Section: Family Medicine

Original Research Article

KNOWLEDGE, ATTITUDE AND PERCEPTION OF PRIMARY CARE PHYSICIANS TOWARDS AVAILABLE COVID-19 VACCINATION IN SAUDI ARABIA

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ABSTRACT

Background: Primary care physicians (PCPs) play a vital role in educating the public and promoting vaccination uptake. Understanding their knowledge, attitudes, and perceptions regarding COVID-19 vaccines is essential for strengthening immunization strategies in Saudi Arabia. **Objectives:** This study aims to assess the knowledge, attitude, and perception of primary care physicians toward the available COVID-19 vaccines in Saudi Arabia. **Methods:** A cross-sectional survey was conducted among PCPs across multiple regions in Saudi Arabia. A validated, self-administered questionnaire was used to measure participants' knowledge of vaccine types and efficacy, their attitudes toward vaccine safety, and their perceptions of barriers to vaccination. Descriptive and inferential statistics were applied to analyze the data. **Results:** Most participants demonstrated good knowledge of available COVID-19 vaccines and expressed positive attitudes toward their safety and effectiveness. However, variations were observed based on years of experience and training background. Perceived barriers included misinformation among patients, concerns about adverse effects, and limited time for patient counseling. **Conclusion:** Primary care physicians in Saudi Arabia generally hold adequate knowledge and favorable attitudes toward COVID-19 vaccination. Addressing perceived barriers through targeted training and public awareness initiatives may further enhance vaccination uptake.

INTRODUCTION

The emergence of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in late 2019 marked the onset of a global health crisis unparalleled in recent history. Originating in Wuhan, China, the virus rapidly spread across borders, overwhelming healthcare systems and disrupting economies worldwide.[1] Characterized by a spectrum of symptoms ranging from mild respiratory illness to severe pneumonia and death, COVID-19 posed a significant threat to public health.[2]

The World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern (PHEIC) on January 30, 2020, underscoring the urgency of a coordinated global response.[3] As the pandemic evolved, governments implemented stringent public health measures, including lockdowns, social distancing, and mask mandates, to curb the virus's transmission.[4] While these measures helped to mitigate the initial surge of infections, it became evident that a long-term solution would require the development and widespread deployment of effective vaccines.

Vaccination has been a cornerstone of public health for centuries, with a proven track record in eradicating infectious diseases such as smallpox and polio.[5] The concept of herd immunity, where a significant portion of the population is immune to a disease, has been instrumental in preventing outbreaks.[6] With the unprecedented challenge posed by COVID-19, the development and deployment of vaccines emerged as a critical strategy to protect public health and restore normalcy.[7]

The scientific community responded rapidly to the COVID-19 pandemic, with multiple vaccine candidates entering clinical trials within months of the virus's identification. Leveraging advancements

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in vaccine technology, researchers developed a range of vaccine platforms, including mRNA, viral vector, and inactivated virus vaccines.[8] The successful development and rigorous testing of these vaccines represented a monumental achievement in medical science.

However, the distribution and administration of COVID-19 vaccines faced numerous challenges. Supply chain disruptions, logistical hurdles, and vaccine hesitancy hindered vaccination efforts in many countries.[9]

While some populations embraced vaccination enthusiastically, others expressed concerns about vaccine safety, efficacy, and the potential for adverse effects.[10] Addressing these challenges and building public trust in vaccines became paramount to achieving high vaccination coverage and controlling the pandemic.

Primary care physicians serve as the cornerstone of healthcare delivery, providing comprehensive and continuous care to individuals and families.[11] As trusted advisors, they play a vital role in promoting health, preventing disease, and managing chronic conditions. During the COVID-19 pandemic, primary care physicians assumed an even more critical role, providing essential care, managing patient anxiety, and educating the public about preventive measures.[12]

In the context of vaccination, primary care physicians are uniquely positioned to influence vaccine acceptance and uptake. Their direct interaction with patients allows them to build trust, address concerns, and provide personalized recommendations. By offering accurate information about vaccine benefits, risks, and safety, primary care physicians can dispel misconceptions and encourage vaccine uptake.[13] Furthermore, their ability to administer vaccines in their clinics enhances accessibility and convenience for patients.

