

**Prevalence of Vaccine Hesitancy Towards Children against
COVID-19 Among Students, Staff, and Faculty of Alfaisal
University, College of Medicine in Riyadh**

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Abstract

Background: Early 2019, the World Health Organization (WHO) declared the coronavirus outbreak a pandemic. A pandemic is the worldwide spread of a new disease. Few studies have been conducted in the Kingdom of Saudi Arabia to determine parental acceptance of childhood COVID-19 vaccines. This study aimed to determine the prevalence of hesitancy to vaccinate children aged 2-11 years against COVID-19, assess the reasons for that hesitancy, and examine factors associated with that hesitancy, among students, staff, and faculty of Alfaisal University, College of Medicine.

Methods: A cross-sectional, web-based study was conducted from June 2021 through August 2021. The study included students, staff, and faculty of Alfaisal University, College of Medicine in Riyadh. Baseline and outcome characteristics were summarized using descriptive statistics as appropriate. Data management and analysis were performed using the Statistical Package for the Social Sciences (SPSS), The chi-square and Fisher's exact tests, version 21 for windows. Data was collected through an online questionnaire. The survey informed the target population of the aim of the study and solicited their informed consent and the study was conducted after obtaining the Institutional Review board's (IRB) approval.

Results: The study involved 300 participants and the majority of them were females (68.7%). The age of participants mainly was less than 25 years old (45%) followed by 25-34 years old (44.3%) and approximately two-thirds of them were non-Saudi citizens (70.7%). Among them, 60.2% were single and 59.3% were current medical students. The hesitancy prevalence of the COVID-19 vaccine for children among surveyed participants was high (75%). Only 21% supported children's vaccination and 4% of them were unsure. Moreover, the greatest concern behind refusing to vaccinate children for COVID-19 was safety concerns (69%) followed by needing more information regarding vaccination from health care providers 18.3% and 4% reported that it might has a long-term negative impact on fertility, 3% were hesitant due to personal beliefs, 2% thought that it might affects a child's development, 1.3% fear of vaccines expected

side effects on child education. While 2.3% were hesitant for other reasons.

Conclusion: The study found that a higher tendency levels to refuse COVID-19 vaccination for children. The highest predominant concern was due to vaccine safety concern.

Keywords: COVID-19 Pandemic, COVID-19 Children Vaccines, Children Vaccine Hesitancy, Vaccine Hesitancy, Vaccine-hesitant parents, Alfaisal University,

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INTRODUCTION

on January, 2020, The World Health Organization (WHO) officially declared COVID-19 outbreak as a global pandemic. Zanke, A. A., et al., 2020).

Covid-19 infects thousands of cases Threatening the global economy and public health system (Al-Mohaithef, M., & Padhi, B. K., 2020) COVID-19 virus spread rapidly in Saudi Arabia on May 26, 2020, causing thousands of deaths and confirmed cases (Al-Mohaithef, M., & Padhi, B. K., 2020). Children are considered carriers of the COVID-19 virus and are less likely to develop serious complications, although some serious illnesses have been reported at certain ages..). (Geddes L., 2021). Vaccine hesitation ranks among the top ten health threats globally. It is defined by the World Health Organization as “delays in accepting or rejecting vaccines despite the availability of vaccine services.” (Olusanya, O. A., et al., 2021)

On the other hand, a relationship founded Increased mortality rates and disease outbreaks among children are linked to parental refusal and hesitancy to adhere to routine childhood vaccinations (e.g., pneumonia, HPV-related cancers and meningitis). ²¹ (Olusanya, O. A., et al., 2021 Vaccine hesitation or acceptance depends on several complex factors which include cultural perspectives, vaccine safety and trust in vaccines and health authorities (Dosanjh, A., 2021). The use of "Theory of planned behavior" may be helpful in explaining vaccine hesitancy that emerges as a behavioral health model ⁶ (Al-Mohaithef, M., & Padhi, B. K., 2020). Previous studies

reported that acceptance of vaccines depends on public trust, as well as on complex human behavior that changes with place and time, which may affect the fairness of vaccination. (Al Muthif, M., and Bede, B. K., 2020.⁶ (Al Mohaithef, M., & Padhi, B. K., 2020). In contrast, a study in China reported an increase in vaccination against Covid-19 between health care workers than among the rest of society. (Al-Mohaithef, M., & Padhi, B. K., 2020).

