



A qualitative exploration of children's willingness to take the COVID-19 vaccine in Jordan

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ABSTRACT

Vaccine willingness has an important role in COVID-19 adult vaccination programs in many countries. However, there are limited data about vaccine willingness among children, which is largely confined to parents' opinions. With the emergence of new variants affecting this age group, children's opinions on COVID vaccination are important. This study aimed to explore children's willingness and opinions regarding COVID-19 vaccination. Focus group discussions, including children, were carried out in different Jordanian schools. Purposive sampling was implemented to select students of different socioeconomic statuses. A total of 54 school students aged 6–14 years from three schools participated in nine focus groups. Overall, participating children were willing to take the COVID-19 vaccine, and three overarching themes described their view regarding the vaccine: benefits, motivators, and hesitancy and barriers. Participating children reported that the vaccine could be beneficial as it protects them from being infected, and they are motivated to take it as it has been approved for children in other countries. However, some children were hesitant regarding taking the vaccine as it could be harmful, and they believed that COVID-19 is not severe in children. In conclusion, this study shows a clear willingness among participants from primary and secondary schools to take the COVID-19 vaccine. Such outcomes should be tested further on a larger scale to deliver future recommendations to include younger children in the vaccination program.

INTRODUCTION

It has been more than 2 years since the outset of the COVID-19 pandemic. While the emerging virus affected older populations during the first wave of the pandemic, new highly contagious variants emerged with higher infection rates among younger populations with increased severity. Increasing numbers

of children are infected, with minors accounting for 11.5% of all COVID-19 cases in the United States (Yılmaz and Sahin, 2021). Clinical signs in children are becoming more common, indicating that the disease has developed (She *et al.*, 2020).

According to Centers for Disease Control and Prevention (CDC) reports, vaccination against COVID-19 is the most effective method to prevent infection and development into severe illness (CDC, 2022). Many countries have started immunizing adolescents against COVID-19. However, immunization rates are much lower than those for the adult population. This, along with the elevated infection rates among children, advocates the need for accelerating vaccination rates among children. This is highly important, especially in countries where the majority of the

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population consists of younger individuals (Sah *et al.*, 2021). To acquire effective herd immunity, 70% of the population should be vaccinated, including children (Sah *et al.*, 2021). This is important, especially since Pfizer-BioNTech indicated that its two-dose COVID-19 vaccination was safe and had a robust antibody response in children aged 5 to 11 (Xu *et al.*, 2022).

Since the children have the right to decide whether to be vaccinated, it is critical to understand their willingness to receive the COVID-19 vaccine and the barriers to and promoters of COVID-19 vaccination. In the COVID-19 vaccination, the most significant restriction mentioned by parents was the vaccine's safety and effectiveness (Goldman *et al.*, 2020). However, children could have different views that could facilitate the vaccination program in this group (Adler *et al.*, 2019). Children are now seen to be active in the construction and determination of their own social lives (Waksler, 1986), the lives of those around them, and the societies in which they live (Norozi and Moen, 2016). However, in the context of care management, the agency of the child remains relatively unsearched. The focus is shifting from pursuing evidence directly from children rather than other information sources, such as their parents (Docherty and Sandelowski, 1999).

In Jordan, around 30% of the total population is younger than 11 years old. However, the immunization rate in this age group still seems very slow, and the majority of children have not been vaccinated. As of October 2022, Jordan reported 1.75 million COVID-19 cases and a total of 14,122 deaths. Among the population residing in Jordan, a total of 10.1 million vaccine doses were given, with 44.7% of the total population reported being fully vaccinated (JHU, 2022). Several previous studies have reported a low rate of adults' willingness to receive COVID-19 vaccines (Abu-Farha *et al.*, 2021b; Qunaibi *et al.*, 2021a; Qunaibi *et al.*, 2021b), while only one explanatory cross-sectional study reported a very low proportion of Jordanian parents (25.4%) willing to vaccinate their 5–12 years old children against SARS-CoV-2 (Alsulaiman *et al.*, 2022). In fact, the hesitancy of a significant proportion of Jordanian parents to administer the COVID-19 vaccine raises concern about attaining herd immunity, especially since children are a potential source for carrying and disseminating the virus, which in turn would endanger its effective control (Chou *et al.*, 2022a). To our knowledge, this study is the first of its kind to study children's willingness to take the COVID-19 vaccine.

