P = 0.002$) and among those who had experienced severe COVID-19 illness ($t = 1.96, P = 0.05$).

Conclusion: Overall concern about vaccination was high, and specific concerns were prevalent. Patient education on how the vaccine protects against reinfection should be targeted at COVID-19 patients before being discharged from hospital.

Keywords: COVID-19, vaccine hesitancy, attitude, VAX scale, vaccination, Saudi Arabia

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Introduction

Vaccine hesitancy, identified in 2019 by the World Health Organization as one of the major threats to global health, became a potentially more important issue during the COVID-19 pandemic. The Strategic Advisory Group of Experts on Immunization describes vaccine hesitancy as “delay in acceptance or refusal of vaccination despite the availability of vaccination services” (1). After a year of worldwide morbidity, mortality, physical distancing and lockdowns, and despite the development of several clinically tested and efficacious vaccines, not everyone is willing to be vaccinated against COVID-19. Considering the devastating health, economic and social effects of the pandemic, the availability of efficacious vaccines represents an important component of the hope to return society to normality (2).

However, some individuals and groups have expressed concerns regarding the fast-tracked new technology involved with the development of COVID-19 vaccines, and these, along with the well-established concerns of anti-vaccine movements, have contributed to substantial hesitancy to take vaccines (3–7). A nationally representative survey conducted in March–

April 2020 with sample sizes ranging from 1041 to 2025 reported rates of potential acceptance of COVID-19 vaccines of 65% in Ireland and 69% in the United Kingdom (3). A more recent 32-country study conducted before vaccine approval (October–December 2020; $n = 26\,758$), with sample sizes between 500 and 1500, found various levels of acceptance for COVID-19 vaccines. Results ranged from 91% of individuals who reported likely vaccine acceptance in China and India to 81% in the United Kingdom, 66% in the United States of America and 44% in France (4). An online survey among 13 426 participants from 19 countries showed that the acceptance of COVID-19 vaccines ranged from 54.8% in Russia to 88.6% in China (5). In the Eastern Mediterranean Region, Jordan and Saudi Arabia had 37.4% and 64.7% acceptance, respectively (6,7).

For COVID-19-infected patients, it is advisable to receive the full dosage irrespective of their history of COVID-19 infection, as this would help in developing a strong immune response against the disease (8). A study of COVID-19 infections in Kentucky among people who were previously infected with SARS-CoV-2 showed that unvaccinated individuals were more than twice as likely to be re-infected as those who were fully vaccinated

(8). These data further indicate that COVID-19 vaccines offered better protection than natural immunity alone and that the vaccines helped prevent reinfection. In India, those who had COVID-19 and those who had contracted it after taking the first vaccine dose were advised to have the vaccination 3 months after fully recovering from the disease (9). In Saudi Arabia, vaccinating COVID-19 patients 6 months after recovery has been recommended as a “booster for their immunity” (10).

Understanding the attitudes that underlie vaccine refusal or hesitancy is important for predicting vaccination behaviour among patients who have recovered from COVID-19 (11). Identifying the most prominent concern driving vaccine refusal can help target interventions because individuals who are concerned about vaccine safety, for example, are unlikely to be influenced by messages directed at changing beliefs about the effectiveness of vaccines in reducing the likelihood of contracting a specific infectious disease.

To our knowledge, no study has previously been conducted in Saudi Arabia to assess the level of acceptability and concerns of COVID-19-recovered patients about vaccination. This study was designed to assess the levels of concern among this group about vaccination at King Abdulaziz Medical City, Riyadh, Saudi Arabia, and to determine the predictors of vaccine hesitancy.

Methods

Study population

This cross-sectional study was conducted at King Abdulaziz Medical City in Riyadh, Saudi Arabia. In this facility, the practical guidelines on clearance and recovery for COVID-19 patients, stipulate that for severe and mild confirmed cases, at least 10 days should have passed since the onset of symptoms, they should have had no recorded fever in the last 3 days without the use of antipyretics and there should be improvement of other symptoms (cough, shortness of breath, and gastrointestinal symptoms). For critical cases, patients must be isolated for at least 21 days after symptom onset and have 2 negative polymerase chain reaction (PCR) tests, 48 hours apart. If the patient still tests positive, the process should be repeated after one week until 2 negative results are recorded. The patient is considered recovered based on the above criteria and, after a thorough assessment once recovery is achieved, isolation can be discontinued (12).