However, very few studies have been conducted in the Kingdom of Saudi Arabia to address hesitancy to get children vaccinated against COVID-19 when vaccines become available for their age group and with the need for more information on global pediatric vaccine hesitancy estimates against COVID-19 and with the lack of regional and local estimates and the need for such information as a guide to better public health practices and vaccine policy implementation. This study aimed to determine the prevalence of hesitancy to vaccinate children aged 2-11 years against COVID-19, assess the reasons for that hesitancy, and examine factors associated with that hesitancy, among students, staff, and faculty of Alfaisal University, College of Medicine.

2. Subjects and Methods

2.1. Study setting, Design and Sampling

Cross-sectional study was conducted from 1 June 2021 through August 2021. The study population includes students, staff, and faculty of Alfaisal University, College of Medicine.

2.3 Study questionnaire and eligibility criteria

The study investigators developed a self-administered online questionnaire using Google Forms which contains an introductory paragraph that informs participants of the study's aim, the confidentiality of their responses, and the freedom to decline to answer any question or to withdraw completely. Besides, the questionnaire contains a combination of closed- and open-ended questions.

The closed-ended questions include inquiries into participants' socio-demographic variables such as gender, age, citizenship, marital status, and affiliation with Alfaisal College of Medicine, and main Outcomes questions such as 1: do you trust COVID-19 vaccination for children ages 2-11 years when vaccines become available for their age group? which answered with yes, no, or no opinion, 2: Mark all the reasons for hesitancy to vaccinate children ages 2-11 against COVID-19? the answer was to choose one option between multiple options which are safety concerns,

personal beliefs, it has a long-term negative impact on fertility, it affects a child's development, the expected side effects of the kids' vaccines are severe enough which might impact their education, the desire for more information from healthcare providers and if there was another answer and to specify. The open-ended question included solicitations of recommendations.

Exclusion criteria included students who had already graduated and faculty and students who participated in pre-tested the study survey.

2.4 Data collection and analysis

The total number of the targeted population, i.e., medical students, staff, and faculty, is about 1300. As we chose a margin of error of 5% and a confidence level of 95% for our study, the study sample size is approximately 300 respondents. Baseline and outcome characteristics were summarized using descriptive statistics, as appropriate. Data management and analysis were performed using the Statistical Package for the Social Sciences (SPSS), The chi-square and Fisher's exact tests, version 21 for windows.

2.5 Descriptive statistics and Comparative statistics

In descriptive statistics, the categorical variables were presented as counts and percentages (e.g., gender, citizenship, marital status, participants' affiliation, supporting children vaccination, and the reasons for vaccination refusal. While in comparative statistics the chi-square and Fisher's exact tests were used to test the association

between socio-demographics and supporting vaccination children and the reasons for vaccination refusal. The 5% level of significance was taken to test the significance of the obtained results.

2.6 Ethical approval was obtained from

Alfaisal University institutional review board committee with approval number IRB-20125, and informed consent was requested before survey enrollment.

3. Results

3.1 Demographic data:

A total of 300 medical participants from the College of Medicine, faculty, staff, and students of Alfaisal University were included. The majority of participants were females (68.7%). The age of participants mainly was less than 25 years old (45%), followed by 25-34 years old (44.3%). Approximately two-thirds of participants were non-Saudi citizens (70.7%). Among them, 60.2% were single and 59.3% of them were current medical students. Demographic data of participants were presented in detail in Table 1 and Figure 1.

