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Research Article

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COVID-19 Vaccine Hesitancy in Jordan is Becoming an Obstacle Toward Achieving Immunity

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Annotation

Background: *Vaccination is currently considered the major hope to slow down the spread of the current coronavirus disease 2019 (COVID-19) pandemic. Currently, the biggest obstacle against mass vaccination is that people are reluctant to take the vaccine.*

Objective: *The aim of this study is to assess the acceptance and hesitancy towards the COVID-19 vaccine among the general population in Jordan. In addition, the study explores the possible causes of vaccine refusal and the possible associated factors. Methods: The study was conducted by using an online survey distributed in March 2021. It is composed of items that assess the respondent characteristics and their acceptance to the vaccine.*

Results: *A total of 3728 respondents completed the survey. The majority of respondents 60.5% (n = 2255) didn't register to the platform to take the vaccine, most of them (54.77% were not convinced with the effectiveness of the vaccine). People who work in the health care sector and people with chronic diseases were found to be more likely to receive the vaccine, whereas previously COVID-19 infected and possibly exposed patients both showed hesitancy to sign up for the vaccine.*

Conclusion: *The effectiveness and safety of different vaccines should be widely available to the general population, and be scientifically explained in a simple trustful way. In addition, more awareness programs probably need to target the hesitant groups, including the previously infected patients.*

Keywords: Vaccination, Vaccine, COVID-19, Jordan, Hesitancy, Acceptance

Introduction

Vaccines prevent the spread of contagious, dangerous, and deadly diseases [1]. Corona Virus Disease 19 (COVID-19) produced catastrophic social, economic, and public health consequences, thus the world needs a universal coronavirus vaccine [2]. Vaccine hesitancy remains a barrier to full population inoculation against highly infectious diseases [3]. Vaccine Hesitancy is the term used to define refusal or reluctance in the acceptance of vaccination despite the availability of vaccination services [4]. Vaccine hesitancy is believed to be responsible for decreasing vaccine coverage [5]. COVID-19 virus was first reported on 31 December 2019 in Wuhan, China [6] and it was declared as a pandemic on 11 March 2020 by the World Health Organization (WHO) [7]. Up to this date, various countries are dealing with the pandemic using different methods and strategies.

In Jordan, the first reported case was on 2 March 2020 [8]. Full lockdown was issued on 17 March 2020 [9] and lasted until 3 May 2020 [10] when the National Center for Security and Crisis Management decided to relax the lockdown and facilitate the re-opening of several key sectors within the country [11, 12]. The government efforts were successful to have 8 consecutive days with no new confirmed cases in May, and this facilitated further decisions for easing the restrictions and improving the economic situation. Unfortunately, as of February 2021, the number of cases has been steadily increasing and reached 9417 cases in one day, which was the highest recorded daily number of new cases in Jordan [13].

The Ministry of Health in Jordan has introduced a vaccination program that gives priority according to age, comorbidities, and high-risk occupations [14]. Despite that, the general population's opinions regarding the vaccine have been variable, and this is represented by the low number of applicants on the online platform provided by the Ministry of Health for individuals to register for taking the vaccine [15]. The aim of our study is to find out possible causes that restrict individuals from signing on the platform, and their correlation with age, sex, occupation, comorbidities and previous exposure to the virus.

Materials and Methods

Study Design

The data utilized in this cross-sectional study was collected using an online-based questionnaire, which was conducted between 5 March 2021 and 6 March 2021. It targeted the residents in Jordan. Potential participant recruitment was performed by advertisements on social media platforms (i.e. Facebook, Instagram and Twitter) and through free messaging services (WhatsApp and Snapchat).

Survey Items

The final questionnaire comprised of seven items, which included six mandatories, and one non-mandatory items. Four questions are related to the participant personal information and they included the participants' age group, gender, working status (health care sector or not), and if the participant has any known co-morbidities. Then, the participant was asked about any previous exposure to COVID-19. Furthermore, the participant is requested to document whether he/she has registered in the vaccine platform. In case of no vaccine platform registration, the reason for that was documented by the participant.

Ethical Approval and Statistical Analysis

Institutional Review Boards (IRB) approval was obtained from Hashemite university (Approval Code No.4/9/2020/2021). Statistical analysis was performed using IMB SPSS version 26.0 for Windows. Statistical significance was considered for $p < 0.05$. We used the chi-squared (X2) test to analyze associations between categorical variables.

Results

Sample Characteristics

The survey that was conducted between 5 and 6 of march 2021, and 3728 responses were obtained, 51.7% (n=1927) of which were males while 48.3% (n=1801) were females. This distribution is relatively similar to the gender distribution within the Jordanian population.