A sample of adults aged 18 years and over of both sexes was selected from all COVID-19 patients who were diagnosed and treated by King Abdulaziz Medical City, Riyadh, Saudi Arabia, during the period 1 May 2020 to 1 October 2020. Using systematic random sampling, every 10th patient of a total of 16 000 patients was selected from the medical records. We contacted 1220 recovered patients individually by telephone 6–12 months after recovery. Patients for whom there was insufficient data in the medical records were excluded from the study.

Data collection

Vaccine attitudes and concerns

Participants who agreed to participate in the study ($n = 319$, 26.1%) were interviewed by a doctor during April and May 2021. The interviews were conducted by one of 3 trained doctors using the Vaccination Attitude Examination (VAX) scale to measure the participants' attitudes towards COVID-19 vaccines (11). The scale is a validated tool that has 12 items covering public perceptions of vaccination under 4 domains: mistrust of vaccine benefit, worries about the effects, commercial profiteering concerns and preference for natural immunity. It uses a 5-point Likert rating, where a score of 1 = absolutely disagree and 5 = absolutely agree were given for the negative statements, while for the positive statements, the reverse of these scores was given. The concern score and the percentage mean score (PMS) were calculated. The total concern scores reported by our respondents ranged from 12 points to 60 points. The respondents were categorized into 3 groups: low concern, PMS < 50%; moderate concern, PMS 50–75%; and high concern, PMS > 75% (12). This categorization was used for each of the 4 domains.

Predictor variables

The following data were collected during the interview: sex; age group; education; marital status, living status, employed as a healthcare worker, having a chronic physical health condition such as diabetes mellitus, hypertension, cardiovascular disease, etc.; post-COVID-19 vaccination; and severity of the previous COVID-19 infection [mild (treated at home), moderate (required hospital admission) or severe (admitted to intensive care unit)].

Data analysis

We used SPSS, version 26.0, for data analysis. Categorical data were summarized and reported as frequencies and percentages. The arithmetic mean was used as a summary statistic for concern scores, with standard deviation as a measure of dispersion. The chi-squared test was used to compare frequencies of respondents at different concern levels associated with categorical variables. Quantitative data were compared using the Student *t*-test. For all statistical analyses, significance was considered as $P \leq 0.05$.

Ethical approval and consent

Participation in this study was voluntary. No written consent was sought, as there were no personal identifiers on the interviews. Agreement to participate in the interview was considered consent. This study was approved by the institutional review board of the Ministry of National Guard Health Affairs in Riyadh, Saudi Arabia (Ref. NRC21R/061/01). This study was conducted in accordance with the Declaration of Helsinki.

Results

We interviewed 319 recovered COVID-19 patients from the central region of the Ministry of National Guard Health Affairs. Just over half (57.7%) were males and 66.1% were under 45 years old (Table 1); around 12% were healthcare workers and most participants (75.2%) had received post-COVID-19 vaccination.

The majority of participants expressed a strong mistrust of vaccine benefits (80.9%), showed a strong preference for natural immunity (67.4%) and had moderate worries about the effects of vaccination (74.0%) (Figure 1). Concerns about commercial profiteering was low among the majority of our participants (74.0%). Overall, concerns about vaccination was moderate (85.3%), with high concern expressed by only 13.8%.

The majority of the participants did not agree that they felt safe after being vaccinated (74.6%) and said they could not rely on vaccines to fight serious infections (74.9%) (Table 2). More than half of the participants thought that natural immunity lasts longer (58.6%) and is more protective (57.4%) and safer (58.9%) than vaccination. Just over half the participants disagreed that children could experience challenges to their health because of vaccination (50.5%) and that they worried about the unknown effects of vaccines in the future (47.3%). The majority (66.5%) disagreed on the issues of commercial profiteering regarding companies making a lot of money from vaccines, the promotion of vaccination by authorities for financial gain (79.0%) and vaccination programmes being a “big con” (85.6%).

