

ACCEPTANCE OF COVID-19 VACCINE AMONG GENERAL POPULATION IN IRAQ

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ABSTRACT

COVID19 emerged as one of the biggest global public health crises in recent history. Many pharmaceutical companies have raced against time to develop a vaccine, so that the pandemic can be brought under control. The aim of the current study was to assess the acceptance of the COVID19 vaccine among the general population in Iraq. A cross-sectional study was conducted among 1069 respondents from different states of Iraq using questionnaires administered online. Though a total of 77.6% of the respondents agreed to take the COVID19 vaccine when available, a majority (64.3%) said they would wait for some time before taking the vaccine. Around two-thirds agreed to pay a price for the vaccine and the majority (48.6%) preferred the Oxford (AstraZeneca) vaccine. There was a significant association between age, working status, educational level, having family members infected with COVID19 and taking flu vaccine before with acceptance of Covid19 vaccine with P value (<0.001, <0.001, <0.001, 0.05, <0.001) respectively. Overall, there is high acceptance willingness among the general population to pay for COVID19 vaccine, once it is available. More education and promotion are needed to assure the public that the vaccine is effective and safe.

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic was first reported in Wuhan, China, and spread to many territories and countries. It causes serious respiratory infections, leading to pneumonia and lung failure. The etiologic agent of the disease is the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is a beta coronavirus and genetically similar to the SARS-CoV reported in 2002 [1–3]. The spike S protein of SARS-CoV-2 binds to the angiotensin-converting enzyme 2 (ACE2) and initiates viral entry into type II pneumocytes in the human lung, similar to SARS-CoV [4,5]. Infection spreads mainly through respiratory droplets and during close contact and can be spread by symptomatic, pre-symptomatic, and asymptomatic carriers. Because of the highly infectious nature of COVID-19, many efforts were made by WHO and Governments to contain it. Potential therapeutics including antiviral medications and immunotherapy (monoclonal antibodies and protease inhibitors) are being developed or are in different stages of clinical trial[6,7].

Vaccination coverage is one of the most successful and cost-effective health mediations to stop infectious diseases, including the COVID-19. Currently, more than 100 COVID-19 vaccine candidates are pre-clinical and clinical development and

this number is increasing. Development of an effective and safe COVID-19 vaccine is not easy, but its manufacture, storage, distribution, and administration could potentially pose extraordinary challenges as well, especially in developing countries[7]. Many considerations have been taken into account in the vaccine design, such as selection of SARS-CoV-2 antigens, vaccine platform and vaccination regimens/routes. There are many platforms of the vaccine, like live attenuated vaccine (LAV), inactivated virus vaccine, protein sub-unit vaccine, viral vector-based vaccine and DNA or m-RNA vaccine [8,9].

Immunization programs are successful when there are high rates of acceptance. However, different considerations should be borne in mind while attempting vaccination of the population in low- and high-income countries [10–12]. It is thus critical to understand the perceptions, confidence and acceptance of people in Iraq about COVID-19. The aim of the current study was to assess the acceptance of COVID19 vaccine among the general population in Iraq.

Materials & Methods

An Internet-based study was performed among 1069 adults living in Iraq. The respondents were chosen using non-probability convenience sampling through invitation links in Facebook and WhatsApp

groups. Google Forms was used to host and distribute the questions to respondents. After opening the invitation link, the respondent needs to agree to participate in research, before answering the questions. The questionnaire consist of 3 parts, of which part 1 concerns sociodemographic data (age, gender, educational level, working status, state). Part 2 deals with COVID-19 infection history, other vaccines history, daily hygiene and protection practices. Part 3 asks about acceptance of COVID-19 vaccine (agree to take, reasons for refusal to take, willingness to pay and pharmaceutical company preferences). Data were analysed using SPSS version 24. Mean and standard deviations were used for numerical variables, while frequency and percentages were used for categorical variables. Chi-square test and independent t test were used to test significance of association between variables.

Results

The result of this study is based on the analysis of 1069 respondents who agreed to participate and completed the online questionnaire regarding the acceptability of the COVID-19 vaccine. The sociodemographic features of respondents are represented in Table 1. The mean age of the participants was 30.9 ± 10.3 years old. Women represented the majority (79.4%) of the participants, while more than half

(57.5%) were government employees, with 47.9% of them having a university degree. The participants were from all the 18 Iraqi provinces and the highest percentage was from Baghdad (23.48%), followed by Dhi-Qar (15.72%) and Wasit (15.06%).

It is seen from Table 2 that there were only 189 (17.7%) participants with a history of COVID-19 infection during the pandemic period and 424 (39.7%) of them had at least one family member diagnosed with COVID-19. The result reported in this table also shows that around three quarters (72.6%) of the respondents had never taken the Flu vaccine in their lives. The majority (85.1%) mentioned using masks, whenever they went out or communicated with others. Although only 415 (38.8%) used gloves when they were out, the majority (82.3%) used hand sanitizer instead.