Regarding the age distribution, there was a general predilection that the survey would mostly attract those aged between 20 and 60 because the survey was published on major media platforms and the majority of visitors to these media platforms are situated between these two group ranges, and thus the majority of the responses were between 20 and 40 years old (79.1%), followed by those aged between 41 and 60 (18.2%), and the least responses were among participants aged under 20 or above 60 with nearly similar distribution (1.3% and 1.34%; respectively).

Only 17.4 % (n=647) of the respondents were working within the health care sector, that involves medicine, nursing and pharmacy, while the rest 82.6% (n=3081) were working in other jobs not related with the health sector. 13% of the participants reported having 'any chronic diseases like hypertension and diabetes' whereas 86.2% did not suffer from any comorbidities.

Previous COVID-19 Exposure

In regards to the exposure to the COVID-19 virus, 61.6% reported that they were not exposed to the virus, and the rest of the responses evenly distributed between 'positive tested cases' accounting for 19.7% of the responses and 'people who thought that they were exposed due to development of symptoms similar to COVID-19 (dry cough, nasal congestion, fever and consequent loss of taste and smell) but did not test for COVID-19' and they were 18.7%.

Platform Registrations

60.5% (n=2255) of the respondents did not sign up for the vaccine on the online platform provided from the ministry of health, while 39.5% (n=1473) did sign up for the vaccine (Table 1).

Table 1: Vaccine registration status stratified by gender, age, health care sector worker, presence of chronic disease and previous COVID-19 exposure

Parameter		Vaccine Registration Status	
		Registered for vaccine	Did not register for vaccine
Gender	Female	678	1123
	Male	795	1132
Age	≤20 years	16	32
	(20-40) years	1085	1862
	(41-60) years	333	347
	≥60 years	39	14
Health Care Sector Worker	Yes	398	249
	No	1075	2006
Presence of Chronic Disease	Yes	288	225
	No	1185	2030
Previous COVID-19	Yes (confirmed by a lab test)	305	431
	I think so (not confirmed by a lab test)	189	508
	No	979	1316

Out of the participants who didn't sign up for the vaccine, about 54.8% (n=1235) stated that their choice was because they were not convinced with the effectiveness of the vaccine, and 19.4% (n=438) of the responses explained that they feared from the possible side effects that might result from the vaccine, and 16.3% (n=367) stated that they have been infected with the virus or at least they think that they were so, and they wouldn't need the vaccine as they have likely acquired immunity from their previous exposure to the virus. 9.5% (n=215) stated that there were other causes that prevented them from signing up on the platform (Figure 1).

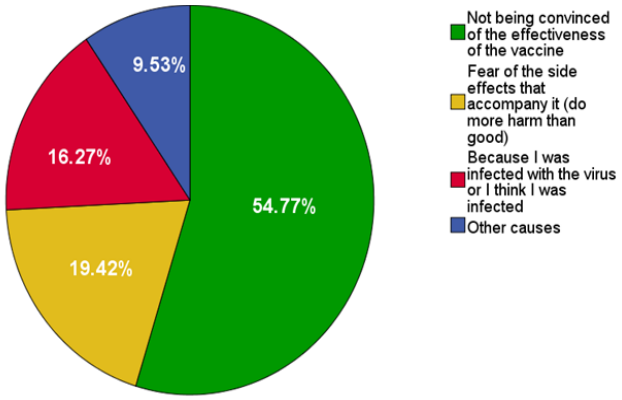

Figure 1: Reasons for Not Registering to The Platform

Associations

The following results were obtained from statistical analysis of the responses of the survey using SPSS ver. 26 and they indicated the following: There was an association between working in the health sector and signing up for the platform, which means that there is more likelihood that workers from the health sector to sign up for the vaccine ($X2=158.581$ DF(1) P value < 0.001).

Regarding comorbidities, it was found that people with chronic diseases such as hypertension and diabetes will sign up to take the vaccine ($X2=68.821$, P value < 0.001) more likely than people who did not suffer from chronic diseases, the latter elucidated that their reasons were that they didn't believe in its effectiveness (55%), feared from the side effects (18.6%), gained immunity from previous exposure (16.3%), or other causes (9.3%) ($X2=11.998$, P value < 0.001).

As for previous virus exposure, there was a strong association between those who were exposed to the virus with a positive COVID-19 test and for not signing up on the platform ($X2=55.459$, P value < 0.001). In contrast, it was found out that people who didn't sign up for the vaccine with no previous exposure to the virus, would most likely explain their action because they didn't believe in the effectiveness of the vaccine ($X2=790.695$, P value < 0.001).