In general, participants reported having a moderate level of concern about vaccination [PMS = 68.96, standard deviation (SD) 7.48] (Table 2). This level of concern was high for preference for natural immunity (PMS = 81.33, SD 20.88), high for mistrust of vaccine benefits (PMS = 90.28, SD 15.38), moderate for worries about the effects (PMS = 60.29, SD 10.46), and low for commercial profiteering (PMS = 43.92, SD 17.09) (Table 2).

Table 3 shows the association between level of concern about the COVID-19 vaccine and selected personal and disease characteristics. Males showed a statistically significantly greater mistrust of vaccine benefits (PMS = 91.9, SD 14.7% vs 88.1, SD 16.0%, $t = 2.19$, $P = 0.029$), while females reported more worries about the effects (PMS = 61.8, SD 10.9% vs 59.2, SD 10.0%, $t = 2.23$, $P = 0.026$). Married participants were significantly more concerned than single ones about commercial profiteering (PMS = 45.2, SD 18.1 vs 41.0, SD 14.2, $t = 2.22$, $P = 0.027$). Healthcare workers were statistically significantly less mistrustful of vaccine benefits (PMS = 80.9, SD 20.4 vs 91.6, SD 14.1, $t = 3.17$, $P = 0.003$) than non-healthcare workers. Those who had recovered from severe COVID-19 illness reported significantly greater overall concern than those who had experienced COVID-19 illness of mild or moderate severity (PMS = 73.8, SD 4.2 vs 68.8, SD 7.5, $t = 1.96$, $P = 0.05$).

Recovered patients who had received post-COVID-19 vaccination reported significantly lower overall concern

Table 1 Personal and disease characteristics of COVID-19-recovered patients at King Abdulaziz Medical City, Riyadh, Saudi Arabia, 2021

Characteristic	No. (%)
Sex	
Male	184 (57.7)
Female	135 (42.3)
Age (years)	
18–44	211 (66.1)
≥ 45	108 (33.9)
Marital status	
Single	97 (30.4)
Married	222 (69.6)
Education	
< secondary	71 (22.3)
≥ Secondary	248 (77.7)
No	149 (46.7)
Health care worker	
Yes	39 (12.2)
No	280 (87.8)
Living status	
Alone	62 (19.4)
With others	257 (80.6)
Chronic disease	
None	188 (62.3)
1	55 (18.2)
2	34 (11.3)
≥ 3	25 (8.3)
COVID-19 severity	
Mild	277 (86.8)
Moderate	33 (10.3)
Severe	9 (3.1)
Post COVID-19 vaccination	
Yes	240 (75.2)
No	79 (24.8)

than those who had not received any such vaccination (PMS = 68.4, SD 7.5 vs 70.6, SD 7.1, $t = 2.27$, $P = 0.024$) (Table 3). They were also less concerned about the effects of the vaccine (PMS = 59.0, SD 9.8 vs 64.1, SD 11.5, $t = 3.54$, $P = 0.001$) and commercial profiteering (PMS = 41.4, SD 14.7 vs 51.6, SD 21.3, $t = 3.97$, $P < 0.001$), yet, they reported greater mistrust of vaccine benefits (PMS = 92.7, SD 13.9 vs 83.0, SD 17.3, $t = 4.52$, $P < 0.001$) (Table 3).

Discussion

This is the first study to describe attitudes to vaccine and the predictors of vaccine hesitancy among COVID-19-recovered patients in Saudi Arabia. Overall, the majority of participants (85.3%) expressed moderate concern about vaccination. Mistrust of vaccination benefits has been reported in a previous study in several Saudi Arabian

hospitals (12). In previous studies assessing attitudes towards vaccination among COVID-19-recovered patients, the majority were hesitant or undecided about the SARS-CoV-2 vaccine (13,14). In our study, mistrust was

the largest attitudinal barrier to having the COVID-19 vaccine, with the majority of participants expressing high mistrust, not feeling safe being vaccinated, and

Figure 1 Distribution of level of concern about vaccination among COVID-19-recovered patients at King Abdulaziz Medical City, Riyadh, Saudi Arabia, 2021

