RESEARCH ARTICLE

Open Access Journal

Attitudes and Intention towards COVID-19 Vaccines among the Public Population in Mosul city

Dr. Rawaa Y. Al-Rawee[1] | Mr. Mohammed Faris Abdulghani[2] | Dr. Waleed Mohamed Basheer Yahya Alsabea[3] | Dr. Mattie Amer Daoud[4] | Dr. Bashar Abdul-Ghani Tawfeeq[5] | Dr. Fadi Kamal Saeed[6]

[1]Department Of Oral and Maxillofacial Surgery

[2]Department of Clinical Nursing Sciences, College of Nursing, University of Mosul, Mosul City, Nineveh, Iraq.

[3]Technical Affairs Department-Nineveh Health Directorate /Iraq

[4]Department Of Oral and Maxillofacial Surgery. Al-Salam Teaching Hospital. Mosul, Iraq

[5]Department Of Oral and Maxillofacial Surgery. Al-Salam Teaching Hospital. Mosul, Iraq

[6]Department Of Oral and Maxillofacial Surgery. Al-Salam Teaching Hospital. Mosul, Iraq

Abstract

Aim: To assess the public's response toward Vaccination in Mosul and causes of refusing vaccination and highlighting the need for an education program for vaccinations in Mosul city. **Material and Method**: Internet-based survey was completed among 1000 individuals residing in Nineveh. Google Forms is used for collecting data through an electronic questionnaire. Answer questionnaire lists starting with demographical information. The data were statistically analyzed by descriptive criteria for numerical variables using the number, percentage, mean and standard deviation. At the same time, for categorical variables, use frequency and percentages, Chi-square test, and independent t-test were used to test the significance of association between variables analyzed all by SPSS 25, and P-value was set at 0.5.
Result: Significant associations of the vaccine agreement and the educational levels and working status of individuals (p-value 0.00118), Also significant association (P= < .00001) of the family history.
Conclusion: Mosul's residents have high-level agreement and willingness for a coronavirus vaccine. More education is needed to promote and ensure the community that the vaccine is efficient and secure.
Keywords: COVID19 knowledge, Vaccine agreement, Attitude of the COVID 19 vaccine

1 | INTRODUCTION

On seventeen November 2019, Morning Star Magazine announce that Wuhan town records the first attack by a new, very extensive, terrifying, and deadly viral infection later named Covid 19 Virus. This epidemic attack like wildfire with widespread all over the world.

Pneumonia and lung failure are the most common cause of death caused by Covid respiratory infection. COVID-19 is a beta coronavirus naturally like the Coronavirus reported in 2002 (1) . Physiologically, it's well known for health care workers that angiotensin-converting enzyme 2 (ACE2) binds to the SARS-CoV-2 / spike S protein and then affects type II pneumocytes in humans lungs (2). The wave of SARS-CoV-2 persists in threatening the health care system with devastating economic, teaching, and social effects worldwide (3). Governments face and world health organisations extraordinary challenges with extraordinary efforts because

To date, no ideal management guidelines or preventive measures are available with 100% results as the virus is genetically unstable and changeable with a wide range of symptoms. (4) One of the approved methods to stop infectious diseases is vaccination. Wang J, in his published article, stated that "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"(5). Different vaccine platforms are available, such as (LAV) living attenuated vaccine, (IVV) inactivated virus vaccine, (PSV) protein sub-unit vaccine, (VVBV) viral vector-based vaccine, and mRNA or DNA vaccine with specific consideration in vaccination design (6).

The Covid attack is a pandemic that has medically, economically, and socially affected people's lives, so it needs to be urgently restricted with a safe, approved, and effective prophylactic vaccination(7).

Nations and states all over the world have spent huge financial budgets for population vaccination

On the contrary, people face the vaccination method with different levels of rejection and or acceptance,

Corresponding Author: *Dr. Rawaa Y. Al-Rawee*
Department Of Oral and Maxillofacial Surgery

particularly in developing countries; various factors influence acceptance of the vaccination (8).

