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Avin Muhsin Assad

Medical Laboratory Technology Department, Koya Technical Institute, Erbil Polytechnical University, Koya Kurdistan Region –F.R. Iraq.,

aveen.muhsin@epu.edu.iq

Rukhosh Esaq Mekha

Nursing Department, Koya Technical Institute, Erbil Polytechnical University, Koya, Kurdistan Region –F.R. Iraq

Dawan Jamal Hawezy

School ofMedicine, Koya University, Koya KOY45, Kurdistan Region –F.R. Iraq

Azhi Aram Kareem

Department of Medical Microbiology, Faculty of Science and Health, Koya University, Koya KOY45, Kurdistan Region –F.R. Iraq.

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RESEARCH ARTICLE

COVID-19 Vaccines Hesitancy among Universities Staff in the Kurdistan Region/Iraq: A Cross-Sectional Study

Aveen Muhsin Asaad[1], Rukhosh Esaq Mekha[2], Dawan Jamal Hawezy[3], Azhi Aram Kareem[4]

[1] *Medical Laboratory Technology Department, Koya Technical Institute, Erbil Polytechnical University, Koya Kurdistan Region – F.R. Iraq.*

[2]*Nursing Department, Koya Technical Institute, Erbil Polytechnical University, Koya, Kurdistan Region – F.R. Ira*

[3] *School of Medicine, Koya University, Koya KOY45, Kurdistan Region – F.R. Iraq*

[4] *Department of Medical Microbiology, Faculty of Science and Health, Koya University, Koya KOY45, Kurdistan Region – F.R. Iraq.*

***Corresponding author:**
Aveen Muhsin Asaad, Medical Laboratory Technology Department, Koya Technical Institute, Erbil Polytechnical University, Koya Kurdistan Region – F.R. Iraq

E-mail:
aveen.muhsin@epu.edu.iq

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ABSTRACT

The coronavirus disease 2019 (COVID-19) started in Wuhan, China, and become a pandemic quickly. The disease affected the lifestyle and damaged socio-economic status due to prevention measures. These measures had benefits at the time but did not stop the spread of the virus, so vaccination was another strategy to prevent the spread of the virus. This study aimed to explore the COVID-19 vaccines' hesitancy among Universities' staff in the Kurdistan Region/Iraq. Methods: A survey which consisted of four sections prepared and social media groups and emails were used to recruit universities' staff in the Kurdistan Region/Iraq. The Google forms used to create the survey. Then, the SPSS program was used for data analysis. Results: The male 486 (67.3%) participates were more and most were in the age group of 36-45 (41.6%). Overall, this study recruited 961 universities' staff. Data analysis was performed for the unvaccinated 722 participants. The majority of participants were willing to vaccinate 425 (58.9%) and prefer the Pfizer vaccine more. Surprisingly, most of the participants did not believe in the vaccine's rumors 432 (59.8%). Conclusions: The COVID-19 vaccination is to prevent morbidity and mortality. However, hesitancy toward COVID-19 vaccines has been stated worldwide. The main reason is the spreading of misinformation and false rumors about the vaccine and social media is the center for spreading these rumors as this study described.

Keywords: COVID-19; vaccine; social media; vaccine hesitancy; Kurdistan region

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) started in Wuhan, China in December 2019 it widely distributed and cause a pandemic. The disease affected the lifestyle and damaged socio-economic status due to prevention measures by governments such as social distancing, , self-isolation, travel bans, and lockdowns (Nicola *et al*., 2020). These measures had benefits at the time, but did not stop the spread of the virus. Accordingly, vaccination was another strategy to prevent the spread of the virus (Rawat *et al*., 2021).

The production of COVID-19 vaccines was expedited, with multiple pharmaceutical companies vying to create them. However, due to concerns about efficacy and safety, as well as misinformation spread through social media, many people have become suspicious of vaccination (Shervani *et al*., 2020; Dror *et al*., 2020). Vaccine hesitancy which is a delay in acceptance or refusal of getting vaccination despite

its availability has been seen all around the world (MacDonald, 2015).

