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## Public satisfaction with COVID-19 vaccination program in Saudi Arabia

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## Public satisfaction with COVID-19 vaccination program in Saudi Arabia

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### Abstract

The challenges posed by the ongoing COVID-19 pandemic have required the introduction of new care delivery models and procedures. For the foreseeable future, vaccine administration will be a key part of the patient experience journey. It is important therefore to understand and evaluate experiences of individuals taking the vaccination, an area which requires considerable attention. To address this, the COVID-19 Vaccination Satisfaction survey was developed and administered at several healthcare facilities across Saudi Arabia. Between January 2021 and end of December 2021, a total of 1,699,177 completed surveys were collected. The survey results suggest high satisfaction among participants taking the vaccine; however, satisfaction with information and communication about the vaccine was relatively low. Results from this survey are updated daily and provide unique insights into the key strengths of the vaccination process, as well as aspects within the process that require improvement.

### Keywords

Patient experience, vaccine, hesitancy, Saudi Arabia, patient-centered care

### Introduction

The ongoing COVID-19 pandemic has had considerable impact on society requiring unprecedented efforts being devoted to development and administration of vaccines against the virus. In the absence of treatments for the disease, vaccines arguably remain the most effective means to control and prevent the spread of the virus.<sup>1,2</sup> Vaccination programs across the world are also considered an effective way to reduce the severe effects of the virus and preventing hospitalizations<sup>3</sup> which can add significant pressure on a country's healthcare system.

Despite the adverse effects of the pandemic on society, acceptance of the vaccine is not considered universal.<sup>2,3</sup> Concerns about vaccine hesitancy are growing across the world,<sup>4,6</sup> with several reasons cited for this hesitancy including but not limited to fear of vaccine content, fear of side-effects, and little information about the vaccine.<sup>7</sup> It is widely acknowledged that the success of the vaccine against the virus hinges greatly on the uptake of the vaccine itself.<sup>8,9</sup> However, a study by Larson et al.<sup>10</sup> has shown that vaccine hesitancy is variable across the globe, with the European region having the least confidence in vaccine safety. The study also noted that there was a gap

between confidence in the importance of vaccination, which was high, and confidence in vaccination safety, which was low.

In Saudi Arabia, uptake of the vaccine was expected to be low. Past research on the uptake of the influenza vaccine in Saudi Arabia suggested lower vaccine uptake<sup>11</sup> whereas recent research in Saudi Arabia also indicated high levels of vaccine hesitancy, particularly among young adults, within the Kingdom.<sup>12</sup>

Nonetheless, the ongoing nature of the pandemic means that for the foreseeable future, vaccinations will be an integral part of the patient experience. Given the importance of vaccination and the challenges around its administration, understanding the perception and satisfaction of the vaccination process, and obtaining feedback from the public is vital. Despite significant advancements being made against the pandemic, understanding the public's satisfaction with the vaccination process itself has received very little attention.<sup>3,7</sup> Recent studies that have assessed patient satisfaction with COVID-19 vaccination program, though important and much needed, have either been conducted at a single hospital,<sup>13</sup> or for a specific target population.<sup>3</sup> There remains a need to understand the experience and

satisfaction of users with the vaccination process, therefore, this study aims to address this gap by reporting the development, administration and results of the national COVID-19 Vaccination Satisfaction survey in Saudi Arabia.

### ***COVID-19 Vaccination Program in Saudi Arabia***

Kingdom of Saudi Arabia took a proactive approach to vaccine administration in the Kingdom. Following the approval of the Pfizer/BioNTech vaccine by World Health Organization (WHO), the vaccine was also approved for administration in the Kingdom by the Saudi Food and Drug Authority in December 2020. Since then, the Ministry of Health (MOH) has taken several steps to ensure efficient vaccine roll-out within the Kingdom. As a first step, the MOH launched Riyadh Expo as the first vaccination center in the Kingdom in December 2020, followed by Launch of Jeddah Airport in the same month. By February 2021, MOH had expanded its vaccination operations to all regions in the Kingdom and across all sectors (MOH and non-MOH). Due to the efforts of the MOH, by May 2021, 10 million vaccines had been administered. As of 2nd January 2022, over 51 million doses of the approved vaccines have been administered within the Kingdom.

