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ORIGINAL RESEARCH

Parents' Attitudes Toward COVID-19 Vaccination for School Children in Jordan

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Abstract

Background: Vaccination against COVID-19 is pivotal in curbing the spread of the virus among school children. However, there is a dearth of studies exploring parents' attitudes and acceptance levels regarding immunizing their children against COVID-19 in Jordan.
Purpose: This study aimed to assess parents' attitudes and key concerns toward administering COVID-19 vaccines to their school-aged children in Jordan. Additionally, it sought to identify the differences in parents' attitudes based on socio-demographic variables.
Methods: The cross-sectional and correlational study was conducted in AL-Mafraq governance within Northeastern Badia schools from March to May 2022 and involved 498 eligible parents. Stratifying the parent population based on school districts, data were conveniently collected using the Parent Attitude about Childhood Vaccines (PACV) scale. Statistical Package for the Social Sciences (SPSS) version 17 facilitated data analysis, incorporating descriptive and inferential statistics at a significance level of 0.05, with a 5% margin of error. The independent t-test and One-Way ANOVA were employed to depict differences between studied variables.
Results: The result showed that out of 600 distributed questionnaires, 498 were returned, resulting in a response rate of 83%. Findings revealed parental reluctance toward administering COVID-19 vaccination to their children. Notably, 65.9% of parents expressed concern about potential serious side effects, while 57.8% of parents harbored anxieties about vaccine safety and efficacy. Marital status emerged as a significant factor, with widowed parents exhibiting a more favorable attitude (p<0.05).
Conclusion: Parents in Jordan are hesitant about COVID-19 vaccination for their school-aged children. Addressing these concerns necessitates educational campaigns through various channels, including social media and authorized TV and radio, to reassure parents about vaccine effectiveness and safety. This proactive approach is crucial to fostering broader acceptance and ensuring the success of vaccination initiatives.

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1. Introduction

Schools have contributed to the spread of the COVID-19 virus among school-age children, as well as an increase in the percentage of COVID-19 screening tests that are positive. As a precautionary measure, many countries closed their schools and shifted to online education, which had a severe impact on educational quality as well as emotional and psychological repercussions on schoolchildren (Dong et al., 2020). Schoolchildren vaccination is strongly advised for schools to restart safely (Kwok et al., 2021). Understanding parents' opinions toward vaccinating their children against COVID-19 is, therefore, critical to maximizing immunization rates among Jordanian children.

There is a global variance in parents' attitudes concerning vaccinating their children and the acceptability of the COVID-19 vaccine. For example, parents' perceptions of vaccination safety and efficacy may influence their decision to vaccinate their children (Bell et al., 2021; Humble et al., 2021). Unfortunately, due to conflicting information about the safety of the COVID-19 vaccine,

parents are becoming increasingly concerned about vaccinating their children. Based on their scientific expertise, parents were unable to decide which sources of information were reliable (Williams et al., 2013).

After receiving parental consent, the Jordanian Ministry of Health (MOH) and Ministry of Education (MOE) approved the COVID-19 vaccine for children aged 12 to 18. There is little information available to parents on the safety and effectiveness of the COVID-19 vaccine for children (Jordan Times, 2023). Parents in Jordan were concerned about their children's vaccinations, which stemmed from a lack of information and mistrust of government policies (Zein et al., 2021). Furthermore, high school (Tawjihi) students are now required to receive two immunization shots before taking their final examinations (Jordan Times, 2023). In Jordan, there is a scarcity of data on the factors that influence parents' opinions concerning their children's vaccination with the COVID-19 vaccine. This information is critical for better understanding these aspects and developing measures to improve parents' views and acceptance of vaccination for their children (Zein et al., 2021).

Typically, parents decide whether to vaccinate their children. Therefore, it is essential to comprehend parents' views, either acceptance or reluctance, regarding their children receiving the COVID-19 immunization. According to the researcher, no studies have been conducted on Jordanian parents' opinions toward their children's COVID-19 vaccinations. Moreover, to the researcher's knowledge, no studies have been published in Jordan that examine parents' attitudes and levels of acceptance for immunizing their children against the COVID-19 virus. This study is significant because it will be one of the first in Jordan to assess how parents feel about and how much they accept their children receiving the COVID-19 vaccine.