In the Kurdistan region/Iraq, the government has created an online portal (https://vac.health.digital.gov.krd/?lang=en) as well as established COVID-19 vaccination centers in all major cities and towns and is currently, assembling mobile teams of healthcare personnel for vaccinating in schools, universities, and other public spaces (Tahir *et al*., 2021; KHM, 2021). According to the "our world in data" website, only 10.85% of the Iraqi population have vaccinated which is relatively low in comparison to other countries, and vaccine hesitancy is the major factor (Ritchie *et al*., 2020).

The primary aim of this study is to investigate the reasons behind the increased hesitancy toward the COVID-19 vaccine among university staff in the Kurdistan Region/Iraq. Additionally, to assess the level of awareness and knowledge of the COVID-19 vaccine among university staff in the Kurdistan Region/Iraq. Identify the factors that influence vaccine hesitancy among university staff in the Kurdistan Region/Iraq, such as socio-demographic characteristics, beliefs, and attitudes towards the vaccine.

2. Methodology

2.1 Study Design and data collection

This cross-sectional study was conducted in the Kurdistan Region/Iraq through an online structured self-administered questionnaire. The questionnaire sheet was prepared by the research staff and some of the questions were extracted from similar studies to assess the attitude of university staff toward COVID-19 vaccination (Qunaibi *et al*., 2021; Aloweidi *et al*., 2021). The Google forms used to create the survey were available online from 11 August to 11 October 2021. Personnel email and Social media Groups were used to target universities' staff. Overall, This study targeted university staff members in the Kurdistan Region/Iraq, with a specific focus on those who exhibited vaccine hesitancy or uncertainty. Consequently, the study excluded staff members who had already been vaccinated against COVID-19 from the data analysis..

2.2 Questionnaire and Data Processing

The questionnaire was divided into four sections. The first section included an introduction page which was about the topic and the study objectives. The second section was the demographic characteristic of the participants including general demographic data like gender, age, marital status, university, and Level of education. In the third section was about the previous history of COVID-19 among the participants and their families and their concerns about COVID-19 vaccines and which one they prefer. In the final section was about the most common rumors received via social media regarding COVID-19 vaccines, along with the rumors that they believe in and the reasons that may encourage them not to vaccinate.

2.3 Ethical Approval

The school of medicine at Koya University approved this study. We did not include any personal information, and the data were anonymously collected and used solely for statistical analysis.

2.3 Statistical analysis

The Statistical Package for the Social Sciences (SPSS) version 25 was used for the exact purpose of statistical analysis. Statistical analysis included frequency and percentage. Frequency refers to the number of times a particular response or category occurs in the dataset. Percentage, on the other hand, is a measure that indicates the proportion of participants who selected a specific response or category out of the total number of participants. This measure provides a standardized way of comparing response rates between different categories or groups within the dataset.

3. Results

Overall, this study recruited 961 universities staff, who consented to participate. However, 239 participants reported that they had already taken the vaccine. Data analysis was performed for the remaining unvaccinated 722 participants within unvaccinated participant 486 (67.3%) males and 236 (32.7%) females enrolled in the study in which 300 (41.6%) participant were 36-45 years (208 males, 92 females). The majority of the participants were from Erbil city 434 (60.0%) followed by Duhok 162(22.5%), Sulaymaniyah 112 (15.5%), and Kirkuk 15 (2.0%). The demographic data also illustrated that most ofthe participants were from Koya University 267 (37.0%) and the least wase from Sulaimani Polytechnic university1 (0.4%). A considerable variation in the educational levelof participants was observed, ranging from certificate holders to individuals with post-doctoral and master's degrees. Of note, 339 participants, corresponding to 47.0%of the sample, had attained notably high levels of education., all of the demographic data are presented in table 1.