COVID-19 vaccination is recognized to be adequate to eradicate the COVID burden. The population's willingness is to control the vaccination programmed related to their vaccine acceptance. Limited studies are published highlighting this acceptance(9). Iraq societies, like others, face some rejection of vaccination. Authors thought that it's crucial to realize Iraqi's acceptance, perception, and belief about vaccination. For that, authors perform this study assessing acceptance in Nineveh, the 3rd state in Iraq, compared to others locally and internationally. Knowing where we are with such a vital epidemic attack can assist the government and related agencies formulate the best COVID 19 vaccination programmer.

The Objective/s of the Research: Authors aim in this article to

● Evaluate the response of the public toward Vaccination in Mosul.

● Evaluate the causes of refusing vaccination

● Highlighting the need for an educations program for vaccinations in Mosul

2 | MATERIAL AND METHOD

Ethical Consideration

The Ethical and Scientific Research Committee approves the Nineveh Health Directorate / Mosul / Nineveh study with the license number 21/72 dated 20/6/2021, following the Helsinki Declaration.

Justification of choosing this topic (Rationale): Evaluating the Monitoring COVID-19 Vaccination Programmed Level in Mosul.

Research Question: Evaluate responses of the public toward COVID 19 Vaccination taken.

Research Time: Sample collected starting from 1st April to 1st June in 2021.

Research Methodology

Study Design: Analytical Descriptive Cross-Sectional Study for Nineveh's population.

Case Definition: The participant who likes to share in the questioner answering is included with omitting all proforma lists not answering all questions.

Sampling Methods:

Self-administered Questioners lists are used to collect data about; Demographics information as; age, education level, years of working, the institution of work. Knowledge questionnaires about Vaccination Acceptances and the Causes of Vaccine's Rejection are also highlighted in the lists.

Description of Methodology

Methods

Study approved ethically with Declaration of Helsinki guidelines and regulations. Nineveh population is the target participants were aged 18 years adults and above who could understand the questions in the Arabic Language.

The face-to-face method is limited in COVID circumstances with the active outbreak; an electronic-based survey was established among 1000 people living in Nineveh.

Google Forms is used for collecting data through an electronic questionnaire. An accidental sampling strategy was used to introduce and deliver the online electronic questionnaire via many social media established to be most used (Facebook, WhatsApp, Twitter). The participant should agree to share by link opening first, then answer questionnaire lists starting with demographical information.

The smallest sample size was determined using Open-Epi Version three. In 2020, the Nineveh population of adults aged 16 years and above was around 3 million. The minimum sample size calculated with a 95% confidence interval was 600. A total of 1065 completed responses were collected.

Statistical Analysis and sample size:

The data were statistically analyzed by descriptive criteria for numerical variables using the number, percentage, mean and standard deviation; while for categorical variables use frequency and percentages also Chi-square test and independent t-test were used to test the significance of association between variables analyzed all by SPSS 21, and P-value was set at 0.5

Questionnaire on COVID-19 vaccine: acceptance and concerns:

The questionnaire chosen from different articles and literature reviews was improved and translated from English to Arabic, the official Language for Mosul populations. Various questions are listed to be answered by the participant, starting with sociodemographic data (age, gender, educational level, working status, state) performed in the 1st list, 2nd list focus on the participant's information about COVID-19, disease, and vaccination with the source of this knowledge. Another group (3rd list) concern with infection history, vaccines history, practising protection ways. Agreement of coronavirus vaccine (acceptance to take, reasons for disagreeing to take, willingness to pay and pharmacological company preferences) categorized in the 4th part. Also, the author highlights the causes of refusing vaccination and the role of participants in family's members becoming sick.

3 | RESULTS

The finding of this survey is based on the investigation of 1000 individuals who consented to participate and complete the electronic questionnaire involving the Attitude and intention of the Coronavirus's vaccination.

The sociodemographic characteristic of individuals in Table 1.

Table 1 : Sociodemographic Characteristics of the individuals.