As Table 3 shows, 830 (77.6%) respondents agreed to take the COVID-19 vaccine when available, but 534 (64.3%) of them preferred to wait for some time before taking the vaccine. Near half (48.6%) preferred the Oxford (AstraZeneca) vaccine and about 63.8% were ready to pay a price for the vaccine. Among the 239 (22.4%) who refused to be vaccinated, there were 155 (64.8%) who thought the vaccine was not safe, while 47 (19.8%) did not believe in

its protective effect against COVID-19 infection.

According to Table 4, this study found significant associations of the vaccine acceptance with the educational levels and working status (p -value <0.001) of the respondents. In addition to the significant association ($P= 0.05$) of family history, 80.7% of those with a family history of COVID-19 agreed to take the vaccine, while the remaining 19.3% did not agree. Past administration of the Flu vaccine was also significantly associated ($P<0.001$) with acceptance of the COVID-19 vaccine, as 84.9% of the participants who had already received Flu vaccine were ready to take the COVID-19 vaccine when available.

Discussion

In Iraq, COVID-19 pandemic has assumed alarming proportions, with a national current reporting of thousands of new cases daily, and hundreds of deaths weekly [13]. At the same time, the Iraqi government has lifted the lockdown and the limitations on public gatherings [14]. In this situation, vaccines represent the best solution to fight against Covid-19. Therefore, this study was conducted to investigate the acceptance of COVID-19 vaccine and associated determinants among the general population, as there no similar study has been carried out in Iraq. Most of the current respondents are females, with university or higher

education, were not infected with COVID-19 before, usually used hand sensitizers and wore a mask outside.

In this study, most of the participants (77.6%) intended to be vaccinated for COVID-19; this level of acceptance would be sufficient for the population to acquire herd immunity, according to some assessments [15]. Compared to other studies, this rate is lower than that reported by a Chinese study [16], in which the rate of vaccine agreement among the general population was 91.3%. Another study among Indonesian citizens reported 93.3%, and 67% acceptability for 95%, and 50% effectiveness of COVID-19 vaccine, respectively [17]. However, public surveys in Saudi Arabia [18], and USA [19] revealed lower acceptance rates of COVID-19 vaccine, viz., 64.7% 57.6% respectively.

Although a good acceptance rate was found in this study, about two-thirds of the respondents with vaccination intention (64.3%) would prefer to postpone getting vaccinated. This is in consonance with the Chinese study finding that around half the participants (47.8%) with vaccination acceptance would wait until the safety of the vaccine is established [16]. The motivation for a vaccine might be affected by hesitancy, causing the individuals to reject it for themselves or their families. Vaccination hesitancy can be due to contextual, individual, and group

influences, as well as vaccine-specific issues such as safety or confidence [20].

Current findings reported that more than one third of the respondents with vaccination acceptance (36.2%) do not agree to pay the price of the vaccine. Cost is determined to be one of the factors of vaccination hesitancy [21]. It is thus better to provide COVID-19 vaccine free of cost to the public to increase vaccine uptake, especially for those who are hesitant towards vaccination. The current result of high vaccine hesitancy could be due to fact of COVID-19 vaccine still being under trial at the time of the survey and there being no current confirmation about vaccine safety and effectiveness. However, this level of hesitancy may be reduced later, when the new vaccine is introduced in the market, accompanied by sufficient data on its safety and effectiveness.

Lack of confidence in the vaccine safety was the most common reason reported for refusing vaccination in the present study. Similarly, Wang et.al. [16] found that about half the respondents (47.8%) with vaccination acceptance would delay vaccination until the safety of the vaccine is established, concerns about vaccine safety being the main cause of their vaccine hesitation. Previous studies researched public attitudes towards vaccines and demonstrated that one of the major obstacles for vaccine acceptance, especially

newly introduced vaccines, was concerns about their safety [22-24].

In this study, several factors were found to be significantly associated with COVID-19 vaccination acceptance, including occupation, educational level, family history of getting COVID-19, and history of influenza vaccination uptake. As stated by Fisher et al. [18], lower educational attainment and not having been vaccinated for influenza were influencing the hesitancy toward COVID-19 vaccine. Confirming this, Malik et al [25] reported that higher duration of education was a predictor for COVID-19 vaccine acceptance, whereas unemployed participants reported a lower acceptance rate of a COVID-19 vaccine. In contrast to our findings, other authors found education, employment status and history of receiving Influenza vaccine may not influence vaccination intention [16,18].

Considering the association of age with vaccination intention, previous findings are contradictory; while some studies have reported older responders as more likely to accept vaccination [18,25], others found no association [16,17], whereas the current results showed that respondents with vaccination acceptance are significantly younger than their non-accepting counterparts ($P < 0.001$). A possible explanation of this result is that younger people are more intolerant of lockdown and social restrictions associated with the

COVID-19 pandemic and are thus more enthusiastic to be vaccinated. They might also be more familiar and confident in scientific phenomena, compared to with their older counterparts.

Although earlier studies indicated gender as a predictor of vaccination acceptance [16,19,25], current findings reported a non-significant association ($P>0.05$), which is consistent with the results of other studies [16,17]. This finding could be due to a majority (79.4%) of respondents in this study being females; thus, a clear association has not been determined.