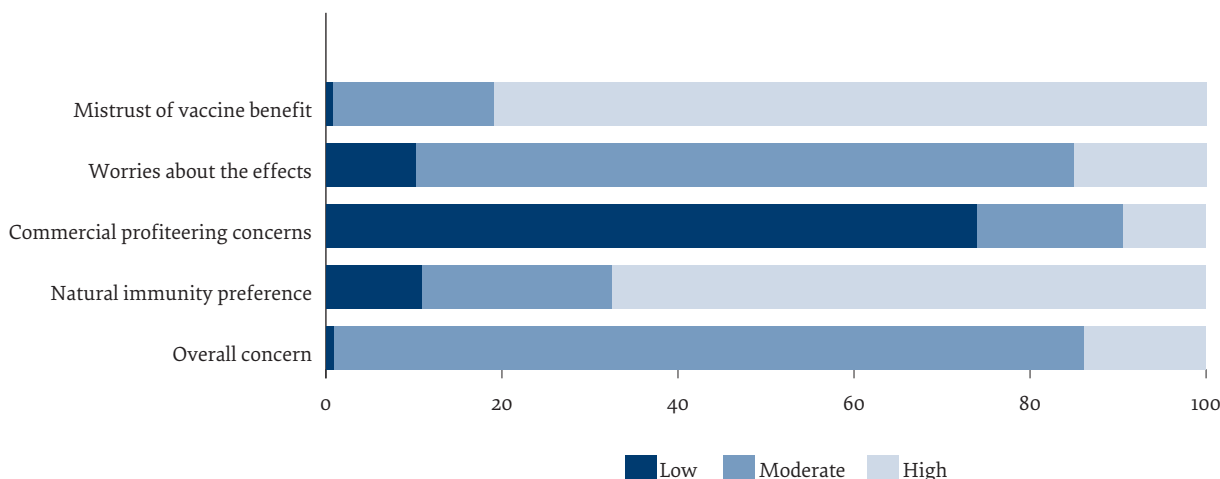


Table 2 Distribution of responses of COVID-19-recovered patients at King Abdulaziz Medical City on the Vaccination Attitude Examination scale, Saudi Arabia, 2021

Concern domain	Strongly agree/ agree No. (%)	Not sure No. (%)	Disagree/strongly disagree No. (%)
Mistrust of vaccine benefits			
I feel safe after being vaccinated	13 (4.1)	68 (21.3)	238 (74.6) ^a
I can rely on vaccines to stop serious infectious diseases	9 (2.8)	71 (22.3)	239 (74.9) ^a
I feel protected after getting vaccinated	12 (3.8)	72 (22.6)	235 (73.7) ^a
Mean score % (SD) (grading)		90.28 (15.38) (high)	
Worries about the effects			
Although most vaccines appear to be safe, there may be problems that we have not yet discovered	107 (33.5) ^a	117 (36.7)	95 (29.8)
Vaccines can cause unforeseen problems in children	66 (20.7) ^a	92 (28.8)	161 (50.5)
I worry about the unknown effects of vaccines in the future	75 (23.5) ^a	93 (29.2)	151 (47.3)
Mean score % (SD) (grading)		60.29 (10.46) (moderate)	
Commercial profiteering concerns			
Vaccines make a lot of money for pharmaceutical companies, but do not do much for regular people	46 (14.4) ^a	61 (19.1)	212 (66.5)
Authorities promote vaccination for financial gain, not for people's health	25 (7.8) ^a	42 (13.2)	252 (79.0)
Vaccination programmes are a big con	13 (4.1) ^a	33 (10.3)	273 (85.6)
Mean score % (SD) (grading)		43.92 (17.09) (low)	
Natural immunity preference			
Natural immunity lasts longer than a vaccination	187 (58.6) ^a	100 (31.3)	32 (10.0)
Natural exposure to viruses and germs gives the safest protection	183 (57.4) ^a	81 (25.4)	55 (17.2)
Being exposed to diseases naturally is safer for the immune system than being exposed through vaccination	188 (58.9) ^a	81 (25.4)	50 (15.7)
Mean score % (SD) (grading)		81.33 (20.88) (high)	
Overall mean score % (SD) (grading)		68.96 (7.48) (moderate)	

^aNegative attitude.

