Medical Science

25(108), February, 2021

Public knowledge and attitudes toward COVID-19 Vaccination: A cross-sectional study

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To Cite:
Ahmed NJ, Alkhawaja FZ, Alrawili AS, Almalki ZS. Public knowledge and attitudes toward COVID-19 Vaccination: A cross-sectional study. *Medical Science,* 2021, 25(108), 279-284

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Peer-Review History
Received: 21 December 2020
Reviewed & Revised: 22/December/2020 to 29/January/2021
Accepted: 29 January 2021
Published: February 2021

Peer-review
External peer-review was done through double-blind method.

ABSTRACT

Aim: The objective of this study was to explore the public knowledge and attitudes towards COVID-19 Vaccination in Saudi Arabia. *Methodology*: This was an online, questionnaire-based cross-sectional study included a questionnaire that was prepared using an online questionnaire. The questionnaire was disseminated by social media platforms to be filled by the public in January 2021. *Results*: Most of the respondents were females (78.00%) and the age of the majority of them was less than 25 years old. Most of the respondents were aware of COVID-19 symptoms (94%), Aware of COVID-19 severity (91%), Aware of COVID-19 risk and negative outcomes (70%) and aware of vaccination necessity (68%). Only 37 % of them agreed that COVID-19 vaccination is effective and only 32% of them agreed that the vaccine is safe. *Conclusion*: The study showed that there was a good acceptability of the public of COVID-19 vaccination but the respondents are worried about the efficacy and safety of COVID-19 vaccines. Efforts to address these concerns and to improve vaccine usage are required. Additionally, targeted educational interventions are needed to increase COVID-19 vaccine uptake of the future.

Keywords: Attitudes, COVID-19, knowledge, SARS-CoV-2, vaccine.

1. INTRODUCTION

Wuhan city in China had witnessed numerous cases of pneumonia like conditions by the end of 2019, which later on found to be caused by a virus called 2019-novel coronavirus (2019-nCoV) (Zhou, 2020; She et al., 2020; Zhu et al., 2020; Song et al., 2020; Lu et al., 2020; WHO, 2020[a]). Later, this novel coronavirus was termed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on February 11, 2020 by the international virus classification commission and the disease caused by this virus was called Coronavirus Disease 2019 (COVID-19) by World Health Organization (WHO) (Li, 2020; Li et al., 2020). On January 30, 2020 WHO had declared COVID-19 as a worldwide health emergency and on 11 March 2020 the disease was characterized as apandemic (WHO, 2020[b]; Ali et al., 2020; BBC, 2020; NPR, 2020; Cucinotta and Vanelli, 2020).

COVID-19 can lead to hospitalization and subsequently ICU admission. People with Diabetes, hypertension, and thyroid disease were at higher risk of

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severe disease requiring hospitalization and subsequently ICU admission compared to other people (Alqahtani et al., 2020). There is no cure yet for Covid-19. Only one treatment, a drug called remdesivir, has been approved by the FDA for the disease, and research suggests it may provide only a modest benefit to patients (Nytimes, 2020). Other medications can be used such as hydroxychloroquine that also may provide only a modest benefit to patients. Previous study showed that hydroxychloroquine had only a modest impact on hospital length stay of patients who were managed with it in the intensive care unit compared with patients treated with other antibacterial or antiviral or agents according to Ministry of Health (MOH) protocols (Almazrou et al., 2020; Taksande et al., 2020; Bonyan et al., 2020; Mirghani et al., 2021).

R0 was taken as a significant goal by organizations around the world, and thousands of individuals and policy makers actively called for the decrease to approach zero (Viceconte and Petrosillo, 2020; Hellewell et al., 2020). One of the most effective strategies to reach this goal is vaccination that can limit the disease spreading in the human population (Lv et al., 2020). Annually, vaccines save millions of lives. These vaccines work by training and preparing the immune system to recognize and to fight off the viruses and other microorganisms they target. After that, if the body is exposed to those disease-causing germs in the future, the body is immediately ready to destroy these germs and prevent illness (WHO, 2020[c]). Vaccines development can be the most suitable approach to prevent the occurrence of COVID-19 and hence will play an essential role in preventing and controlling the spread of the virus and also decreasing mortality (Rawat et al., 2020).

