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A Cross-sectional Study to Examine the Acceptance of COVID-19 Vaccine among Family Medicine Board Residents, Saudi Arabia, 2021

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Abstract

Introduction: Different levels of vaccine acceptance and many factors were found responsible for low vaccine acceptance such as perceived severity of infection, education, ethnicity, and cultural background. We aimed to determine the acceptance of COVID-19 vaccine among family medicine residents as an important portion of health staff who expected to have a high level of vaccine acceptance.

Methods: This is a cross-sectional web-based study targeting all family medicine board residents in Saudi Arabia. The questionnaire is self-administered and consists of two sections of questions, section “A” about demographics and clinical related factors of the residents, and section “B” contains questions related to vaccine acceptance and preference. The questionnaire is based on previous surveys, one of them done in Saudi Arabia. Descriptive statistics such as frequencies, percentages were calculated to summarize nominal and ordinal data. Chi-squared test was applied to evaluate the association between the determinants and the outcome variables. Any P-value < 0.05 was considered as an indication for a statistically significant association or difference.

Results: Out of 215 family medicine residents responded to the questionnaire, 60% were males and 40% were females. We found about 69.8% of the residents were probably or definitely willing to receive COVID-19 vaccine if it was free or covered by health insurance, while 13.5% and 16.7% were unwilling or unsure about that, respectively. Main reasons of not-willing to receive the vaccine were worries of vaccine safety followed by worries of vaccine efficacy. Knowing patients with COVID-19 in their immediate social network and perceived knowledge about COVID-19 vaccine side effects were significantly associated with acceptance of COVID-19 vaccine. Other factors including, age, gender, marital status, number of children, residency level, presence of a chronic disease, previously effected with COVID-19, or knowledge about COVID-19 were not significantly associated with acceptance of the vaccine.

Conclusions: Although all of them were vaccinated, about one third of family medicine residents were unwilling to accept vaccine of COVID-19 and a substantial number of the residents were unwilling to recommend the vaccine for family members or patients. Further qualitative researches are recommended to explore in depth causes of vaccine non-acceptance.

Keywords: Vaccine, COVID-19, Health workers, Attitudes, Hesitancy, Acceptance

Introduction

The severe acute respiratory syndrome, caused by coronavirus 2 (SARS-CoV-2) and called COVID-19, resulted in a widespread pandemic that affects almost all countries in the world [1]. It affects more than 187 million people and caused more than four million deaths till July 2021 [2]. The pandemic leads to unprecedented economic impact and social restriction and became a major threat for health system. The World Health Organization has been initiating global efforts for primary and secondary prevention of COVID-19. A start point in the prevention of the pandemic was implementation of infection control measures such as mouth masks, hand hygiene, social distancing, and closure of public places. Active surveillance with early detection, isolation and treatment of cases have been implied in order to reduce the epidemic curve and prevent health system collapse. However, awaiting vaccine was the best intervention as hundreds of research centers engaged into the development of the vaccine.

By the first quarter of 2021, several vaccines have passed the phase III trial and become approved to be used in mass vaccination such as Pfizer-BioNTech vaccine (US - Germany), Oxford Uni-AstraZeneca vaccine (UK), Moderna vaccine (US), Gamaleya-Sputnic V vaccine (Russia, China's Covid-19 Vaccine (China), and Johnson & Johnson vaccine (US). However, a high level of vaccine hesitancy was reported in different countries which is a result of misconceptions associated with COVID-19 pandemic. As many anti-vaccination groups became very active particularly after application of quarantine, myths related to conspiracy theory became prevalent during the early pandemic days [3]. Public view about vaccine has been influenced by these misconceptions which resulted in high level of vaccine hesitancy, particularly after reporting of few rare side effects that were linked to the vaccine. Thus, vaccine availability did not guarantee acceptance of the vaccine by the general population and even by some of health staff.

A systematic review showed the effect of public acceptance of a vaccine on vaccine coverage rate [4].

