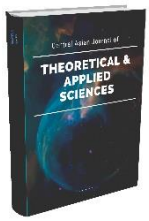

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The Perceptions of Healthcare Workers about the COVID 19 Vaccine, Baghdad, Iraq, 2021

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Abstract: Background: *Healthcare workers' perception and vaccine use are significant elements that are consistently linked to people's acceptance and lessened hesitation/aversion that will lead to increased vaccine usage and vaccination schedule adherence.*

Objectives: *To determine the perceptions of healthcare workers working in the medical city teaching hospitals on the COVID-19vaccine, Baghdad, Iraq, 2021.*

Methods: *This is a cross-sectional study using a convenient sample of healthcare workers working in the medical city teaching hospitals, Baghdad, Iraq. The Data was collected from Feb to May 2021 using a self-administered questionnaire. The questionnaire was broken up into three partss: part 1 asked about sociodemographic traits, part 2 asked about opinions on the COVID-19 vaccine, and part 3 asked about potential ways to promote the immunisation in the future as well as obstacles to getting it.*

Results*: The overall number of participants in the research was 312; 65% were females, 37% were between the ages of 30-39, and one-third were medical practitioners. 54% of those polled had a history of COVID-19 infection. Less than half of the individuals (48%) elected to acquire the vaccination whenever it was offered. When it becomes available, 26% of the participants think the COVID-19 vaccination is safe, and 25% think it will be successful. Social media received the greatest reports of knowledge on the COVID-19 vaccine (57%), followed by official websites of international health organisations and news outlets including the US CDC and WHO (46.8%). Twenty-nine percent of participants felt the vaccination may prevent COVID-19 problems, and 92% advocated for a vigorous public awareness campaign regarding the COVID-19 vaccine. Being a doctor is substantially linked with an increased incidence of vaccination uptake in the binary logistic regression (OR 7.2, 95% CI 2.67 -19.66, P<0.001). Age, gender, education level, and past infection history were not statistically significant (p > 0.05) other variables.*

Conclusions: *The total acceptability percentage of the COVID-19 vaccination among healthcare personnel was less than 50%. To build and keep the public's trust in COVID-19 vaccines, healthcare workers must be ready to use a science- and evidence-based method that looks at the safety and effectiveness of vaccines in the community.*

1. INTRODUCTION

The recent occurrence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) outbreak in the Hubei area of China towards the end of 2019 serves as a demonstration of the epidemic capacity shown by coronaviruses [(1)]. Because of rising numbers of reported cases in China and elsewhere throughout the world, the WHO Emergency Committee issued a worldwide health alert on January 30, 2020 [(2)].

In 2019, policymakers across the globe have implemented a wide range of control strategies to stem the tide of the Coronavirus pandemic. These include mandatory lockdowns, quarantining and isolating sick people, maintaining a minimum social distance, establishing stringent and enforcing regulations, limiting public gatherings, and mandating the use of face masks [(3)].

To decrease COVID-19 illness and death by a large amount, everyone should be able to get a safe and effective vaccine [(4)]. Researchers have been trying to find vaccinations to tackle the pandemic since the beginning, and as a consequence of their efforts, many vaccines are now available [(3)].

Vaccination is often recognized as one of public health's greatest achievements and the most effective way of preventing infectious diseases [(5)]. The availability of a COVID-19 vaccination has been predicated on the possibility of returning to normalcy. Studies of vaccinations have shown that the COVID-19 vaccine is both safe and successful [(6)].

COVID-19 herd immunity should be established by vaccination rather than by exposing them to the microorganism that causes the disease [(7)]. The term "population" or "herd" refers to a group of individuals belonging to the same species that occupy a certain geographical area and have common characteristics. The term "immunity" refers to the indirect protection against an infectious illness that occurs when a sufficient number of people have developed immunity to the sickness [(8)].

The outbreak has caused significant changes in countries' willingness to adopt a COVID-19 vaccine [(9)]. Since the development of the first vaccine, vaccine scepticism has been a problem [(10)]. Despite great advancements, there are still substantial challenges ahead in terms of future COVID-19 immunisation, one of which is public acceptance of COVID-19 vaccine [(11)].

Healthcare workers (HCWs) are the most trusted advisers and promoters of vaccination choices, and they must be recognised and respected in order to provide credible vaccine information [(12)]. They are required to understand the dangers and advantages of vaccinations and the ability to effectively transmit this knowledge to their patients[(13)].

Rationale for the Study

Multiple researches have demonstrated that the decision to use available vaccinations is influenced by the attitudes and beliefs of the population's targeted groups[(14, 15)]. As a result, there is growing worry throughout the world over public acceptability of the potential COVID-19 vaccines [(16)].

The relationship between the population groups and the HCWs is crucial to creating vaccination trust [(17)].

Healthcare workers' perception (refers to the concerns and misconceptions about vaccines) and vaccine use are significant elements that are consistently linked to people's acceptance and lessened hesitation/aversion that will lead to increased vaccine usage and vaccination schedule adherence[(18)] . Studies have revealed that individuals are significantly influenced to become vaccinated by seeing health care workers who are vaccinated [(19)].

To the best of our knowledge, there has been little published data on healthcare professionals' or other groups' impressions of the COVID 19 vaccination in Iraq.

2. Objective of the study

To determine the perceptions of HCWs working in the medical city teaching hospitals on the COVID-19 vaccine, Baghdad, Iraq, 2020-2021.

2.1. Coronavirus disease etiology, epidemiology and outbreak

COVID-2019 developed respiratory sickness caused by a novel coronavirus found in Wuhan, China, in December 2019[20]. Electron microscopy was used to discover coronaviruses, which are positive-sense RNA viruses with enclosed, non-segmented, single-stranded surface projections called coronas or crowns, which correspond to large surface spike proteins [21].

The SARS-CoV-2 epidemic was considered to be the consequence of a zoonotic transmission associated to a seafood market in Wuhan, China; however, the subsequent outbreak was eventually determined to be predominantly attributable to human-to-human transmission [22]. WHO has received reports of 171,708,011 confirmed COVID-19 infections globally as of 4 June 2021, with 3,697,151 deaths [23].