Table 3 Distribution of scores for concern about vaccination according to selected personal and disease characteristics at King Abdulaziz Medical City, Saudi Arabia, 2021

Characteristic	Concern domain				
	Mistrust of vaccine benefit	Worries about the effects	Commercial profiteering	Preference for natural immunity	Overall concern
	Mean score % (standard deviation)				
Sex					
Male	91.9 (14.7)	59.2 (10.0)	43.6 (16.7)	79.5 (20.5)	68.6 (7.0)
Female	88.1 (16.0)	61.8 (10.9)	44.4 (17.6)	83.8 (21.3)	69.5 (8.0)
t-value, P-value	2.19, 0.029*	2.23, 0.026*	0.39, 0.69	1.81, 0.07	1.12, 0.26
Age (years)					
18–44	90.8 (15.0)	59.5 (10.6)	42.2 (14.8)	79.7 (21.1)	68.0 (7.2)
45+	89.2 (16.2)	61.9 (10.1)	47.3 (20.6)	84.6 (20.3)	70.8 (7.7)
t-value, P-value	0.90, 0.37	2.01, 0.045*	2.31, 0.022*	1.99, 0.047*	3.12, 0.002*
Marital status					
Single	90.5 (15.2)	59.2 (10.5)	41.0 (14.2)	80.4 (20.3)	67.8 (7.9)
Married	90.2 (15.5)	60.8 (10.4)	45.2 (18.1)	81.7 (21.2)	69.5 (7.3)
t-value, P-value	0.16, 0.87	1.21, 0.23	2.22, 0.027*	0.52, 0.60	1.86, 0.06
Education					
< Secondary	89.5 (16.1)	62.9 (9.7)	45.9 (19.4)	82.5 (20.8)	70.2 (7.9)
≥ Secondary	90.5 (15.2)	59.5 (10.6)	43.4 (16.4)	81.0 (20.9)	68.6 (7.3)
t-value, P-value	0.48, 0.63	2.41, 0.017*	1.08, 0.28	0.52, 0.60	1.58, 0.12
Health care worker					
Yes	80.9 (20.4)	59.8 (11.3)	47.3 (21.7)	88.0 (17.9)	69.0 (9.0)
No	91.6 (14.1)	60.4 (10.4)	43.5 (16.3)	80.4 (21.1)	68.9 (7.3)
t-value, P-value	3.17, 0.003*	0.30, 0.77	1.06, 0.29	2.44, 0.018*	0.05, 0.96
Living status					
Alone	95.7 (10.3)	57.7 (10.4)	37.5 (8.8)	86.6 (17.6)	69.3 (5.7)
With others	89.0 (16.1)	60.9 (10.4)	45.5 (8.2)	80.1 (21.5)	68.9 (7.9)
t-value, P-value	4.07, < 0.001*	2.18, 0.03*	5.03, < 0.001*	2.50, 0.014*	0.56, 0.57
Chronic diseases					
Yes	88.9 (15.0)	61.3 (11.1)	47.8 (19.2)	81.7 (19.8)	69.9 (7.2)
No	91.3 (15.6)	59.6 (10.0)	41.3 (14.9)	81.1 (21.6)	68.3 (7.6)
t-value, P-value	1.35, 0.18	1.47, 0.14	3.25, 0.001*	0.25, 0.80	1.91, 0.06
COVID-19 severity					
Mild/moderate	90.3 (15.4)	60.1 (10.5)	43.7 (16.9)	81.1 (21.0)	68.8 (7.5)
Severe	88.9 (14.7)	65.4 (8.7)	51.9 (22.2)	88.9 (13.6)	73.8 (4.2)
t-value, P-value	0.28, 0.78	1.50, 0.14	1.41, 0.16	1.66, 0.13	1.96, 0.05*
Post COVID-19 vaccination					
Yes	92.7 (13.9)	59.0 (9.8)	41.4 (14.7)	80.6 (22.1)	68.4 (7.5)
No	83.0 (17.3)	64.1 (11.5)	51.6 (21.3)	83.7 (16.5)	70.6 (7.1)
t-value, P-value	4.52, < 0.001*	3.54, 0.001*	3.97, < 0.001*	1.34, 0.18	2.27, 0.024*

*Statistically significant.

being unsure that vaccination would prevent them from contracting serious infectious diseases.