WHO reported that there are presently more than 50 COVID-19 vaccine candidates in trials (WHO, 2020[c]). WHO is working to speed up the pandemic response in collaboration with other global health organizations and scientists. When an effective and safe vaccine is found, the equitable access and distribution of vaccine will be facilitated in order to protect people in all countries (WHO, 2020[c]). People most at risk will be prioritized. It should be noted that individuals must continue other essential public health actions that aims to reduce transmission and decrease mortality (WHO, 2020[c]).

The COVID-19 vaccine is given as an injection into upper arm (NHS, 2020). It's given in 2 doses. After 3 to 12 weeks of having the 1st dose, the 2nd dose is given (NHS, 2020). So far, thousands of people have been given a COVID-19 vaccine and reports of severe side effects, including allergic reactions, have been very rare (NHS, 2020). Moreover, no long term complications have been reported (NHS, 2020). Strong international coordination and cooperation between vaccine developers, policymakers, funders, regulators, public health bodies and governments will be needed to guarantee that promising late-stage vaccine candidates can be manufactured in adequate quantities and equitably supplied to all affected areas, predominantly low resource regions (Le et al., 2020).

COVID-19 transmissions can be reduced by increasing vaccination in the general population to decrease the mortality and morbidity in the at-risk population. In addition, prevention of COVID-19 lowers treatment costs while rising health-related quality of life (Sales et al., 2021). In order to stop the spread of COVID-19, people must be aware of the importance of the vaccine and raise awareness within themselves. All relevant data at the time of this survey indicated that only 178,000 received vaccines across Saudi Arabia (El-Elimat et al., 2020). Understanding and exploring the different sociodemographic and medical factors that may hinder the voluntary vaccination against COVID-19 is essential in order to formulate an effective national plan aimed at improving the rate of vaccination against epidemic and pandemic infections such as COVID-19 (Sales et al., 2021). Therefore, the objective of this study was to explore the public knowledge and attitudes towards COVID-19 Vaccination in Saudi Arabia.

2. METHODS

This was an online, questionnaire-based cross-sectional study that was conducted to explore the public knowledge and attitudes toward COVID-19 Vaccine in Saudi Arabia. The questionnaire was prepared using the questionnaire of previous study conducted by Sales et al. (Sales et al., 2021) after that it was converted to online form using a Google® forms and was disseminated by social media platforms to be filled by the public during January 2021.

The survey included 2 parts, the first part about the personal data of the respondents and the second part included questions about the public knowledge, attitudes, and practices. The study included small sample size that will assist in planning for more large-scale studies. The data was collected and analyzed descriptively using excel sheet and represented as a percentages and as a numbers. The study was approved by IRB ethical committee of Prince Sattam Bin Abdulaziz University.

3. RESULTS AND DISCUSSION

Most of the respondents were females (78.00%) and the age of the majority of them was less than 25 years old. Among the 100 respondents, 62 % said that they have health insurance and only 30% of them said that their financial situation was comfortable as shown in table 1.

Table 1 Personal data

Variable	Category	Number	Percentage
Gender	Male	22	22.00
	Female	78	78.00
Age groups	<25 years	82	82.00
	25–39 years	17	17.00
	More than 39	1	1.00
Education level	High school	60	60.00
	University degree	36	36.00
	Postgraduate	4	4.00
Employment	Yes	14	14.00
	No	86	86.00
Health Insurance	None	38	38.00
	Governmental	42	42.00
	Private	20	20.00
Financial situation	Comfortable	30	30.00
	Manageable	57	57.00
	Difficult	13	13.00

Table 2 shows the knowledge of the public about COVID-19 vaccines and figure 1 shows the awareness of vaccination necessity. The present study found that most of the respondents were aware of COVID-19 symptoms (94%), Aware of COVID-19 severity (91%), Aware of COVID-19 risk and negative outcomes (70%) and aware of vaccination necessity (68%).

Table 2 Knowledge of the public about COVID-19 vaccines.