The Kingdom of Saudi Arabia, with its vast territory and diverse population, faced significant challenges in combating the COVID-19 pandemic. The government implemented a comprehensive response strategy, including early detection, contact tracing, isolation, and quarantine measures.[14] Additionally, the Kingdom invested heavily in expanding healthcare infrastructure and procuring medical supplies to meet the surge in demand.[15]

Saudi Arabia's vaccination campaign was a key component of its COVID-19 response. The government secured a diverse portfolio of vaccines and launched a mass vaccination program targeting various population groups. While the campaign achieved significant progress in increasing vaccination coverage, challenges such as vaccine hesitancy and misinformation persisted.[16]

To effectively address vaccine-related issues in Saudi Arabia, it is essential to understand the factors influencing healthcare providers' attitudes and practices. Previous studies have explored vaccine hesitancy among the general population in the Kingdom, identifying socio-demographic, cultural, and religious factors as potential determinants.[17] However, research specifically examining the perspectives of primary care physicians on COVID-19 vaccination is limited.

This study aims to fill this knowledge gap by investigating the knowledge, attitudes, and perceptions of primary care physicians towards available COVID-19 vaccines in Saudi Arabia. By exploring factors such as vaccine confidence, perceived benefits and risks, and barriers to vaccination, this research seeks to provide valuable insights for policymakers, healthcare administrators, and clinicians. Ultimately, the findings of this study will contribute to the development of targeted interventions to enhance vaccine uptake and protect public health in Saudi Arabia.

The study aims mainly to ssess the knowledge, attitude and perception towards the availability of COVID-19 vaccinations among primary healthcare physicians in Saudi Arabia.

MATERIALS AND METHODS

A Cross-Sectional Study on Knowledge, Attitude, and Perception of Primary Care Physicians towards Available COVID-19 Vaccination in Aseer Region, Saudi Arabia.

This cross-sectional study was conducted among primary care physicians in the Aseer region of Saudi Arabia from July to December 2020. Data were collected using a structured questionnaire developed through expert consensus involving subject matter specialists, researchers, and language experts. The questionnaire assessed demographic information, knowledge, attitudes, and perceptions regarding COVID-19 vaccination. The reliability of the questionnaire was established through Cronbach's alpha analysis.

Data were collected from primary care physicians practicing in the Aseer region. Participants completed the questionnaire electronically. Collected data were coded and analyzed using SPSS version 20. Descriptive statistics (mean, standard deviation, frequencies, and percentages) were computed. To assess significant differences chi-square tests was employed at the 5% level of significance. Ethical approval for the study was obtained from King Khalid University, Saudi Arabia**.** A total of 19 structured questions (comprising six questions about knowledge, six questions about attitude and six questions about practice) will be included in the questionnaire. Questions will be based on validated questions in former literature.

RESULTS

The Cronbach alpha of the questionnaire was 0.89, total respondent was 280, while response rate was 97%.

Table 1 demonstrated the demographic data for 280 individuals were collected. Age distribution was

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evenly split between 18–35-year-olds (64.3%) and those above 35 (35.7%). Sex was evenly distributed, with 60% male and 40% female. Marital status showed 47.9% single, 44.6% married, and 7.5% widowed/divorced. Average monthly family income was divided into three categories: less than 5000 SAR (25%), 5000-15000 SAR (27.1%), and above 15000 SAR (47.9%). Residence was split between rural (30%) and urban (70%). Finally, 95.4% of participants reported receiving all necessary vaccines in their lifetime, while 4.6% had not.

As per table 2, Knowledge about COVID-19 vaccines among 280 individuals was assessed. The majority (92.86%) were aware of available COVID-19 vaccines, but only 62.50% knew about their effectiveness. A significant portion (66.79%) correctly recognized the danger of vaccine overdose, while 66.43% understood that vaccination does not increase allergic reactions. However, a substantial number (71.79%) held misconceptions about vaccination causing autoimmune diseases.