Accordingly, this study aimed to assess parents' attitudes toward the COVID-19 vaccine administration to their school-age children in Jordan and to identify key parental concerns about vaccinations. In addition, identifying the differences in parents' attitudes toward their children receiving the coronavirus vaccine based on a socio-demographic variable was also studied.

2. Methods

2.1 Research design

A cross-sectional and correlational study design was used. The data were collected at a single point in time to analyze relationships between variables. This approach allows for the examination of associations without manipulating factors, providing a snapshot of interconnections within a specific timeframe (Polit & Beck, 2017).

2.2 Setting and samples

The study was conducted in Al-Mafraq governance, located in the eastern-northern area of Jordan. Six conveniently governmental schools were selected from the six districts located in AL-Mafraq, and those conveniently selected schools had students aged between 12 and 18 years old. The selection of six conveniently chosen governmental schools from the six districts in Al-Mafraq aimed to ensure a representative and accessible sample for the study. Those schools were three schools with female students and three schools with male students from grade 7^{th} to grade 12^{th}, with about 1,366 students. This study targeted parents who had students aged 12–18 years old in the northeast Badia public schools. Inclusion criteria included parents with children aged between 12 and 18 years old. Exclusion criteria were parents who had children with some diseases, namely chronic diseases, autoimmune diseases, bronchial asthma, and having high allergic reactions because those children would never be vaccinated regardless of their parent's attitudes.

The sample size of the study participants was calculated based on a conventional power of 0.80, a conventional criterion of statistical significance of 0.05, and a medium effect size by using the G*Power 3.1.2 and selecting the t-test and ANOVA test (Faul et al., 2007). The minimum total number of participants of parents estimated for this study was 335. The sample was increased to 600 to control attrition and make our sample more representative. This study employed a stratified sampling technique. In the initial stage, the parent population in the Al-Mafraq governance was stratified according to school districts. Subsequently, a convenient sample of parents was selected from each stratum, ensuring a representation of diverse backgrounds and characteristics within the study area. One hundred questionnaires were then distributed in each school as part of the data collection process.

2.3 Measurement and data collection

Data collection was done using a set of questionnaires that was filled out by the students' parents using a paper survey. The first part included an introduction to the study, its aim, and its benefits. Also, it contained a consent form to participate in the study. The second part was the socio-demographic of the parents, such as gender, nationality, age, level of education, monthly income, marital status (married, separated), and parents' previous infection with COVID-19. The third part was the Parent Attitudes about Childhood Vaccines (PACV) tool that was developed and used in the United States of America to identify parents' attitudes toward vaccines (Opel et al., 2011). It has 15 questions. Two questions are related to childhood vaccination behaviors, four are related to safety and efficacy, and nine are related to general attitude and trust. Answers are with numeric scores ranging from 0=not hesitant, 1=do not know, and 2=hesitant. The higher the score, the higher the parent's hesitancy toward vaccination. The overall raw score was calculated by adding the item scores in an unweighted manner. The final step was to transform the overall raw score to a scale from 0 (least hesitant) to 100 (most hesitant). Participants with a score greater than or equal to 50 were defined as hesitant and disagreed with giving vaccinations to their children (Opel et al., 2011). In contrast, participants with a score of less than 50 were defined as not hesitant to give vaccination to their children (Opel et al., 2011). The original tool had been used in different countries, and it had an internal consistency ranging from 0.74 to 0.84 (Opel et al., 2011).

