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COVID-19 vaccination acceptance among a sample of healthcare providers in Karbala Governorate (Iraq)

Rasha Haider Shareef
College of Health and Medical Technology Middle Technical University / Iraq
Email: attaahalsarray@gmail.com

Atta Ah Mousa Al-Sarray
Professor. Dr. College of Health and Medical Technology Middle Technical University / Iraq

***Abstract*---**Although many vaccines are in development and clinical trials, and many vaccines have been distributed worldwide, the world has faced a huge challenge in line with the willingness to accept a COVID-19 vaccine in different countries. However, no study has been conducted on the acceptance of the COVID-19 vaccine among HCPs in Iraq. Therefore. Health care providers, the frontline fighters, are at high risk of being infected with SARS-CoV- 2. A descriptive; the cross-sectional study was performed at 4 hospitals and 18 PHCCs randomly selected (multistage sampling) in the Karbala governorate. The period of data collection lasted 3 months, it began on 18th January 2022 ending on 12th April 2022. The study was conducted on 457 a sample of health care providers. The study conducted on 457 healthcare providers with an age range was between 20 -59 years, the Mean±SD of the age was 33.6±9.42 the highest percentage of healthcare providers (45.3%) was in the age group 20-29 years and the lowest percentage of healthcare providers (8.8%) was in the age group 50-59 years. The percentage of females represented 66.5% of the healthcare sample, and males were 33.5%, and the marital status, the highest percentage of healthcare providers (78.0%) was married, whereas the lowest percentage of them (2.0%) was divorced. A high percentage (95.4%) of health care providers were residents of rural areas. Related to educational qualification, the highest percentage of HCPs (74.3%) graduated from college and higher, whereas the lowest percentage of them (1.5%) graduated from secondary school. Regarding the occupational level, the highest percentage of them (48.1%) was nurses. And years of work was 60.6% of them had equal or less than 10 years of work. While 76.4% of HCPs had been infected with coronavirus and 79.9% of them had immunization cards. Acceptance score regarding COVID-19 showed that (45.1%) had fair acceptance, (37.4%) had poor

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acceptance, and only (17.5%) of them with good acceptance. The study concluded that the highest proportion of the study sample had an acceptable score regarding knowledge, awareness and acceptance

***Keywords*---**COVID-19, vaccine, healthcare providers, acceptance, Karbala city.

1 Introduction

COVID-19 has destroyed healthcare facilities even in well-resourced nations, and healthcare workers are at high risk of infection because they are regularly exposed to SARS-CoV-2, so protecting them from infection is critical, not only for themselves but also for keeping healthcare resources from collapse (Nguyen et al., 2020). In response to the 2020 COVID-19 pandemic, multiple vaccines were developed, tested through clinical trials, and presented to the FDA for Emergency Use Authorization (EUA), vaccines are one of the most dependable and cost-effective public health interventions ever developed, saving millions of lives each year (Ehreth, 2003). Many aspects are considered in the vaccine design, including the selection of SARS-CoV-2 antigens, the vaccine platform, and immunization regimens/routes. Vaccine platforms include live attenuated vaccine (LAV), inactivated virus vaccine, protein subunit vaccination, viral vector-based vaccine, and DNA or mRNA vaccine (Shin et al., 2020).

As of February 18, 2021, WHO listed at least seven different vaccinations that have been distributed in many countries, with healthcare workers (HCWs) being designated as the highest priority for vaccination. Furthermore, more than 200 other vaccines are now under development, with more than 60 of them in clinical trials (Huynh et al., 2021). Vaccines' production, storage, distribution, and administration may provide tremendous challenges, particularly in developing countries (Ghazi et al., 2021).

Health workers, the frontline fighters, are at high risk of being infected with SARS-CoV- 2, many health workers in the world, have lost their lives in fighting with COVID-19(Taqi et al., 2021) .therefore, there is a more prominent need to evaluate the factors influencing vaccination uptake among HCWs (Achenbach & Eunjung Cha, 2021). As a result, having high vaccination coverage among healthcare personnel early provides a sufficient workforce to treat patients and allows medical authorities to communicate their good immunization experiences with patients and their families. nevertheless, several concerns have been raised concerning the vaccine's newness and safety, as well as vaccination acceptability, which are expected to impair the success of the COVID-19 vaccine program's roll-out (Dror et al., 2020).

Vaccine acceptance is determined by confidence and convenience (Al-Mohaithef & Padhi, 2020). Many people are unsure about vaccination safety, which will be a major challenge for health care providers, politicians, community leaders, and governments to overcome in order to promote vaccine uptake (MacDonald, 2015).
This study aimed to determine the acceptability of the COVID-19 vaccine among healthcare providers who are front-liners in the war against the Covid-19

Pandemic and to identify the perceived barriers to vaccine uptake among them and determine the association between the sociodemographic variables and Covid-19 knowledge, awareness, and acceptability.