Table 1: demographic data distribution related to by gender

Characteristics		Male		female		Total	
		No.	(%)	No.	(%)	No.	(%)
Gender		486	(67.3)	236	(32.7)	722	(100.0)
Age (years)	< 25	40	(8.2)	24	(10.2)	64	(8.7)
	26-35	142	(29.2)	76	(32.2)	218	(30.2)
	36-45	208	(42.8)	92	(39)	300	(41.6)
	46-55	76	(15.7)	34	(14.4)	110	(15.3)
	> 56	20	(4.1)	10	(4.2)	30	(4.2)
	Total	**486**	**(67.3)**	**236**	**(32.7)**	**722**	**(100.0)**
City	Duhok	110	(22.6)	52	(22.0)	162	(22.5)
	Erbil	284	(58.4)	150	(63.6)	433	(60.0)
	Kirkuk	10	(2.1)	4	(1.7)	15	(2.0)
	Sulaymaniyah	82	(16.9)	30	(12.7)	112	(15.5)
	Total	**486**	**(67.3)**	**236**	**(32.7)**	**722**	**(100.0)**
Marital Status	Single	76	(15.6)	72	(30.5)	148	(20.5)
	Married	408	(84)	156	(66.1)	564	(78.1)
	Divorced	2	(0.4)	4	(1.7)	6	(0.8)
	Widow	0	(0.0)	4	(1.7)	4	(0.6)
	Total	**486**	**(67.3)**	**236**	**(32.7)**	**722**	**(100.0)**
University	University of Sulaimani	5	(1.0)	6	(2.5)	11	(1.5)
	Salahaddin university-Erbil	8	(1.6)	23	(9.7)	31	(4.3)
	University of Duhok	13	(2.7)	6	(2.5)	19	(2.6)
	Hawler Medical University	4	(0.8)	8	(3.4)	12	(1.7)
	Koya University	190	(39.1)	77	(32.6)	267	(37.0)
	Charmo University	7	(1.4)	0	(0.0)	7	(1.0)
	University of Raparin	8	(1.6)	6	(2.5)	14	(1.9)
	Soran University	0	(0.0)	4	(1.7)	4	(0.6)
	Sulaimani Polytechnic University	1	(0.2)	2	(0.8)	3	(0.4)
	University of Zakho	97	(20.0)	37	(15.7)	134	(18.6)
	Duhok Polytechnic University	4	(0.8)	8	(3.4)	12	(1.7)
	Erbil Polytechnic University	101	(20.8)	46	(19.5)	147	(20.4)
	University of Garmian	41	(8.4)	9	(3.8)	50	(6.9)
	Kurdistan Technical Institute	4	(0.8)	0	(0.0)	4	(0.6)
	Knowledge University	3	(0.6)	4	(1.7)	11	(1.5)
	Total	**486**	**(67.3)**	**236**	**(32.7)**	**722**	**(100.0)**
Level of education	Certificate	7	(1.4)	3	(1.3)	10	(1.4)
	Diploma	37	(7.6)	14	(5.9)	51	(7.1)
	Bachelor	69	(14.2)	40	(16.9)	109	(15.1)
	Higher diploma	3	(0.6)	1	(0.4)	4	(0.6)
	Board	4	(0.8)	2	(0.8)	6	(0.8)
	Master	220	(45.3)	119	(50.4)	339	(47.0)
	Doctorate	142	(29.2)	52	(22.0)	194	(26.9)
	Post-doctorate	4	(0.8)	5	(2.1)	9	(1.2)
	Total	**486**	**(67.3)**	**236**	**(32.7)**	**722**	**(100.0)**

In the third section, we asked about chronic diseases 563 (78%) of participants reported having chronic diseases. 344 (47.6%) confess that they got COVID-19 and 650 (90.0%) stated getting the disease by close family/friends. Additionally, 236 (32.7%) declare losing someone due to COVID-19. The second section of the survey reported in table 2 and table 3

Table 2: participants answer to questions about COVID-19 medical history.

No.	Questions	Yes		No	
		No.	(%)	No.	(%)
1.	Do you have any chronic diseases?	563	(78)	159	(22)
2.	Previous history of getting COVID–19	344	(47.6)	378	(52.4)
3.	Previous COVID-19 infection among family/friends	650	(90.0)	72	(10.0)
4.	Have you experienced the loss of a close relative due to COVID-19?	236	(32.7)	486	(67.3)

In this section, participants were asked about their COVID-19 vaccination status, with 239 individuals (24.9%) indicating that they had already been vaccinated. Of those vaccinated, the majority had received the Pfizer-BioNTech vaccine (51.5%). Non-vaccinated participants were also asked about their willingness to receive the vaccine, and the majority expressed a willingness to do so. Furthermore, participants were asked which type of vaccine they would prefer if they were to consider vaccination, with a significant proportion (43.9%) indicating a preference for the Pfizer-BioNTech vaccine, while only 4 participants expressed a preference for the Sputnik V vaccine.