Table 1: Socio-Demographic Variables

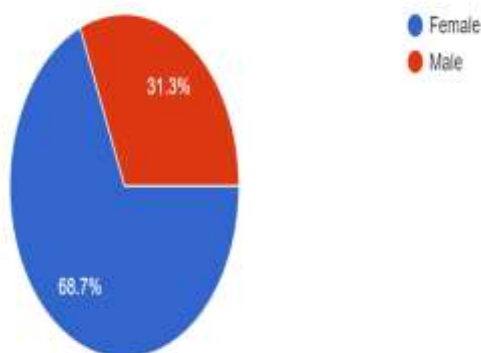
Parameter	Categories	Count	Valid Percent
Gender	Male	94	%31.3
	Female	206	%68.7
Age	years <25	135	%45
	years 25-34	133	%44.3
	years ≥ 35	27	%9

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	years >50	٥	%١.٧
Citizenship	Saudi	٨٨	%٢٩.٣
	Non-Saudi	٢١٢	%٧٠.٧
Marital Status	Single	١٨٦	%٦٢.٠
	Married	١٠٣	%٣٤.٣
	Other	١١	٣.٧
Affiliation	Alumnus	٣٢	%١٠.٧
	Current medical student	١٧٨	%٥٩.٣
	Faculty	١٢	%٤
	Graduate	٦١	%٢٠.٣
	Intern	١٢	%٤
	Other	٥	%١.٧

Figure 1: Socio-Demographic Variables

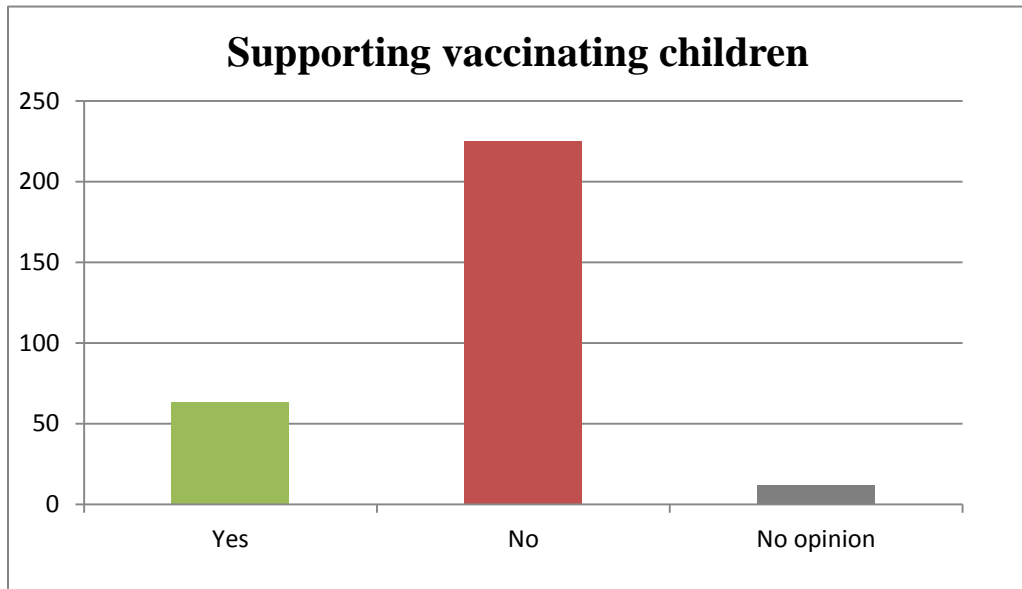
Gender:



3.2 Hesitancy of COVID-19 vaccination for children

The hesitancy prevalence of the COVID-19 vaccine for children among surveyed medical participants was high around 225 participants (75%). Only 63 participants (21%) were supporting children's vaccination and 12 (4%) of them were unsure and shown in detail in Figure 2 and Table 2

Figure 2: Supporting Vaccinating Children:



**Table 2: Supporting
Vaccinating Children**

Parameter	Categories	Count	Percent
Supporting vaccinating children	Yes	63	21%
	No	225	75%
	No opinion	12	4%

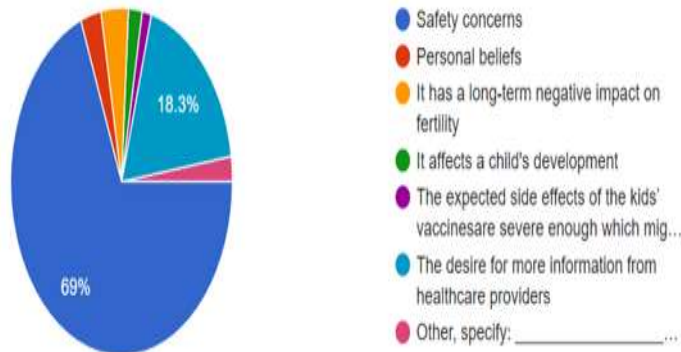
Moreover, the highest concern behind refusing to vaccinate children for COVID-19 was safety concerns (69%) followed by needing more information regarding vaccination from health care providers (18.3%).