2 Materials and Methods

The study is a descriptive cross-sectional study that was conducted in Karbala city in Iraq at 22 hospitals and PHCCs that were randomly selected (multistage sampling). The duration of data collection lasted three months, The period of data collection lasted 3 months, it began on 18th January 2022 ending on 12th April 2022. The place of study was 4 hospitals, 4 health sectors and 18 primary health care center. Inclusion criteria: healthcare providers randomly selected in health care centers and hospitals in Karbala city. Exclusion criteria: healthcare workers out Karbala city and healthcare workers who does not have the desire or refuses to participate

Statistical data analysis

Analysis of data was carried out using the available statistical package of SPSS-28 (Statistical Packages for Social Sciences- version 28). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum values). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum). The significance of difference for different percentages (qualitative data) was tested using Pearson Chi-square test (χ2-test) with the application of Yate's correction whenever applicable. Statistical significance was considered whenever the P-value was equal to or less than 0.05.

3 Results and Discussions

The present study enrolled 457 of health care providers the results of acceptance which were listed in the table (1), this study showed the highest percentage of participants (73.3%) were taken the vaccine before, while 69.1% of participants saw that they were willing to take the COVID-19 vaccine. Regarding the acceptance of the COVID-19 vaccine (69.0%) of them answered that their families had taken the COVID-19 vaccine, and the results found more than half (53.4%) of participants never delayed getting the vaccine for any reasons other than illness. Whereas 51.9% of participants that they never decided not to get the vaccine for other reasons other than illness. The results showed that (75.1%) of participants would take the COVID vaccine if available with efficacy (95%), while (56.7%) of participants would take it if available with efficacy 70% and (37.2%) of participants would take it if available with efficacy 50%. (31.3%) of participants preferred to take the COVID-19 vaccine even if they suffering from any health issue, while (64.3%) of participants never accepted the paid fees the for COVID-19 vaccine. The highest percentage of the participants (78.3%) recommended their families and friends taking the COVID-19 vaccine. Only (24.7%) received seasonal flu shot in the last 12 months, while only (39.2%) planned to receive a seasonal flu vaccine next year.

Table (**1**): Distribution of 457 healthcare providers according to their acceptance of COVID-19 vaccine

Acceptance of healthcare providers regarding COVID-19 vaccine	Defiantly acceptance (YES)		defiantly unacceptance (NO)		Hesitate (uncertain)	
	No	%	No	%	No	%
Have taken any other vaccine before	335	73.3	115	25.2	7	1.5
Do willing to take the COVID-19 vaccine	316	69.1	129	28.2	12	2.6
Family get the COVID-19 vaccine	363	79.4	85	18.6	9	2.0
As an adult, have ever delayed getting a vaccine for any reasons other than illness or allergy	192	42.0	244	53.4	21	4.6
As an adult, have ever decided not to get a vaccine for reasons other than illness or allergy	198	43.3	237	51.9	22	4.8
If a COVID-19 vaccine is available with an efficacy of 95%, would be a candidate for receiving all shots	343	75.1	84	18.4	30	6.6
If a COVID-19 vaccine is available with an efficacy of 70%, would be a candidate for receiving the vaccine	259	56.7	158	34.6	40	8.8
If a COVID-19 vaccine is available with an efficacy of 50%, would be a candidate for receiving the vaccine	170	37.2	249	54.5	38	8.3
Prefer to take the COVID-19 vaccine even if suffering from any health issues	143	31.3	283	61.9	31	6.8
Agree to pay fees for the vaccine	133	29.1	294	64.3	30	6.6
Will recommend family and friends to take the vaccine	358	78.3	80	17.5	19	4.2
Received the seasonal flu shot in the last 12 months	113	24.7	321	70.2	23	5.0
Planning to receive a seasonal flu vaccine the next year	179	39.2	222	48.6	56	12.3

Acceptance score regarding COVID-19 vaccine showed that (45.1%) had fair acceptance, (37.4%) had poor acceptance, and only (17.5%) of them with good acceptance.