The COVID-19 vaccination program was rolled-out in three phases in Saudi Arabia. During the first phase, registration for vaccination was available to those aged over 65 years and those who had chronic ailments or were at a high risk of infection. During the second phase, which began on 18th February 2021, vaccination registration was available for those aged 50 and over and those with chronic ailments or high risk of infection. Health practitioners also continued to receive vaccinations during this phase. During phase 3, vaccination was offered everyone else. Registration for the vaccination program was done via a dedicated booking app. Vaccinations are being provided free of cost to both Citizens and Residents in the Kingdom. In line with the WHO guidelines, four vaccines are currently approved for administration in Saudi Arabia. These include:

- Pfizer-BioNTech (2 dose)
- AstraZeneca (2 dose)
- Moderna (2 dose)
- Johnson and Johnson (1 dose)

Vaccine administration continues to be a priority in the Kingdom and across the globe especially due to the evolving nature of the COVID-19 virus. Vaccine administration at this scale and pace is unprecedented, but nonetheless is now an integral part of patient experience going forward. It is important therefore that the experience of those taking the vaccine is captured to aid with quality improvement initiatives and implementation of person-centered care in such procedures.

## **Methodology**

### ***Survey Design and Development***

The COVID-19 vaccination satisfaction survey was designed to capture key information about the experience of individuals taking their vaccination. To ensure robustness, the survey development underwent several key stages. As a first step, it was important to understand the journey of individuals taking their vaccination (journey analysis). This involved a collaborative effort with key stakeholders at the MOH to map a typical journey from registering for a vaccination appointment through to receiving vaccine administration. As part of this process, the current challenges being faced by the MOH during the vaccination process were also noted as well as their expectations from the survey. Following this, a series of questions were drafted to capture the experience of taking the vaccination across the journey. The questions were adapted from validated patient experience surveys routinely administered by Press Ganey® given that prior surveys aiming to capture such information were not available.

A first draft of the survey was completed and discussed with key stakeholders at MOH for feedback. After this, the survey was finalized and prepared for administration. The final survey consisted of 18 questions within four domains: Booking Application, Access, Vaccination and Overall Assessment (see Table 1). Prior to testing, individuals utilized MOH's Sehhaty App to schedule vaccination appointments. The first domain of the survey therefore covers user experience of using these applications. The second domain allows respondents to rate the experience of accessing the vaccination centers. The third domain asks respondents about their experience of vaccine administration while the fourth domain asks those taking the vaccine to provide an overall assessment of their experience. The survey also included an additional open-ended question to allow participants to provide any further feedback about their experience. The survey was made available in Arabic and English languages.

### ***Survey Administration and Data Collection***

A key aspect of the MOH vaccination program is a unified repository for all relevant information integrated with the dedicated booking app. All public and private vaccine centers use the same platform and all data collected is stored in the National Health Observatory (NHO). The collected data is verified through established government systems using linked national IDs and verified phone number of those receiving the vaccine.

A unified central system allowed for efficient survey administration throughout the Kingdom. Everyone taking the vaccination was sent a SMS link to their verified phone number to complete the survey. This link is unique to the respondent and only accessible to the respondent

**Table 1. List of Survey Domains and Associated Questions**

Domain	Questions
<b>Booking application</b>	Ease of the registration and login Ease of using the application and registering for vaccination
<b>Access</b>	Ease of reaching the vaccination center through the location link Courtesy of the registration staff Ease of the registration process Waiting time before entering the vaccination room Comfort of the waiting area
<b>Vaccination</b>	Staff explanation of the vaccination procedure Staff response to your questions and worries Concern shown for your comfort when giving you the vaccine Information given about what to expect after vaccination and how to report any adverse events Courtesy and respect of vaccination center's staff Our concern for your privacy during vaccination Staff efforts to protect your safety during vaccination (i.e. wearing masks and gloves and following infection control measures) Cleanliness of the vaccination center
<b>Overall assessment</b>	How well staff worked together to provide your vaccine Overall rating of your vaccination experience Likelihood of recommending the vaccination program to others

therefore reducing duplications. Participants are free to choose whether they would like to complete the survey. Once the survey is completed and submitted, data is collected centrally for monitoring and analysis. During this process, strict data collection protocols are followed to ensure privacy of survey participants is maintained. The survey was also tested for validity and reliability to ensure robustness of results.