Many determinants were found responsible for low vaccine acceptance such as perceived severity of infection, education, ethnicity, and cultural background [5]. Complex factors could be involved in explaining of vaccine hesitancy related to human behavior such as “theory of planned behavior” [6]. A quantitative and qualitative studies are needed to explain the reasons behind hesitancy towards COVID-19 vaccine since it could jeopardize the effort of the pandemic control. We aimed to determine the acceptance of COVID-19 vaccine among family medicine residents as an important portion of health staff who expected to have a high level of vaccine acceptance. Demographic and clinical determinants of the acceptance level were also evaluated.

Methods

This is a cross sectional study based on a web-based survey distributing to family medicine board residents of Saudi Arabia. The questionnaire is based on previous surveys, one of them done in Saudi Arabia and assessed by the public health experts working at the College of Public Health at Saudi Electronic University [7]. The study targeted all current family medicine board residents of Saudi Arabia and the survey is a web designed survey delivered to participants electronically by emails, virtual groups including WhatsApp and Telegram. Regarding sample size, as it is a web-based survey, we calculated the statistical power of 215 participants using Gpower software. At the level of 95% confidence with five degrees of freedom to detect a medium effect size, 215 participants gave a statistical power of 0.94 which was adequate for this study.

The questionnaire is self-administered and consists of two sections of questions, section A about demographics and clinical related factors of the residents, and section B contains questions related to vaccine acceptance and preference. Reminders were sent to the healthcare workers to motivate them to participate. Data were entered and analyzed by Statistical Package of Social Science SPSS, version

26. The descriptive statistics such as frequencies, percentages were calculated to summarize nominal and ordinal data. Chi-squared test was applied to evaluate the association between the determinants and the outcome variables. Any P-value < 0.05 was considered as an indication for a statistically significant association or difference.

The study protocol was submitted to local ethical review committee of Qurayat region for ethical approval. Data were collected after the ethical clearance and approval from Directorate of Health Affairs in the Aljouf area. There was no funding and conflict of interests in this study.

Results

Out of 215 family medicine residents responded to the questionnaire, 60% were males and 40% were females. More than a half of the respondents (52.1%) aged 28-30 years old, while only 18.5% were older than 30 years old. The majority of the residents (54%) were married and 65.6% had no children. Regarding residency level, a slightly higher percentage (34.9%) were in R3 in comparison to 29.3% and 24.2% in level R4 and R2. The residents were living in different regions of Saudi Arabia but mainly in Riyadh, Makkah, Aljouf and Eastern regions in which 72.5% were living (table 1). Distribution of factors related to COVID-19 among the respondents was demonstrates in table 2. About 10% of the residents had a chronic disease and 18.1% had confirmed COVID-19. More than quarters of the residents (78.1%) had confirmed COVID-19 patients in their immediate social network. General perceived knowledge on COVID-19 was rated good in 58.1% while only 2.8% rated themselves to have a poor level of knowledge. Perceived knowledge on COVID-19 vaccine side effects was rated poor or very poor by about 15% of the residents. The majority of the residents (88.4%) agreed or strongly agreed to the statement “The COVID-19 vaccine might have short-term side effects, like fever, headache or soreness in the arm”, while about 10% were unsure.

Table 3 presents factors related to acceptance of COVID-19 vaccine among the respondents. About 70% of the residents were probably or definitely willing to receive COVID-19 vaccine if it was free or

Table (1): Demographic characteristics of the respondents

Characteristics	Frequency	Percent (%)
Gender		
Male	129	60.0
Female	86	40.0
Age		
25-27	63	29.3
28-30	112	52.1
31-33	36	16.7
34-36	2	0.9
>36	2	0.9
Marital status		
Single	97	45.1
Married	116	54.0
Divorced	2	0.9
Number of children		
No children	141	65.6
1	45	20.9
2	25	11.6
3 or more	4	1.9
Residence level		
R1	25	11.6
R2	52	24.2
R3	75	34.9
R4	63	29.3
Region		
Northern border	6	2.8
Aljouf region	28	13.0
Almadinah	16	7.4
Almunawarah	5	2.3
Alqassim	4	1.9
Assir	25	11.6
Eastern	21	9.8
Hail	7	3.3
Makkah	49	22.8
Riyadh	54	25.1

covered by health insurance, while 13.5% and 16.7% were unwilling or unsure about that, respectively.