The full reasons for vaccination hesitancy are given in Table 3 and Figure 3.

Table 3: Reasons for Refusing Children COVID-19 Vaccination

Parameter	Categories	Count	Percent
Reasons for refusing children COVID-19 vaccination	Safety concerns	٢٠٧	%٦٩
	The desire for more information from healthcare providers	٥٥	%١٨.٣
	It has a long-term negative impact on fertility	١٢	%٤
	Personal beliefs	٩	%٣
	It affects a child's development	٦	%٢
	vaccines are severe "The expected side effects of the kids enough that they might impact their education	٤	%١.٣
	Other	٧	%٢.٣

Figure 3: Reasons for Refusing Children COVID-19 Vaccination



٣.3 Factors Affecting Vaccination Hesitancy

By analyzing the confounding factors of hesitating regarding vaccinating children against COVID-19; there was a significant correlation between age, marital status and citizenship and how the respondents hesitated against vaccinating children. Younger individuals (less than 35 years old) were more hesitant compared to older individuals ($p<0.001$). Whereas married individuals had a higher tendency to support vaccinating children ($p=0.035$).

Besides, Saudi citizens were more accepting of COVID-19 vaccination for children than non-Saudi individuals ($p<0.0001$). Finally, the study did not find any statistically significant relationship between gender and hesitation regarding vaccination and did not find any statistically significant relationship between Affiliation with Alfaisal College of Medicine and hesitancy to vaccinate children against COVID-19 (Table 4).

Table 4: Correlation between Demographic characteristics and supporting vaccinating children against COVID-19

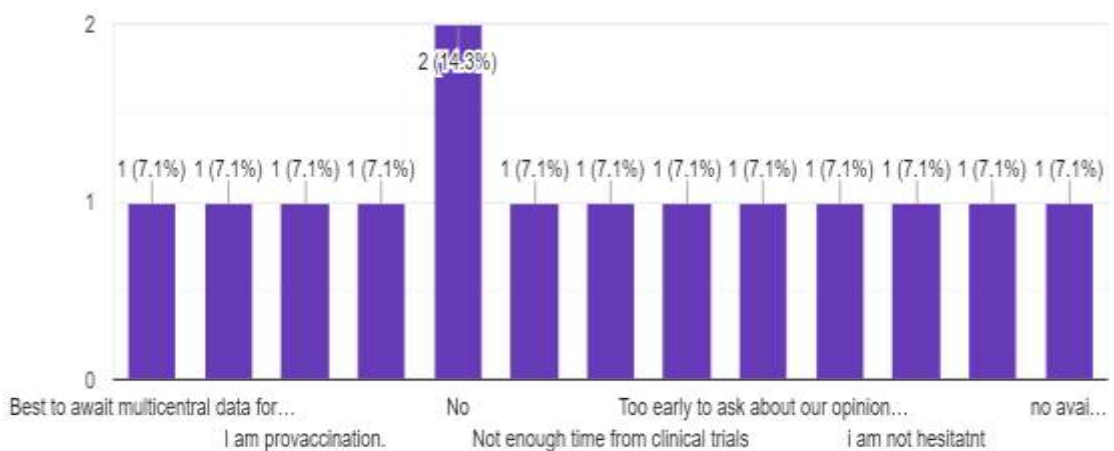
Parameters		Do you support vaccinating children? (n=300)						
		Yes (n=63)		No (n=225)		No opinion (n=12)		P-value
		Count	%	Count	%	Count	%	
Gender	Male	١٨	١٩.١	٧٤	٧٨.٧	٢	٢.١	٠.٤٣٣
	Female	٤٥	٢١.٨	١٥١	٧٣.٣	١٠	٤.٩	
Age group	years ٢٥>	٢٦	١٩.٣	٩٩	٧٣.٣	١٠	٧.٤	*<0,001