Permission to use the PACV tool had been taken from the author (Opel et al., 2011). The instrument was translated into Arabic by a linguistic expert. The PACV tool, initially in English, underwent a translation process to be rendered into Arabic. Subsequently, it was back-translated into English. The translated version was identical to the original questionnaire. The translated Arabic version of the instrument underwent a thorough examination of its content validity. A Content Validity Index (CVI) was calculated. The Individual Content Validity Index (I-CVI) scores were 0.90, indicating a high degree of agreement among experts. Seven experts participated in the evaluation process, confirming the robustness of the instrument in capturing the relevant aspects of parents' vaccine hesitancy in the Arabic cultural context. Additionally, Cronbach's alpha was used to make sure the instrument was reliable. It needs to be 0.70 or higher for the instrument to be considered reliable (Polit & Beck, 2017). The translated Arabic version's Cronbach alpha scores were 0.79, and the Arabic version could serve as a tool in the Arabic culture area in the evaluation of parents' vaccine hesitancy toward their children's vaccination (Alsuwaidi et al., 2020). This translated version was employed in a study conducted in the United Arab Emirates.

Data collection took place over a two-month period from January to March 2022. After obtaining IRB approval from AL-al-Bayt University and the Ministry of Education (MOE), the selected school's principles were approached. The questionnaires were then distributed to the specified students, via the classroom teachers, instructing them to ask their parents to complete and seal the questionnaires in an envelope. The students were asked to return the sealed envelopes the next day to their respective classroom teachers. These teachers, in turn, delivered the sealed envelopes containing the completed questionnaires to the principal's office. Returned responses were arranged and saved in a folder in the researcher's cabinet.

2.4 Data analysis

The Statistical Package for the Social Sciences (SPSS) program version 17 was used in the data analysis to generate descriptive and inferential statistics with α=0.05 and a margin of error of 5%. For continuous demographic variables, descriptive statistics of mean and standard deviation were generated, and for categorical demographic variables, frequency analysis was generated to describe demographic data among participants. Furthermore, tables were generated to facilitate reading means and standard deviations. Before answering the research questions and according to the tool author's scoring instruction, the raw total PACV scores were calculated by simply summing each item. Then, the raw scores were converted to a 0–100 scale using a simple linear transformation accounting for items. A total score of the PACV scale and the whole mean score of the scale for the whole sample were calculated (Polit & Beck, 2017). The total scores for items 8, 9, and 10 from the questionnaire were calculated separately. The total score for items 8, 9, and 10 measured parents' concerns regarding vaccination side effects, vaccination safety, and whether vaccination prevented the disease, respectively. After having the total score on the scale,

the independent t-test and One-Way ANOVA were used to describe the differences between studied variables (Polit & Beck, 2017).

2.5 Ethical considerations

This study obtained ethical approval from Al al-Bayt University's Institutional Review Board (IRB) (No. 5/2021/2022). Approval from the Ministry of Education (MOE) was also obtained to facilitate our access to the targeted schools. The cover letter at the beginning of the survey had an explanation of the aim of the study, benefits, and risks; the researcher's contacts; an explanation that their participation was considered a consent form; and their approval to participate in the study. To ensure the privacy of the information provided, no names or contact numbers were asked of participants. Participation was voluntary, and participants had the right to withdraw from the study at any time. Participants' demographic, personal, and response data were kept strictly confidential and electronically archived using a password-protected document. Only the researchers had access to the research data.

3. Results

3.1 Socio-demographic characteristics of the participants

Out of 600 distributed questionnaires, 498 were returned, resulting in a response rate of 83%. Table 1 shows participants' socio-demographic variables. Regarding age, the participants' mean age was 41.4 (SD=7.91) years. The majority of participants were male (79.5%), Jordanians (88%), were working as public sector employees (33.5%) and private-sector employees (25.6%), having secondary education or less (52.2%), married (77%), and had been previously infected with COVID-19 (61.3%). As many as 209 (42%) of the parents who participated in the study were willing to vaccinate their children with COVID-19 vaccinations.