To support effective decision making using this information, the PX Connect dashboard was used. This dashboard helps in tracking survey operations, check engagement rates and follow-up on survey results daily. The dashboard covers both, quantitative and qualitative information to provide a complete picture of participant's experience of the vaccination process. Live reporting of results in this way allows immediate actions to be taken on quality improvements. For this paper, data collected from January 2021 to December 2021 was used.

#### ***Data Analysis and Validation***

A descriptive analysis was performed on the collected data using IBM SPSS 26 software. Where required, one-way ANOVA was also used to determine differences between groups. Each of the survey questions was rated by respondents on a five-point Likert scale from Very Poor to Very Good. For analysis, the response scale was converted into a numeric scale (see Table 2) in line with the established methodology used by Press Ganey®<sup>14</sup> to facilitate interpretation of collected data. This document is available by contacting Press Ganey®. The main measure for the survey, Vaccination Satisfaction Score was calculated by taking the average of the means of each of the survey domains at the participant level. Calculating the satisfaction score in this way ensures that equal weightage is given to each of the survey participants.

Sentiment analysis was used to analyze the open-ended questions. Three coders independently reviewed each comment and manually assigned a sentiment label to the comments based on the criteria set out in Table 3. Once the assignment was complete, it was cross checked for

**Table 2. Press Ganey® Converted Values**

Survey response	Likert scale value	Converted value
Very Poor	1	0
Poor	2	25
Fair	3	50
Good	4	75
Very Good	5	100

**Table 3. Sentiment Coding Criteria**

Sentiment	Criteria
Positive	Agreeable/complimentary remarks highlighting a positive experience
Negative	Disagreeable/complaining remarks which stipulate improvement
Mixed	Contain both positive and negative remarks
Neutral	A statement of fact that includes neither a compliment nor a complaint

consistency and any disagreement was settled following discussions.

Confirmatory factor analysis (CFA) was used to evaluate the construct validity of the survey using the fit indices; comparative fit index (CFI), Tucker-Lewis index (TLI) and standardized root mean square residuals (SRMR).<sup>15</sup> Reliability of the survey was tested using Cronbach Alpha scores. Convergent validity was evaluated using average variance extracted (AVE).<sup>15,16</sup>

**Results**

**Participants**

During 2021, a total of 23,734,595 surveys were conducted. From these, responses were recorded from 3,909,431 (16.47%) participants. 1,699,177 (43.4%) of these surveys were considered complete. Table 4 provides a breakdown of respondents based on the *sector, type of facility* where vaccination was received, *residency status* and *dose*.

**Reliability and Validity**

Table 5 provides a summary of the Cronbach Alpha scores for the survey domains and the overall survey.

Cronbach alpha scores for all domains were above 0.7 demonstrating good internal consistency. Results of the CFA indicate an acceptable construct validity (CFA=0.86, TLI=0.83 and SRMR=0.06). Factor loadings for all items were found to be above 0.7 except for Item Q3—Ease of reaching the vaccination center through the location link (0.497). The AVE scores for all constructs were above 0.5 therefore supporting good convergent validity of the survey.

**Overall Satisfaction Scores**

Overall, the vaccine satisfaction scores were high across all three sectors (see Table 6).

Participants vaccinated at MOH facilities reported higher satisfaction scores, on average, compared with facilities at other sectors. Similarly, across facility types, reported satisfaction was relatively high, although there was some variability in scores.

Participants vaccinated at MOH premium centers reported the highest satisfaction scores (see Table 7) compared with other facility types.

Among MOH facilities, satisfaction scores for primary health centers (PHCs) were lowest (on average).