Reasons of not-willing to receive the vaccine mainly included worries of vaccine safety followed by worries of vaccine efficacy, lack of information and presence of vaccine contra-indications. Regarding travelling restrictions, 22.3% and 18.1% disagreed or were not sure about taking vaccine for travelling reasons only. Although all the residents were vaccinated, about a quarter of the residents were not willing to take vaccine if it was not free.

Table (2): Distribution of factors related to COVID-19 among the respondents

Factors	Frequency	Percent (%)
Do you have a chronic illness?		
Yes	21	9.8
No	194	90.2
Have you been sick with COVID-19?		
Yes, confirmed	39	18.1
Yes, but not yet confirmed	5	2.3
Don't know	171	79.5
Do you know in your immediate social network anyone sick with COVID-19?		
Yes, confirmed	168	78.1
Yes, but not yet confirmed	4	1.9
Don't know	43	20.0
How would you rate your knowledge level on COVID-19?		
Very poor	0	0.0
Poor	6	2.8
Average	73	34.0
Good	125	58.1
Very good	11	5.1
How would you rate your knowledge level on COVID-19 vaccine side effects?		
Very poor	5	2.3
Poor	27	12.6
Average	115	53.5
Good	57	26.5
Very good	11	5.1
The COVID-19 vaccine might have short-term side effects, like fever, headache or soreness in the arm.		
Strongly disagree	0	0.0
Disagree	3	1.4
Not sure	22	10.2
Agree	112	52.1
Strongly agree	78	36.3

About a quarter of the residents were willing to pay 200-1000 SAR and 7.4% were willing to pay more than 1000 SAR to get the COVID-19 vaccine. Factors related to preference and trust on COVID-19 vaccine among the respondents are shown in table 4. The majority (62.8%) preferred Pfizer-BioNTch vaccine, if

they had a chance to choose, followed by Oxford Uni-AstraZeneca vaccine

and Moderna vaccine (US) which were preferred by 16.7% and 11.2% of the residents. About 27% agreed to the statement of "It would be hard to find a provider or clinic that could give you the vaccine, if you decided to get the COVID-19 vaccine", while 31.6% were not sure about that. Regarding believes about vaccine safety, 59.1% thought that the COVID-19 vaccine has met the full qualifications of safety before published for public. Moreover, 84.2% trusted the vaccine, if the vaccine has Saudi FDA approval, and 80.5% will recommend the vaccine for their patient/family.

Table 5 and 6 highlight the association between vaccine acceptance and both demographic and clinical characteristics of the respondents. Knowing patients with COVID-19 in their immediate social network and perceived knowledge about COVID-19 vaccine side effects were significantly associated with acceptance of COVID-19 vaccine. A significantly higher percentage (68.5%) of those who knew patients with confirmed COVID-19 in their immediate social network were willing to accept the vaccine in comparison to that in residents who knew patients but were not confirmed. Similarly, a higher percentage (78%) of those who had good level of knowledge about COVID-19 vaccine side effects were willing to take vaccine in comparison to 53.1% of those who had poor knowledge. Other factors including, age, gender, marital status, number of children, residency level, presence of a chronic disease, previously effected with COVID-19, or knowledge about COVID-19 were not significantly associated with acceptance of the vaccine.