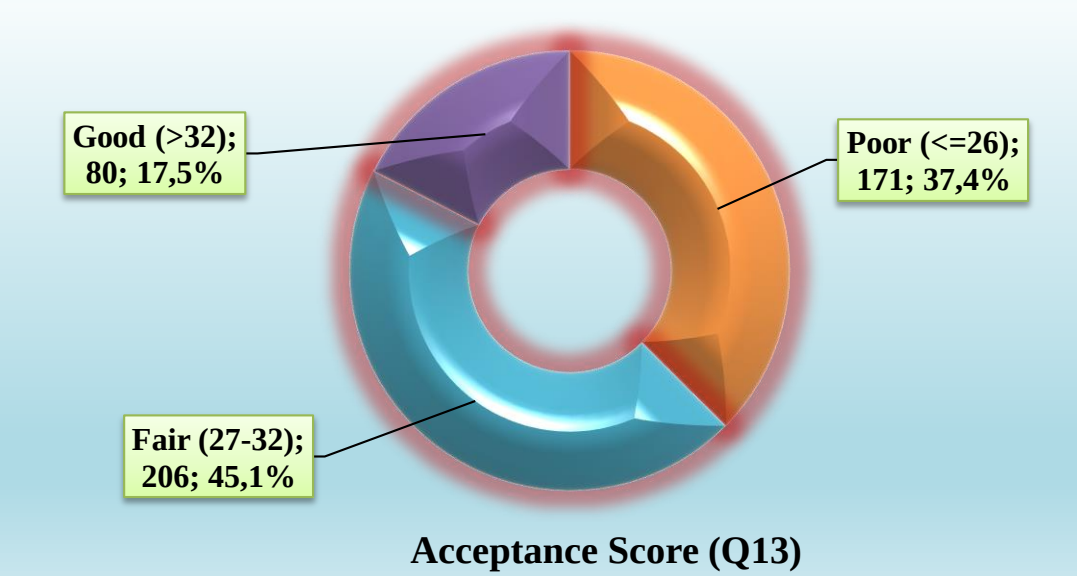

Figure (1) Acceptance score toward COVID-19 vaccine among a sample of healthcare providers

Table (2) showed that there was no significant association between acceptance of health care providers to COVID-19 vaccine and socio-demographic characteristics except the gender was significant at P-value (0.0001), marital status was significant at P-value (0.007), and qualification was significant at P-value (0.007). This table illustrated that (77.5%) of females had good acceptance of the COVID-19 vaccine, as well as, (70.0%) of those married also had good acceptance of the COVID vaccine, and a regarding qualification (55.0%) of nurses had good acceptance of the COVID-19 vaccine.

Table (2): Association between acceptance of COVID-19 vaccine and the socio-demographic characteristics of healthcare providers.

SOCIO-DEMOGRAPHIC CHARACTERISTICS		ACCEPTANCE SCORE (Q13)						P VALUE
		Poor (<=26)		Fair (27-32)		Good (>32)		
		No	%	No	%	No	%	
Age (years)	20---29	77	45.0	89	43.2	41	51.2	0.726
	30---39	56	32.7	63	30.6	23	28.7	
	40---49	24	14.0	36	17.5	8	10.0	
	50---59	14	8.2	18	8.7	8	10.0	
Gender	Male	45	26.3	90	43.7	18	22.5	0.0001*
	Female	12	73.	11	56.	62	77.	

		6	7	6	3		5	
Educational level	Secondary	4	2.3	3	1.5	-	-	0.270
	Diploma	30	17.5	40	19.4	22	27.5	
	College & higher	137	80.1	163	79.1	58	72.5	
Marital status	Single	44	25.7	42	20.4	24	30.0	0.007*
	Married	119	69.6	163	79.1	56	70.0	
	Divorced	8	4.7	1	.5	-	-	
Residence	Rural	160	93.6	200	97.1	76	95.0	0.262
	Urban	11	6.4	6	2.9	4	5.0	
Qualification	Doctor	1	.6	4	1.9	4	5.0	0.007*
	Pharmacist	18	10.5	27	13.1	7	8.8	
	Dentist	2	1.2	12	5.8	-	-	
	Nurse	77	45.0	99	48.1	44	55.0	
	Technical	71	41.5	58	28.2	23	28.7	
	Administrator	2	1.2	6	2.9	2	2.5	
Duration of work (years) g	<10years	104	60.8	121	58.7	52	65.0	0.412
	20---29	51	29.8	54	26.2	18	22.5	
	=>30years	16	9.4	31	15.0	10	12.5	
Have been infected withCOVID-19 virus	Yes	128	74.9	159	77.2	62	77.5	0.839
	No	43	25.1	47	22.8	18	22.5	
*Significant difference between percentages using Pearson Chi-square test (χ2-test) at 0.05 level.								

Although great progress has been made, there are still important challenges regarding future immunization against COVID-19, one of which is the uncertainty about the public acceptance of COVID-19 vaccination. Vaccine acceptance reflects the overall perception of disease risk, vaccine attitudes and demand within the general population, which is critical for the success of immunization programs to attain high vaccination coverage rates (Wang *et.al.*, 2020).