Coronaviruses are mostly spread by droplets in the air or close contact. However, a large amount of contamination of the environment by patients who are carrying coronaviruses through respiratory droplets suggests that the environment could be a way for the virus to spread, and strict adherence to environmental and hand hygiene regulations is needed [24].

The incubation period varies from 2 to 14 days (median 5 days), and people might remain infectious for as long as they have symptoms and even after they have recovered clinically [25].

2.2. Clinical and laboratory features of Coronavirus disease

The infection of COVID-19 may lead to varying degrees of disease, ranging from mild to significant symptoms and the development of pneumonia in some individuals. This can result in the need for immediate medical attention and, in severe cases, can even lead to mortality, especially among the elderly population. Conversely, other individuals may exhibit no symptoms at all while being infected with the virus [26].

Fever, cough, dyspnea, myalgia, tiredness, diarrhea, nausea are all common symptoms. A tiny percentage of patients may also have headache or hemoptysis [27].

Persons who are at a greater likelihood of getting a severe disease include: People aged 60 and up, as well as those with underlying medical conditions like hypertension, lung and cardiac diseases, DM, obesity or cancer [28].

The findings shown below are typical of those seen in clinical laboratories. COVID-19 is characterised by elevated levels of lactate dehydrogenase and creatine kinase in addition to the characteristic leucopenia and lymphopenia. In addition, abnormal liver function is present in almost half of individuals, as measured by elevated levels of alanine aminotransferase or aspartate aminotransferase [29].

In individuals who do not exhibit symptoms, COVID-19 pneumonia manifests as abnormalities in chest CT imaging. Within a few of weeks, these anomalies may spread from a circumscribed unilateral to a diffuse bilateral pattern of ground-glass opacities, and even into consolidations. The early detection of COVID-19 pneumonia could potentially be facilitated by combining imaging characteristics with clinical and laboratory findings [30].

2.3. Prevention and treatment of Coronavirus disease

Public health authorities globally have been engaged in efforts to mitigate the transmission of Covid-19 via strategies such as enhancing public awareness, contact tracing, and targeted identification and isolation of individuals with heightened susceptibility to the virus [31].

To avoid transmission to other contacts, patients, and healthcare staff, the first priority is to establish appropriate isolation [32]. Measures for preventing the spread of infection and providing supportive care, such as oxygen therapy and breathing machines, are being used to treat COVID-19 right now [33].

The pathogenesis of COVID-19 is considered to be driven by two major mechanisms; the illness is largely driven by SARS-CoV-2 replication early in the clinical phase and it appears to be driven later in the clinical course by a disordered immune/inflammatory response to SARS-CoV-2, which results in tissue destruction. Based on this information, antiviral therapy should be more beneficial early in the course of COVID-19, but immunosuppressive/anti-inflammatory medications should be more successful later in the disease [34, 35].

The most hopeful option for bringing the epidemic to an end is a successful rollout of COVID-19 vaccines [36].

2.4. Impact of vaccinations against COVID-19

Despite the fact, that quarantine and other social distancing techniques can be used to reduce the threat of the corona virus, a large-scale vaccination effort is required to completely eradicate COVID-19 [37].

Many questions remain unanswered about the immune response to SARS-CoV-2, and the virus's immune-evasion strategies may lead to vaccine-induced protective immunity that differs from natural immunity. Nevertheless, a deeper understanding of the immune system's natural response will aid in the development of effective vaccines and treatment options [38].

Given the vaccine's global demand, diverse vaccination tactics will be a strategic aim, especially during the early stages of vaccine distribution, prioritising population groups with greater exposure to the virus or a higher risk of severe disease or death [39].

The initial findings of major phase-3 COVID-19 vaccination trials were released in early November 2020. More than 30 vaccine options have been evaluated in advanced clinical studies or are presently being evaluated. Data on safety and efficiency were provided at a rate of up to 95%, Vaccination has begun in a number of nations throughout the world, and many more have begun preparations [40-43].

Pfizer/BioNTech confirmed values of 95% for its COVID-19 vaccine on November 18, 2020, and Moderna announced 95% efficacy on November 16. The following day, on November 18, 2020, the Oxford and AstraZeneca groups reported safety and immunogenicity across a wider range of groups [44]. According to WHO, a total of 1,638,006,899 vaccination doses were provided as of June 2, 2021[23].

2.5. Acceptance and hesitancy of COVID-19 vaccine

Long-term coronavirus disease control will almost certainly rely on the development and distribution of a vaccine to a substantial percentage of the population in order to obtain appropriate vaccination coverage and prevent the spread of disease in the community [45].

The acceptability and demand for vaccines are multifaceted and contingent upon several factors, including temporal dynamics, geographical variations, and the perceived behavioural attributes of the populace [46].Various anti-vaccine mythologies are being developed and are likely to be embraced by huge populations, with serious implications [47].

However, merely having a vaccine accessible is insufficient to assure universal immunological protection; the vaccine must also be accepted by both the medical community and the general public [4]. Even in situations when high-quality vaccination services are available, a decrease in vaccination coverage (vaccine hesitancy or even refusal) may occur [48]. However, the efficacy of a vaccination campaign will be decided by population adoption rates [6].

There are several reasons why individuals choose not to be vaccinated; a WHO vaccine advisory committee identified complacency, difficult access to immunisation, and lack of trust as key causes [7].

In order to secure public acceptance of immunisation in critical situations, it is essential for governments, public health agencies, and advocacy groups to be well equipped to handle concerns related to vaccine anxiety and enhance the overall understanding of vaccination [49].

Despite the availability of vaccination facilities, vaccine hesitancy is defined as a delay in accepting, reluctance, or refusal to get a vaccination. Since Edward Jenner created vaccinations in 1796, it has been observed [50, 51]. It has been designated by the WHO as the eighth significant health hazard to be addressed in 2019 [52].

The World Health Organisation has categorised vaccination hesitancy into three distinct dimensions: confidence, complacency, and convenience. Confidence refers to the level of trust individuals have in healthcare professionals, vaccines, and their efficacy. Complacency refers to people's understanding of vaccine-preventable illness risks and immunisation importance. Finally, convenience includes vaccination and healthcare accessibility [51].