Table3:Participants answer to COVID-19 vaccination

No.	Questions	Answers	No. (%)
1.	Have you been vaccinated against COVID-19?	Yes	239 (24.9)
		NO	722 (75.1)
Total			**961 (100)**
2.	Type of vaccine you would use?	Pfizer–BioNTech vaccine (German/American)	123 (51.5)
		Oxford/AstraZeneca vaccine (British)	76 (31.8)
		Moderna Vaccine (American)	1 (0.4)
		Sinovac vaccine (Chinese)	37 (15.5)
		Sputnik V vaccine (Russian)	2 (0.8)
		Not vaccinated	722 (75.1)
3.	Willingness in getting COVID-19 in the future	Yes	425 (58.9)
		No	297 (41.1)
		Have been vaccinated	239 (24.9)
4.	If you consider vaccination which type, would you prefer?	Pfizer–BioNTech COVID-19 Vaccine (German/American)	317 (43.9)
		Oxford/AstraZeneca COVID-19 vaccine (British)	51 (7.1)
		Moderna COVID-19 Vaccine (American)	11 (1.5)
		Sinovac COVID-19 vaccine (Chinese)	42 (5.8)
		Sputnik V COVID-19 vaccine (Russian)	4 (0.6)
		None	297 (41.1)
		Have been vaccinated	239 (24.9)

The study revealed that the most widespread rumor regarding COVID-19 vaccines among the participants was the belief that they are unsafe, with 308 individuals (42.6%) reporting having heard this rumor. In contrast, only 29 participants reported having heard no rumors regarding the vaccines. Chart 1 provides a summary of the

different rumors that participants reported having heard about COVID-19 vaccines, highlighting the prevalence of the safety concern rumor.

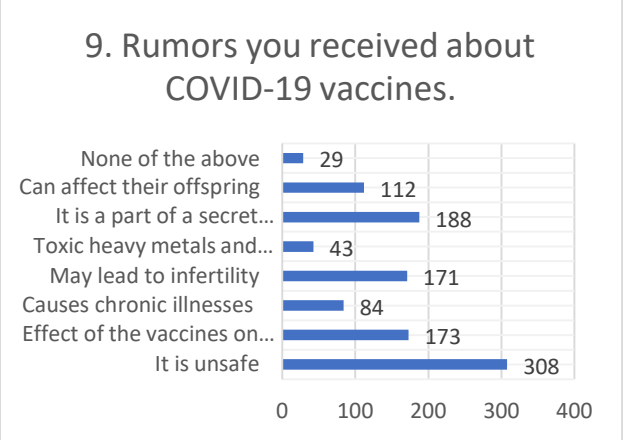

Chart 1: rumors heard by participants

A considerable number of participants mention that they have heard about the COVID-19 vaccine rumors through the media and social media 428 (59.3%), in comparison only 97 participants stated that they did hear about the COVID-19 vaccine rumors through scientific research. All sources of the rumors are mentioned in Chart 2.

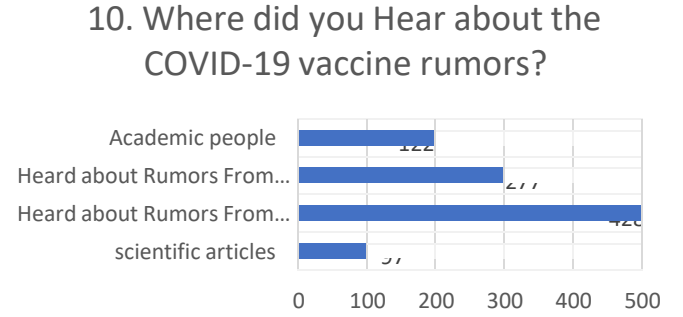

Chart 2: represents Sources of the rumors about COVID-19 vaccine

We ask if the participants believe in these rumors and the majority did not believe in them at all 432 (59.8%). Similarly, most of them were concerned about the safety of the vaccine 136 (18.8%). The participant's perception of the rumors about vaccines is shown in Chart 3.