As the majority of the studied sample (73.3%) had taken another vaccine before, these findings are consistent with findings reported by (Njoku & Nwolim Paul, 2021) in Nigeria which found (that 96.5%) of participants had taken another vaccine before. while in this study, 69.1% of them answered they are willing to take the COVID-19 vaccine in comparison with other studies, it is agree with

results conducted by (Kumari *et.al.*, 2021) in India which reported 67.1% of them were willing to get COVID-19 vaccine and also agree with findings reported by (Fu *et.al.*, 2022) in chines provinces which found 76.4% of healthcare workers were willing to get COVID-19 vaccine.

These results showed about half of the healthcare providers (51.9%) have never decided not to get a vaccine for reasons other than illness or allergy, this percentage was compared with another study, which observed that 75.1% of respondents would accept the COVID-19 vaccine with an efficacy 95%, while 56.7% would do so with an efficacy 70% and 37.2% would accept vaccine with an efficacy 50%, besides these results are further 31.3% prefer to take the COVID-19 vaccine even they suffering from any health issues. Consistent with our findings, it has been found by (Elhadi *et.al.*, 2021) that 79.6% of Libyan would accept a vaccine with an efficacy of 95%, 60.6% of them with an efficacy of 70% and 41.2% with an efficacy 50%.

The obtained data demonstrated that 64.3% of HCPs do not agree to pay fees for the vaccine, this percentage is higher than the results reported by (Ghazi *et.al.*, 2021) in Iraq among the general population 36.2 % of the population disagreed to pay fees for COVID-19 vaccine, It is better to provide COVID-19 vaccine free to all public to raise vaccine uptake, especially for those with hesitate towards vaccination.

The current results showed high acceptance of the COVID-19 vaccine (78.3%) that recommend to their family and friends, similar to previous studies conducted in Egypt among medical students (Saied *et.al.*, 2021) demonstrated that most of the participants accepted taking the vaccine and encouraged family, friends to get the vaccine. The fear of infection with coronavirus so they desired to protect their families and friends as shown in this study were the motivators for the people to take the vaccine. In terms of vaccination history of seasonal flu shots, 24.7% of healthcare providers received flu shots in the last 12 months while 39.2% planned to get flu shots in the next year, our observations are in line with results reported by (Wang *et.al.*, 2020) in China among the population which found 14.6% of respondents have received vaccinations against influenza in the past season, this addition problem of unsatisfactory acceptance.

Regarding overall acceptance of the COVID-19 vaccine among HCPs 62.6% with acceptance. These findings, together with findings of the study conducted by (Ghazi *et.al.*, 2021) in Iraq that highlighted the general population has high acceptance and willingness for a COVID19 vaccine, once it is available. Also in agreement with a survey conducted in Ethiopia by (Abebe *et.al.*, 2021) which found the level of intention to accept the COVID-19 vaccine (62.6%) among the adult population, and in line with a study conducted in the USA (69%) by (Biasio *et.al.*, 2021). While lower than reported in Australia (89.88%) and the UK (71%) (Mannan & Farhana, 2020; Freeman *et.al.*, 2020) respectively.

In comparison, our results have found that vaccine acceptance rates range widely across populations and countries. (Lazarus *et.al.*, 2021) as part of a global survey, identified vaccine acceptance rates between below 55% (Russia) and 90% (China). Similarly, (Sallam *et.al.*, 2021) in a literature review, found substantial variation

in vaccine acceptance rates among adults, reaching a high of 97% in Ecuador and lows of 23.6% in Kuwait and 28.4% in Jordan. (Njoku & Nwolim Paul, 2021) in the University of Port Harcourt in Rivers State, which found the total acceptance rate for COVID 19 vaccine in this population was 25.2%.

Regarding the association of the acceptance with demographic characteristics, the current study found a significant association between acceptance and gender, marital status and qualifications, this study is in line with other observations, Mohamed *et.al.*, (2021) which found an association between gender and acceptance of COVID-19 vaccine, and agreed with Njoku & Nwolim Paul, (2021) which found a significant association between acceptance and gender, marital status and occupation were all statistically significant at (p=0.001), as well as with Nzaji *et.al.*, (2020) which found some variable had a significant association between intention to acceptance of COVID-19 vaccine and age and qualification.

4 Conclusion

Regarding acceptance, nearly two-thirds of participants had an adequately score. Significant association was found between acceptance score and gender, marital status and qualification. It is preferable to do further studies on medical practitioners, medical students, and people as well as on health providers in other governorates in order to evaluate knowledge, awareness and acceptance regarding the COVID-19 vaccine.

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