Several studies on 19-vaccination willingness in broad populations have been conducted. In Saudi Arabia, a community-based study was done to see if people would be ready to get the fictional COVID-19 vaccine. The results showed that most people wanted to get the shot [46]. A early online research done among the general community in Italy revealed a favourable opinion towards COVID-19 vaccine [53].

According to a study of U.S. individuals from the general public, 57.6% wanted to get vaccinated [54]. People in the Democratic Republic of the Congo aren't too keen on being vaccinated [43].

A global study of prospective COVID-19 vaccine acceptability in 19 countries was conducted to evaluate potential acceptance rates showed that 71.5% of participants accept the COVID-19 vaccine, Acceptance rates varied from almost 90% (in China) to less than 55% (in Russia)[49].

During the study of Australian public views and behaviours towards a possible COVID-19 vaccine, most people were in favour of vaccination [55]. In Portugal, vaccination hesitancy was high (56 %) [50].

2.6. The perceptions of healthcare workers about the COVID 19 vaccine

A high percentage of infected persons are HCWs [56]. They are at danger of physical attack, exposure to pathogens, long work hours, mental pain, weariness, and job burnout since they are on the front lines of the COVID19 pandemic response [57].

However, health workers' competence and confidence are frequently strained due to time restrictions, limited resources, and insufficient information and/or training to react to queries and clarify the uncommon dangers and advantages of vaccination [58].

The newly created COVID-19 vaccination may be accepted or rejected depending on a number of circumstances, especially among doctors and nurses who are known to be patient advocates [59]. HCWs' motivation to utilise and advocate for vaccination among their patients is directly related to the depth and breadth of their vaccine education and awareness [60].

A global assessment of published evidence (reviewed of 35 studies worldwide) on perception of HCWs towards COVID-19 vaccination showed that the hesitancy rate ranged from 4.3 to 72% [61]. In a worldwide investigation, arab HCWs showed high vaccine hesitation regarding Covid 19 immunisation [62].

An Asia-Pacific study (includes countries from India, Indonesia, China, Vietnam, Singapore and Bhutan) on perception of HCWs towards Covid 19 vaccination showed that (More than 95% of the HCWs studied were accept the vaccine [63].

In Iraq, researchers compared the immunisation rates of healthcare professionals with the general population and found that HCWs were far more likely to be vaccinated than the general population [64].

The acceptance rate of COVID-19 vaccination among HCW in Saudi Arabia range from 55.55 to 70% [59, 65, 66]. While HCWs in Egypt and Palestine showed a low level of readiness to get the Covid 19 vaccination (21% and 37.8%, respectively) [67, 68].

A high rate (about 84.6%) of willingness toward Covid-19 vaccine among HCWs in Turkey (69). Researchers in South Africa found an extremely high percentage of vaccination uptake among HCWs 90.1% [51].

Good acceptance rates towards Covid 19 vaccination were reported from studies done in France and Italy among HCWs; 75% and 67% respectively [70, 71]. In contrast, only roughly 36% of HCWs in the United States are ready to use the Covid-19 vaccination [72].

3. Study design:

A cross sectional study

3.1. Study setting:

The research was carried out in all departments of the teaching hospitals of the Medical City Complex in Baghdad, Iraq, from October 20th, 2020 until July 30th, 2021.

3.2. Data collection time:

From February 2, 2021, until May 15, 2021, we gathered the data. (It was undertaken during the delivery of COVID-19 vaccine(s) to Iraq).

3.3. Study population:

All HCWs (doctors, nurses, pharmacist, dentists, and laboratory workers and other health professionals) working in the assigned hospitals at the Medical city Complex will be eligible to be part of the study. Those who refused to participate or not available during the data collection time were excluded.

3.4. Sampling technique and sample size: A convenient sample was selected from the assigned hospitals. The needed sample size was calculated using the formula below [73].

$n=Z^2 P (1-p)/d^2$

n= sample size

Z= 1.96 which is the corresponding value for the 95% confidence interval

P= prevalence of healthcare workers' perception towards COVID 19 vaccine,

d= the degree of precision was at 0.05 at 95% confidence interval

Anticipated prevalence of healthcare workers' perception towards COVID 19 vaccine = 50 %

The sample size is = $\frac{(1.96)^2 * 0.5 * (1-0.5)}{(0.05)^2} = \frac{0.9515}{0.0025} = \mathbf{380}$

A 10% increase in the sample size was made to account for the non-response rate, making the necessary sample size of 380+38=418 participants. The questionnaire was distributed to the eligible participants working in different departments of the teaching hospitals in the Medical City Complex.

3.5. Operational Definition

A healthcare provider may be a doctor or nurse, but it can also be someone who works in a related field such as an assistant, assistance, laboratory technician, or even a medical waste handler [74].

3.6. Questionnaire form:

The questionnaire (Appendix) was created after an assessment of the existing literature. It was created in English initially, then translated into Arabic, and approved by a number of faculty members in the Department of Community and Family Medicine. It consists of three parts, with part 1 containing sociodemographic

characteristics and queries regarding seasonal influenza vaccination, previous infection with COVID-19, and COVID-19-related source information. Part 2 was made up of questions about how people felt about the COVID-19 vaccine. Part 3 was about the problems with COVID-19 vaccinations and the ways that COVID-19 vaccinations could be promoted in the future.

1. Sociodemographic characteristics and questions relevant to Influenza vaccine, and history of COVID-19 infection. It includes the following:

A. Age, gender, education level and job.

- The job was categorized as doctors (rotator, permanent, specialist), Dentist, Pharmacist, Nurse, Medical assistant, Healthcare technician (Lab technician, Radiology technician).
- Age was obtained and then it was coded into categories: less 30, 31 – 39, 40 – 49, 50 and above.

B. Questions related to intake of seasonal influenza vaccine, pervious infection with COVID-19 and the source information related to COVID-19.