Table 1. Participant socio-demographic characteristics (n=498)

Demographic variables	f	%	Mean	SD
Age (year)			41.4	7.91
Gender				
Male	396	79.5		
Female	102	20.5		
Nationality				
Jordanian	438	88.0		
Non-Jordanian	60	12.0		
Job				
No Work	98	19.6		
Private sector	125	25.6		
Self-employed	111	22.7		
Public sector	164	33.5		
Education level				
Secondary education or less	260	52.2		
Diploma or Bachelor's level	203	40.7		
Post-graduate education	35	7.1		
Marital Status				
Married	382	77.0		
Separated or widow	106	17.1		
Previously infected with COVID-19				
Yes	305	61.3		
No	193	38.7		
Parents willingness to vaccinate their children				
Yes	209	42.0		
No	289	58.0		

3.2 Parents' attitudes toward vaccinating their children

Table 2 indicates parents' attitudes toward their children's vaccination with COVID–19 vaccines (M=76.62, SD=15.07). These results, according to the (PACV) tool scoring results, meant that parents did not agree and were hesitant to give vaccinations to their children. The results of the study revealed diverse attitudes and behaviors regarding childhood vaccinations among

parents in Al-Mafraq governance. Notably, a significant portion of parents had delayed or chosen not to have their child receive certain shots (35.5%), while others expressed uncertainty (33.1%). Confidence in the recommended shot schedule was high, with the majority expressing ratings of 0-5 (73%) on a scale of 0 to 10. While opinions varied on the perceived severity of preventable illnesses and the belief that children received too many shots, a majority disagreed (60.4%) with the notion that it was better for a child to develop immunity through illness rather than vaccination. Trust in information about shots and open communication with healthcare providers exhibited divisions among respondents. Concerns about side effects and safety were generally low (14.5% and 19.3%, respectively), and a majority expressed future hesitation about vaccinating their potential children (67.8%). Overall, these findings underscored the nuanced landscape of parental attitudes toward childhood vaccinations in the Al-Mafraq region.

Table 2. Parents' attitudes toward children's vaccination (n=498)

Attitude Toward Vaccination	Mean	SD	Yes/Agree/ Concerned/ 6-10 f(%)	No/Disagree/ Not concerned/0-5 f(%)	Do not know/ not sure f(%)	Confidence f(%)
Overall parents' attitude	76.62	15.07				
Parents' attitude per statement						
Delayed child's shot?			177(35.5)	156(31.3)	165(33.1)	
Skipped child's shot?			163(32.7)	212(42.6)	123(24.7)	
Sure about shot schedule?			135(27.0)	364(73.0)		
Kids get too many shots?			109(21.9)	122(24.5)	267(53.6)	
Severity of preventable illnesses			107(21.5)	200(40.2)	191(38.4)	
Better immunity by getting sick?			26(5.2)	301(60.4)	171(34.3)	
Fewer vaccines at once better?			96(19.8)	315(64.8)	75(15.4)	
Concern about serious side effects			72(14.4)	328(65.9)	98(19.7)	
Concern about shot safety			96(19.3)	288(57.8)	114(22.9)	
Concern shot might not prevent disease			62(12.4)	288(57.8)	148(29.7)	
Want future child to get all shots?			80(15.6)	335(67.8)	83(16.6)	
Overall hesitancy about shots			75(15.1)	291(58.4)	132(26.5)	
Trust information about shots			53(10.1)	280(56.8)	165(33.1)	
Discuss concerns with child's doctor			41(7.6)	318(64.6)	139(27.8)	
Trust child's doctor			171(34.3)	367(73)		36(7.2)

3.3 Parents' major concerns of vaccinating their children

Table 3 shows that the majority of parents (65.9%) were somewhat concerned and very concerned that their children might have serious side effects from a shot, while only 14.4% of respondents had not concerned that their children might have serious side effects from a shot. Furthermore, 57.8% of participants were somewhat concerned and very concerned regarding vaccine safety, while about (19.3%) were not concerned regarding vaccine safety. Moreover, 57.8% of the parents were somewhat concerned and very concerned if the vaccine could prevent the disease, while 12.4% had not concerned if the vaccine might prevent the disease.