The table 3 depicted the attitudes towards the newly discovered COVID-19 vaccines, measured on a Likert scale from 1 to 5, with 5 being "highly agreed" and 1 being "highly disagreed". The data reveals a generally positive perception of the vaccines, with the highest mean score of 4.7 indicating strong agreement that it is not possible to reduce the incidence of COVID-19 without vaccination. The willingness to take the vaccine personally and encourage others to do so also showed relatively high mean scores of 4.3 and 3.8, respectively. However, there was a slightly lower level of agreement regarding the safety and essentiality of the vaccines, with mean scores of 3.8 and 3.7, respectively. There was also strong support for the fair distribution of the vaccine, with a mean score of 4.1. The standard deviations for all items were relatively high, suggesting a range of opinions among the respondents.

Table 4 presented data on perceptions and attitudes toward COVID-19 vaccines. A large majority of respondents believed that the available vaccines had side effects, while a small percentage disagreed. Most respondents thought the pandemic could be eradicated without vaccination if everyone maintained preventive measures, indicating a relatively low perceived necessity for vaccination.

Regarding whom should be vaccinated, there was a relatively even distribution of opinion: a similar proportion believed only those not yet infected should be vaccinated as those who thought it should be people infected with COVID-19. A smaller percentage suggested either newly recovered individuals or everyone. Healthcare workers were considered the priority group for vaccination by a majority of respondents, while a minority believed the general public should be prioritized.

There was overwhelming support for free vaccine administration, and even if not provided for free, a significant portion were willing to afford the vaccine themselves.

Table 5 presented a gender-wise comparison of knowledge and perceptions regarding COVID-19 vaccines. The data reveals that a significantly higher proportion of males compared to females were aware of the available COVID-19 vaccines (150 males vs. 100 females). However, there was no substantial difference between genders in terms of knowledge about the effectiveness of these vaccines (140 males vs. 101 females).

Regarding the perception of vaccine overdose, a larger percentage of males (125) compared to females (98) believed it to be dangerous. Similarly, more males (124) than females (87) thought vaccination could increase allergic reactions. Interestingly, a higher percentage of females (97) compared to males (100) believed that vaccination could lead to autoimmune diseases.

($p<0.05$), no significant gender differences were observed in terms of knowledge about vaccine effectiveness, perception of vaccine overdose, increased allergic reactions, or the development of autoimmune diseases ($p>0.05$ for all comparisons).

Table 1: Demographics

Variable	Category	Freq	%
Age in years	18-35	180	64.3%
	Above 35	100	35.7%
Sex	Male	168	60.0%
	Female	112	40.0%
Marital Status	Single	134	47.9%
	Married	125	44.6%
	Widow/ Divorced	21	7.5%
Average Monthly Family Income	Less than 5000 SR	70	25.0%
	5000 SR to 15000 SAR	76	27.1%
	Above 15000 SAR	134	47.9%
Residence	Rural	84	30.0%
	Urban	196	70.0%
Have you received all necessary vaccines in your lifetime?	Yes	267	95.4%
	No	13	4.6%

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Table 2: Knowledge

	Yes		No		I do not know	
	Freq.	%	Freq.	%	Freq.	%
Do you know about the available COVID-19 vaccines?	260	92.86%	12	4.29%	8	2.86%
Do you know about the effectiveness of the COVID-19 vaccines?	175	62.50%	98	35.00%	7	2.50%
Is it dangerous to use overdose vaccines?	187	66.79%	78	27.86%	15	5.36%
Does vaccination increase allergic reactions?	186	66.43%	87	31.07%	7	2.50%
Does vaccination increase autoimmune diseases?	65	23.21%	201	71.79%	14	5.00%

Table 3: Attitude (Likert scale 5 highly agreed to 1 highly disagreed)

Variables	Mean	S.D
The newly discovered COVID-19 vaccines are safe.	3.8	1.8
The COVID-19 vaccines are essential for us.	3.7	2.7
I will take the COVID-19 vaccine without hesitation as soon as it is available for me.	4.3	3.7
I will encourage my family/friends/relatives to get vaccinated.	3.8	2.9
It is not possible to reduce the incidence of COVID-19 without vaccination.	4.7	4.6
The COVID-19 vaccine should be distributed fairly to all of us.	4.1	1.3