Variable	Category	Number	Percentage
Aware of COVID-19 symptoms	Yes	94	94.00
	No	0	0.00
	Don't know	6	6.00
Aware of COVID-19 severity	Yes	91	91.00
	No	0	0.00
	Don't know	9	9.00
Aware of COVID-19 risk and negative outcomes	Yes	70	70.00
	No	18	18.00
	Don't know	12	12.00

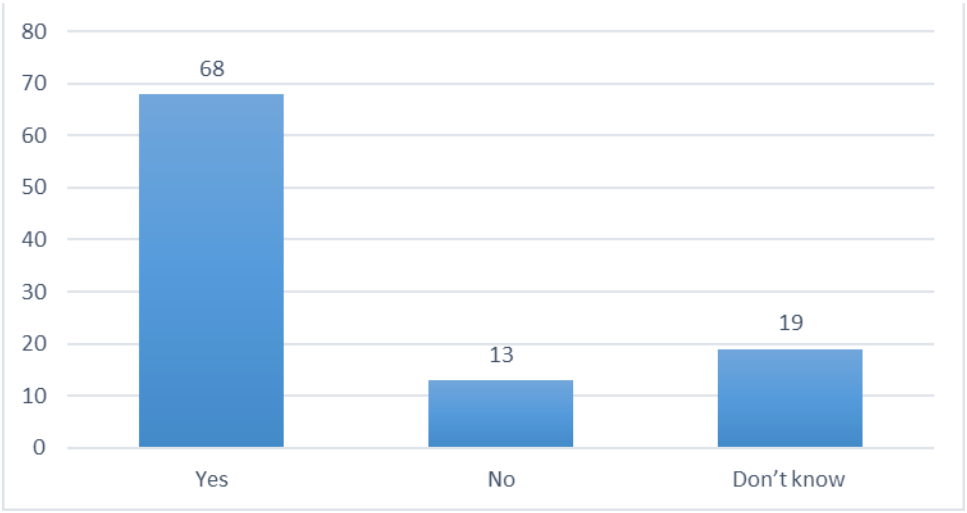

Figure 1 Awareness of vaccination necessity

Table 3 shows the attitudes of the public toward COVID-19 vaccines. The study found that the respondents are worried about the efficacy and safety of COVID-19 vaccines. Only 37 % of them agreed that COVID-19 vaccination is effective and only 32% of them agreed that the vaccine is safe. Only 28% of the respondents said that they have a fear of needles and only 17 % said that the vaccine is expensive.

Table 3 Attitudes of the public toward COVID-19 vaccines.

Variable	Category	Number	Percentage
COVID-19 vaccination is effective	Yes	37	37.00
	No	12	12.00
	Don't know	51	51.00
The vaccine should be taken at a specific time	Yes	21	21.00
	No	42	42.00
	Don't know	37	37.00
The vaccine is safe	Yes	32	32.00
	No	20	20.00
	Don't know	48	48.00
Has a fear of needles	Yes	28	28.00
	No	72	72.00
The vaccine is expensive	Yes	17	17.00
	No	83	83.00

The acceptability of the public of COVID-19 vaccination was good; most of the participants know that the vaccination is necessary. In contrast to that, El-Elimat et al., (2020) reported that the public acceptability of COVID-19 vaccines was fairly low (37.4%) in Jordan and that systematic interventions are needed in order to improve vaccines' acceptance and reduce the levels of vaccines' hesitancy (El-Elimat et al., 2020). Lazarus et al. (2020) reported that there were differences in vaccines' acceptance rates ranged from almost 90% in China to less than 55% in Russia (Lazarus et al., 2020). Al-Mohaithef and Padhi (2020) stated that regarding COVID-19 Vaccine Acceptance in Saudi Arabia, 642 respondents among the 992 respondents showed interest to accept the COVID-19 vaccine if it is available (Al-Mohaithef and Padhi, 2020). Reiter et al., (2020) reported among adults in the United States about 69% of participants were willing to get a COVID-19 vaccine (Reiter et al., 2020). This is similar to data recently made available online, where 59%-75% of US adults indicated a willingness to get vaccinated (JCH, 2020; Kelly et al., 2020).

Although the acceptability of the public of COVID-19 vaccination was good in the present study, the respondents are worried about the efficacy and safety of COVID-19 vaccines. To be effective, the vaccines must be accepted and used by the majority of the population (Pogue et al., 2020). A previous study about the attitudes regarding potential COVID-19 vaccination in the United States stated that approximately 68% of all respondents were supportive of being vaccinated for COVID-19, but side effects, efficacy and length of testing remained concerns (Pogue et al., 2020).