MATERIALS AND METHODS

A structured interview was used in the current qualitative study to assess children's willingness to take the COVID-19 vaccine. Study sites for this project were classrooms within different primary and secondary schools in Jordan. Individual school names were not included to retain confidentiality. The schools were chosen to represent all the different types of schools in Jordan (one public, one private, and one nonprofit school). In this study, 54 students participated in the different focus groups. Students were from different age groups: 6–8-year-old pupils (first, second, and third grades), 9–11-year-old pupils (fourth, fifth, and sixth grades), and 12–14-year-old pupils (seventh, eighth, and ninth grades). The sample size recruited in this study ($n = 54$) was enough to reach saturation, as the general recommendation for in-depth interviews is to have a sample size of 20–30 to reach saturation (Boddy, 2016; Creswell and Poth, 2016).

Via personal communication with school head teachers, through the study's principal investigator, permission was sought to carry out focus group sessions with groups of children within the age groups detailed above. Having gained this permission, letters were prepared for each school to be sent to parents/guardians of children detailing the research that was to be performed and seeking parental/guardian permission for their child to take part. These letters were sent out by the schools to the parents/guardians of children within a particular year group selected by the head teacher. As well as parent/guardian consent for their child to participate in the study, the written assent of all children was also sought. Children for whom written consent and assent was obtained were invited to attend a focus group discussion. The timing of the focus group discussions was determined by the head teacher, for example, during normal class time, over the lunch break, or immediately after school.

All the participating schools in the study allowed the researcher to use one of their teaching rooms to carry out the focus group discussions. The room was made ready by the researcher before requesting the children's presence. A table, with several chairs surrounding it, was placed in the middle of the room, and a recording device was placed in the middle of that table. During the focus group discussions, notes were taken by the facilitator to help identify particular participants when analyzing the transcripts.

A detailed study guide was used to ensure that all focus groups were undertaken in a relatively uniform manner. The "facilitator" (author) was introduced to each group of pupils by one of their teachers. The teacher told the group briefly about the topic to be discussed but did not remain in the room during the focus group to keep the student answers confidential and to avoid any influence on the discussion. The teachers were briefed after the discussions so that they would be prepared to answer questions that the children may raise with them as a result of the research study. The facilitator put the children at their ease by first giving some details about himself, and then the group was told that the discussion was going to be audio-recorded to help the facilitator remember the views that had been expressed.

The facilitator put the children at ease by first giving some details about themselves and then asking each child to say who they are and whether they have any knowledge about COVID-19 and the vaccination program. The language used was adjusted as appropriate to the different age groups. Following this, the questions in the study guide were asked, leaving time for discussion around any related subjects raised by the participants. As before, the language used was modified, as appropriate, to take account of the age of the children involved. However, the meaning was kept constant. Each focus group was planned to last no longer than 45 minutes, and indeed most focus groups took a shorter time (30–40 minutes). The focus group interviews were conducted in April 2022.

All discussions were audio-recorded and transcribed in full. A thematic analysis was performed using QSR NVivo® computer software to allow a complex organization, indexing, sorting, and retrieval of data. The further analysis consisted of refining the concepts which had been identified, grouping similar statements into themes, and presenting a series of hierarchical tree structures whereby themes and categories were identified as they "emerge" from the data from each of the age groups of children. External validation of the analysis was performed by a separate

investigator. Finally, the demographic characteristics of the study participants were presented as frequency and percentages.

The study received ethical approval from the IRB at the Kind Abdulla University Hospital, Jordan University of Science and Technology, and was funded by the Jordan University of Science and Technology (REF: 20210592).

RESULTS

A total of 54 children from three schools in the main cities of Jordan participated in a total of nine focus groups. Students were recruited from three different groups, as seen in [Figure 1](#) (19 from a public school, 18 from a private school, and 17 from a nonprofit school). Moreover, students were from different age groups (17 were 6–8 years old, 18 were 9–11 years old, and 19 were 12–14 years old). Among the participating students, around half of them were females ($n = 28$, 51.9%). Also, more than two-thirds of children taking part in the study ($n = 38$, 70.4%) indicated that they were willing to take the COVID-19 vaccine, and the majority of children ($n = 51$, 94.5%) were aware that both their parents took the COVID-19 vaccine. Further details of children who attended the focus groups are presented in [Table 1](#).

Three overarching themes were identified in the analysis: benefits, motivators, hesitancy, and barriers to taking the COVID-19 vaccine. A summary of themes generated from this study is presented in [Table 2](#). Participating children who were willing to take the vaccine discussed that the vaccine was beneficial as it could protect them from being infected with COVID-19 and reduce the severity of the disease had they been infected with the virus. Moreover, participating children were motivated to take the vaccine because of their families' support and positive experience with the vaccine. Participants were also influenced by the awareness created by news in the media about giving the vaccine to children in other countries, which encouraged them to take the vaccine.