The quality, quantity and durability of protective immunity elicited by natural infection with SARS-CoV-2 have been found to be poor compared with the much higher levels of virus-neutralizing antibodies and T-cells induced by the vaccines currently being administered globally (15,16). However, our findings

suggest that preference for natural immunity is one of the greatest attitudinal barriers to receiving a COVID-19 vaccine: more than half of our participants expressed a strong preference for natural immunity and more than half negatively reported that natural immunity lasts longer and is more protective and safer than vaccination. The level of concern in regard to preference for natural immunity was high.

Fear and mistrust in pharmaceutical companies were the main barriers against the acceptance of COVID-19 vaccine during clinical trials in Jordan (17). In our study, worries about the possible side-effects and commercial profiteering concerns were of moderate and low levels respectively. Organized antivaccination groups with a strong social media presence have contributed to mounting anxieties concerning vaccination worldwide (18).

Vaccine acceptability is influenced by space, time, social class, sex, ethnicity, the quality of the vaccination experience, cost and health regulations or mandates (6,19,20). In a web-based national survey in Saudi Arabia (7), respondents aged over 45 years and those who were married reported a significantly more positive attitude towards COVID-19 vaccine acceptance than those who were young or single. In our study, overall high concern about vaccination was significantly associated with both age and the severity of previous COVID-19 illness. Those who had experienced severe illness and those of older age showed significantly higher concern scores than others. Age was associated with concerns about the effects of the vaccine and commercial profiteering, a preference for natural immunity and overall concern. Being married was also associated with concern about commercial profiteering (21). In previous studies, perceived risk or perceived susceptibility to an infection were associated with positive support for vaccination (7,22,23). Lower vaccine acceptance among the older population may be influenced by lower perceived risk (7,23). Although the elderly are more vulnerable to COVID-19, most of the older population in Asian and Arab countries have low mobility, spend more time at home and are less likely to travel. In a Jordanian study, males were more likely to accept the COVID-19 vaccine (6).

Acceptance of the COVID-19 vaccine has been shown to increase with increasing age, income and education level (24,25). Greater vaccine acceptance with increasing age could be due to greater perceived vulnerability, as suggested by Detoc et al. (25). Among the COVID-19-recovered patients, vaccine hesitancy is diffuse and multifactorial (13). In a knowledge, attitudes and practices study on COVID-19 in Turkey targeting COVID-19-recovered patients, participants were hesitant about vaccination due to possible suspicion regarding its effectiveness (14). In a study in Italy, older age, public work exposure and the 2019 flu shots were the main factors associated with a positive attitude towards vaccination (13). In contrast, in our study, older participants reported more worries about vaccination effects, greater preference for natural immunity and more concerns about commercial profiteering. Participants who had a lower level of education expressed more worries about the vaccine effects. There have been conflicting reports on the role of sex in the literature: some studies have reported greater levels of acceptance by males (6,24); in others females were more likely to accept the vaccine (26,27). In our study, males showed a greater level of mistrust of vaccine benefits while females were more

worried about the vaccine effects. This sex difference may be attributed to the difference in perceptions of the risk of infection.

Health professionals' attitudes about vaccines are an important determinant of their own vaccine uptake and their likelihood of recommending the vaccine to their patients. It was interesting that the healthcare workers in our study expressed a lower level of mistrust of the vaccine benefits but a greater preference for natural immunity. In a study of acceptability of COVID-19 vaccination among healthcare workers in the Congo (27), only 27% said they would accept a COVID-19 vaccine if available, and this lack of interest in vaccination was attributed to the waning of public confidence in vaccines worldwide (28). When more information was available about the process of development of the new vaccines, a lot of misinformation and rumours resulted in lowering the trust of the public in their safety and effectiveness (29). A study in the United States of America reported that 36% of healthcare workers were willing to take the vaccine when available (30).