Variables	Min	Max	Mean	SD
Age	18	68	30.9	9.3
	N		%	
Age				
18-28	260		26	
29-39	240		24	
40-50	70		7	
51-61	360		36	
62-72	60		6	
Total	1000		100	
Gender				
Male	620		62	
Female	380		38	
Total	1000		100	
Marital status				
Single	660		66	
Marriage	340		34	
Total	1000		100	
Working Status				
Unemployed	90		9	
Government Worker	270		25	
Student	480		65	
Retired	160		16	
Total	1000		100	
Educational level				
Primary	90		9	
Secondary	10		1	
Diploma	70		7	
University degree	770		77	
Postgraduate	60		6	
Total	1000		100	
Occupation Type				
Medical and health employment	180		18	
Lower	10		1	
Engineer	30		3	
Teacher	40		4	
Administrative employee	90		9	
Farmer	10		1	
Retired	160		16	
Student	480		48	
Total	1000		100	

The age mean of the persons was 33±10 years old. Male individuals had the most (62%) of the participants, while other than half (65%) were college students, with 77% having a university degree.

Table 2: History and Measures Protective Followed by the individuals regarding Coronavirus.

Variables	Number	Percentage
In general, how do you rate your health over the past year?		
Excellent	210	21
Very good	480	48
Acceptance	240	24
Bad	70	7
Total	1000	100
You have been infected with the COVID-19 virus		
Yes	490	49
No	510	51
Total	1000	100
Do you have any family or relative members who have the COVID-19 virus		
Yes	900	90
No	100	10
Total	1000	100
Do you have any chronic diseases		
Yes	80	8
No	920	92
Total	1000	100
When getting the COVID-19 virus, you suffer from a severe complication		
Yes	40	4
No	960	96
Total	1000	100
You have taken the Flu vaccine in your live		
Yes	280	28
No	720	72
Total	1000	100
Using masks to prevent infection with the COVID-19 virus		
Yes	650	
No	350	

It is clear from Table 2 that there were 490 (49%) members with a history of corona viruses infection through the wave period, and 900 (90%) of them had at least one family member diagnosed with corona viruses. The finding reported in this table also shows that around three-quarters (72%) of the respondents had never taken the Flu vaccine in their lives.

Table 3: Vaccination intonation among Study Members.

Variables	N	%
When the coronaviruses vaccine is available, will you accept to take the vaccine?		
Yes	660	66
No	340	34
If you agree to take it when you take the vaccine?		
Directly	360	35
I will delay for a period	640	64
Do you agree to pay fees for the vaccine?		
No	650	65
Yes	350	35
Which vaccine do you prefer?		
I do not want to take it	**340**	**34**
US Moderna (Pfizer)	430	43
Russian	30	3
Chinese	110	11
Oxford (AstraZeneca)	90	9
Total	1000	100
If No, what are the reasons?		
I do not believe in the vaccine	150	15
Natural immunity better	60	6
Not safe	330	33
I do not believe it will protect me versus coronaviruses	200	20
Knowledge deficiency	50	5
Conspiracy Theory	210	21
Total	1000	100
Do you agree to pay fees for the vaccine?		
Yes	350	35
No	650	65
Total	1000	100