Discussion

Quantitative and qualitative studies are needed to explain the magnitude of vaccine hesitancy and reasons behind acceptance towards COVID-19 vaccine, since it could jeopardize the effort of the pandemic control. Vaccine hesitancy is defined as "delay in acceptance or refusal of vaccine taking in spite of availability of vaccination services" [8]. Low

vaccine acceptance was associated with high rate of vaccine hesitancy. Thus, we aimed, through a quantitative approach, to determine the acceptance of COVID-19 vaccine among family medicine residents. As vaccination against COVID-19 was highly indicated by health authority for health staff in Saudi Arabia, there was no reported refusal of vaccination. Thus, assessment of vaccine acceptance would be an indicator of the beliefs and misconceptions about the vaccine among an important segment of health staff, namely family medicine residents. A suboptimal acceptance of the residents towards the vaccine may make them unwilling to recommend the vaccine for their patients, friends or relatives. This may indirectly lead to increased vaccine hesitancy among the general population.

We found about 69.8% of the residents were probably or definitely willing to receive COVID-19 vaccine if it was free or covered by health insurance, while 13.5% and 16.7% were unwilling or unsure about that, respectively. For a highly educated and an important segment of health staff, this level of vaccine acceptance is considered inadequate. Globally, the acceptance of COVID-19 vaccine among health staff varied from 27.7% in Republic of the Congo to 78.1% in Israel [9]. A higher level of acceptance among general population (90%) was reported in some Asian countries namely China [10], Indonesia [11], and Malaysia [12]. This highlighted that being a health worker is not a main determinant of acceptance towards COVID-19 vaccine. It seems that other factors, such as cultural factors, play a more important role than health literacy. Some authors attributed this high level of vaccine acceptance to public trust on governments [13]. Moreover, the acceptance rate of the vaccine is not stable and varied with time, as it dropped from 85.8% in April 2020 to 75.8% after one year among Australian parents [14, 15]. A decline in the acceptance rate was noticed in Europe [16].

The reduction in vaccine acceptance rate could be attributed to dissemination of misconceptions and reported few side effects that might be related to the vaccine. In another hand, we found about a quarter of the residents were willing to pay 200-1000 SAR and 7.4% were willing to pay more than 1000 SAR to get the COVID-19 vaccine. A high awareness among a minority of health staff made them willing to pay out

of pocket. In contrast, a very low level of vaccine acceptance was reported among health workers on Democratic Republic of the Congo where only 27.7% were willing to take the vaccine [17].

Vaccine acceptance in Latin America was relatively similar to that reported in this study with a level of 70% acceptance reported in Brazil and Ecuador [13, 18]. In Europe, the acceptance level differed according to the geographical location. In the southern countries, lower acceptance levels were reported as 53.7% and 58.9% from Italy and France, respectively. Furthermore, a low vaccine acceptance was reported among health staff in Malta (44.2%) [13, 19]. However, in the Northern countries, a higher level of acceptance rate (80%) was reported in Denmark [13]. The Middle East is where one of the lowest acceptance rates was reported, and much lower than that reported in this study. Low rates of vaccine acceptance in Middle east countries were linked to wide spread of belief on conspiracy theory [20]. However, a higher rate of vaccine acceptance (75%) was reported in Israel [21]. The acceptance rate was 23.6% in Kuwait and 28.4% in Jordon [22], which is much lower than 64.7% that was reported among general population in Saudi Arabia in a web-based national study [7]. In comparison to our findings of 69.8% acceptance rate among family medicine residents, it was slightly higher than that found in general Saudi population. Another Saudi study, conducted by Barry et al. [23], found similar findings to our findings as 70% of health workers were willing to accept the vaccine. This suggested again a non-significant role of health literacy in the acceptance of COVID-19 vaccine. Differently, Alfageeh et al. found a lower acceptance rate of 48% among 2319 participants of general population through a web-based survey [24]. Another study, conducted by Magadmi and Kamel, found the same acceptance rate (48%) among 3,101 participants of general population [25].

The present study found that main reasons of not-willing to receive the vaccine were worries of vaccine safety followed by worries of vaccine efficacy. Similarly, the low confidence on COVID-19 vaccine was related to safety and effectiveness causes as suggested by a systematic review conducted by Lin et al. [16]. About 41% of our participants had concerns

regarding safety of the vaccine and about 20% said they will not recommend the vaccine for family or patients. This could lead to a substantial indirect effect on vaccine acceptance on the general population, since they trust the opinion of their doctors or family members who are health workers.