Table 3. Parents' major concern of vaccination (n=498)

Parents' major concerns	Not at all concerned and not too concerned f(%)	Not sure f(%)	Somewhat concerned and very concerned f(%)
How concerned are you that your child might have a serious side effect from a shot?	72(14.4)	98(19.7)	328(65.9)
How concerned are you that anyone of the childhood shots might not be safe?	96(19.3)	114(22.9)	288(57.8)
How concerned are you that a shot might not prevent the disease?	62(12.4)	148(29.7)	288(57.8)

3.4 Parents' attitudes toward children vaccination according to socio-demographic characteristics

Tables 4 shows parents' attitudes toward vaccination by demographic variables. The results showed that there was a statistically significant difference in the attitude by marital status (t=7.24, p=0.01). Widowed or separated groups tend to be more hesitant to give vaccination to their children compared to married groups. The results also indicated no statistically significant differences in the attitude based on education level (F=1.74, p=0.209), gender (t=-1.71, p=0.088), age (t=2.0, p=0.073), nationality (t=0.56, p=0.523, and job (F=1.65, p=0.146).

Table 4. Parents' attitudes toward vaccination according to the socio-demographic characteristics (n=498)

Characteristics	n	Parents's Attitude		F/t test	*p*
		Mean	SD		
Gender					
Male	396	76.04	14.39	t=-1.71	.088
Female	102	78.89	17.38		
Age					
Less than 30	153	76.30	13.67	t= 2.0	.073
30 and more	345	78.40	15.43		
Nationality					
Jordanian	438	76.82	.088	t= .56	.523
Other nationality	60	75.00	14.41		
Employment					
No work	98	77.80	12.24	F=1.65	.146
Private Employee	125	75.06	17.16		
Self-employed	111	74.87	16.79		
Public Employee	164	78.94	13.41		
Educational level					
Secondary education or less	133	76.83	15.68	F=1.47	.209
Diploma or Bachelor's level	127	75.83	17.10		
Post-graduate education	80	76.20	12.6		
Marital status					
Married	382	76.08	15.87	t=7.24	.001
Separated or widows	106	86.79	11.30		

Note. F: One-way ANOVA, t: Independent t-test

4. Discussion

This study aimed to assess parents' attitudes and identify key parents' concerns toward the administration of the COVID-19 vaccines to their school-aged children in Jordan. The findings showed that, regarding parents' attitudes toward their children's vaccination with COVID-19 vaccines, the parents in this study were hesitant and disagreed with giving their children the COVID-19 vaccination. Furthermore, only 42% of the parents who participated in the study were willing to vaccinate their children with COVID-19 vaccinations. The current study finding is similar to the rate of participating parents in Turkey, with 45.2% of parents accepting and wanting to give their children the COVID-19 vaccine (Yilmaz & Sahin, 2021). Parents' reluctance to vaccinate their children with COVID-19 may be due to a lack of information regarding the vaccine's safety or potentially negative effects. Furthermore, some parents feel that the immunizations will harm their children in the future.

Our study findings revealed a stark contrast in the beliefs and attitudes of parents in the current research context compared to previous studies. The study findings contrasted Canadian and Ecuador parents' beliefs and attitudes toward their children's COVID-19 vaccination. According to the Canadian study, 63% of participating parents wanted and were willing to vaccinate their children against COVID-19 (Humble et al., 2021), while in Ecuador, the number was 97% (Sallam, 2021). In another study, 65% of parents who visited 16 pediatric emergency clinics in Canada, the United States, Japan, Spain, Palestine, and Switzerland agreed to and planned to vaccinate their children with the COVID-19 vaccine (Goldman et al., 2020). As many as 82.61% of the Chinese parents who took part in the study were also willing to vaccinate their

adolescent children against the COVID-19 virus (Wu et al., 2022). Furthermore, in a Brazilian study, vaccine reluctance was found to be very low (2.8%) among parents, emphasizing the relevance of COVID-19 vaccination for the entire population, adults, and children (Bagateli et al., 2021). Upon further analysis, variations in the results between Jordan and Turkey compared to other countries may be attributed to cultural nuances, including religious beliefs and perspectives. For instance, religious beliefs may shape attitudes toward vaccination, and these differences could manifest in the perceived relevance of certain aspects of vaccine hesitancy.