- The following are some of the sources of information about COVID-19:

a) General web pages (regardless of knowing the source's trust) in Google's search
b) Official international health organization sites and media e.g. WHO, CDC.
c) Official government sites and media e.g. Ministry of Health of Iraq.
d) News Media e.g. TVs, radios, Magazines, Newspapers and Journals
e) Social Media e.g. WhatsApp, Facebook, Twitter, Instagram

2. Perception related questions

Five questions based on opinions on COVID-19 vaccine were added in the second part:

- Perception about the safety and effectiveness of eventual COVID-19 vaccination whenever available.
- If the vaccination would be considered the best way against the complications of COVID-19,
- Whether the public needs to be more informed about COVID-19 vaccine, and if they planned to get COVID-19 Vaccine

3. The third part addressed barriers that may prevent participants from receiving vaccinations and prospective opportunities for promoting COVID-19 vaccination.

- The potential obstacles included

- I am concerned about the vaccine's side effects.
- I don't believe that the vaccine will stop the infection.
- The vaccine did not take long enough for scientific tests.
- I don't need the vaccine because I do all the right things; I wash my hands and wear a mask and gloves.
- I don't need the vaccine because I'm young and healthy.
- I was infected, so I don't need to get a vaccine
- I don't like needles.
- The COVID-19 vaccine is a conspiracy.

- The possibilities for promoting COVID-19 immunization in the future

- If it was compulsory by the government (MOH).
- If my family or friends were vaccinated.
- If I know that more studies showed that, the vaccine is safe and effective.
- I would not take it in any situation.
- If there is a way other than injection.

3.7. Pilot study:

Prior to beginning the data collection and lasting one week, a pilot research was conducted. To test the questionnaire for any modification, any difficulties and to detect time needed for collection of data. Twenty participants comprised the pilot study sample; they were excluded from the study sample, and the questionnaire was modified to make it obvious.

3.8. Ethical considerations

Verbal approval was granted first from all the participants. The confidentiality of the study participants' information was maintained throughout the research by making the participants' information anonymous and demanding honest responses.

3.9. Statistical analysis

Categorical variables were examined and reported as frequencies and percentages using SPSS version 24. Cross-tabulation and chi-square tests were employed to assess the connection between participant characteristics and COVID-19 vaccination intention. While assessing the connection between COVID-19 vaccination intention and participant factors, binary logistic regression was utilised to compensate for possible confounding variables. To measure their predictive abilities, all predictor variables were examined in a single block. The model's dependent variable was the desire to vaccinate. The responses were transformed into a dichotomous variable, with a value of 1 assigned to answers indicating "Yes" to the intention question, and a value of 0 assigned to answers indicating "No" or "Not Sure". The collected variables were used as independent variables.

We calculated adjusted odds ratios (AOR) and 95% confidence intervals (CI). Throughout the analysis, a p-value less than 0.05 was regarded statistically significant. The Cronbach's alpha for the five perception-related items was 0.71, according to the reliability study.

Sociodemographic variables of the participants

A total of 312 of HCWs took part in this study. The response rate was 74%. More than one third (37.5%) of the participants had an aged range of 31-39 years, 63.1 % of were females, 63.1% of them had been graduated from University/Institute and about 24 % of the participants were medical assistants.

Regarding history of seasonal influenza vaccine intake, about 40.7% of HCWs had get an influenza vaccine before. More than half (54.2 %) of HCWs had been infected with COVID-19 as shown in table 4.1.

Participants' source of information about COVID-19

According to Figure 4.1, the most common source of information about COVID-19 was social media (57%), followed by official international health organisation sites and media (e.g., WHO, US CDC) (46.8%), news media (e.g., TVs, radios, magazines, newspapers, and journals) (35%), official government sites and media (e.g., Ministry of Health of Iraq (34.6%), and general web pages (regardless of trust) in Google's search (19%).

Characteristics	Groups	No. (312)	Percentage (%)
Age	less 30	74	23.7
	31 – 39	117	37.5
	40 – 49	65	20.8
	50 and above	56	17.9
Gender	Male	106	34.0
	Female	197	63.1
	Missing	9	2.9

Education and level	University/Institute	197	63.1
	Secondary	47	15.1
	Higher Education	68	21.8
Job	Doctors	103	33.0
	Dentist	8	2.6
	Pharmacist	25	8.0
	Nurse	49	15.7
	Medical assistant	75	24.0
	Healthcare technician	50	16.0
	Missing	2	0.6
Previous history of getting seasonal influenza vaccine	Yes	127	40.7
	No	181	58.0
	Not Sure	3	1.0
	Missing	1	0.3
History of infection with COVID-19 before	Yes	169	54.2
	No	122	39.1
	Not Sure	20	6.4
	Missing	1	0.3