Several limitations were found in this study; firstly, the generalizability of the results may be limited by how the questionnaire was distributed. Social media were used for collection of data' hence, we missed surveying poor, illiterate, and old people. At the same time, the sampling method was convenient, the sample was excessively representative of the highly educated, and females. Second, the study was cross-sectional in design and as such, a causal association between exposure and outcome cannot be confirmed. Third, the acceptability was assessed at time when a vaccine was not available. It is possible that when an effective vaccine becomes

available with information about its safety and side effects, some participants may change their response. However, this is the first study that investigated in detail COVID-19 vaccine acceptance and its associated determinants among the Iraqi population with a large sample, across the country, from different occupations and ages.

Conclusion

In conclusion, the general population has high acceptance and willingness to pay for a COVID19 vaccine, once it is available. More education and promotion are needed to assure the public that the vaccine is effective and safe.

Conflict of interest

The authors declare no conflicts of interest.

Financial statement

The authors did not receive any financial support from any source.

Authors' contribution:

HFG: formulated the idea and conducted the study, TMJT: statistical analysis and data presentation, SALA: discussion and conclusion, SA: contributed to methods and data collection, SAH: draft manuscript, TAH: data analysis, RHR: data collection.

Table 1: Socio-demographic characteristics of the respondents.

Variables	Min	Max	Mean	SD
Age	18	70	30.9	10.3
	N		%	
Gender				
Male	220		20.6	
Female	849		79.4	
Province				
Erbil	32		2.99	
Anbar	19		1.78	
Basra	56		5.24	
Qadisiyah	23		2.15	
Sulaymaniyah	11		1.03	
Muthanna	6		0.56	
Nineveh	133		12.44	
Najaf	37		3.46	
Babil	62		5.80	
Baghdad	251		23.48	
Duhok	14		1.31	
Diyala	16		1.50	
Dhi Qar	168		15.72	
Saladin	20		1.87	
Karbala	30		2.81	
Kirkuk	21		1.96	
Maysan	9		0.84	
Wasit	161		15.06	
Working Status				
Unemployed	395		36.9	
Government Worker	614		57.5	
Private Sector	60		5.6	
Educational level				
Primary	9		0.8	
Secondary	148		13.8	
University degree	512		47.9	
Postgraduate	400		37.5	

Table 2: Frequency distribution of disease history and protective measures followed by the respondents regarding COVID-19.

Variables	N	%
Did you get COVID-19 infection?		
Yes	189	17.7
No	880	82.3
Did one of your family members get COVID-19 infection?		
Yes	424	39.7
No	645	60.3
Did you take the Flu vaccine before?		
No	777	72.6
Yes	292	27.4
Do you wear masks daily when you go outside		
No	160	14.9
Yes	909	85.1
Do you wear gloves daily when you go outside		
No	654	61.2
Yes	415	38.8
Do you use hand sanitizers daily		
No	189	17.7
Yes	880	82.3

Table 3: Vaccine acceptance among participants.

Variables	N	%
When COVID-19 Vaccine is developed, will you agree to take it?		
No	239	22.4
Yes	830	77.6
If Yes, when will you take it?		
Immediately	296	35.7
I will wait for some time	534	64.3
Do you agree to pay fees for the vaccine?		
No	530	36.2
Yes	300	63.8
Which vaccine do you prefer?		
US Moderna	167	20.2
Russian	180	21.7
Chinese	80	9.5
Oxford (AstraZeneca)	403	48.6
If No, what are your reasons?		
I do not believe in vaccine	26	10.8
Too expensive	11	4.6
Not safe	155	64.8
I do not think will protect me against COVID-19	47	19.8

Table 4: Association between socio-demographic characteristics and COVID-19 vaccine acceptance

Variables	Acceptance				X ²	P-Value
	NO		YES			
	N	%	N	%		
Gender						
Female	195	22.9	654	77.1	0.89	0.35 ^a
Male	44	20.0	176	80.0		
Working Status						
Unemployed	69	17.5	326	82.5	15.60	<0.001 ^a
Government worker	163	26.5	451	73.5		
Private sector	7	11.6	53	88.4		
Educational level						
Primary	0	0	9	100	37.5	<0.001 ^b
Secondary	26	17.57	122	82.43		
University	84	16.4	428	83.6		
Postgraduate	129	32.2	271	67.3		
Did you get COVID-19 infection?						
No	201	22.8	679	77.2	0.67	0.41 ^a
Yes	38	20.1	151	79.9		
Did one of your family members get COVID-19 infection?						
No	157	24.3	488	75.7	3.69	0.05 ^a
Yes	82	19.3	342	80.7		
Did you take the Flu vaccine before?						
No	195	25.1	582	74.9	12.30	<0.001 ^a
Yes	44	15.1	248	84.9		
	Mean	SD	Mean	SD	T test	
Age	34.40	11.58	29.91	9.76	14.58	<0.001 ^c

^a Chi-square test was performed, ^b Fisher exact test was performed, ^c independent t test was performed.

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