Clinicians are an important source of information for vaccines and physician communication can improve adherence to vaccination recommendations (31–33). Vaccine acceptance has been reported to be greater among healthcare workers involved in direct patient care and among healthcare workers who had chronic medical conditions, possibly due to their higher perceived risk of COVID-19 infection (30). The high concerns among healthcare workers about the COVID-19 vaccine could also have broader consequences. It has been shown that healthcare workers who are vaccinated are more likely to recommend vaccines to friends, family and their patients (31,34,35). In a cross-sectional study conducted in January 2021 among healthcare workers in 10 countries in the Eastern Mediterranean Region, the top 3 reasons for not intending to be vaccinated were “unreliability of COVID-19 vaccine clinical trials”, “fear of the side-effects of the vaccine”, and “COVID-19 vaccine will not give immunity for a long period” (36).

In a study among people who were previously infected with SAR-CoV-2, unvaccinated individuals were more than twice as likely to be re-infected with COVID-19 than those who were fully vaccinated (8). In our study, those who received post-COVID-19 vaccination were significantly less concerned about the effects of the vaccine and commercial profit, but showed greater mistrust of vaccine benefits than those who had not received the vaccine. However, we found that the high prevalence of post-COVID-19 vaccination among recovered patients may not reflect the level of concern or willingness to get the vaccine simply because COVID-19 vaccination has been implemented as compulsory in Saudi Arabia, and people would not be allowed to go to work, go shopping or travel outside the country without having the vaccination certificate. In Saudi Arabia, vaccinating COVID-19-recovered patients 6 months after recovery was recommended previously; nowadays, vaccination is given 10 days post-recovery.

It has been reported that being hospitalized during the acute phase of COVID-19 was not associated with willingness to get the SARS-CoV-2 vaccine (28.7%) (15). This is in agreement with our finding, where those who were admitted to the intensive care unit because of severe COVID-19 illness reported significantly greater overall concern than those who experienced less severe illness. This may be explained by their negative recent disease experience still burdening them, the lack of clear public information regarding the SARS-CoV-2 vaccine or the belief that they were immune (29).

The strength of this study lies in its novel results, which present the main concerns of recovered patients about vaccination. It may act as a pilot for other studies from similar countries. However, our study did have some limitations: It was conducted in a single tertiary hospital in Saudi Arabia and this may not allow for the generalization of the conclusion. The cause and effect relationship is not guaranteed due to the cross-sectional design, thus, it is difficult to determine whether the exposure (predictors) or outcome (vaccine concerns) came first. The COVID-19 pandemic is a rapidly evolving

situation with national and local policies being constantly modified. Also, the survey was conducted during April and May 2021. For these reasons, it may not fully capture the current situation.

Conclusion

This is the first study to describe the attitude and predictors of vaccine hesitancy among COVID-19-recovered patients. Overall attitudes towards vaccination were negative and specific concerns regarding COVID-19 vaccine were prevalent, especially among older patients and those who had experienced severe COVID-19 illness. Our findings suggest that the greatest attitudinal barrier to receiving COVID-19 vaccine among recovered patients was mistrust of the vaccine benefits.

Addressing barriers to vaccination among those patients who have recovered will be essential. A pro-vaccine education message should be targeted to recovered patients before discharge from hospital, explaining how the vaccine will protect them against reinfection. Future studies are recommended to assess the levels of vaccine uptake among recovered patients.

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Évaluation des préoccupations concernant la vaccination des patients guéris de la COVID-19 en Arabie saoudite

Résumé

Contexte : La réticence face à la vaccination est redevenue un problème de santé publique majeur pendant la pandémie de COVID-19.

Objectifs : La présente étude a évalué les préoccupations des patients guéris de la COVID-19 vis-à-vis de la vaccination et les facteurs prédictifs de la réticence vaccinale.

Méthodes : Il s'agissait d'une étude transversale portant sur 319 patients adultes guéris de la COVID-19 en Arabie saoudite. Elle a été menée du 1^{er} mai au 1^{er} octobre 2020 à la Cité médicale Roi Abdulaziz, Riyad. Chaque participant a été interrogé six à douze mois après son rétablissement à l'aide de l'échelle d'examen de l'attitude face à la vaccination. Des données ont été recueillies sur la gravité de la maladie, les caractéristiques sociodémographiques, les antécédents de maladie chronique et la vaccination post-COVID-19. Le degré de préoccupation lié au vaccin a été évalué en fonction du score moyen en pourcentage.

