Research Article

Covid-19 Booster Dose Vaccination: Its Awareness and Acceptance amongst Citizen of Riyadh Region, Saudi Arabia

Tayseer Almutairi[1], Mohammed Shakil Ahmad[2*], Shaden Almutairi[3], Ghadah Almutairi[3], Nouf Almutairi[3], Lama Alhabdan[3]

[1]Department of Obstetrics and Gynecology, College of Medicine, Majmaah University, Majmaah, Saudi Arabia.
[2]Department of Family and Community Medicine, College of Medicine, Majmaah University, Majmaah, Saudi Arabia.
[3]Medical Student, College of Medicine, Majmaah University, Majmaah, Saudi Arabia.

Corresponding author:
Mohammed Shakil Ahmad,
Department of Family and Community Medicine,
College of Medicine,
Majmaah University,
Majmaah, Saudi Arabia,
E-mail: m.shakil@mu.edu.sa

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Abstract

Background: Since the outbreak of the COVID-19 pandemic, the acceptance of the coronavirus-19 vaccine has been one of the most indispensable steps of the world's mission to confront the disease. Hence, acceptance and awareness of COVID-19 vaccination and third dose among the public were measured. This study was carried out with an objective to assess the quality of web-based health information on COVID-19 and the willingness to accept the third dose among citizen of the Riyadh region. **Methodology:** A cross-sectional online survey was conducted to measure the need for a booster dose and it's acceptance and the quality of web-based information. A total of 631 people contributed their responses. All males and females above 18 years of age living in the Riyadh region of Saudi Arabia were included in the study. This research was conducted in randomly chosen Riyadh, Al Majma'ah, Al Ghat, and Zulfi cities of Riyadh Region. **Results:** A highly significant association ($p<0.001$) between the awareness of vaccine effectiveness and trust in the ability of the vaccine to prevent complications and acceptance of the third dose was observed. Almost 54.8% participants accepted to take the booster dose regardless of any belief about the side effects of COVID-19 vaccines. **Conclusion:** The acceptance of a COVID-19 third dose vaccine was higher in females, single individuals, those aged 18-24, and those with a bachelor's or a diploma degree, and it revealed a positive association between those who had previously been infected with COVID-19 and acceptance of the booster dose. It has shown that many people depend on the health ministry as the first source for obtaining health information about covid19.

Keywords: COVID-19; Social Media; Riyad Region; Vaccine

Introduction

The Coronavirus family is a large group of viruses that can cause illnesses ranging from the common cold to severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) or Severe Acute Respiratory Syndrome (SARS-CoV). While the SARS-CoV was transmitted from civet cats to humans in China in 2002, MERS-CoV was transmitted from dromedary camels to humans in Saudi Arabia in 2012 [1]. The novel coronavirus, COVID-19, was detected in the Chinese city of Wuhan at the end of December 2019 in the form of acute pneumonia. The virus was identified by its genetic sequence [2]. A close contact without nasal and oral protection was able to spread the virus from one person to another. The common symptoms of COVID-19 include fever, cough, shortness of breath, and sometimes pneumonia. People with immuno-deficiency disorders, the elderly, and those who suffer from chronic debilitating diseases such as cardiovascular, metabolic and pulmonary diseases carry higher chances of severity of infection and it's associated complications [3].

Since the rise of the COVID-19 pandemic, the acceptance of the coronavirus-19 vaccine was one of the indispensable and precarious steps of the world's mission to confront the disease. The public awareness to fight covid by vaccination could face many issues, including hesitancy and stigmatization misconceptions that public health authorities need to work on [4].

The Kingdom of Saudi Arabia was the first Arab country to dispense the Pfizer-BioNTech vaccine since it's start on Dec 17, 2020. Health care workers, being most exposed to the disease, were among the first to be included in the immunization phase. The second and third phases were for those over fifty years, being the most susceptible, and then for the general public. Moreover, coronavirus mutations led to the emergence of new variants like the Delta , which holds a great threat to herd immunity; hence, a larger number of people need to be immunized to reach the threshold needed to reduce the circulation of the virus [5].