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	٣٤-٢٥ years	١٢	٩.٠	١٢٠	٩٠.٢	١	٠.٨	
	٤٩-٣٥ years	٢٠	٧٤.١	٦	٢٢.٢	١	٣.٧	
	years < ٥٠	٥	١٠٠.٠	٠	٠.٠	٠	٠.٠	
Marital status	Married	٢٥	٢٤.٣	٧٥	٧٢.٨	٣	٢.٩	*٠.٠٣٥
	Single	٣٢	١٧.٢	١٤٥	٧٨.٠	٩	٤.٨	
	Other	٦	٥٤.٥	٥	٤٥.٥	٠	٠.٠	
Citizenship	Saudi	٣٦	٤٠.٩	٤٩	٥٥.٧	٣	٣.٤	*٠.٠٠٠١>
	Non-Saudi	٢٧	١٢.٧	١٧٦	٨٣.٠	٩	٤.٢	
Affiliation	Alumnus	١	٣.١	٣٠	٩٣.٨	١	٣.١	*٠.٠٠٠١>
	Current medical student	٢٣	١٢.٩	١٤٩	٨٣.٧	٦	٣.٤	
	Faculty	١٠	٨٣.٣	٠	٠.٠	٢	١٦.٧	
	Graduate	٢٢	٣٦.١	٣٨	٦٢.٣	١	١.٦	

Intern	٣	٢٥.٠	٧	٥٨.٣	٢	١٦.٧	
Other	٤	٨٠.٠	١	٢٠.٠	٠	٠.٠	

Graph 1: Participants Recommendations



3.4 Participants Recommendations

Among our surveyed medical participants, 7.1% of each recommendation is ranging from supported the desire for more information from healthcare providers, that there is no available RCT to test the efficacy & safety of the vaccine in this age group, await to multicentral data for vaccination side effect on that age group, it might has a long term negative impact on fertility and it might affect their education and if the vaccine might has side effects and the long-term harm to children, while 14.2% said that the vaccine still needed sufficient clinical research data, scientific evidence and enough time from clinical trials.

DISCUSSION

As seen in our study, there was a high hesitancy prevalence among medical respondents was seen (75%). Our hesitancy results were substantially higher than most published studies regarding vaccinating

children for COVID-19 (Teasdale CA., et al., 2021) (Ruggiero KM., et al., 2021) (Aldakhil H., et al., 2021). which could be justified due to our study limitations.

In an international cross-sectional survey, 33% of participants do not intend to vaccinate their children against COVID-19 (Goldman, RD., et al., 2020). Also, In New York City, 23.3% of parents reported hesitancy to vaccinate their children against COVID-19, while 61.9% supported vaccination and 14.8% of participating parents refused vaccination (Teasdale, CA., et al., 2021). In May 2021, a study in Saudi Arabia examined mothers supporting children vaccination against Covid-19 and childhood vaccination, as a result of that study, only 24% of mothers intend to vaccinate their children against Covid-19 and 24.31% of mothers were 79% of them supported the although hesitant about childhood vaccinations importance of vaccines. It was reported that only 24% of mothers supporting children vaccination against Covid-19 (Aldakhil, H., et al., 2021).

In the present study, we also addressed the reasons behind COVID-19 vaccine refusal. Safety concerns (69%) followed by needing more information from health care providers regarding vaccination (18.3%) were the most predominant concerns behind refusing to vaccinate children for COVID-19. Previous studies of vaccine hesitancy among parents have found safety concerns and side effects as well to be the most significant concerns that increased vaccine hesitancy (Kempe, A., et al., 2020) (Teasdale, CA., et al., 2021) (Ruggiero, KM., et al., 2021). Moreover, a study was conducted in February 2021 in Saudi Arabia among young adults about COVID-19 vaccine hesitancy. Providing 39% of participants with sufficient information about the effectiveness and safety of the vaccine contributed to encouraging them to accept the vaccine. (Almaghaslah, D., et al., 2021).

Factors affecting vaccination hesitancy: The findings of the current study further indicated a significant correlation between age, marital status and citizenship, and COVID-19 vaccine refusal for children.

Older, married and Saudi individuals tended to be more accepting of vaccinating children for COVID-19. We did not find any statistically

significant relationship between gender and affiliation and hesitation regarding vaccination.