Discussion

Vaccination is encountering refusal from a decent proportion of people for a variety of causes, it can be attributed to the confluence of several sociocultural, political, and personal factors [16, 17]. Some of them consider COVID-19 as a hoax or a form of a conspiracy, while some people think it is formed by injectable micro-chips to control their bodies by altering their DNA [18, 19]. In addition, Anti-Vaxxers are people that refuse all types of vaccines from the beginning whatever the type of disease [20].
COVID-19 has currently affected more than 120 million people and lead to more than 2.6 million deaths [21]. which means that vaccination is urgently needed.

In Jordan, the government's target to vaccinate 4 million individuals seems to be facing difficulties due to the refusal to register in the platform, till 24 March 2021 approximately only 750 thousand individuals signed up among the 10+ million individuals living in Jordan, which represents only 7.5% of the general population and approximately 18.75% of the targeted population. Approximately only 250 thousand people received the first shot of the vaccine, which is about 33.33% of those whom registered in the platform, this might be due to the fact that 25% of individuals who received a letter to receive the vaccine, did not attend the vaccination [22-25].

The hesitancy and concern became more obvious with the emergence of the new virus variants, like the B.1.1.7 variant that emerged in the United Kingdom in September 2020 and was found to be more contagious and harmful than the previous variant [26, 27]. In addition, new variants like South African and Brazilian variants have emerged [28].

People were also concerned whether the current vaccination can cover the new variants, especially that the new strains started to emerge after the development of the COVID-19 vaccines, which vastly raised suspicions about the vaccine efficacy against them [29].

Furthermore, the speed at which the vaccines were produced and the emergency use authorization have both raised some questions about their safety, particularly the long-term possible side effects, as it usually takes at least 2 years to make vaccines available for use in non-pandemic times [30].

Nevertheless, this speed in vaccine production is urgently needed as the Severe Acute Respiratory Syndrome corona virus 2 (SARS-CoV-2) is highly contagious [31]. Corona virus infections were previously encountered in humans. A prominent example is the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) which was first reported in 2012 at Saudi Arabia, and most probably a vaccine against the corona virus structure started to be developed since that incident [32, 33]. In the current pandemic, it should not be forgotten that COVID-19 has relatively high case fatality rates [34].

In addition, the people's reluctance towards the vaccine was even enforced after the incidents claimed to be related to introduction of vaccine brand called Oxford-AstraZeneca, which was first administered on 4 January 2021, This concern was made after Denmark reported several deaths after the administration of the vaccine, and this lead some countries like Norway, Iceland, Austria, Estonia, Lithuania, Luxembourg, Italy, and Latvia to temporarily stop using this brand [35, 36]. Though it was later declared safe to be used, many people are still afraid of receiving it [37].

There was also some debate whether a previously infected individual needs to get the vaccine or not and for how long the natural immunity works after getting infected with COVID-19 [38-40].

Many steps are required to improve mass vaccination among people. For example, researchers within the country must provide detailed statistical analysis that shows the number of individuals who took the vaccine, which brand they took and any reported side effects resulted from taking the vaccine, this will in turn provide some sense of confidence to the public given that these results are

provided from the current vaccination program within Jordan. Furthermore, having teams that provide the vaccine at your doorstep is probably a very helpful step to encourage people to get vaccines in a short period. This means that there will be teams who focus on highly populated areas that roam each state, and they provide a mobile vaccination station that can provide the vaccine to those who have mobility issues or those who are reluctant to take the vaccine. These teams are expected to target markets and shopping malls first, and then they could be deployed in different neighborhoods at different times of the day.

Additionally, awareness programs can help moving the vaccination process among people. These include evidence-based and best-of-knowledge information about the vaccines' efficacy and safety, differences between different types of vaccines, and the precautions for their intake. Moreover, it would be extremely helpful to educate the previously infected people about the risk of re-infection and that immunity against SARS CoV2 might not be permanent, and the antibodies might fade down after few months [41].

Conclusions

Our findings indicate that people who work in the health care sector and people with chronic diseases are more likely to receive the vaccine, whereas previously COVID-19 infected patients and individuals with possible previous exposure both showed refusal or hesitancy to sign up for the vaccine, and probably awareness programs need to target those groups once the vaccine becomes widely available.

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Informed Consent Statement

Participation in this study was voluntary. Informed consent was ensured by the presence of an introductory section in the survey used in this study, with the submission of responses implying an agreement to participate.

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