Moreover, we found that knowing patients with COVID-19 in their immediate social network was significantly associated with acceptance of COVID-19 vaccine. A significantly higher percentage (68.5%) of those who knew patients with confirmed COVID-19 in their immediate social network were willing to accept the vaccine in comparison to that in residents who knew patients but were not confirmed. Thus, a relative experience with COVID-19 made the residents more willing towards the vaccine. In another hand, perceived knowledge about COVID-19 vaccine side effects was associated with willingness to accept the vaccine, which means that a good knowledge about side effects is associated with positive attitudes towards vaccine. It indicates the fact that side effects are rare and were not confirmed to be related to the COVID-19 vaccine. This study is limited by a quantitative approach which lack to in-depth exploration of reasons behind inadequate vaccine acceptance. Combination of both quantitative and qualitative approaches would be more efficient to answer the questions about acceptance of COVID-19 vaccine.

Conclusions

Although all of them were vaccinated, about one third of family medicine residents were unwilling to accept vaccine of COVID-19 and a substantial number of the residents were unwilling to recommend the vaccine for family members or patients. Knowing patients with COVID-19 in their immediate social network and perceived knowledge about COVID-19 vaccine side effects were significantly associated with acceptance of COVID-19 vaccine.

Conflict of interests

The authors declared no conflict of interests

References

1. Acter, T., et al., Evolution of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as coronavirus disease 2019 (COVID-19) pandemic: A global health emergency. *Science of the Total Environment*, 2020. 730: p. 138996.
2. worldometers. COVID-19 CORONAVIRUS PANDEMIC. 2021 [cited 2021 2-7-2021]; Available from: COVID-19 CORONAVIRUS PANDEMIC.
3. Germani, F. and N. Biller-Andorno, The anti-vaccination infodemic on social media: A behavioral analysis. *PloS one*, 2021. 16(3): p. e0247642.
4. Larson, H.J., et al., Measuring trust in vaccination: A systematic review. *Human vaccines & immunotherapeutics*, 2018. 14(7): p. 1599-1609.
5. Nguyen, T., et al., Acceptance of a pandemic influenza vaccine: a systematic review of surveys of the general public. *Infection and drug resistance*, 2011. 4: p. 197.
6. Xiao, X. and R.M. Wong, Vaccine hesitancy and perceived behavioral control: a meta-analysis. *Vaccine*, 2020. 38(33): p. 5131-5138.
7. Al-Mohaithef, M. and B.K. Padhi, Determinants of COVID-19 vaccine acceptance in Saudi Arabia: a web-based national survey. *Journal of multidisciplinary healthcare*, 2020. 13: p. 1657.
8. MacDonald, N.E., SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: definition, scope and determinants. *Vaccine*, 2015. 33(34): p. 4161-4.
9. Sallam, M., COVID-19 vaccine hesitancy worldwide: a concise systematic review of vaccine acceptance rates. *Vaccines*, 2021. 9(2): p. 160.
10. Wang, J., et al., Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China. *Vaccines*, 2020. 8(3): p. 482.
11. Harapan, H., et al., Acceptance of a COVID-19 vaccine in Southeast Asia: a cross-sectional study in Indonesia. *Frontiers in public health*, 2020. 8.
12. Wong, L.P., et al., The use of the health belief model to assess predictors of intent to receive the COVID-19 vaccine and willingness to pay. *Human vaccines & immunotherapeutics*, 2020. 16(9): p. 2204-2214.