Our results conformed with a web-based national survey conducted in 2020 (Al-Mohaithef, M., & Padhi, B. K., 2020). Receiving the COVID-19 vaccine is relatively high among older age groups and being married participants, while our finding differs concerning accepting Saudi and Non-Saudi citizens to COVID-19 vaccinations.

In our study, non-Saudi residents were more willing to accept vaccination⁶ (Al-Mohaithef, M., & Padhi, B. K., 2020). It can be explained that non-Saudi citizens have an increased possibility of contracting COVID-19 infection as they are sharing houses and rooms. However, the prior study was conducted on adult participants in 2020 at the beginning of the pandemic and before releasing the COVID-19 vaccine, with a lack of awareness of vaccine-preventable diseases, while in our study, non-Saudis participants were hesitant to vaccinate children against COVID-19. Moreover, vaccinating children against COVID-19 faces a great deal of hesitancy among adults and parents even if they are vaccinated themselves.

Furthermore, in a study conducted on young Saudi adults only, approximately half of the respondents stated that if COVID-19 vaccine becomes mandatory they would only accept it (Almaghaslah D., et al., 2021).

It could be justified due to first: rather than a face-to-face interview, Survey participants' responses were registered using a web-based survey which may lead to a potential bias in reporting their responses. Second: the study design shows a picture at the point of the study of the community's response as it is a cross-sectional study. Third: limited sample size in relation to the Saudi population which the future longitudinal study could have generated more accurate results while in general people are hesitating to vaccinate their children due to several reasons including religious reasons, personal beliefs, safety concerns, and a desire for more information from a healthcare provider.

The study Limitation includes that rather than a face-to-face interview, answers were recorded using an online survey that may introduce potential response bias. Limited sample size in relation to

the Saudi population, the future longitudinal study could have generated more accurate results.

1. Conclusion:

The study found that a higher tendency levels to refuse COVID-19 vaccination for children 75%. 21% were supporting children's vaccination and 4% of them were unsure. The highest predominant concern was due to vaccine safety concern.

2. RECOMMENDATIONS:

It is recommended that requiring vaccine developers to consistently disclose all clinical trials of vaccines to the public (for example, on a live program shows), follow up on all volunteers, share all information and facts, and analyze suspected side effects reported to be associated with vaccines, as well as acknowledge their potential risks. Also, encourage local clinical and scientific studies at all universities around the kingdom of Saudi Arabia, focusing on long-term effects of vaccinations, on children who have received the COVID-19 vaccine, and offer moral and financial rewards for health professionals and volunteers would boost public trust in vaccine safety and alleviate public concerns.

APPENDIX I

Reasons for Hesitancy to Vaccinate Children against COVID-19 Questionnaire

We are conducting a study to determine reasons for the hesitancy to vaccinate children ages 2-11 against COVID-19 when vaccines become available for their age group. Your participation is voluntary. The information you provide will help us achieve the study aims. Your responses will be kept confidential and used for research purposes only.

Answering this survey is your agreement to participate in the study.

Socio-demographic variables:

1. Gender

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a. Female

b. Male

2. Age _____ years

3. Marital status (Check only one choice):

a. Single

b. Married

c. Other

4. Affiliation with Alfaisal College of Medicine

a. Current medical student

b. Graduate students (MPH, etc)

Faculty (including clinical, adjunct faculty) &
c. Teaching assistants.

d. Alumnus

e. Intern (College of Medicine).

Other, specify

_____ f.

5. Citizenship

a. Saudi

b. non-Saudi

Main Outcomes

6. Do you trust COVID-19 vaccination for children ages 2-11 when vaccines become available for their age group?

- a. Yes
- b. No, I do not support vaccinating children.
- c. No opinion

7. Mark all the reasons for hesitancy to vaccinate children ages 2-11 against COVID-19

- a. Safety concerns
- b. Personal beliefs
- c. It has a long-term negative impact on fertility.
- d. It affects a child's development.
- e. The expected side effects of the kids' vaccines are severe enough which might impact their education.
- f. The desire for more information from healthcare providers

Other, specify :

_____g.

Any additional
comments _____8.

THANK YOU FOR YOUR PARTICIPATION

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