Saudi Arabia has administered at least 64,649,318 doses of

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COVID vaccines so far4. KSA began to offer the availability of getting a vaccine booster third dose after the need was scientifically proved to the risk groups. Risk groups included those who suffered from chronic renal failure or who have undergone organ transplants, those above sixty years, and those who took the second dose eight months ago [6]. The COVID-19 pandemic and other such events that may occur in future have created an urgent need for the general public to research and find various sources of extracting more information about their spread and prevention. This is where high-quality web-based information sources play a vital role in countering the threats of a pandemic. Authorities need to issue restrictions and recommendations for the public to help them accommodate healthy, preventive protocols during the pandemic. To reduce the spread of the virus, the prevention process needs to be faster and equipped with quality information; it also needs to be published and known to the general population to ensure that effective measures are being taken [7]. Among different resources, the media is the first that people seek information from. It serves as a platform for all communications, education guidelines, and social distancing strategies. The media allowed the Center for Disease Control and Prevention (CDC) and the World Health Organization (WHO) for rapid communication and instructions on public health. Relay of Public health information through different media platforms have an unlimited role that must be understood and appreciated as they represent a grand tool for combating pandemics like COVID-19 [8]. Studies also conveyed that more accessible and credible information from high-quality and reliable sources is difficult during the pandemic, which is a cause of concern and worry in general public. Searches of online information regarding COVID-19 have been met with false information or unnecessary advertisements which has further increased people's anxiety [9]. Therefore, this study aimed to assess people's awareness of the necessity of a booster dose and its acceptance, and the quality of web-based information obtained during COVID-19.

Material and Methods

This cross-sectional online survey was carried out during Covid-19 from February 11 to March 1, 2022 to identify the need for a booster dose and its acceptance and the quality of web-based information available on Covid-19. A total of 631 people contributed their responses. Males and females above 18 years of age who were living in the cities of Riyadh, Al Majma'ah, Al Ghat, and Zulfi of the Riyadh Region of Saudi Arabia were randomly selected for the study.

The data was collected using a designed self-administered questionnaire shared as a link through social media. This data was collected only from the Riyadh region and included three sections: (1) Sociodemographic variables [age, gender, education level, and social status], (2) awareness and acceptance of the booster dose, (3) the quality of web-based health information obtained.

Questionnaire

The study utilized an Arabic online survey. Questions were based on the quality of web-based health information on COVID-19 and willingness to accept the third dose. The questionnaire was grouped into three categories: 1) sociodemographic information, (2) Awareness of the necessity of a booster dose and its acceptance, and (3) the quality of web-based information obtained during COVID-19. For the first category, sociodemographic questions included age, gender, level of education, social status, and the city in which the participant lived. The level of education was defined as public education, Bachelor/diploma, master/doctorate, and illiterate. The age was categorized into four groups: 18-24, 25-34, 35-44, and 45 years or older. The second section contained several questions regarding awareness and acceptance of the booster dose with yes or no choices. And the last section included questions about the quality of web-based health information obtained.

The link was created using a web-based online questionnaire using a google form shared among the research team's contacts in the Riyadh region. Then, the link was distributed through social media and mobile applications such as WhatsApp and Telegram.

Sample size and Data analysis

A total of 631 individuals were interviewed and data was analyzed using SPSS version 21.0. The data was summarized in frequencies and percentages. Associations between variables were assessed using the Chi-square test or Fischer's exact test at a confidence interval of 95% and $p < 0.05$ was considered significant.

Ethical considerations and data protection

The Institutional Review Board approved the study, and an electronic, anonymized self-administered questionnaire was generated using a secured survey platform. The respondents were informed and assured that their participation is voluntary and withdrawal from the study anytime is accepted without any penalties.

Results

Table 1 shows the relation between sociodemographic information of participants with the acceptance of the booster dose of the COVID-19 vaccine. A total of 347 participants revealed their acceptance of getting the vaccine in which most of them who answered yes were female, 319 (91.9), and a few were male participants, 28 (8.1%).

Most participants were 18-24 years old, and 217 (62.5%) answered yes. However, 179 (63.0%) of these participants answered no. Moreover, 232 (66.9%) with a diploma degree showed their acceptance of the booster dose. On the other hand, 198 (69.7%) responded with no. Also, most of the participants from Majmaah revealed their acceptance of the vaccine 216 (62.2%), and several 176 (62.0%) answered no to the booster dose.