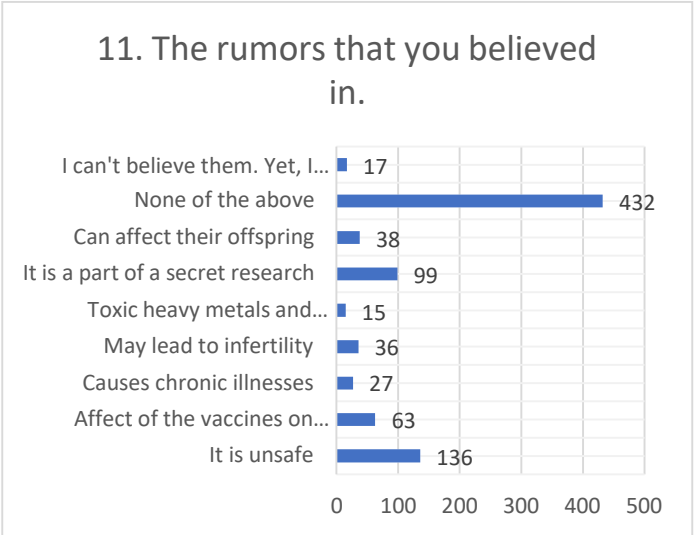

Chart 3: the rumors that participants believe

Finally, in response to the query "reasons that may encourage you not to vaccinate" participants had different reasons not to vaccinate all the participant's reasons mentioned in Chart 4. Overall, 198 (27.4%) participants reported that afraid of unknown side effects.

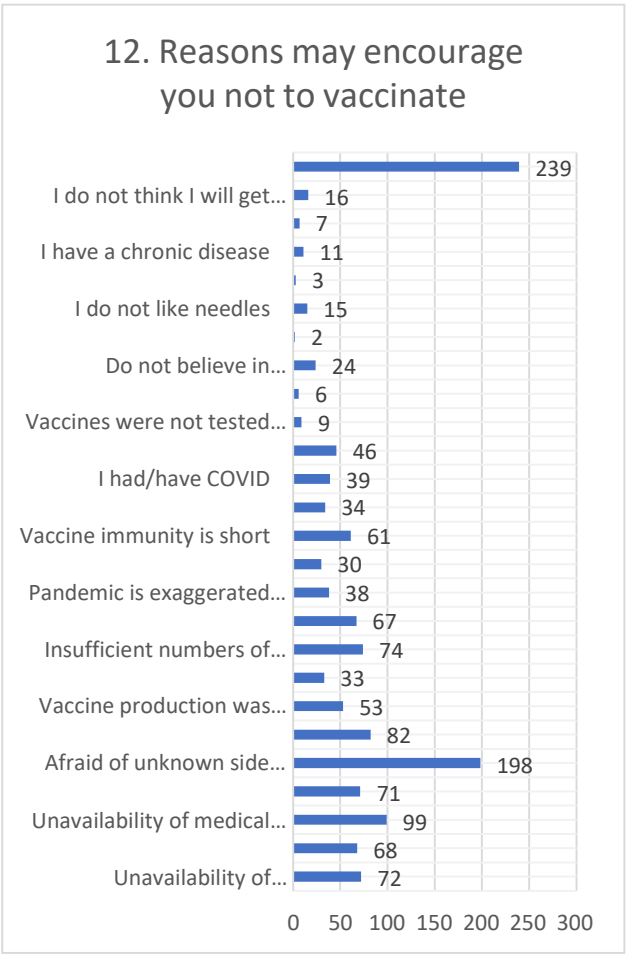

Chart 4: factors may influence vaccination

4. Discussion

Vaccination is one of the most effective methods against infectious diseases that saved millions of lives and eradicate some of the dangerous diseases such as smallpox virus. Additionally, scientists believe it is the best tool in facing the COVID-19 (Wilson *et al*., 2021). However, mass production, unfair distribution, period of efficacy, and difficult storage requirements of COVID-19 vaccines developed a negative conception regarding accepting the COVID-19 vaccine (Sallam *et al*., 2021). In this study, we have prepared a survey to determine the hesitancy toward COVID-19 vaccines among universities' staff.

A huge number of participants were having a chronic illness of 563 (78%), which made them concerned regarding vaccination. People with chronic diseases are at risk to get a worse and severe COVID-19 infection. This made People with chronic diseases show hesitancy in accepting the COVID-19 vaccine (Bono *et al*., 2021; Laires *et al*., 2021). Despite that considerable number of the participants willing to get vaccinated in the future 425 (58.9%). Based on the available data, the percentage of staff members accepting COVID-19 vaccination in this study is not satisfactory. The exclusive data from neighboring countries show similar pattern such as Saudi Arabia 52% (Al-Hanawi *et al*., 2021), Jordan (17.1%), Saudi Arabia (29.4%), Lebanon (18.5%), and Iraq (34.7%) (Abu-Farha *et al*., 2021), Turkey (54.7%) (İkiışık *et al*., 2021) and Kuwait (53.1%) (Alqudeimat *et al*., 2021).