**Table 4. Breakdown of Participants**

		N	%
<b>Sector</b>	MOH	1,460,152	85.9%
	Non-MOH	125,209	7.4%
	Military	113,420	6.7%
	Not known	396	0%
<b>Service type</b>	Hospital	417,710	24.6%
	PHC	279,597	16.5%
	Premium center	627,760	36.9%
	Vaccine center	366,187	21.6%
	Pharmacy	5,697	0.3%
	Not known	2,226	0.1%
<b>Residency</b>	Citizen	1,030,468	60.6%
	Resident	386,544	22.7%
	Not known	282,165	16.6%
<b>Dose</b>	First	1,295,007	76.2%
	Second	401,857	23.7%
	Not known	2,313	0.1%

Table 5. Survey Cronbach Alpha Scores

Domain	Item	Alpha	Corrected item-total correlation	Alpha if item deleted
<b>Booking Application</b>		0.804		
	Ease of the registration and login		0.677	
	Ease of using the application and registering for vaccination		0.677	
<b>Access</b>		0.826		
	Ease of reaching the vaccination center through the location link		0.449	0.836
	Courtesy of the registration staff		0.685	0.779
	Ease of the registration process		0.644	0.786
	Waiting time before entering the vaccination room		0.676	0.776
<b>Vaccination</b>		0.903		
	Comfort of the waiting area		0.685	0.774
	Staff explanation of the vaccination procedure		0.787	0.885
	Staff response to your questions and worries		0.821	0.878
	Concern shown for your comfort when giving you the vaccine		0.800	0.881
	Information given about what to expect after vaccination and how to report any adverse events		0.730	0.894
	Courtesy and respect of vaccination center's staff		0.695	0.893
	Our concern for your privacy during vaccination		0.692	0.893
	Staff efforts to protect your safety during vaccination		0.644	0.897
Cleanliness of the vaccination center		0.622	0.900	
<b>Overall</b>		0.918		
	How well staff worked together to provide your vaccine		0.789	0.917
	Overall rating of your vaccination experience		0.877	0.847
	Likelihood of recommending the vaccination program to others		0.839	0.878

Satisfaction scores for PHCs were also low among non-MOH healthcare facilities.

Across all three sectors, overall satisfaction scores remained high for participants taking their first and second doses (Table 8), and among citizens and residents of Saudi Arabia (Table 9)

#### **Key Strengths and Areas for Improvement**

Table 10 provides a summary of the mean scores for each of the questions on the survey. The mean scores were high

across all questions suggesting high satisfaction levels among participants. In particular, participants were very satisfied with the cleanliness of the vaccination center, staff efforts to protect participant's safety during the vaccination process and courtesy of the registration staff at the vaccination center. For all three of these questions, majority of the participants (>89%) gave a rating of very good.

In contrast, the lowest average scores were recorded for questions regarding information and communication about

Table 6. Overall Satisfaction Scores by Sector

	N	Mean satisfaction score	Standard deviation
<b>MOH</b>	1,460,144	92.80	13.86
<b>Non-MOH</b>	125,209	90.84	16.23
<b>Military</b>	113,420	91.94	15.89

**Table 9. Overall Satisfaction Scores by Facility Types within Sectors**

	Service type	N	Mean satisfaction score	Standard deviation
<b>MOH</b>	Hospital	221,929	91.08	15.41
	PHC	276,157	89.44	17.17
	Premium center	627,760	95.8	9.41
	Vaccine center	332,608	91.1	15.52
	Pharmacy	104	90.13	17.69
<b>Non-MOH</b>	Hospital	82,361	90.77	16.05
	PHC	3,440	89.32	17.07
	Vaccine center	33,579	91.5	16.2
	Pharmacy	5,593	89.27	17.76
<b>Military</b>	Hospital	113,420	91.95	15.89

**Table 8. Overall Satisfaction Score by Dose within Sectors**

Sector	Dose	N	Mean satisfaction score	Standard deviation
<b>MOH</b>	First	1,119,492	92.46	13.84
	Second	340,660	93.90	13.93
<b>Non-MOH</b>	First	83,655	90.90	15.82
	Second	39,241	90.51	17.28
<b>Military</b>	First	91,570	92.31	15.17
	Second	21,850	90.43	18.53

**Table 7. Overall Satisfaction Score by Residency Status within Sectors**

Sector	Residency	N	Mean satisfaction score	Standard deviation
<b>MOH</b>	Citizen	924,210	93.60	13.35
	Resident	336,271	92.38	13.16
<b>Non-MOH</b>	Citizen	56,991	90.92	16.97
	Resident	33,177	91.43	14.53
<b>Military</b>	Citizen	49,119	91.54	16.54
	Resident	16,956	91.87	14.69

the vaccination process. Information given about what to expect after vaccination and how to report any adverse events was the lowest rated question by participants across all three sectors, followed by staff explanation of the vaccination procedure and staff response to your question and worries. Among facility types, the average rating for these three questions was lowest among participants vaccinated at PHCs (Figure 1).