However, participating children who were hesitant to take the vaccine discussed that the vaccine could be harmful, mainly because they thought that the vaccine was developed in a short period and was not tested thoroughly, especially in their

age group, and that the vaccine could have side effects that could harm them. This thought was mainly generated because some of the children's parents suffered from the vaccine's side effects and because of reports on news and social media. Some participants feared the vaccine as it was delivered in an injection, and they indicated that they do not favor this delivery method. Had the vaccine been delivered as pills, they would be more willing to take it. Other children who were hesitant to take the vaccine indicated that they think that the vaccine is not effective enough as it does not protect people from being infected with COVID-19, and its efficacy could protect individuals for a short period. Participating children reported knowledge of people who took the vaccine and were infected, and this highly affected the hesitancy to take the vaccine. Furthermore, many participants believed that they were protected and that there is no need to take the vaccine as the virus does not infect children and is more common among adults, not being aware of the recent developments in the virus that makes it more contagious among this age group.

DISCUSSION

As the SARS-CoV-2 continues to circulate and mutate, the COVID-19 pandemic is evolving into different stages, while the emphasis is being shifted from a disease of adults to a disease of the young. The younger generation is now the main source of SARS-COV-2 spread ([Cui *et al.*, 2021](#); [Li *et al.*, 2020](#)). As such, in November 2021, the CDC issued recommendations to vaccinate children aged 5 years and older ([CDC, 2021b](#)). However, the pace of vaccination in this age group is slow worldwide ([Zou and Cao, 2021](#)). While several studies have recently provided data on children's COVID-19 vaccination uptake and hesitancy, most of them were self-administered questionnaires confined to parents' opinions ([Di Giuseppe G *et al.*, 2022](#); [Fazel *et al.*, 2021](#); [Rane *et al.*, 2022](#); [Temsah *et al.*, 2021](#)). Nonetheless, these studies were susceptible to social desirability and recall bias. At the time of writing this paper, this was the first qualitative study that was conducted among children aged 6–14 years, which has reflected participants' spontaneous, honest, and genuine responses.

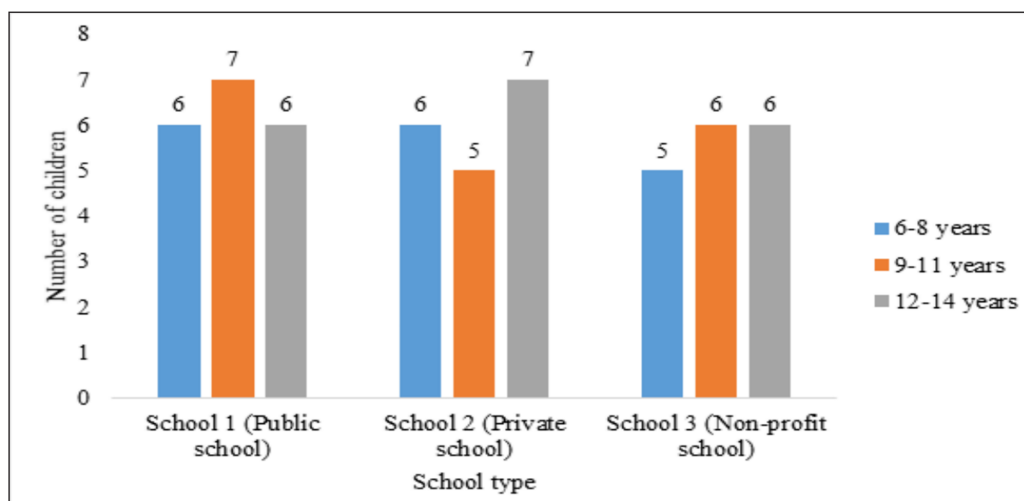


Figure 1. Number of children who attended the focus groups based on their age groups and school type.

Table 1. Characteristics of participating children in the focus groups (*n* = 54).

Parameters	<i>n</i> (%)
Age	
6–8 years	17 (31.5)
9–11 years	18 (33.3)
12–14 years	19 (35.2)
Gender	
Female	28 (51.9)
Male	26 (48.1)
Previously infected with COVID-19	
No	45 (83.3)
Yes	9 (16.7)
Willing to take the vaccine	
No	16 (29.6)
Yes	38 (70.4)
Took the vaccine	
No	16 (29.6)
Yes	3 (5.6)
Information not available	35 (64.8)
Parents took the vaccine	
Both parents	51 (94.9)
One parent	2 (3.7)
Does not know	1 (1.9)

To optimize the control of the COVID-19 pandemic and fasten the return to pre-pandemic activity, health policymakers should promote the uptake of the COVID-19 vaccine among the population (Abu-Farha *et al.*, 2021a; Murewanhema *et al.*, 2021; Velavan *et al.*, 2020). However, to achieve this, effective herd immunity should be attained. Recruiting children in the early vaccination trials might expose them to health risks, but delaying their enrollment might deprive them of being immunized against the virus, hence interrupting the adequate and effective control of the pandemic (Mintz *et al.*, 2021; Velavan *et al.*, 2020).