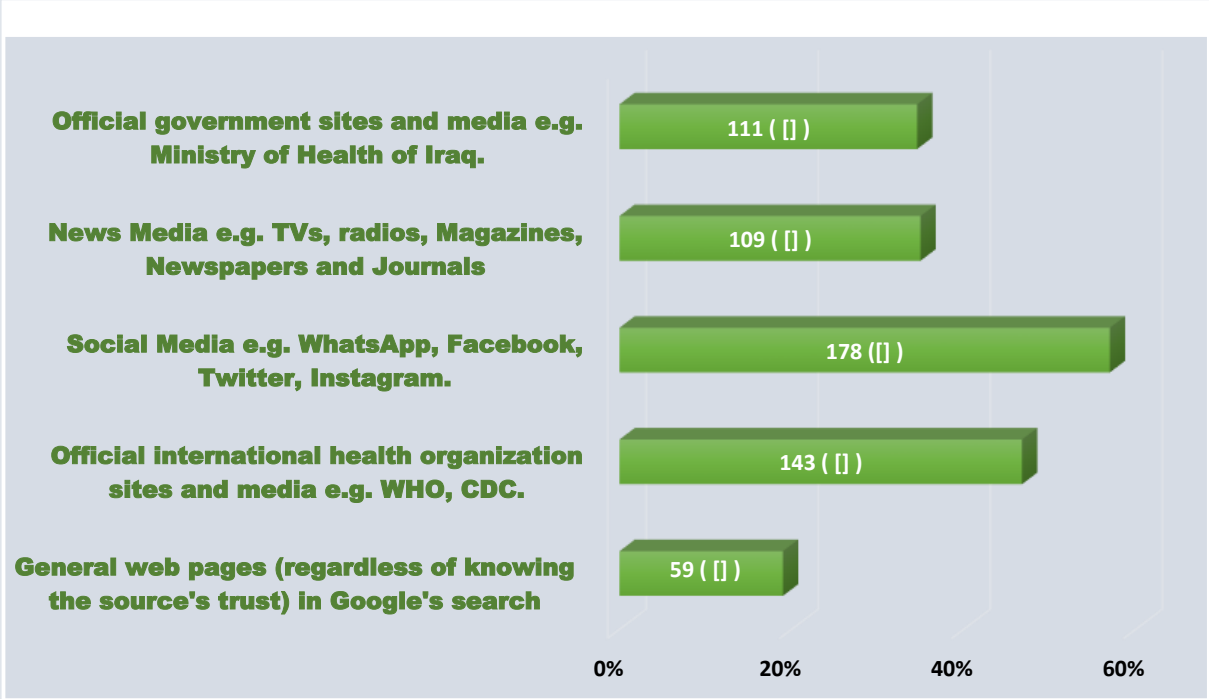

Figure 4.1 Participants' source of information about COVID-19

Participants' Perception toward COVID-19 vaccination:

Figure 4.2 depicts HCWs' perspectives on several elements of COVID-19 immunisation. In terms of the safety and efficacy of the COVID-19 vaccine, around 26.3% of participants thought it was safe whenever it was accessible, and 25% thought it would be effective.

Approximately 29.2% of participants believed that the immunisation may reduce COVID-19 problems. A substantial number of responders (92%) agreed that there is an urgent need for increased public knowledge of the COVID-19 vaccination. Less than half of the participants (47.8%) intended to obtain the COVID-19 vaccine whenever it was made available.

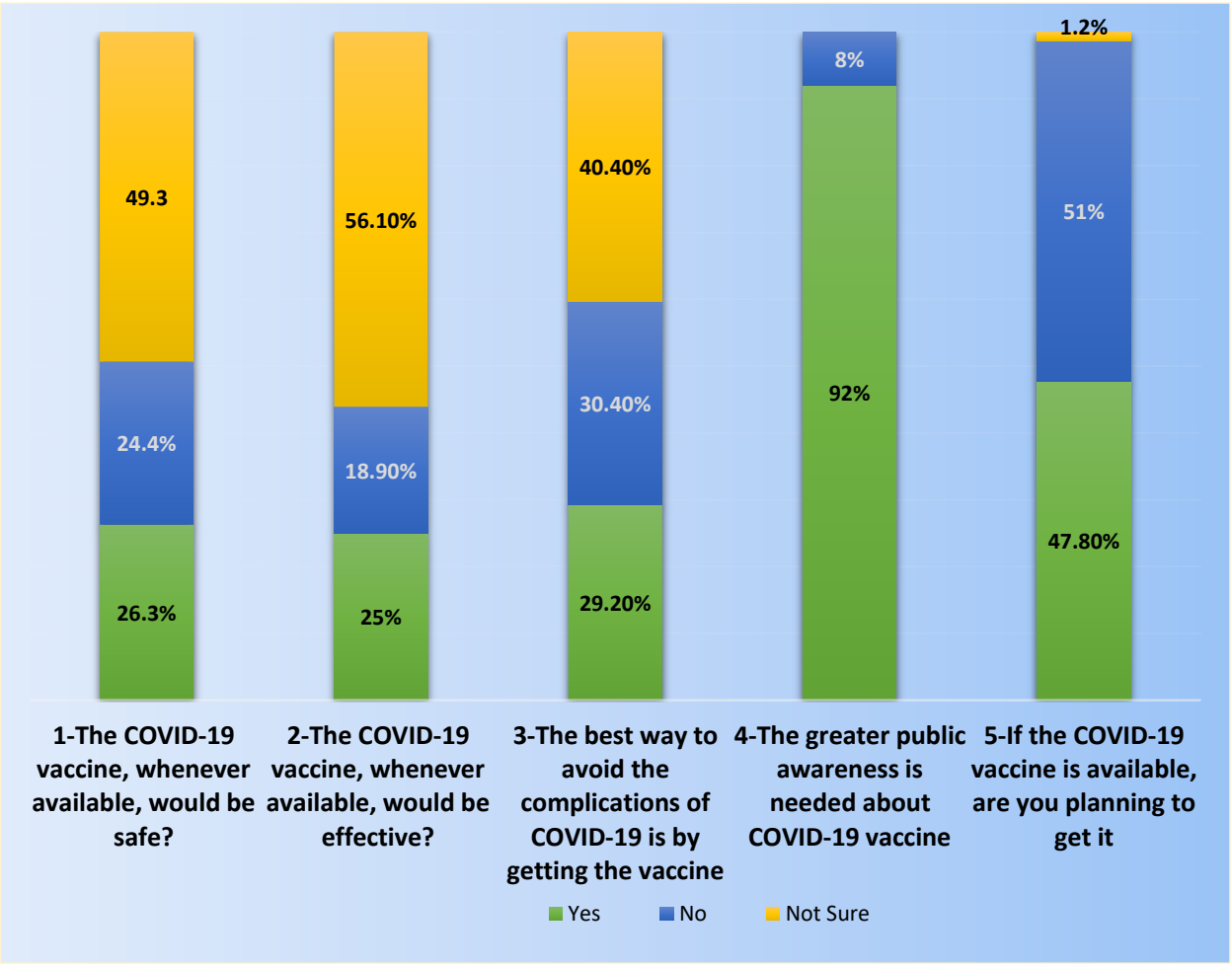

Figure 4.2. Participants' Perception toward COVID-19 vaccination (n = 312)

The association between intention to be vaccinated and the variables

Differences (p-value < 0.05) were found between COVID-19 vaccination reluctant and not hesitant individuals (Tables 4.2 and 4.3) in terms of education level, job, and prior history of influenza vaccine consumption.