13. Lazarus, J.V., et al., A global survey of potential acceptance of a COVID-19 vaccine. *Nature medicine*, 2021. 27(2): p. 225-228.
14. Rhodes, A., M. Hoq, and M. Measey, A., Danchin M. Intention to vaccinate against COVID-19 in Australia. *Lancet Infect Dis*, 2020: p. 30724-6.
15. Dodd, R., et al., Sydney Health Literacy Lab COVID-19 group (2020). Willingness to vaccinate against COVID-19 in Australia. *Lancet Infectious Diseases*. [https://doi.org/10.1016/S1473-3099\(20\):p.30559-4](https://doi.org/10.1016/S1473-3099(20):p.30559-4).
16. Lin, C., P. Tu, and L.M. Beitsch, Confidence and receptivity for COVID-19 vaccines: a rapid systematic review. *Vaccines*, 2021. 9(1): p. 16.
17. Nzaji, M.K., et al., Acceptability of vaccination against COVID-19 among healthcare workers in the Democratic Republic of the Congo. *Pragmatic and observational research*, 2020. 11: p. 103.
18. Sarasty, O., et al., The demand for a COVID-19 vaccine in Ecuador. *Vaccine*, 2020. 38(51): p. 8090-8098.
19. La Vecchia, C., et al., Attitudes towards influenza vaccine and a potential COVID-19 vaccine in Italy and differences across occupational groups, September 2020. *La Medicina del lavoro*, 2020. 111(6): p. 445.
20. Hornsey, M.J., E.A. Harris, and K.S. Fielding, The psychological roots of anti-vaccination attitudes: A 24-nation investigation. *Health psychology*, 2018. 37(4): p. 307.
21. Dror, A.A., et al., Vaccine hesitancy: the next challenge in the fight against COVID-19. *European journal of epidemiology*, 2020. 35(8): p. 775-779.
22. Sallam, M., et al., High rates of COVID-19 vaccine hesitancy and its association with conspiracy beliefs: A study in Jordan and Kuwait among other Arab countries. *Vaccines*, 2021. 9(1): p. 42.
23. Barry, M., et al., COVID-19 vaccine confidence and hesitancy among healthcare workers: a cross-sectional survey from a MERS-CoV experienced nation. *Medrxiv*, 2020.
24. Alfageeh, E.I., et al., Acceptability of a COVID-19 vaccine among the Saudi population. *Vaccines*, 2021. 9(3): p. 226.
25. Magadmi, R.M. and F.O. Kamel, Beliefs and barriers associated with COVID-19 vaccination among the general population in Saudi Arabia. 2020.
27. Vu, L.H., et al., Knowledge and attitudes about vitamin D and impact on sun protection practices among urban office workers in Brisbane, Australia. *Cancer Epidemiology and Prevention Biomarkers*, 2010. 19(7): p. 1784-1789.
28. O'Connor, C., et al., Knowledge, attitudes and perceptions towards vitamin D in a UK adult population: A cross-sectional study. *International journal of environmental research and public health*, 2018. 15(11): p. 2387.

Table (3): Distribution of factors related to acceptance of COVID-19 vaccine among the respondents

Factors	Frequency	Percent (%)
How willing would you be to get the COVID-19 vaccine if it was free or covered by health insurance?		
Definitely not willing	4	1.9
Probably not willing	25	11.6
Not sure	36	16.7
Probably willing	27	12.6
Definitely willing	123	57.2
If you are "not Willing" to get the COVID-19 vaccine, what will be the reason of that?		
You are not sure about vaccine safety	14	6.5
You are not sure about vaccine efficacy	12	5.6
You are afraid of Vaccine side effects	12	5.6
You have allergy of vaccine or its contents	1	0.5
You have contraindication for vaccine	2	0.9
Due to lack of vaccine information	12	5.6
Others	6	2.8
What if there is an international travelling restriction without COVID-19 Vaccine Card do you will take the vaccine for travelling issue only?		
Strongly disagree	13	6.0
Disagree	35	16.3
Not sure	39	18.1
Agree	63	29.3
Strongly agree	65	30.2
If you decided to get the COVID-19 vaccine what is the most you would pay out of pocket to get the COVID-19 vaccine (full doses)? This would be from your own money, not paid for by health insurance or government?		
If it's not free I will not pay	54	25.1
50-100 S.R	45	20.9
101-200 S.R	46	21.4
201-400 S.R	29	13.5
401-600 S.R	16	7.4
601-1000 S.R	9	4.2
1001 or more S.R	16	7.4