Table 4: Attitude of Population toward COVID-19 Vaccine

Variables	N	%
When COVID-19 Vaccine is available, will you agree to take it?		
Yes	660	66
No	340	34
If you agree to take it, when will you take it?		
Immediately	350	35
I will wait for some time	640	64
Do you agree to pay fees for the vaccine?		
No	650	65
Yes	350	35
How upset did you feel about the spread of the new Coronavirus and the fear of taking it or infecting a close one in the past year?		
too much	410	41
I have **upset**	230	23
Moderate **upset**	240	24
I do not have **upset**	120	12
If you have not been infected with the new Coronavirus yet, the chance of getting it in the next few months is relatively high		
Strongly agree	120	12
Agree	240	24
Natural	340	34
Disagree	160	16
Strongly disagree	140	14
Complications caused by infection with the new COVID-19 virus are serious		
Strongly agree	160	16
Agree	380	38
Natural	260	26
Disagree	80	8
Strongly disagree	120	12
I would be very sick if I am infected with the COVID-19 virus		
Strongly agree	140	14
Agree	230	23
Natural	350	35
Disagree	200	20
Strongly disagree	80	8
I feel strong negative emotions such as fear, horror, anger, and panic when I remember the novel COVID-19 virus pandemic		
Strongly agree	60	6
Agree	280	28
Natural	270	27
Disagree	90	9
Strongly disagree	300	30
If a large meet number of populations takes place due to a religious purpose (such as prayer, for example), there is no chance of the spread of the Coronavirus		
Strongly agree	60	6
Agree	220	22
Natural	140	14
Disagree	500	50
Strongly disagree	80	8
I think that measures should be imposed regarding the Corona epidemic and quarantine		
Strongly agree	130	13
Agree	390	39
Natural	170	17
Disagree	110	11
Strongly disagree	200	20
Vaccines are generally beneficial		
Strongly agree	220	22
Agree	280	28
Natural	240	24
Disagree	60	6
Strongly disagree	200	20
COVID-19 have a lot of complication		
Strongly agree	250	25
Agree	300	30
Natural	50	5
Disagree	200	20
Strongly disagree	250	25
The vaccine is a hoax, and a media lie for political and purposes		
Strongly agree	90	9
Agree	50	5
Natural	220	22
Disagree	290	29
Strongly disagree	350	35
Bill Gates and the world's influential people made the virus and produced the vaccine to reduce the world's population and increase financial profit		
Strongly agree	110	11
Agree	170	17
Natural	320	32
Disagree	240	24
Strongly disagree	160	16
If one of your family want to take the vaccine, you should encourage to take it		
Strongly agree	170	17
Agree	300	30
Natural	30	3
Disagree	220	22
Strongly disagree	230	23
Getting a vaccine will reduce the chances of being infected with COVID-19 viruses		
Strongly agree	110	11
Agree	400	40
Natural	280	28
Disagree	110	11
Strongly disagree	100	10

Table 4 how the Attitude of participant toward COVID-19 vaccine was positive toward taking vac-cine 660 (66%) while 340 (34%) refuse to take the vaccine, Vaccines are generally beneficial 400 (40%) agree with this statement. Also, 550 (55%) thought that the vaccine has many complications, 51 % thought that getting the vaccine will reduce the chances of being infected with COVID-19 viruses.

Table 5: The relation between sociodemographic characteristics and vaccine intention

Variables	Acceptance				X2	P-Value
	NO		YES			
	N	%	N	%		
Gender						
Female	130	22	250	77	0.0168.	0.89
Male	220	20	400	80		
Working Status						
Unemployed	30	3	60	6	16.0303	0.00118
Government Worker	70	7	200	20		
Student	80	8	400	40		
Retardation	110	11	50	5		
Educational level						
Primary	60	6	20	20	10.8237	0.028618
Secondary	10	1	10	10		
Diploma	10	1	30	30		
University degree	550	55	270	270		
Postgraduate	50	5	10	10		
Family history to COVID-19						
Positive	50	5	850	85	35.3956	< .00001
Negative	70	7	30	3		
Mean	SD	Mean	SD	T test		
Age	34.40	11.58	29.91	9.76	14.58	<0.001

Table 5, this survey found statistically significant as-sociations of the vaccine agreement with the individ-ual's educational levels and working status (p-value 0.00118), in adding to the significant association (P= < .00001) of family history.

4 | DISCUSSION

The primary aim of this study was to assess in-tentions towards COVID-19 vaccines among the general population in Mosul city; the coronaviruses spread has expected distressing amounts, with this national reporting of more than many thousands of new cases daily more than of

deaths every week (10). Simultaneously, the Iraqi government has removed the curfew and the boundaries on community crowds (11).

In this condition, covid-19 vac-cination represents the best resolution to fight against Coronavirus. However, this survey was shown to examine the vaccine's reception and associated with determining factors between the general individuals, as the first study done in Mosul. Most individuals in the present study are males with a university degree, were infected with SARS-COV2 before, typically used hand sensitizers, and wear masks outside.

In the current study, most participants proposed to be immunized for Coronavirus; this level of accep-tance would be adequate for the individual to obtain immunity, like another survey (12). While a rea-sonable acceptance degree was shown in this survey, about 2/3 of the individuals to take the vaccine 1/3 would prefer to postpone getting vaccinated. Com-pared to other studies, this proportion is less than that described by a Chinese survey (13), in which the proportion of vaccine acceptance between the general individual was 91%. Another study among Indonesian citizens reported 93% and 67% accept-ability for 95% and 50% effectiveness of coronavirus vaccine, correspondingly (14). However, public surveys in Saudi Arabia (15) and the united states (WHO, 2020) revealed negative attitudes to-ward the COVID-19 vaccine.