Participants with high educational level had a significant higher proportion (75%) of vaccine acceptance than the others (secondary level or university/ institutes). Doctors had the highest (71.8%) rates of vaccine acceptance among other HCWs, and the positive history of influenza vaccine intake were associated with high significant rate of vaccine acceptance than those who were not get influenza vaccine before.

Other characteristics, such as age, gender, and past COVID-19 infection, had no significant connection with vaccination reluctance.

Being a doctor (OR 7.2, 95% CI 2.67 -19.66) was still substantially linked with a higher probability of vaccination uptake in the binary logistic regression model (tables 4.3) ($p< 0.001$). Other characteristics, however, had no significant effect on vaccination acceptance ($p > 0.05$).

Table 4.2 Distribution of the participants by their intention towards the vaccine and certain charactestics

Characteristics	Groups	(adj-ORs)	95% C.I.	p-Value
Age	less 30	0.74	0.31 - 1.734	0.49
	31 – 39	0.79	0.36 - 1.765	0.57
	40 – 49	1.23	0.53 - 2.853	0.62
	50 and above (Ref.)			
Gender	Male	1.57	0.91 - 2.70)	0.10
	Female (Ref.)			
Education and level	University/Institute	0.63	0.25 - 1.54	0.31
	Secondary	0.64	0.14 - 2.87	0.56
	Higher Education (Ref.)			
Job	Doctors	7.25	2.67 - 19.66	<0.0001
	Dentist	3.80	0.76 - 18.87	0.10
	Pharmacist	3.08	1.01 - 9.36	0.47
	Nurse	2.42	0.61 - 9.54	0.20
	Medical assistant	1.99	0.84 4.68	0.11
	Healthcare technician (Ref.)			
Previous history of getting seasonal influenza vaccine	Yes	2.41	0.16 - 36.15	0.52
	No	1.35	0.09 - 20.04	0.82
	Not Sure (Ref.)			
History of infection with COVID-19 before?	Yes	1.33	0.46 - 3.86	0.59
	No	1.09	0.36 - 3.24	0.87
	Not Sure (Ref.)			

Table 4.3: The association between intention to be vaccinated and the variables

Variables		Intention towards COVID-19 vaccination		
		Yes	No or Not Sure	P-Value
Age	≤ 30	30 (40.5%)	44 (59.5%)	0.48
	31 - 39	59(50.4%)	58 (49.6%)	
	40 to 49	34 (52.3%)	31(47.7%)	
	≥50	26(46.4%)	30(53.6%)	
	Total	149 (47.8%)	163 (52.2%)	
Gender	Male	56 (52.8%)	50 (47.2%)	0.20
	Female	89 (45.2%)	108 (54.8%)	
	Total	145 (47.9%)	158 (52.1%)	
Educationlevel	University/Institute	79 (40.1%)	118 (59.9%)	**<0.0001**
	Secondary	19 (40.4%)	28 (59.6%)	
	Higher Education	51 (75.0%)	17 (25.0%)	
	Total	149 (47.8%)	163 (52.2%)	
Job	Doctors	74 (71.8%)	29 (28.2%)	**<0.0001**
	Dentist	4 (50.0%)	4 (50.0%)	
	Pharmacist	10 (40.0%)	15 (60.0%)	
	nurse	20 (40.8%)	29 (59.2%)	
	Medical assistant	29 (38.7%)	46 (61.3%)	
	Healthcare technician	12 (24%)	38(76.0%)	
	Total	149(48.1%)	161 (51.9%)	

The obstacles that may prevent participants from receiving the vaccine

Figure 4.3 depicts the perceived barriers associated with COVID-19 vaccination acceptance. The notion that the vaccine did not take long enough for scientific testing (43.3%) was the most often stated barrier to obtaining immunisation (68%), followed by 35.2% who did not trust that the vaccine would halt the illness.

While other reasons of vaccination hesitancy in a lesser proportion included; having previous infection with COVID-19 (16.3%), use of personal protective measures (15.7%), no preference for needles (7.5%), the COVID-19 vaccine is a conspiracy (7%) and being heathy and young age (5%) as shown in the following figure.