As part of the survey, participants were also asked about their likelihood of recommending the vaccination program to others. Majority of the participants (n=1,317,722) gave the highest rating (Very Good), suggesting they were highly likely to recommend the vaccination program to others. When considering facility type, participants vaccinated at premium centers had a significantly higher score for likelihood of recommending the vaccination

program compared with other facilities (mean=98.23, p<0.01). PHC again had the lowest average scores for likelihood to recommend (mean=89.96, p<0.01).

#### ***Participant's Comments***

The survey also encouraged participants to provide any other feedback about the vaccination process through open ended questions. A total of 510,756 comments were received from participants during 2021. Majority of the vaccination recipients were highly complementary of the vaccination program. Sentiment analysis shows that a high concentration of comments received from the participants were positive (Figure 2).

Participants were very complimentary about the vaccination process in general.

**Table 10. Item Level Descriptive Statistics**

Survey questions	N	Mean	Standard deviation
Ease of the registration and login	1,152,452	91.81	19.86
Ease of using the application and registering for vaccination	1,159,585	90.01	22.02
Ease of reaching the vaccination center through the location link	1,499,107	94.85	15.75
Courtesy of the registration staff	1,647,566	95.62	15.12
Ease of the registration process	1,647,772	94.15	16.95
Waiting time before entering the vaccination room	1,651,658	93.29	18.86
Comfort of the waiting area	1,643,137	92.48	19.98
Staff explanation of the vaccination procedure	1,568,250	83.78	28.61
Staff response to your questions and worries	1,577,394	88.49	23.99
Concern shown for your comfort when giving you the vaccine	1,596,652	92.12	20.00
Information given about what to expect after vaccination and how to report any adverse events	1,578,155	83.27	29.57
Courtesy and respect of vaccination center's staff	1,603,834	94.94	16.08
Our concern for your privacy during vaccination	1,599,903	94.82	16.08
Staff efforts to protect your safety during vaccination (i.e. wearing masks and gloves and following infection control measures)	1,602,595	95.87	14.45
Cleanliness of the vaccination center	1,592,296	96.29	13.17
How well staff worked together to provide your vaccine	1,504,854	94.41	16.27
Overall rating of your vaccination experience	1,513,092	94.45	16.08
Likelihood of recommending the vaccination program to others	1,510,767	94.45	17.25

*"I experienced an excellent hospitality throughout the vaccination process and the swift working skill with proper care and safety. Keep up the good work team."*

Participants were also very complementary of the staff, *"Very good treatment by staff at vaccination center and very good application for registration."*

The overall positive sentiment of participants meant that they were happy recommend vaccination to others as well. *"Excellent experience very well organized and excited to recommend to my friends to go ahead and get vaccinated as soon as possible."*

The negative comments received from participants were mostly about the information and communication regarding the vaccination procedure. Participants expressed their dissatisfaction with not being provided sufficient information about the symptoms and side effects of the vaccine.

*"To stress upon the side effects that may happen following vaccination and how to treat..."*

*"Not informed regarding need of updating post vaccination side effects in the Sebbat app."*