This result is the same as with the Chinese survey that around the less than half of the individuals (47.8%) who agree to take vaccine would stay until the vaccine's security is established (16). The reason for motivation to a vaccine may be influenced by hesitation and trigger the individuals to refuse the vaccine for themselves or their families. Vaccine taking hesitation may be due to the background, personality, and group impacts, as well as vaccine-specific matters such as security or trust (17).

Presented results informed that more than two-thirds of the individuals agree to take the vaccine and would concur to take the vaccine (66%) while do not agree to pay the price of the vaccine was 650 (65%). Cost is strong-minded to be one of the most factors of vaccine hesitation (18). The present high vac-cination hesitancy might be due to the coronavirus vaccine however have been below trial at the study time. There is no present evidence about vaccina-tion effectiveness and safety. therefore, reasonable to give the coronavirus vaccine with no cost to the

community to raise vaccine acceptance, particularly for those hesitant for vaccination.

The absence of trust in vaccine security was the principal reason for rejecting vaccines in the current survey. As observed, about half the individuals (47.8%) with vaccination agreement would postpone vaccine until the vaccine's security is established, fears about vaccine security being the lead to reason of their vaccination hesitation. However, this level of hesitation may be diminished later, when the novel vaccine is presented in the market, accompanied by sufficient data on its security and effectiveness (19). (20) (21)

Age is concerned about the relationship with vaccine intention; previous results are contradictory. (22) (23)Also, some studies have registered older individuals as more likely to agree on the vaccine (24). Another study shows no relation (25). Indifference, these results found that vaccine agreement individuals are significantly younger than their non-agreement complements (P< 0.001). (26)

Numerous limitations were discovered in this survey first. Social media were utilized to gather data. Tertiary, the agreement was evaluated at a period when a vaccine was not offered. Tertiary, the agreement was evaluated at a period when a vaccine was not offered. Therefore, we lost studying low education, inadequate income with no internet access, and older people. At the same period, the selection method was suitable, and the sample was excessively representative of the highly educated and females. Secondly, the survey was a cross-sectional study. It is probable that when an actual vaccine becomes accessible with knowledge about its security and side effects, some individuals can alter their response. But, this is the first survey studying coronavirus vaccine agreement in Mosul and its associated determinants among the Iraqi people with many individuals, within the country, from different professions and years.

5 | CONCLUSION

Mosul's people have a high agreement for a coronavirus vaccine. More education is needed to increase the agreement toward the safety and efficacy of the coronavirus vaccine.

REFERENCES

1. Possamai M. A time of fear: how Canada failed our health care workers and mismanaged Covid-19. Canadian Federation of Nurses Unions; 2020. ;.

2. Gheblawi M, Wang K, Viveiros A, Nguyen Q, Zhong J-C, Turner AJ, et al. Angiotensin-converting enzyme 2: SARS-CoV-2 receptor and regulator of the renin-angiotensin system: celebrating the 20th anniversary of the discovery of ACE2. Circ Res. 2020;126(10):1456–74. ;.

3. Kaye AD, Okeagu CN, Pham AD, Silva RA, Hurley JJ, Arron BL. Economic Impact of COVID-19 Pandemic on Health Care Facilities and Systems: International Perspectives. Best Pract Res Clin Anaesthesiol. 2020;.

4. Tian L, Li X, Qi F, Tang Q-Y, Tang V, Liu J, et al. Pre-symptomatic transmission in the evolution of the COVID-19 pandemic. arXiv. 2020; ;.

5. Nasrollahzadeh M, Sajjadi M, Soufi GJ, Iravani S, Varma RS. Nanomaterials and nanotechnology-associated innovations against viral infections with a focus on coronaviruses. Nanomaterials. 2020;10(6):1072–1072.