Table 2 shows a statistically significant association between those who had previously been infected with COVID-19 and acceptance of the booster dose ($p<0.001$). 169 participants who had previously been infected with COVID-19 showed their unacceptance of the booster dose. However, a small proportion, 91 (26.1%), revealed their acceptance. Moreover, 257 (73.9) participants who had never been infected with COVID-19 approved of the booster dose. On the other hand, 114 (40.3%)

Table 1: Shows Association of demographic characteristics with the third dose of COVID-19 vaccine acceptance among the population of Riyadh region, Saudi Arabia 2022 (n=631). *Fisher's exact test was done instead of the chi-square test to calculate education and social status.

Variables	Acceptance of COVID-19 vaccine third dose					
	Yes (n=347)		No (n=284)			
	Frequency	%	Frequency	%	Chi-square	P-value
Age (Years)						
18-24	217	62.50%	179	63.00%	0.093	0.993
25-34	43	12.40%	33	11.60%		
35-44	43	12.40%	36	12.70%		
> 45	44	12.70%	36	12.7%		
Gender						
Female	319	91.90%	262	92.30%	0.881	1
Male	28	8.10%	22	7.70%		
Education						
Bachelors/ diploma	232	66.90%	198	69.70%	2.821	0.429
Public education	101	29.10%	80	28.20%		
uneducated	3	0.90%	0	0.00%		
Master/ PhD	11	3.20%	6	2.10%		
Social status						
single	233	67.10%	185	65.10%	0.716	0.895
married	103	29.70%	87	30.60%		
divorced	8	2.30%	9	3.20%		
widow	3	0.90%	3	1.10%		
City						
Almajmaah	216	62.20%	176	62.00%	2.315	0.51
Riyadh	95	27.40%	85	29.90%		
Zulfi	28	8.10%	15	5.30%		
Alghat	8	2.30%	8	2.80%		

Table 2: Association between those who had previously been infected with COVID-19 and acceptance of the booster dose.

Variables	Acceptance of COVID-19 vaccine booster dose				
	Yes (n=348)		No (n=169)		
	Frequency	%	Frequency	%	P-value
Got infected with COVID-19.	91	26.10%	114	40.30%	<0.001 (p=0.000)
Never got infected with COVID-19	257	73.90%	169	59.70%	
Total	348	100.00%	283	100.00%	

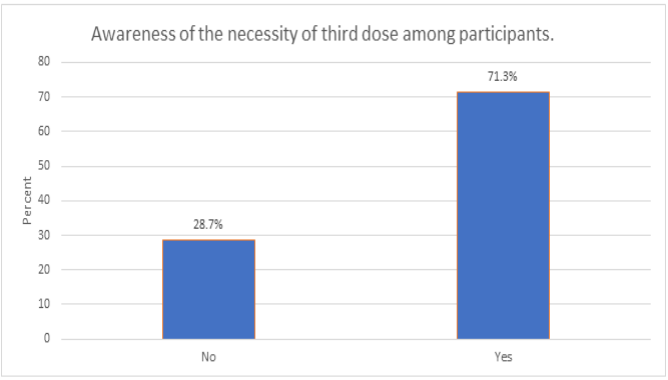

Figure 1: Shows participant's awareness of the necessity of third dose of Covid-19 vaccine.

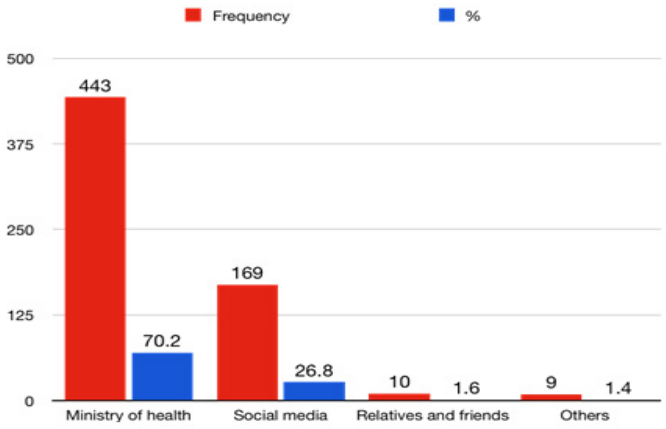

Figure 2: Source of information reported by particpants.

of participants weren't accepting the booster dose.