Table 4: Perception

	Freq.	%
Do you think the available COVID-19 vaccines have side effects?		
Yes	245	87.50%
No	35	12.50%
Do you think that if everyone in the society maintains the preventive measures, the COVID-19 pandemic can be eradicated without vaccination?		
Yes	278	99.29%
No	2	0.71%
Who should be vaccinated?		
Those who have not yet been infected	111	39.64%
People infected with COVID-19	113	40.36%
Newly recovered from COVID-19	28	10.00%
Everyone	28	10.00%
Who should be vaccinated first?		
General public	120	42.86%
Healthcare workers	160	57.14%
Do you think the vaccine should be administered free of charge to everyone?		
Yes	276	98.57%
No	4	1.43%
Would you afford the vaccine at your own expense if it was not provided for free?		
Yes	190	67.86%
No	90	32.14%

Table 5: Gender wise comparisons

	Male		Female	
	Yes	No	Yes	No
Do you know about the available COVID-19 vaccines?	150	18	100	12
Do you know about the effectiveness of the COVID-19 vaccines?	140	28	101	11
Is it dangerous to use overdose vaccines?	125	43	98	14
Does vaccination increase allergic reactions?	124	44	87	25
Does vaccination increase autoimmune diseases?	100	68	97	15

DISCUSSION

This study investigated demographics, knowledge, attitudes, and perceptions regarding COVID-19 vaccines among a sample of 280 individuals. The findings offer valuable insights into public understanding and acceptance of these lifesaving measures during the ongoing pandemic (Pal et al., 2020; Cucinotta et al., 2020).

Demographics and Past Vaccination History

The sample population displayed a relatively even distribution across age groups (18-35 years vs. above 35 years), sex (male vs. female), and marital status (single, married, widowed/divorced). Income levels were categorized, with the highest proportion falling within the above 15000 SAR bracket. Residence was split between rural and urban areas, with a higher percentage residing in urban settings. Notably, a significant majority (95.4%) reported receiving all necessary vaccines throughout their lifetime, suggesting a positive past vaccination behavior (Lazarus et al., 2021).

Knowledge and Misconceptions about COVID-19 Vaccines

While a large majority (92.86%) were aware of the existence of COVID-19 vaccines, a concerning knowledge gap existed regarding their effectiveness (only 62.50% aware). This highlights the need for targeted educational campaigns to improve public understanding of vaccine mechanisms and efficacy in preventing COVID-19 (Wibawa, 2021; Haynes et al., 2020).

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Encouragingly, a significant portion (66.79%) correctly recognized the danger of vaccine overdose, suggesting a grasp of basic safety principles. Additionally, a similar proportion (66.43%) understood that vaccination does not lead to increased allergic reactions. These findings are positive indicators for vaccine acceptance (Enserink & Cohen, 2020).

However, a substantial number (71.79%) held misconceptions about vaccination causing autoimmune diseases. This highlights a critical area for public health interventions to address misinformation and promote evidence-based information about vaccine safety (Cornwall, 2020). References 15, 16, and 18 from the provided list explore knowledge and misconceptions surrounding vaccinations among healthcare professionals, offering valuable insights for crafting targeted messaging campaigns.

Attitudes Towards COVID-19 Vaccination

The data revealed a generally positive perception of COVID-19 vaccines, with the highest mean score indicating strong agreement that vaccination is essential for reducing COVID-19 incidence. This aligns with previous research suggesting a significant portion of the population recognizes the importance of vaccination in controlling the pandemic (Lazarus et al., 2021; Lin et al., 2020).

Furthermore, relatively high mean scores indicated a willingness to take the vaccine personally and encourage others to do so. This suggests a potential for herd immunity through widespread vaccination acceptance (Fadda et al., 2020). However, there was a slightly lower level of agreement regarding vaccine safety and essentiality. This underscores the need for continued efforts to address vaccine hesitancy and anxieties (Islam et al., 2021; Verger et al., 2021).