## Discussion

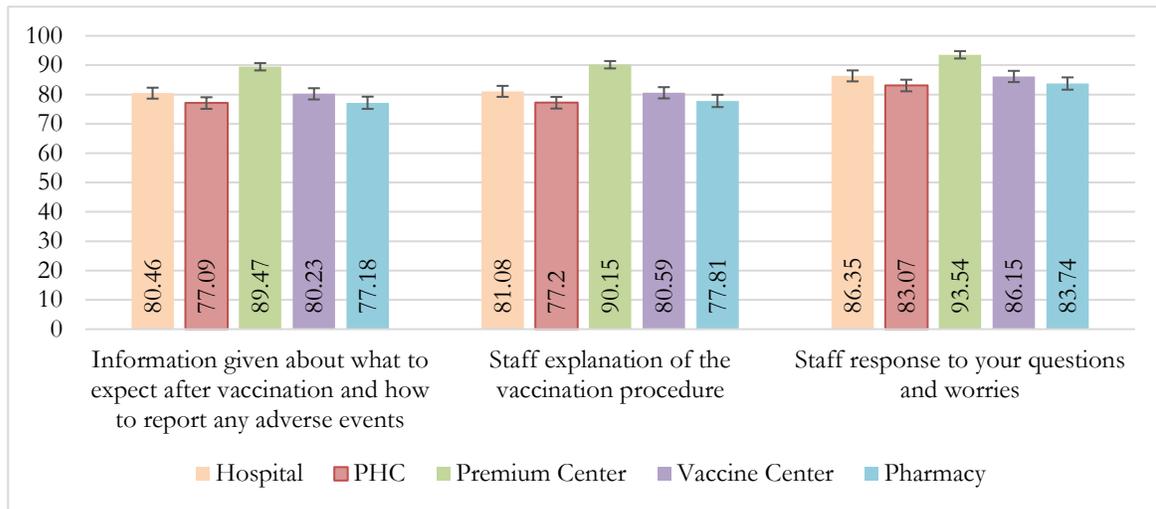
Measuring patient experience is an integral part in improving the quality of health services provided to

patients. With the ongoing pandemic, vaccine administration can be considered a new patient experience journey making it necessary to understand the experience of those undergoing the vaccination process. This study documents a first of its kind national survey developed and administered in the Kingdom of Saudi Arabia to capture the experience and satisfaction of the public with the vaccination process.

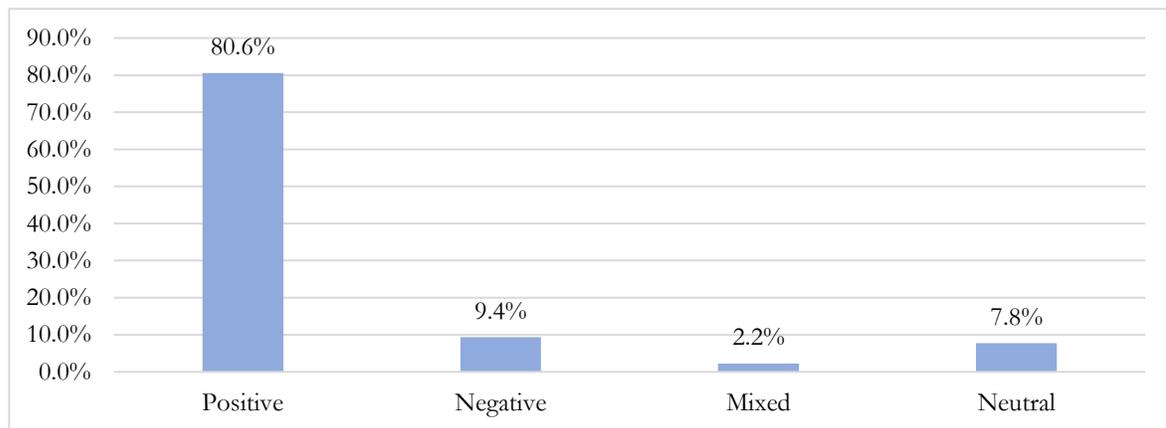
The results of the survey are encouraging. Overall, participants reported high satisfaction levels with the vaccination process and were highly complementary about their experience. In particular, participants were highly satisfied with the cleanliness of the vaccination centers, the efforts made by vaccination center staff to protect their safety by using the appropriate personal protective equipment, and the courtesy of the registration staff.