Based on socio-demographic characteristics, parents' opinions regarding their children receiving the COVID-19 vaccine were investigated. The findings indicated that there was a significant statistical difference in attitude by marital status in favor of the separated or widowed parents, who were more cautious about vaccinating their children with COVID-19 vaccinations than married parents. Separated status was substantially more related to COVID-19 vaccine reluctance in the UAE and Ghana than any other marital status (Alsuwaidi et al., 2020; Anokye et al., 2018). This can be explained by the fact that unmarried mothers make decisions about their children's vaccinations alone, making them more hesitant to make such an important decision.

On the other hand, the findings of this study revealed that there was no statistically significant difference in attitude by gender. This is an excellent opportunity to delve more into this subject. This finding is consistent with other investigations (Teasdale et al., 2021; Zhang et al., 2021). This can be explained by the fact that both fathers and mothers perceived the same number of COVID-19 hazards and vaccination against this danger. It can be concluded that gender may not play a significant role in shaping parents' attitudes. In contrast, a study published in Turkey in 2021 found that mothers' reluctance to vaccinate their children with the COVID-19 vaccine was statistically significant (Yilmaz & Kursat, 2021). Furthermore, in Italy, mothers were substantially connected with their children's reluctance to receive the COVID-19 vaccine (Fedele et al., 2021). The observed maternal connection prompts further analysis, suggesting potential influences such as heightened responsibility, emotional attachment, health-related anxieties, cultural norms, and societal expectations. According to the current study result, there was no statistically significant variation in attitudes based on education level. These findings are consistent with previous findings that found no statistically significant differences between levels of education and parents' desire or reluctance to vaccinate their children against the COVID-19 virus (Choi et al., 2021). This is an issue that requires greater exploration and research to provide an explanation. In contrast, this conclusion contradicts a study published in Turkey in 2021 that found that parents' reluctance to vaccinate their children with the COVID-19 vaccine was connected with primary and secondary school parents' education (Yilmaz & Kursat, 2021). In this study, age did not affect parents' attitudes toward immunizing their children with the COVID-19 vaccine. This finding is consistent with the findings of a Korean study, which discovered that age was not a significant determinant in parents' opinions toward their children's immunization (Choi et al., 2021). This could be explained by the fact that Jordan has a predominantly young population, and there is no difference in the age distribution of the parents in this study. Younger parents were significantly related to an unwillingness to vaccinate their children with the COVID-19 vaccine in Italy (Fedele et al., 2021), whereas older participants were associated with hesitancy and refusal of the COVID-19 vaccine for their children in Brazil (Bagateli et al., 2021).

In terms of parents' major concerns in vaccinating their children, over two-thirds of parents (65.9%) were concerned about their children experiencing major adverse effects from the COVID-19 vaccine, and only 14.4% of responders were not concerned that the vaccine would cause major negative effects in their children. This notable level of concern may be rooted in various factors, including uncertainties about vaccine effectiveness, perceived risks or side effects, and possibly misinformation circulating within the community. The majority of parents' concerns about their children's vaccinations were that vaccine preparations had not been sufficiently evaluated and that there was insufficient information about potential future consequences (Babicki et al., 2021). This concern was also highly related to the vaccine's safety. Parents had no concerns about the safety of the COVID-19 vaccine, and there was high trust in the safety that was signed as well to be related to parents' intention to vaccinate their children (Choi et al., 2021). One of the parents' worries about vaccines in the UAE was vaccine safety (28%) (Alsuwaidi et al., 2020). In our study, 57.8% of parents were concerned about the vaccine's ability to prevent the disease, while 12.4% were not concerned about the vaccine's inability to prevent the sickness. COVID-19 vaccine effectiveness and a lack of COVID-19 vaccine-related information were discovered to be key

sources of anxiety for parents and the principal cause of parents' reluctance to vaccinate their children against the COVID-19 virus (Pan et al., 2021).