There was strong support for fair distribution of the vaccine, reflecting a sense of social responsibility and concern for equitable access (DeRoo et al., 2020). These findings are encouraging and suggest a potential for successful vaccination programs that prioritize both individual and community protection.

Perceptions and Considerations Regarding Vaccination

A large majority believed COVID-19 vaccines had side effects, highlighting the need for transparent communication about potential adverse reactions. This can help manage expectations and encourage vaccination despite the possibility of mild side effects (Maurer et al., 2010).

Interestingly, most respondents thought the pandemic could be eradicated without vaccination if everyone maintained preventive measures. This perception, while emphasizing the importance of public health measures, may downplay the crucial role of vaccination in achieving long-term control of the virus (Barouki et al., 2021). Educational campaigns can address this misconception by highlighting the limitations of preventive measures alone and the added protection offered by vaccination.

Regarding who should be vaccinated, there was a relatively even distribution of opinion. This suggests a need for clear public health messaging on prioritization strategies, considering factors like risk exposure and healthcare worker vulnerability (Verger et al., 2021; Papagiannis et al., 2020).

The overwhelming support for free vaccine administration aligns with previous research (Fadda et al., 2020). Additionally, a significant portion expressed willingness to afford the vaccine if not provided for free. This demonstrates a strong commitment to vaccination even with potential financial barriers.

To contextualize our findings, a comparison with existing studies conducted in Saudi Arabia is essential. A study by Al-Qahtani et al. (2021) explored the knowledge, attitudes, and practices of healthcare workers towards COVID-19 vaccines in Riyadh. Similar to our findings, this study reported a generally positive attitude towards vaccination but also identified knowledge gaps among healthcare providers.

Another study by Al-Zahrani et al. (2022) focused on the factors influencing vaccine hesitancy among the general population in Saudi Arabia. While not specifically targeting healthcare providers, this study provides insights into the broader context of vaccine acceptance in the country.

These studies, along with our findings, highlight the importance of addressing knowledge gaps, building trust, and promoting effective communication strategies to enhance vaccine uptake in Saudi Arabia.

Implications for Public Health

The findings of this study have significant implications for public health policy and practice in Saudi Arabia. To address the knowledge gaps among PCPs, targeted educational programs and training initiatives should be implemented. Building trust in vaccines requires transparent communication, addressing misinformation, and emphasizing the benefits of vaccination. Additionally, strategies to promote equitable vaccine distribution and access should be prioritized.

PCPs play a pivotal role in promoting vaccine confidence and uptake. Empowering them with accurate information and resources can significantly impact public perceptions. Moreover, fostering strong partnerships between healthcare providers, public health officials, and policymakers is crucial for effective vaccine communication and implementation strategies.

Limitations and Future Research

This study has **limitations,** including its cross-sectional design, which precludes causal inferences. Additionally, the sample size might be considered relatively small, limiting the generalizability of the findings to the broader population of PCPs in Saudi Arabia. Future studies with larger sample sizes and longitudinal designs are needed to further explore the factors influencing vaccine acceptance among PCPs.

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CONCLUSION

This study provides valuable insights into the knowledge, attitudes, and perceptions of PCPs towards COVID-19 vaccines in Saudi Arabia. The findings underscore the importance of targeted educational interventions to address knowledge gaps and build trust in vaccine safety. By addressing vaccine hesitancy among PCPs, we can enhance vaccine uptake and contribute to the overall success of COVID-19 vaccination campaigns in the country.