On the other hand, satisfaction among participants was relatively lower with questions relating to information and communication about the vaccination program. This result is consistent with previous studies; in a satisfaction survey of people hospitalized with COVID-19 in Liverpool, United Kingdom, Wu et al.<sup>13</sup> found that information about medication and side effects had the lowest satisfaction. Similarly, a study by Algado-Selles et al.<sup>3</sup> on satisfaction with COVID-19 vaccination program among teaching staff in General University Hospital of Alicante found that 'information offered prior to the vaccine' and 'information provided before attending the facilities for vaccination' were rated low by participants. Information and

**Figure 2. Average Scores by Facility Type**



**Figure 1. Sentiment Analysis**



communication about the vaccine are important factors. A study by Di Gennaro et al.<sup>7</sup> found that lack of information about the vaccine is a contributing factor towards vaccine hesitancy. In the current survey, a simple Pearson correlation between the three information questions and the likelihood of recommending vaccination to others was positive and statistically significant ( $p < 0.01$ ). This suggests that a higher overall satisfaction will result in more people recommending the vaccination program to others. The current pandemic is unprecedented and unsurprisingly can lead to anxiousness among the public. Given the growing concerns around vaccine hesitancy, it is important that any concerns raised by those taking the vaccine are alleviated and a good level of explanation about the vaccination procedure, both before taking the vaccine and after the vaccine has been administered, is provided<sup>21</sup>. Comments

from survey participants suggested they felt there was lack of information about the vaccine side effects and information about next steps that can be taken in case of any issues following vaccination. Such concerns, at a basic level, can be alleviated by providing those taking the vaccine with information leaflets that clearly lay out what to expect during the vaccination procedure and provide all the necessary contact details to use in case there are any issues following vaccination. Informational concerns about the vaccine must also overcome the misinformation and disinformation about the vaccine, which is known to promote vaccine hesitancy.<sup>22</sup> Therefore, careful planning on how information about the vaccine can be effectively and reliably disseminated is required to overcome this challenge. Nonetheless, it is important that healthcare providers respond promptly to concerns raised by those

taking the vaccine and direct them towards reliable sources of information.

Overall satisfaction levels were also high at various facilities. While premium centers, setup specifically for vaccine administration, recorded the highest satisfaction levels among participants, PHC recorded the lowest. This result was somewhat expected; public opinion about PHC is generally low in Saudi Arabia and past studies have suggested that the general public often seeks to bypass PHC and access secondary care directly.<sup>17</sup> Studies have noted that PHC centers have lacked sufficient equipment<sup>18</sup> and have lower levels of patient satisfaction.<sup>19</sup> More recently, a study by Caswell and Kenkre<sup>17</sup> found five key areas of concern: communication, poor environment, lack of streamlining and flow, lack of unified governance for nursing staff and inadequate training support for nurses and physicians.

Nevertheless, the results from the survey are overwhelmingly positive during 2021. However, these results are from a very early stage of the pandemic and past research has shown that during a pandemic, enthusiasm for vaccine can be high, especially immediately before and after a new vaccine is released.<sup>20</sup> It is therefore important to continuously monitor the trends in satisfaction rates so that appropriate actions can be taken to improve patient experience.

## Conclusion

The COVID-19 vaccination satisfaction survey is a first-of-its-kind global survey implemented in Saudi Arabia. This survey aims to facilitate continuous improvements in patient experience by learning from key insights provided by Saudi residents undergoing vaccination administration. The survey therefore plays a significant role in supporting person-centered care by capturing valuable information about the vaccination process, in particular, the key strengths of the process and areas requiring improvement.

The current results of the survey show a very high satisfaction level among individuals taking their vaccination. Satisfaction levels were particularly high at premium vaccination centers and across all regions. The key areas of strength of this program were (i) cleanliness of the vaccination center, (ii) staff's efforts to protect your safety during vaccination (i.e., wearing masks and gloves and following infection control measures), and (iii) the courtesy of the registration staff. Nevertheless, the survey also highlighted three key areas for improvement: staff explanation of the vaccination procedure, information given about what to expect after vaccination and how to report any adverse events, and staff response to your question and worries. Improvements can be made in these areas by ensuring that a consistent approach is taken to

communicate all key information about the vaccine and how to report any symptoms post vaccination clearly.

The COVID-19 pandemic is unprecedented, and the uptake of vaccine has had some resistance globally. It is important therefore, that any concerns raised by those taking the vaccine are alleviated and a good level of explanation about the vaccination procedure, both before taking the vaccine and after the vaccine has been administered, is provided. It is also important to continuously monitor the results of the survey on an ongoing basis so that appropriate actions can be taken to improve patient experience.

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