Although only 30% of children are reluctant to take the COVID-19 vaccine, it is still considered a number of appreciable concern, as it may affect the vaccination rate in this age group to a lower rate and, in turn, affect the mitigation of COVID-19 infections and transmission. It is worth mentioning that recent data issued by the American Academy of Pediatrics revealed that the high transmissibility rates of the highly contagious Omicron variant were mainly attributed to children, which were recently considered potential spreaders and dangerous carriers of COVID-19 and new emerging variables. Researchers from Massachusetts General Hospital showed important findings that infants, toddlers, children, and adolescents are equally capable of carrying a very high level of SARS-COV2 virus in their respiratory system even when asymptomatic (Chou *et al.*, 2022b).

However, among the children and adolescents who are hesitant to receive the COVID-19 vaccine, the main reasons are attributed to safety issues. This finding could be interpreted by the fact that antivaccine activists target vulnerable parents on social media that are easily influenced by vaccine misinformation. A recent study has found that 68% of parents that use social media reported using it for health information (Frey *et al.*, 2021). These parents are the main target of antivaccine activists who are more

skilled at tackling messages that impact children's safety and cause serious harm.

Nonetheless, the other proportion of hesitant children was mainly related to speculations and uncertainty related to the efficacy of COVID-19 vaccines. This hypothesis was particularly stronger among children, as breakthrough cases were observed even in previously infected individuals who were fully vaccinated. Thus, this could have influenced their perception of the COVID-19 vaccine. Some children believed that the COVID-19 vaccine would not provide any additional protection as it does not infect children. This underestimated perception requires specific attention and highlights the urge for initiatives to be taken to increase public awareness about pediatric COVID-19 and implement broader testing programs in children. This vulnerable group is an essential component in beating the pandemic, and a thorough investigation of how they are affected and interact with others would add a stop to the outbreak. These initiatives are extremely important since recent studies have found that children are potential spreaders, as the true incidence of COVID-19 among them is unknown due to prioritization of testing among adults and severe cases, not forgetting that also COVID-19 symptoms duration is shorter, and symptoms burden is lower among this age group.

This study will serve as an opportunity to alert policymakers in optimizing the role of pediatricians and other healthcare providers in building parents' trustworthiness in the vaccine since they are a trusted source of information on COVID-19. These influencers can use social media platforms to provide scientific information in addressing parents' concerns and doubts about pediatric COVID-19 vaccination. Furthermore, the solution may also lie in working with schools to empower children to feel confident. The CDC recommended action steps that schools should take to increase the uptake of the COVID-19 vaccine and improve health literacy among students and their parents (CDC, 2021a).

This study was proactive in investigating the children's willingness to receive the COVID-19 vaccine using a qualitative method approach, reflecting their genuine responses. Nonetheless, several limitations should be pointed out. First, this study was conducted among students of three schools only, which might induce selection bias and thus limit the generalizability of results to the general population. However, the selected schools have a diverse student body with different backgrounds, cultures, and financial statuses. Second, several potential confounding variables that influence the participants' willingness to receive the vaccine were not controlled during the study's conduction; these include parents' educational and employment status, age, cultural background, exposure to media, and children's knowledge and perception toward COVID-19 and its severity. Nonetheless, this is an exploratory qualitative study that aimed to identify the children's spontaneous responses and did not intend to thoroughly investigate the determinants of children's willingness. Third, at the time of the study's conduction, the Jordanian Government did not mandate vaccination for children of the targeted age group. Hence, the decision to vaccinate belongs to their parents. As such, it would have been more interesting to investigate and compare the parents' and their children's willingness to receive the COVID-19 vaccine.

Table 2. A summary of themes and subthemes generated from the focus groups.