The majority of unvaccinated personnel preferred Pfizer–BioNTech vaccine 317 (43.9%). A study showed that health care workers accept Pfizer–BioNTech more than Oxford/AstraZeneca. These different opinions may be due to the vaccine's efficiency in preventing the infection, the vaccine's side effects, and the vaccine's manufacturing country (Temsah *et al*., 2021).

Our findings show that only 29 participants did not hear rumors regarding COVID-19 vaccines. Our results indicate that the social media directly increased the risk of vaccine hesitancy towards COVID-19 vaccination because it was the most popular way for spreading the COVID-19 vaccine rumors. Nowadays, social media are an essential part of our daily life, and it is not possible to ignore their huge role in communication and interactions among people (Al-Surimi *et al*., 2017). Misinformation regarding COVID-19 vaccination has been circulating widely on social media platforms, leading to negative attitudes and beliefs towards vaccination. These false claims and rumors are often presented as credible information, creating confusion and distrust among the public. Research has shown that the circulation of such misinformation can undermine public health efforts and contribute to vaccine hesitancy (Reno *et al*., 2021; Larson *et al*., 2013; Pennycook *et al*., 2020).

Surprisingly most of the unvaccinated participants did not believe in these rumors 432 (59.8%). In contrast, in other countries, the parentage of the participant who did not believe in the rumors was different and probably due to differences in beliefs and social factors by nations such as Jordan (44.7%) (Aloweidi *et al*., 2021), African and Middle East countries (72.39%) (Faezi *et al*., 2021). Among the rumor believer's safety of the COVID-19 vaccine worried a handful of them 136 (18.8%). Since the production of the COVID-19 vaccine, safety has been always an issue. A review study suggests that COVID-19 vaccines are safe in the short-term and long-term surveillance is required (Wu *et al*., 2021). Additionally, a recent study conducted on the effectiveness and safety of COVID-19 vaccines reassured the vaccine's safety and could reduce death (Liu *et al*., 2021).

Finally, we listed several reasons that may encourage people not to vaccinate and the most frequent reasons were (Afraid of unknown side effects) (27.4%), (Unavailability of medical follow–up post-vaccination) (13.7%), (Not enough time to test vaccine safety) (11.4%). The reasons somehow were consistent with a large-scale study conducted in the middle east. However, the participant's percentages were different side effects (58.0%), safety (57.0%) and vaccine production rushed (43.9%) (Qunaibi *et al*., 2021). Accordingly, another study conducted in the United Sate mentioned that the participants were concerned about in which safety (69%), effectiveness (69%), and speed of development/approval (74%) (Shekher *et al*., 2021). We noted that our participants were less concerned in comparison to both studies in the middle east and the United States.

One noteworthy limitation of this study is that it focused solely on the university staff's hesitancy towards COVID-19 vaccination and did not evaluate the general population's level of awareness regarding vaccination. Additionally, the study only included participants who use social media, potentially limiting the representation of individuals who do not engage with such platforms. It is essential to investigate the general population's hesitancy towards vaccination in future studies to gain a more comprehensive understanding of the factors affecting vaccine acceptance. Furthermore, future research should include participants from various socioeconomic and demographic backgrounds to provide a more representative sample.

4. Conclusions

To sum up, the COVID-19 vaccination is one of the preventive strategies to prevent morbidity and mortality. However, hesitancy toward COVID-19 vaccines has been stated all over the world. The main particular reason is the spreading of misinformation and false rumors about the vaccine and social media is the center for spreading these rumors as of this study and many other studies described. We demonstrated that despite the odds against vaccination, most universities' staff in the Kurdistan Region/Iraq are willing to vaccinate 425 (58.9%) and prefer the Pfizer vaccine more. Surprisingly, most of the participants did not believe in the vaccine's rumors 432 (59.8%) and they are concerned about the unknown side effects of the vaccines.

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