According to the KFF COVID-19 Vaccine Monitor survey in 2020, 71 percent of Americans in December 2020 said they would definitely or probably get COVID-19 vaccine if it was determined to be safe by scientists and also if it is available for free to everyone who wanted it (KFF, 2020). According to the KFF survey in 2020, the most common concerns among "vaccine hesitant" individuals included possible side effects (59%), lack of trust in the government to ensure the vaccines' safety and effectiveness (55%) and concerns that the vaccine is too new (53%)(KFF, 2020). Fisher et al. (2020) stated that among U.S. Adults, 57.6% of participants intended to be vaccinated, 31.6% were not sure, and 10.8% did not intend to be vaccinated (Fisher et al., 2020). The reasons for vaccine hesitancy included vaccine-specific concerns, a lack of trust, a need for more information, and antivaccine attitudes or beliefs (Fisher et al., 2020). Largent et al. reported that public health efforts aimed at making COVID-19 vaccines accessible and improving uptake should continue and mandates should be used only if COVID-19 continues to be insufficiently contained and voluntary vaccine uptake is inadequate (Largent et al., 2020).

4. CONCLUSION

The study showed that there was a good acceptability of the public of COVID-19 vaccination but the respondents are worried about the efficacy and safety of COVID-19 vaccines. Targeted educational interventions are needed to increase COVID-19 vaccine uptake

of the future. Additionally, efforts to address these concerns and to improve vaccine usage efforts to address these concerns and to improve vaccine usage are required. If the voluntary vaccine uptake is inadequate, mandates should be used.

Acknowledgment

This Publication was supported by the Deanship of Scientific Research at Prince Sattam bin Abdulaziz University.

Authors' contributions

This work was carried out in collaboration between both authors. Nehad J. Ahmed and Ziyad S. Almalki designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Faisal Z. Alkhawaja and Abdulrahman S. Alrawili managed the analyses of the study. Nehad J. Ahmed and Ziyad S. Almalki managed the literature searches. Both authors read and approved the final manuscript.

Funding

This study has not received any external funding.

Conflict of interest

The authors declare that there are no conflicts of interests.

Informed consent

Written informed consent was obtained from all individual participants included in the study.

Ethical approval

The study was approved by IRB ethical committee of Prince Sattam Bin Abdulaziz University.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. Ali MG, Ahmad MO, Husain SN. Spread of Corona Virus Disease (COVID–19) from an Outbreak to Pandemic in the Year 2020. AJRID 2020; 37-51.
2. Almazrou SH, Almalki ZS, Alanazi AS, Alqahtani AM, AlGhamd SM. Comparing the impact of Hydroxychloroquine based regimens and standard treatment on COVID-19 patient outcomes: A retrospective cohort study. Saudi Pharm J 2020; 28(12):1877-1882.
3. Al-Mohaithef M, Padhi BK. Determinants of COVID-19 Vaccine Acceptance in Saudi Arabia: A Web-Based National Survey. J Multidiscip Healthc 2020;13:1657-1663
4. Alqahtani AM, AlMalki ZS, Alalweet RM, Almazrou SH, Alanazi AS, Alanazi MA. Assessing the Severity of Illness in Patients with Coronavirus Disease in Saudi Arabia: A Retrospective Descriptive Cross-Sectional Study. Front Public Health 2020; 8:775.
5. BBC. Coronavirus confirmed as pandemic by World Health Organization. Available at: https://www.bbc.com/news/world-51839944.
6. Bonyan FA, Shareef LG, Al-waily A, Abdulrazaq AA, Al-Rubayee WA. COVID-19 clinical characteristics and outcomes in 60 hospitalized Iraqi patients - Case series. Medical Science, 2020, 24(104), 2251-2258
7. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. Acta Bio Medica: Atenei Parmensis 2020; 91(1):157.
8. El-Elimat T, AbuAlSamen MM, Almomani BA, Al-Sawalha NA, Alali FQ. Acceptance and Attitudes toward COVID-19 Vaccines: A Cross-Sectional Study from Jordan. MedRxiv 2020.
9. 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): 964-973.
10. Hellewell J, Abbott S, Gimma A, Bosse NI, Jarvis CI, Russell TW, et al. Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. Lancet Glob Health 2020; 8(4):e488-e496.
11. JCH Impact. New Yorkers and COVID-19. Available at: https://jhcimpact.com/posts/f/new-yorkers-and-covid-19-week-7.
12. Kelly B, Bann C, Squiers L, Lynch M, Southwell B, McCormack L. Predicting willingness to vaccinate for