The current findings reveal that parents were concerned about the safety and side effects of the COVID-19 vaccination, and they were still hesitant to vaccinate their children. These behaviors could be assumed to be attributed to a variety of factors, including the study period being associated with varying levels of knowledge from various resources via social media regarding the COVID-19 vaccination, spreading rumors about a variety of conspiracy theories, misleading, conflicting, manipulating, and misinformation about the vaccine. However, these assumptions need further investigation. Another factor that could influence the results was public trust in government decisions and parents' willingness to accept official advice. Another explanation could be that parents who feel compelled to conduct an activity may feel compelled to behave in the exact opposite way. Furthermore, parents may adopt the "wait and see" mentality and later become more concerned about their children's vaccination as a result of the trials. This perspective is in line with findings from Suran et al. (2022)'s study, which has reported a correlation between delayed vaccine acceptance and increasing concerns among parents. Acknowledging and addressing these concerns in public health communication can be crucial in fostering vaccine acceptance and understanding the dynamic nature of parental attitudes toward vaccination.

5. Implication and limitation

The current study is one of the most advanced studies in Jordan, and its findings are critical to understanding parents' attitudes, beliefs, and fears about their children's immunization with the COVID-19 vaccine to increase the COVID-19 vaccination acceptance rate. Both the Ministry of Health (MOH) and the Ministry of Education (MOE) play critical roles in raising awareness and providing necessary health education to increase parents' acceptability and willingness to administer COVID-19 vaccines to their school-age children. Community health nurses have an important role in implementing healthcare programs and initiatives, and they should focus on educating children about the value of the COVID-19 vaccine and its protection.

This is one of the few studies in Jordan targeted at examining parents' attitudes toward school-age immunization. However, the current study has limitations, including the fact that the study design is cross-sectional and descriptive, which has less robustness than other study designs in finding connections between study variables. The survey was only delivered in one government region (Mafraq), which may restrict the generalizability of the study outcomes. The risk of bias is that data were collected via a self-report questionnaire, which may alter the accuracy of the information reported.

6. Conclusion

The study's findings revealed that parents in Jordan were hesitant to vaccinate their children with the COVID-19 vaccine, and their concerns regarding vaccination's safety, side effects, and effectiveness in avoiding infection with the COVID-19 virus were high. In terms of marital status, there were substantial disparities in the arithmetic mean of parents' reluctance to vaccinate their children with COVID-19 vaccinations. There were no statistically significant variations in parents' reluctance to vaccinate their children with COVID-19 vaccinations based on age, gender, income, education level, or child features. Understanding the causes and factors that interfere with and are connected with parents' desire and reluctance to vaccinate their children with the COVID-19 vaccine may assist in improving parental acceptability and minimize parental reluctance. The Jordanian government should launch targeted public awareness campaigns, tailoring messages based on marital status, to address parental concerns about COVID-19 vaccination. Prioritizing accessible vaccination centers and community education initiatives can enhance vaccine uptake. Future studies should focus on qualitative aspects of parental reluctance, conduct longitudinal research, explore cross-cultural differences, and evaluate interventions to refine strategies and policies for improving parental acceptability of COVID-19 vaccination for children in Jordan.

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Author contribution

AAZ: Primary data collection, analysis of data, and writing up the research.
MS: Designing research methodology, overseeing data analysis, and follow-up research publication.
MAb: Ensuring research validity and contributing to the interpretation of statistical findings.
WT: Reviewing and synthesizing relevant literature.
MAj: Ensuring clarity and coherence in presenting the study's findings.
AAb: Contributing to the discussion section and ensuring the study's relevance to current nursing practices.
AAl: Contributing to the conclusion and recommendations.

Conflict of interest

The authors declare that there is no conflict of interest regarding the research, authorship, or publication of this manuscript.

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