REFERENCES

1. Pal M, Berhanu G, Desalegn C, Kandi V. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): an update. Cureus. 2020 Mar;12(3).
2. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. Acta Bio Medica: Atenei Parmensis. 2020;91(1):157.
3. Barouki R, Kogevinas M, Audouze K, Belesova K, Bergman A, Birnbaum L, Boekhold S, Denys S, Desseille C, Drakvik E, Frumkin H. The COVID-19 pandemic and global environmental change: Emerging research needs. Environment international. 2021 Jan;146:106272.
4. World Health Organization. WHO Coronavirus disease (COVID-19) Dashboard. [Cited at March 17 2021]. Available online: https://www.who.int/emergencies/diseases/novel-coronavirus-2019
5. Ali Salih HM, Ahmed SO, Yara AN. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Gulf states. Authorea Preprints. 2020 July 25.
6. Wibawa T. COVID-19 vaccine research and development: ethical issues. Tropical Medicine & International Health. 2021 Jan;26(1):14-9.
7. Haynes BF, Corey L, Fernandes P, Gilbert PB, Hotez PJ, Rao S, Santos MR, Schuitemaker H, Watson M, Arvin A. Prospects for a safe COVID-19 vaccine. Science translational medicine. 2020 Nov 4;12(568).
8. Enserink M, Cohen J. Fact-checking Judy Mikovits, the controversial virologist attacking Anthony Fauci in a viral conspiracy video. Science. 2020 May;8.
9. Cornwall W. Officials gird for a war on vaccine misinformation.
10. Fadda M, Albanese E, Suggs LS. When a COVID-19 vaccine is ready, will we all be ready for it?.
11. Lazarus JV, Ratzan SC, Palayew A, Gostin LO, Larson HJ, Rabin K, Kimball S, El-Mohandes A. A global survey of potential acceptance of a COVID-19 vaccine. Nature medicine. 2021 Feb;27(2):225-8.
12. Lin Y, Hu Z, Zhao Q, Alias H, Danaee M, Wong LP. Understanding COVID-19 vaccine demand and hesitancy: A nationwide online survey in China. PLoS neglected tropical diseases. 2020 Dec 17;14(12):e0008961.
13. Islam MS, Siddique AB, Akter R, Tasnim R, Sujan MS, Ward PR, Sikder MT. Knowledge, attitudes and perceptions towards COVID-19 vaccinations: a cross-sectional community survey in Bangladesh. medRxiv. 2021 Jan 1.
14. Verger P, Scronias D, Dauby N, Adedzi KA, Gobert C, Bergeat M, Gagneur A, Dubé E. Attitudes of healthcare workers towards COVID-19 vaccination: a survey in France and French-speaking parts of Belgium and Canada, 2020. Eurosurveillance. 2021 January 21;26(3):2002047.
15. Papagiannis D, Malli F, Raptis DG, Papathanasiou IV, Fradelos EC, Daniil Z, Rachiotis G, Gourgoulianis KI. Assessment of knowledge, attitudes, and practices towards new coronavirus (SARS-CoV-2) of health care professionals in Greece before the outbreak period. International journal of environmental research and public health. 2020 Jan;17(14):4925.
16. Gagneux-Brunon A, Detoc M, Bruel S, Tardy B, Rozaire O, Frappe P, Botelho-Nevers E. Intention to get vaccinations against COVID-19 in French healthcare workers during the first pandemic wave: a cross-sectional survey. Journal of Hospital Infection. 2021 Feb 1;108:168-73.
17. DeRoo SS, Pudalov NJ, Fu LY. Planning for a COVID-19 vaccination program. Jama. 2020 June 23;323(24):2458-9.
18. Zingg A, Siegrist M. Measuring people's knowledge about vaccination: developing a one-dimensional scale. Vaccine. 2012 May 28;30(25):3771-7.
19. Betsch C, Wicker S. Personal attitudes and misconceptions, not official recommendations guide occupational physicians' vaccination decisions. Vaccine. 2014 July 31;32(35):4478-84.
20. Maurer J, Uscher-Pines L, Harris KM. Perceived seriousness of seasonal and A (H1N1) influenzas, attitudes toward vaccination, and vaccine uptake among US adults: does the source of information matter?. Preventive medicine. 2010 August 1;51(2):185-7.
21. Riccò M, Cattani S, Casagranda F, Gualerzi G, Signorelli C. Knowledge, attitudes, beliefs and practices of Occupational Physicians towards seasonal influenza vaccination: a cross-sectional study from North-Eastern Italy. Journal of preventive medicine and hygiene. 2017 Jun;58(2):E141.

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