Table (4): Distribution of factors related to preference and trust on COVID-19 vaccine among the respondents

Factors	Frequency	Percent (%)
If you decided to get the COVID-19 vaccine and you have the chance to choose which type of the following, will you prefer?		
Moderna vaccine (US)	24	11.2
Pfizer-BioNTch vaccine (US - Germany)	135	62.8
Oxford Uni-AstraZeneca vaccine (UK)	36	16.7
Gamaleya-Spuntic V vaccine (Russia)	6	2.8
China's Covid-19 Vaccine (China)	9	4.2
Johnson & Johnson vaccine (US)	5	2.3
If you decided to get the COVID-19 vaccine, it would be hard to find a provider or clinic that could give you the vaccine (including governmental & private clinics).		
Strongly disagree	16	7.4
Disagree	43	20.0
Not sure	68	31.6
Agree	48	22.3
Strongly agree	40	18.6
Do you think the COVID-19 vaccine has met the full qualification of safety before published for public?		
Yes	127	59.1
No	88	40.9
If the vaccine has Saudi FDA approval, do you trust in Saudi FDA?		
Yes	181	84.2
No	34	15.8
Do you will recommend COVID_19 vaccine for your patient/family?		
Yes	173	80.5
No	42	19.5

Table (5): Association between vaccine acceptance and respondents' characteristics

Characteristics	Acceptance of COVID-19 vaccine		Chi-square	P value
	Not willing or unsure	willing to accept		
Gender				
Male	35	94	1.5	0.225
	27.1%	72.9%		
Female	30	56		
	34.9%	65.1%		
Age				
30 or less	49	126	2.2	0.136
	28.0%	72.0%		
>30	16	24		
	40.0%	60.0%		
Marital status				
Single	29	68	0.38	0.829
	29.9%	70.1%		
Married	35	81		
	30.2%	69.8%		
Divorced	1	1		
	50.0%	50.0%		
Number of children				
<3	63	148	0.76	0.385
	29.9%	70.1%		
3 or more	2	2		
	50.0%	50.0%		
Residence level				
R1	8	17	6.9	0.078
	32.0%	68.0%		
R2	9	43		
	17.3%	82.7%		
R3	23	52		
	30.7%	69.3%		
R4	25	38		
	39.7%	60.3%		

Table (6): Association between vaccine acceptance and factors related to COVID-19

Factors	Acceptance of COVID-19 vaccine		Chi-square	P value
	Not willing or unsure	willing to accept		
Do you have a chronic illness?				
Yes	5	16	0.45	0.500
	23.8%	76.2%		
No	60	134		
	30.9%	69.1%		
Have you been sick with COVID-19?				
Yes, confirmed	13	26	2.3	0.309
	33.3%	66.7%		
Yes, but not yet confirmed	0	5		
	0.0%	100.0%		
Don't know	52	119		
	30.4%	69.6%		
Do you know in your immediate social network anyone sick with COVID-19?				
Yes, confirmed	53	115	12.1	0.002*
	31.5%	68.5%		
Yes, but not yet confirmed	4	0		
	100.0%	0.0%		
Don't know	8	35		
	18.6%	81.4%		
How would you rate your knowledge level on COVID-19 vaccine side effects?				
Poor or very poor	15	17	6.4	0.042*
	46.9%	53.1%		
Average	35	80		
	30.4%	69.6%		
Good or very good	15	53		
	22.1%	77.9%		
How would you rate your knowledge level on COVID-19?				
Poor	3	3	3.0	0.220
	50.0%	50.0%		
Average	26	47		
	35.6%	64.4%		
Good	36	100		
	26.5%	73.5%		