Themes	Sub-themes	Sample quotes
Benefits	Protection	102p1: "I have to take it because it will protect me and those around me"
		203p1: "The vaccination is very important in order to protect us and protect the people around us and we are always in contact with them, even if we are not affected by corona too much, but we can infect another person and become infected and get sick a lot of it, and it may affect him more than us, that is why they started giving children vaccinations"
		302p7: "I will take it as the first people because I am 100% confident that it is good and protective, because there are many companies worked on it and there are more than one type as much as I can ask which type suits me and I take it"
	Reduce disease severity	303p4: "The only way until the corona ends"
		303p1: "It is free for all people, and it is sure to prevent infection with the Corona virus"
Motivators	Family	302p7: "It is very important, and it relieves the symptoms. My family was infected, though they received the vaccination"
		101p5: "I was infected, and I was afraid that I would die or be hospitalized"
		301p3: "I did not get infected, but I took the vaccine before school started. So that if I get infected, it will be mild"
	Other countries do it	202p4: "I asked my cousin who is a physician about the vaccine, and he told me to take it"
		203p6: "I will take the vaccine just like my family did"
		302p5: "My father was one of the first people to receive the vaccine in Jordan and I trust him"
	The vaccine is ineffective	102p3: "I will receive the vaccine because some countries outside Jordan have started giving it to children in my age group"
		203p1: "I will get it for sure, but I prefer to take Pfizer or Moderna because some countries have given these two types to children"
		303p5: "It is not very useful, there are people who received the vaccine, and yet they were infected"
	Vaccine is scary and harmful	301p5: "Not very effective..... I don't think it's effective because it only protects you for 6 months and then it wears off"
		202p1: "What's the point, because even if I take the vaccination, I am still going to wear the mask and use disinfectants"
		201p3: "It could do something undesirable, meaning side effects"
Hesitancy and barriers		203p2: "The vaccine is not good because it is a dead corona virus that goes into your body. ... and there are people when they were vaccinated, they had COVID like symptoms as if they had contracted the corona..."
		301p4: "I saw videos where those who got the vaccine the site of injection turned into a magnet and attracted metal objects"
		301p1: "I will not take the vaccine because my father took it he got really sick that he almost died and so did my aunt"
	The vaccine is not adequately studied	201p5: "The scariest vaccine is the XXX (company name) one because I saw on the news someone took it and died instantly."
		103p3: "I have asthma, and my father told me that I cannot take the vaccine because I will get sick"
		203p5: "Serious side effect may appear after 1 or 5 years"
	The route of administration	202p5: "I heard from the teacher that her hand hurt her after receiving the vaccine"
		301p4: "There are not enough studies because the vaccine came out quickly, and pharmaceuticals pushed doctors to recommend it quickly without doing enough experiments"
		203p5: "They have not tested the vaccine and they approved it so quickly."
	Children do not get COVID-19	103p5: "I also want to receive the vaccine, but if it was in the form of pills or syrup, it would be better"
		103p1: "I want to get the vaccine, but I'm afraid of the needle"
		201p6: "I will not take the vaccine because I took vaccine when I was in the first class, I was dizzy and vomited"
		202p2: "I am afraid of a needle"
		203p1: "We are not affected by the coronavirus"
		302p4: "Because children are less likely to get infected and their immunity is stronger than adults"
		302p6: "Important and safe, but for adults, not for us because we are young. Adults have weaker immunity than us"
		201p2: "My dad told us that we are young, and we do not need to take the vaccine, because we had strong immunity"

CONCLUSION

This study shows a clear willingness among children to take the COVID-19 vaccine. Such outcomes should be tested further on a wider scale to deliver future recommendations to include younger children in the vaccination program. Disease prevention, severity reduction, parental support, and media awareness were the main predictors of vaccination among children.

AUTHOR CONTRIBUTIONS

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the

work. All the authors are eligible to be an author as per the international committee of medical journal editors (ICMJE) requirements/guidelines.

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CONFLICTS OF INTEREST

The authors report no financial or any other conflicts of interest in this work.

ETHICAL APPROVALS

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DATA AVAILABILITY

All data generated and analyzed are included in this research article.

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SUPPLEMENTARY MATERIAL**INTERVIEW GUIDE**

After starting a brief introduction about COVID-19 pandemic and its vaccination, then we can talk together about it completely

1. Have you or any of your family members been infected with COVID-19?
2. If the answer is yes, what did you feel at the time? Was the fear of illness controlling you?
3. What do you think about the role of the vaccine and its importance?
4. Where did you get your ideas about the vaccine?
5. If the vaccine was tested on children of your age and it became available for them, would you like to receive the vaccine or not?
6. If your answer is no, may I know the reasons?
7. Has any of your family members received the vaccine? What do they think of that?
8. Are you confident in the opinion of doctors and pharmacists about the vaccine and giving it to children?
9. Is the reason for your refusal of the vaccine due to fear of the needle, for example, or from its possible side effects?
10. What age do you think children can adequately participate in decision-making?
11. In the event that the vaccine is available to those of your age and it becomes compulsory to take it to enter schools, parks and places of recreation, what will be your opinion on that matter?