Table 3 shows a statistically significant association between those who believed in any side effects of booster dose and refusal to take the vaccine. of the side effects of the booster the relationship between those who believed in the booster dose's side effects and vaccination refusal ($p<0.05$). Most participants, 183 (29%), who didn't believe in the side effect of the booster dose of the COVID-19 vaccine were planning to take the booster dose. However, a small portion, 44 (7%), didn't accept the booster dose, while 76 (12%) of participants reported: "I don't know." Additionally, many participants 163 (25.8%) who

believed in the side effect of COVID-19 vaccination were planning to take the booster dose. Only a few participants were against the booster dose, 63 (10%), while 102 (16.2%) participants were unsure about the booster dose.

The association between the awareness of vaccine effectiveness and trust in the ability of the vaccine to prevent complications and acceptance of the third dose which was found to be statistically significant (p>0.001). 42.6% who showed acceptance for the third dose believed that receiving the third (booster) dose of the vaccine will decrease the chances of infection from Covid-19 and its complications while only 12.2% didn't show acceptance for booster dose as they believed otherwise.

Figure 1 shows a total of 631 participants and their awareness of the necessity of third dose of COVID-19 vaccine, in which 450(71.3%) participants were aware of the importance of the third dose, while181(28.7%) were unaware.

Figure 2 shows that out of total 631 participants, 443 (70%) obtain their information from the ministry of health, 169(26.2%) from the social media, and 10(1.6%) participants from relatives and friends. In addition, 9(1.4%) participants obtain their information from other sources.

Figure 3 shows a total of 631 participants and their level of satisfaction with the health information available on the internet about covid-19 out of which 306(48.5%) of participants were satisfied, 211(33.4%) are very satisfied, and 90(14.3%) are dissatisfied while 24(3.8%) were very dissatisfied.

Firgure 4.1 shows that the majority of the participants,

Table 3: Association between those who believe there is a side effect of the booster dose and vaccination refusal.

Variables	Planning to take a COVID-19 booster dose						
	Yes (n=346)		No (n=107)		I do not know (n=178)		
	Frequency	%	Frequency	%	Frequency	%	P-value
Awareness of any side effects of the booster dose	163	25.80%	63	10%	102	16.20%	0.025
Not aware of any side effects of the booster dose	183	29%	44	7%	76	12%	0.025
Total	346	54.80%	107	17%	178	28.20%	

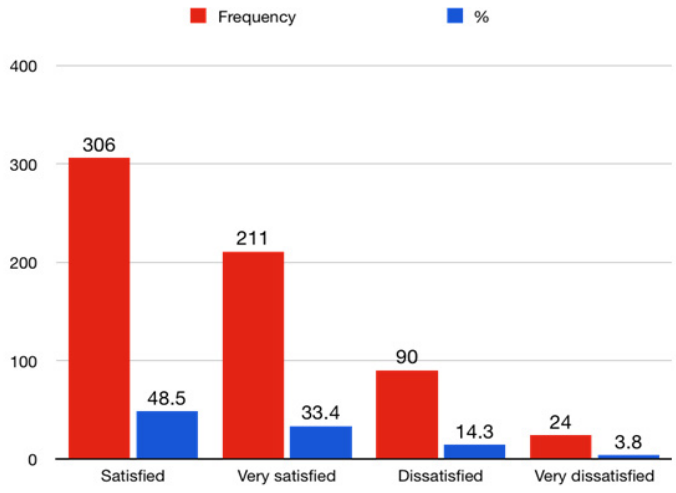

Figure 3: Level of satisfaction of the participants with the health information available about Covid-19.

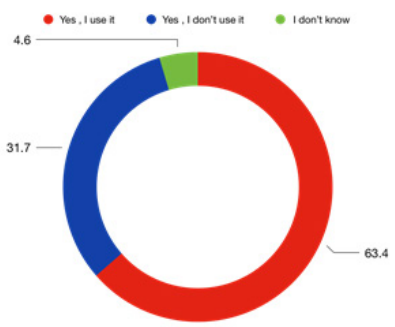

Figure 4.1: How many participants knew about the application of sehaty, and did they use it to take information about COVID-19 or not.

Figure 4.2: How many people knew about the toll-free Number (937 services) of the Saudi Ministry of Health to inquire about Covid 19 and whether they use it.

Figure 4: Shows the number of participants who were aware about the application of sehaty, and whether they use it to take information about Covid-19 or not.

n=400(63.4%), knew about sehaty and used it while 200(31.7%) of them knew about sehaty, but did not use it, while 29(4.6%) did not know about it at all. Figure 4.2 shows that many of the participants n=327(51.8%), knew about the toll-free number (937 services) but did not use it and 94(14.9%) knew about it and used it, while 210(33.3%) didn't know about it.