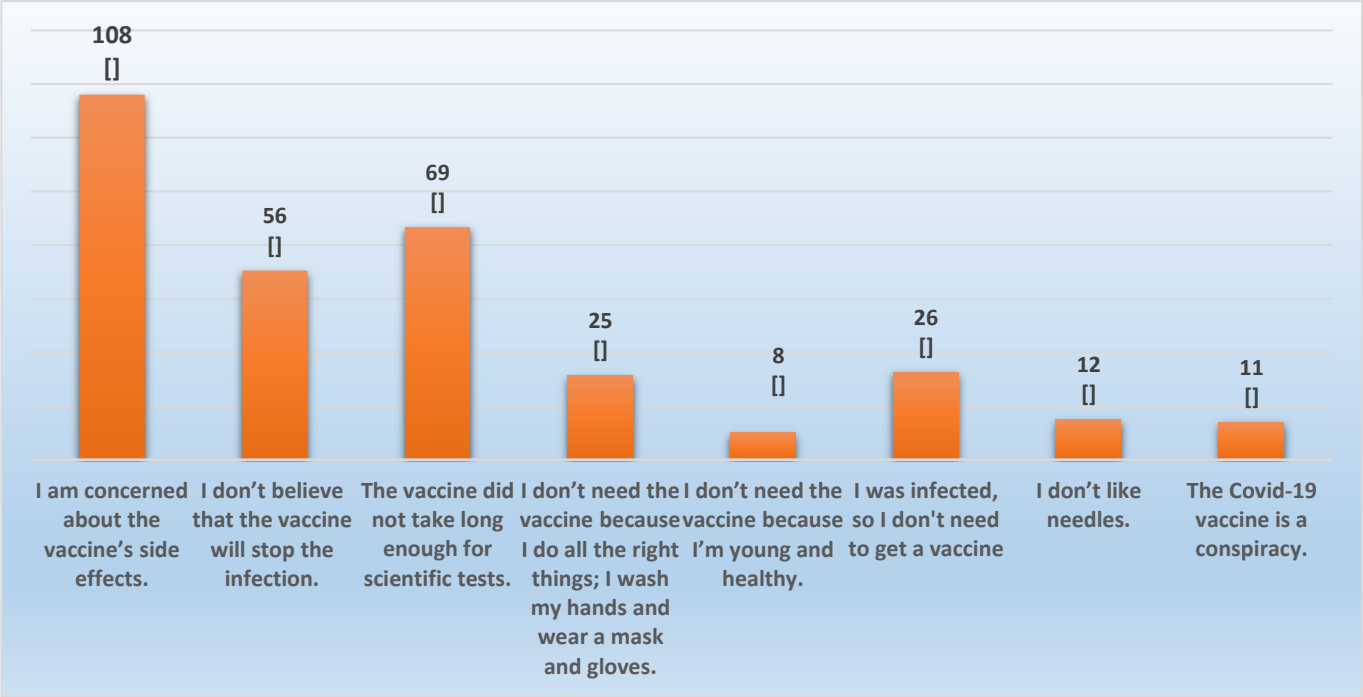

Figure 4.3 the obstacles perceived by the participants from receiving the vaccine (Vaccine hesitators=159)

The possibilities for promoting COVID-19 vaccination in the future

The most reported option for obtaining COVID-19 vaccine was related to possibility of more research about safety and effectiveness of COVID-19 vaccines, while 28% of the hesitators declined that they will not take it in any situation. Other options were shown in figure 4.4.

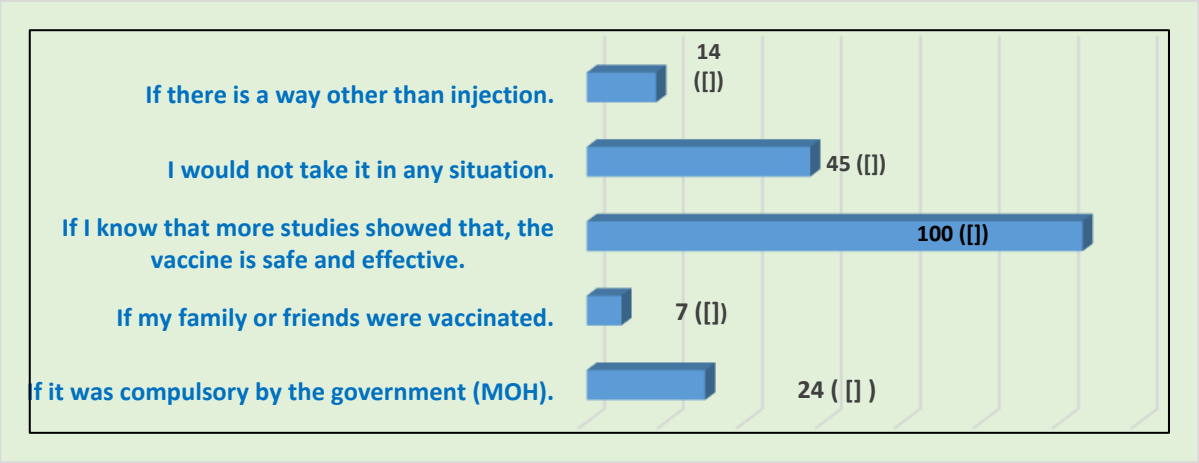

Figure 4.4 the possibilities for promoting COVID-19 vaccination in the future (vaccine hesitators =159)

4. Disscusion

The HCWs are regarded as the most significant leaders in the fight against COVID-19; they acted quickly despite a lack of crucial protective equipment and resources, they had a direct impact on patient survival rates [(75)]. Given their high degree of exposure to COVID-19, HCWs should also be prioritized for receiving the vaccine [(43)].

The present research investigates the perception and degree of acceptability of the COVID-19 vaccine, as well as the variables that contribute to vaccine acceptance, the reasons for vaccine rejection, and the methods available to encourage vaccinations among HCWs in Baghdad, Iraq.

Concerning the safety and efficiency of the COVID-19 vaccine, around 26.3% of participants thought it was safe whenever it was accessible, and 25% thought it would be effective. Whereas, in Saudi Arabia, 63.6% of HCWs felt that the vaccination was safe and effective in a comparable research [(59)]. Another similar study done in Los Angeles showed that the majority of the participants stated that the vaccine is safe and effective [(45)].

The reason the participants were not convinced of the efficacy and safety of the vaccine may be due to the fact that the study was conducted before and the beginning of the vaccine's arrival to the country, and at that time there was a conflict against COVID-19 vaccines from the media and there were great fears from vaccines' adverse effects[(76).]

In a number of countries, anti-vaccination activists are already arguing against the need for a vaccine, with some even denying that COVID-19 exists [(49).]

A review study found that the major concerns (safety, effectiveness, and side effects) of HCWs regarding COVID-19 vaccines were quite comparable to what the general population was concerned about [(61).]

The current study showed that 29.2% of the participants considered the vaccine to prevent the complications of COVID-19. While a high proportion (85%) of HCWs in a study done in New York City stated that deaths or other complications related to COVID-19 can be prevented through vaccination[(77).] Another research conducted in Saudi Arabia by Barry et al., (2020) indicated that 64% of HCWs believe that vaccination against COVID-19 is the best way to prevent disease severity [(66).]

The variation between the current study and other studies might be related to differences in levels of medical knowledge among HCWs. In addition to the loss of confidence in the vaccine in general as a

result of the severity of the infection, the number of deaths in the country, and the collapse of the health system, which makes HCWs think that nothing may reduce the complications of the epidemic of death.

According to the present survey, a huge number of the participants (92%) agree that there is a high need for public awareness about the COVID-19 vaccination. The spread of myths and misconceptions about COVID-19 vaccines widely among the general population might indicate the need for great public awareness through adequate and scientific medical information.

Likewise, a survey conducted in Italy among HCWs found that most of the participants explored that there was little information about COVID-19 vaccination as well as conflicting or misleading information(71). A study done in Egypt revealed that HCWs did not receive sufficient information about the COVID-19 vaccine[67].

Regarding the participants' intention towards COVID-19vaccination, less than half (47.8%) of the participants decided to get the vaccine whenever available. While 51% reject the vaccine and 1.3% are not sure or undecided.