6. Belete TM. A review on Promising vaccine development progress for COVID-19 disease. Vacunas. 2020;21(2):121–129.

7. Calina D, Sarkar C, Arsene AL, Salehi B, Docea AO, Mondal M. Recent advances, approaches and challenges in targeting pathways for potential COVID-19 vaccines development. Immunol Res. 2020;p. 1–10.

8. Shadmi E, Chen Y, Dourado I, Faran-Perach I, Furler J, Hangoma P. Health equity and COVID-19: global perspectives. Int J Equity Health. 2020;19(1):1–16.

9. Hooper MW, Nápoles AM, Pérez-Stable EJ. No populations left behind: Vaccine hesitancy and equitable diffusion of effective COVID-19 vaccines. J Gen Intern Med. 2021;p. 1–4.

10. The Right to Information in Times of Crisis : II . The Right to Information During a Health Emergency. UNESCO. 2020;p. 1–17.

11. Ali KM, Tawfeeq HM, Rostam HM. COVID-19 Second Spike as an Aftermath of the Sudden Restrictions Ease: Kurdistan Region of Iraq as an Example. Passer J. 2020;2(2):57–61.

12. Fontanet A, Cauchemez S. COVID-19 herd immunity: where are we? Nat Rev Immunol [Internet]. 2020;20(10):583–587.

13. Jarab AQW, S A. COVID-19 Vaccination Acceptance and Its Associated Factors Among a Middle Eastern Population. Internet];9:34–34.

14. Harapan H, Wagner AL, Yufika A, Winardi W, Anwar S, Gan AK, et al. Acceptance of a COVID-19 Vaccine in Southeast Asia: A Cross-Sectional Study in Indonesia. Front public Heal [Internet]. 2020 Jul 14;8:381. Available from:;Available from: https://pubmed.ncbi.nlm.nih.gov/32760691.

15. Al-Mohaithef M, Padhi BK. Determinants of covid-19 vaccine acceptance in saudi arabia: A web-based national survey. J Multidiscip Healthc. 2020;13:1657–63.

16. Wang J, Jing R, Lai X, Zhang H, Lyu Y, Knoll MD. Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China. Vaccines. 2020;8(3):482–482.

17. Guzman-Holst A, Deantonio R, Prado-Cohrs D, Juliao P. Barriers to vaccination in Latin America: A systematic literature review. Vaccine. 2020;38(3):470–81.

18. Olorunsaiye CZ, Langhamer MS, Wallace AS, Watkins ML. Missed opportunities and barriers for vaccination: a descriptive analysis of private and public health facilities in four African countries. Pan Afr Med J. 2017;27(3).

19. Geoghegan S, O'callaghan KP, Offit PA. Vaccine safety: myths and misinformation. Front Microbiol. 2020;11:372–372.

20. Larson HJ, Jarrett C, Eckersberger E, Smith D, Paterson P. Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature. Vaccine. 2007;32:2150–2159.

21. Dubé E, MacDonald NE. Vaccine acceptance: barriers, perceived risks, benefits, and irrational beliefs. In: The Vaccine Book. Elsevier; 2016. p. 507–28. ;.

22. Padhi BK, Al-Mohaithef M. Determinants of COVID-19 vaccine acceptance in Saudi Arabia: a web-based national survey. medRxiv. 2020; ;.

23. Malik AA, Mcfadden SM, Elharake J, Omer SB. Determinants of COVID-19 vaccine acceptance in the US. EClinicalMedicine. 2020;26:100495–100495.

24. Ghazi HF, Taher TMJ, Alfadhul SAL, Al-Mahmood S, Hassan SA, Hamoudi TA, et al. ACCEPTANCE OF COVID-19 VACCINE AMONG GENERAL POPULATION IN IRAQ. 2020; ;.

25. Sherman SM, Smith LE, Sim J, Amlôt R, Cutts M, Dasch H. COVID-19 vaccination intention in the UK: results from the COVID-19 vaccination acceptability study (CoVAccS), a nationally representative cross-sectional survey. Hum Vaccin Immunother. 2021;17(6):1612–1633.

26. Fisher KA, Bloomstone SJ, Walder J, Crawford S, Fouayzi H, Mazor KM. Attitudes toward a potential SARS-CoV-2 vaccine: a survey of US adults. Ann Intern Med. 2020;173(12):964–73.