Résultats : La plupart (85,3 %) des patients qui ont guéri de la COVID-19 ont exprimé une préoccupation générale modérée (score moyen en pourcentage = 68,96 %) concernant la vaccination. Les plus fortes préoccupations concernaient la méfiance à l'égard des avantages du vaccin (score moyen en pourcentage = 90,28 %), suivie par la préférence pour l'immunité naturelle (score moyen en pourcentage = 81,33 %) et les inquiétudes au sujet des effets secondaires du vaccin (score moyen en pourcentage = 60,29 %). La préoccupation relative aux profits commerciaux était faible (score moyen en pourcentage = 43,92 %). Le score moyen global en pourcentage de la préoccupation vis-à-vis de la vaccination était significativement plus élevé chez les patients âgés de plus de 45 ans ($t = 3,12$, $p = 0,002$) et ceux qui avaient développé une forme grave de la COVID-19 ($t = 1,96$, $p = 0,05$).

Conclusion : La préoccupation générale à l'égard de la vaccination était élevée et des préoccupations spécifiques étaient répandues. La sensibilisation des patients à la manière dont le vaccin protège contre la réinfection devrait être ciblée aux patients atteints de COVID-19 avant leur sortie de l'hôpital.

تقييم القلق بشأن التطعيم لدى المتعافين من مرض كوفيد-19 في المملكة العربية السعودية

محمد الرويلي، تركي الخثلان، عبد الرحمن العقل، إبراهيم المسند، هديل الرويلي، ندى العايد، مصطفى أبو الفتوح

الخلاصة

الخلفية: عاود التردد في أخذ اللقاح الظهور بوصفه مشكلة بالغة الأهمية من مشاكل الصحة العامة أثناء جائحة كوفيد-19.

الأهداف: هدفت هذه الدراسة إلى تقييم القلق لدى المتعافين من مرض كوفيد-19 بشأن التطعيم، ومُنبتات التردد في أخذ اللقاح.

طرق البحث: شملت هذه الدراسة المقطعية 319 مريضاً بالغاً تعافوا من كوفيد-19 في المملكة العربية السعودية. وقد أُجريت الدراسة في المدة من 1 مايو/ أيار إلى 1 أكتوبر/ تشرين الأول 2020 في مدينة الملك عبد العزيز الطبية بالرياض. وأُجريت مقابلات مع كل مشارك بعد التعافي بمدة تتراوح بين 6 أشهر و12 شهراً باستخدام مقياس فحص الموقف من التطعيم. وُجمعت بيانات عن وخامة كوفيد-19، والخصائص الاجتماعية السكانية، وسوابق الأمراض المزمنة، والتطعيم بعد الإصابة بكوفيد-19. وقيّم مستوى القلق بشأن التطعيم استناداً إلى متوسط الدرجة المئوية.

النتائج: أعرب معظم المرضى (85.3%) الذين تعافوا من كوفيد-19 عن قلق عام متوسط (متوسط الدرجة المئوية = 68.96%) بشأن التطعيم. وكان أعلى مستوى للقلق بشأن عدم الثقة في منافع اللقاح (متوسط الدرجة المئوية = 90.28%)، يليه تفضيل المناعة الطبيعية (متوسط الدرجة المئوية = 81.33%)، ثم القلق بشأن الآثار الجانبية للقاحات (متوسط الدرجة المئوية = 60.29%). وكان القلق بشأن الربحية التجارية منخفضاً (متوسط الدرجة المئوية = 43.92%). وكان المتوسط العام للدرجة المئوية للقلق بشأن التطعيم أعلى كثيراً في صفوف المرضى الذين تزيد أعمارهم على 45 سنة (الفرق بين المتوسطات = 3.12، القيمة الاحتمالية = 0.002) وفي صفوف الذين أصيبوا بمرض كوفيد-19 الوخيم (الفرق بين المتوسطات = 1.96، القيمة الاحتمالية = 0.05).

الاستنتاجات: كان القلق العام بشأن التطعيم مرتفعاً، وكانت هناك مخاوف محددة سائدة. وينبغي تثقيف مرضى كوفيد-19 قبل إخراجهم من المستشفى بشأن قدرة اللقاح على حمايتهم من عودة العدوى.

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