Discussion

In this study, 631 participants were asked about their acceptance of a Covid-19 third (booster) vaccine, and the association of their sociodemographic characteristics was analyzed.

Most participants showed acceptance (n=347) while (n=284) refused booster dose. These findings were similar to Abdulrahman Alamri et al., who showed that (60%) of 2,227 participants in Saudi Arabia were willing to accept COVID-19 vaccination [10]. In contrast, a study conducted in Bosnia and Herzegovina by Hibbard et al showed that only (25.7%) of respondents would like to get the COVID-19 vaccine, while (74.3%) were either hesitant or rejected vaccination [11].The majority of participants who expressed an acceptance of a third dose of the vaccine were females (91.9%) in contradiction to the study conducted by EL-Element T, et al. where males were more likely to accept the vaccine than the females [12].

Among our respondents, those aged between 18 to 24 years were the most accepting as compared to the older age group. Similarly, a study conducted by EL-Element T et al. in Jordan showed that younger groups were also more accepting than those aged >35 years and older [12].

In contrast, study by Mohammed AL-Mohaithef et al. showed that those in the old age group were more willing to receive COVID-19 third dose [13].

Our results showed more acceptance towards the third dose in those with bachelor's or a Diploma degree (66.9%) than those with higher education levels. In contradiction, Eman Ibrahim Alfageeh et al. reported that most of the participants with a higher education level (52%) refused to get vaccinated [14]. Single individuals were among the majority of those who had accepted the vaccine (67.1%), while married individuals showed more refusal (30.6%). Although in recent studies, married individuals were more accepting (51.61%) than single individuals (42.44%) [13]. Our results revealed a positive association between those who had previously been infected with COVID-19 and acceptance of the booster dose. These results demonstrated that 114 (40.3%) who had a history of COVID-19 infection refused to take the booster dose. However, a higher number 257 (73.9%) of those who had never been infected, revealed their intentions of getting vaccinated. This study involving 631 participants demonstrated that the booster dose of COVID-19 vaccine refusal was relatively low among the Saudi Arabian population. However, there was a positive attitude toward the booster dose among the majority of the participants, 346 (54.8%), regardless of the awareness of any side effects of the booster dose. In addition, the majority of the participants who believed in any side effects of the booster dose were planning to get vaccinated 163 (25.8%). In contrast, another study reported by Noura Altulahi et al. showed that the fear of side effects of the COVID-19 vaccine was the main cause for vaccine refusal [15]. However, more than half of our study participants (54.8%) plan to take the booster dose of the COVID-19 vaccine [16].

The result also shows a highly significant relationship between the awareness of vaccine effectiveness and trust in the ability of the vaccine to prevent complications and acceptance of the third dose. This is in agreement with a recently published Saudi study done by Ali S. Mubarak et al., which showed that there is also a significant association between planning to get the vaccine and students' positive thoughts about vaccine safety and efficacy among Taif University students [17].

This study found that almost 70% of the total participants depended on the ministry of health as the first source for obtaining health information in times of crisis while the social media was the second most preferred source (24.2%). In contrast, a study done among the General Public of Saudi Arabia by Noor Al Shareef et al showed that the sample population mainly relied on social media platforms for obtaining information about COVID-19 rather than on the ministry of health as which was the second most popular source [18].The majority of our participants show a high level of satisfaction with the health information available on the internet about Covid-19. In contrast, previous studies have raised concerns about the quality of health information on the internet and noted that the potential harm from inaccurate sources may be significant [19,20].

Conclusion

Our study, thus concluded that the acceptance of a COVID-19 third dose vaccine was higher in females, single individuals, those between 18-24 years of age and those with a bachelor's or a diploma degree, and it revealed a positive association of acceptance of a booster dose in those who had previously been infected with COVID-19.There was a highly significant association between the awareness of vaccine effectiveness and trust in the ability of the vaccine to prevent complications and acceptance of the third dose. The majority of participants (54.8%) accepted to take the booster dose regardless of any belief about the side effects of COVID-19 vaccines. Moreover, this study showed that many people depend on the health ministry as the first source for obtaining health information about Covid-19.The higher rate of the participants' acceptance in our study can be considered as a positive indicator of the population's acceptance for future doses.

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