COVID-19 in the US. Available at: https://jhcimpact.com/posts/f/predicting-willingness-to-vaccinate-for-covid-19-in-the-us.
13. KFF. KFF COVID-19 Vaccine Monitor: December 2020. Available at: https://www.kff.org/coronavirus-covid-19/report/kff-covid-19-vaccine-monitor-december-2020/
14. Largent EA, Persad G, Sangenito S, Glickman A, Boyle C, Emanuel EJ. US Public Attitudes Toward COVID-19 Vaccine Mandates. *JAMA New Open* 2020; 3(12):e2033324.
15. Lazarus JV, Ratzan SC, Palayew A, Gostin LO, Larson HJ, Rabin K. A global survey of potential acceptance of a COVID-19 vaccine. Nat Med 2020; 1-4.
16. Le TT, Andreadakis Z, Kumar A, Roman RG, Tollefsen S, Saville M. The COVID-19 vaccine development landscape. Nat Rev Drug Discov 2020; 19(5):305-306.
17. Li D. Immune dysfunction leads to mortality and organ injury in patients with COVID-19 in China: insights from ERS-COVID-19 study. Signal Transduct Target Ther 2020; 5:1–3.
18. Li X, Geng M, Peng Y, Meng L, Lu S. Molecular immune pathogenesis and diagnosis of COVID-19. J Pharm Anal 2020; 10(2):102-108.
19. Lu H, Stratton CW, Tang YW. Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. J Med Virol 2020; 92(4):401-402.
20. Lv H, Wu NC, Mok C. COVID-19 vaccines: Knowing the unknown. Eur J Immunol 2020; 50(7):939–943.
21. Mirghani H, Alsaeed MMT, Alshehri WAH. The effects of Hydroxychloroquine on COVID-19 in Tabuk, Saudi Arabia. Medical Science, 2021, 25(107), 224-229
22. NHS. Coronavirus vaccine. Available at: https://www.nhs.uk/conditions/coronavirus-covid-19/coronavirus-vaccination/coronavirus-vaccine/.
23. NPR. Coronavirus: COVID-19 Is Now Officially A Pandemic, WHO Says. Available at: https://www.npr.org/sections/goatsandsoda/2020/03/11/814474930/coronavirus-covid-19-is-now-officially-a-pandemic-who-says.
24. Nytimes. Coronavirus Drug and Treatment Tracker. Available at: https://www.nytimes.com/interactive/2020/science/coronavirus-drugs-treatments.html.
25. Pogue K, Jensen JL, Stancil CK, Ferguson DG, Hughes SJ, Mello EJ, et al. Influences on Attitudes Regarding Potential COVID-19 Vaccination in the United States. Vaccines (Basel) 2020; 8(4):582.
26. Rawat K, Kumari P, Saha L. COVID-19 vaccine: A recent update in pipeline vaccines, their design and development strategies. Eur J Pharmacol 2021; 892: 173751.
27. Reiter PL, Pennell ML, Katz ML. Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated? Vaccine 2020; 38(42):6500-6507.
28. Sales IA, Syed W, Almutairi MF, Al Ruthia Y. Public Knowledge, Attitudes, and Practices toward Seasonal Influenza Vaccine in Saudi Arabia: A Cross-Sectional Study. International Journal of Environ Res Public Health 2021; 18(2):479.
29. She J, Jiang J, Ye L, Hu L, Bai C, Song Y. 2019 novel coronavirus of pneumonia in Wuhan, China: emerging attack and management strategies. Clin Transl Med 2020; 9(1):19.
30. Song F, Shi N, Shan F, Zhang Z, Shen J, Lu H, et al. Emerging 2019 Novel Coronavirus (2019-nCoV) Pneumonia. Radiology, 2020; 295(1):210-21.
31. Taksande A, Panwar RAS, Saqqaf SA, Rao R, Meshram R. Study of Knowledge, Attitude and Practice (KAP) towards COVID-19 Pandemic in Rural Area. Medical Science, 2020, 24(106), 4144-4157
32. Viceconte G, Petrosillo N. COVID-19 R0: Magic number or conundrum? Infect Dis Rep 2020; 12(1):8516.
33. WHO. Coronavirus. Available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf.
34. WHO. Covid-19 vaccines. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines.
35. WHO. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. Available at: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.
36. Zhou P. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 2020; 579:270–273.
37. Zhu H, Wei L, Niu P. The novel coronavirus outbreak in Wuhan, China. GHRP 2020; 5:6.