The acceptability of putative COVID-19 vaccinations varied among investigations. HCWs in Egypt and Palestine exhibited lower levels of willingness to get the COVID-19 vaccination, with 21% and 37.8%, respectively [67, 68]. According to three distinct research, the acceptability percentage of COVID-19 immunisation among Saudi HCW ranged from 55.55% to 70% [59, 65, 66].

In Iraq, researchers looked at how many people in the general population and how many healthcare workers were willing to get the vaccination. They found that HCWs were far more likely to agree to get the vaccine [64].

High acceptance rates towards COVID-19 vaccination among HCWs were reported from studies done in South Africa, France, and Italy; 90.1%,75%, and 67%, respectively [51, 70, 71].

Individual vaccine acceptance decisions are based on a complicated combination of vaccine confidence, illness complacency, and accessibility to vaccination (51). World Health Organization was suggested that any vaccination program be planned ahead of time to guarantee high acceptability [78].

Various vaccination decision-makers had different ideas about how to develop trust with communities and encourage involvement to achieve national vaccination goals [59].

In this study, being a doctor was significantly related to high rates of vaccine acceptance. This finding was in line with those of previous studies that recorded physicians had the highest intention rates for receiving the COVID-19 vaccines [70, 79]. The findings of this study were incongruous with previous research, which indicated a lack of correlation between healthcare workers' occupations and the percentage of acceptance of vaccines [59, 65, 66]. The high level of medical knowledge, continual availability to medical research, and extensive exposure to the illness during their everyday job may have contributed to the high rate of vaccination acceptance rates among physicians in our study.

The most reported barrier from receiving vaccination was related to the vaccine's adverse events, followed by the perception that the vaccine did not take long enough for scientific tests and didn't believe that the vaccine will stop the infection.

Other less frequent reasons for vaccine refusals included; the previous infection with COVID-19, use of personal protective measures, no preference for needles, the COVID-19 vaccine is a conspiracy and being young and healthy, and hence less risk for the serious outcome.

This result was similar to what Barry et al. (2020) found in a study they did in Saudi Arabia. They found that the most common reasons people gave for not getting the vaccine were a lack of studies on the safety

of vaccines, worries about side effects, and doubts about how well vaccines work. While the less common obstacles for vaccination were the positive history of COVID-19 infection and fear from the painful injection[66].

Similarly, our findings were compatible with another study done by Qattan et al. (2021) in Saudia Arabia, who reported that the common reasons for vaccine rejection were: concern on vaccines' adverse events, safety, and efficacy, and to a lesser degree: use of personal protective measures and the COVID-19 vaccine is a conspiracy [80].

Concern on vaccines' safety, concern on vaccines' effectiveness and, no sufficient information about the vaccine formed the main barrier from vaccination among HCW in Egypt, Palestine Italy, and France [67, 68, 81, 82].

Regarding the promoting factors helping in vaccination acceptance, the most reported option for obtaining the COVID-19 vaccine was related to the possibility of more research about the safety and effectiveness of COVID-19 vaccination. This result was in line with a research conducted in Egypt, which found that adequate and accurate information about the vaccinations available might potentially increase HCW acceptance of immunisation[67].

Misinformation and conspiracy theories may lower vaccine uptake; consequently, the key to combating the anti-vaccination movement is to reach an agreement on how various parts of the population will get vaccinations and to assuage any doubts or concerns that may arise in order to enhance vaccine demand [83].

The most reported source of information related to the COVID-19 vaccine was from social media (57%), followed by official international health organization sites and media e.g., WHO, CDC (46.8%), News Media e.g., TVs, radios, magazines, newspapers, and journals (35%), official government sites and media e.g., Ministry of Health of Iraq (34.6%) and general web pages (regardless of knowing the source's trust) in Google's search (19%).

This finding was consistent with the finding of a study done in Baghdad, Iraq among HCWs and the general population, which showed that most (68%) reported source of information about COVID-19 was social media, newspapers, and television while, 44.7% rely on scientific sources such as scientific webinars or scientific publications [64].

Social media played a crucial role in distributing information during the COVID-19 pandemic since it is relatively easy and affordable for many individuals to access[84]. It may have a dual-edged weapon that can facilitate the spread of false information, contributing to excessively unfavorable perceptions regarding potential vaccinations(85). The media was trusted by HCWs in Saudia Arabia as it creates a positive impression about the COVID-19 vaccine [59].

This research has several limitations. First, since the data was collected using a non-random sample approach, it cannot be generalised to the full population. The investigation was conducted during a time of intense media publicity of prospective COVID-19 vaccinations, which may have influenced vaccination views and intentions. In addition, the questionnaire was self-administered, and obtaining samples was challenging due to the fatigue and preoccupation of the HCWs. Despite these limitations, the present research may help health officials identify projected challenges, concerns, and options for vaccine coverage.

5. Conclusions

- The overall rate of COVID-19 vaccine acceptance among HCWs was less than fifty percent
- Medical doctors had significantly higher rates of vaccine acceptance.
- There was a low level of perceptions regarding the safety and effectiveness of the COVID-19 vaccine.

- Concerns about vaccine adverse events, insufficient clinical trials about the vaccines, and concerns about vaccine's effectiveness were the common reasons for vaccine refusal.
- The most-reported option for obtaining the COVID-19 vaccine was related to the possibility of more research about the safety and effectiveness of COVID-19 vaccines.
- The most reported source of information related to COVID-19 among HCWs was social media.

6. Recommendations

- As the COVID-19 vaccines become available, it will be crucial to track uptake and compare the refusal categories to the benchmark findings in this study.
- A future multicenter national study is recommended, with a larger sample of the population.
- To establish and sustain public trust in COVID-19 vaccinations, HCWs have to be well prepared for a science- and evidence-based strategy that addresses vaccine safety and effectiveness in the community.
- To transmit accurate and scientific information among general people, a well-planned media and a positive influence campaign lead by HCWs can be employed in the context of epidemiological information, scientific findings, and the vaccine's methodological approach to stimulate critical thinking, which might lead to higher confidence in the vaccine's uptake.

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