

# Understanding Parental Intentions for COVID-19 Child Vaccination: A Cross-Sectional Study From Jordan Using Theory of Planned Behavior

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**Introduction:** Using the Theory of Planned Behavior, this study addresses the factors that influence parental intentions to vaccinate their 12- to 17-year-old children against COVID-19. The study looked at how attitudes, subjective norms, perceived behavioral control, and fear of the COVID-19 vaccine impact these intentions.

**Methods:** Between November and December 2021, 396 Jordanian parents completed an anonymous online survey. A multivariate logistic regression analysis was used for analyzing the relationships.

**Results:** While 94.7% of children had received routine vaccinations, only 23.5% intended to vaccinate their children against COVID-19, indicating a vaccine acceptance gap. The analysis revealed that attitudes are the most significant positive predictor of vaccination intent, accounting for 75% of the variance. Subjective norms had a positive influence on parents' decisions, whereas fear of the COVID-19 vaccine was a significant barrier. Perceived behavioral control had a small but negative effect, indicating significant challenges to vaccination.

**Conclusion:** The Theory of Planned Behavior (TPB) clarifies numerous factors that influence parents' decisions to immunize their children against COVID-19. Understanding these factors is critical for narrowing the gap between high rates of routine vaccinations and low rates of COVID-19 vaccinations, as well as developing effective strategies to increase vaccine acceptance among parents.

**Keywords:** theory of planned behavior, COVID-19 vaccination, parental intentions, attitudes, subjective norms, perceived behavioral control, fear, children vaccination, parental decision-making, vaccination confidence, vaccine uptake

## Introduction

The World Health Organization estimates that the COVID-19 pandemic has caused over 773 million cases and 6.9 million deaths by December 2023,<sup>1</sup> creating significant threats to global health. In the fight against the pandemic, vaccination has proven to be crucial, especially for children and adolescents. Parents' decisions about the COVID-19 vaccine and how to handle future health crises can be better understood with the help of Ajzen's Theory of Planned Behavior (TPB).<sup>2</sup> Based on both medical and psychological research, this theory emphasizes the importance of personal attitudes, subjective norms, and perceived control in influencing health-related decisions.

As new vaccination-preventable subvariants and illnesses like measles, seasonal influenza, and respiratory syncytial virus (RSV), have emerged, it is even more important to understand vaccination behaviors. Vaccination campaigns against preventable infections face difficulties due to the concurrent rise in anti-vaccine movements.<sup>3</sup> As evidenced by the studies by Yahaghi et al,<sup>4</sup> Leigh et al et al,<sup>5</sup> and more recent applications of TPB in vaccine research highlight the importance of attitudes, subjective norms, and perceived control in shaping vaccination intentions.<sup>6,7</sup> These results are consistent with the larger body of literature, which includes a meta-analysis and systematic review by Limbu et al.<sup>8</sup> This study aims to combine the Theory of Planned Behavior (TPB) with the concept of fear of the COVID-19 vaccine

to understand why parents choose to vaccinate their 12–17-year-old children against COVID-19. It looks at how three key TPB factors—attitudes, subjective norms, and perceived control—influence vaccination intentions. This study plays an important role because it addresses critical factors influencing parental decisions in the context of pandemic management.

## Materials and Methods

### Theoretical Framework

Many psychological theories attempt to predict behavior, with the Theory of Planned Behavior (TPB) being one of the most widely used. This study predicts that parents' attitudes, subjective norms, and perceived control over the vaccination decision impact, the willingness of parents to vaccinate their children aged 12–17.

### Theory of Planned Behavior

Yahaghi et al<sup>4</sup> suggested employing the Theory of Planned Behavior (TPB) for examining adults' intentions regarding the COVID-19 vaccine. Subjective norms, perceived control, and attitudes were found to play a significant role in determining people's intentions to get vaccinated. Zhang et al<sup>9</sup> investigated the intention of parents to vaccinate their children against COVID-19. They reported that parents with positive attitudes that conformed to subjective norms and felt perceived behavioral control of their children under the age of 18 were more likely to give their permission to their children to receive vaccinations. According to Yahaghi,<sup>4</sup> the most common reasons for parents rejecting the administration of the COVID-19 vaccine for their children were due to fear of the COVID-19 vaccine side effects, a lack of understanding about vaccine efficacy, and a lack of confidence in vaccines imported from other countries. As addressed in Goldman et al study,<sup>9</sup> two major factors influence parents' decisions to vaccinate their children, the first is parents' fear of the COVID-19 vaccine due to their novelty. The second motivation stems from the knowledge that vaccines are safe and will protect their children from infection. However, to our knowledge, studies have yet to measure the effects of all these factors on intention in a single model which also adds fear of the COVID-19 vaccine as a potential barrier to parents' acceptance of their children's vaccination plan.

This study was conducted in Jordan using a cross-sectional survey. It took place through anonymous online interviews with parents of children aged 12–17 between Nov–Dec 2021. The study used a convenience sample of 396 parents of school- The sample included parents of children going to public as well as private schools. It excluded parents of adopted children and refugees in addition to parents who refused to participate in the study. Subjects were selected based on consultations with Regional Educational Administrative Authorities, School Principals facilitated the online communication with parents which took place on school premises after obtaining parent's consent to conduct the interviews. To increase participation, information about the study was shared through school communication channels, such as newsletters, and apps, and biweekly reminders were sent out to parents, Local educators and healthcare providers also encouraged parents to participate in the survey. Interviewers underwent standardized training. After discarding 10% for piloting, and incomplete forms, the completed information could be secured from 396 subjects. The data obtained from these subjects were analyzed. The survey questionnaire measured attitudes, subjective norms, intentions, and fear of the COVID-19 vaccine using a five-point Likert scale with closed-ended questions.

### Measurements

#### Effect of Parents' Attitude on Their Intention to Vaccinate Children

The term "attitude towards a behavior" refers to an individual's strong perception or evaluation, whether positive or negative, of a particular behavior that is being dealt with.<sup>2</sup> In this study, attitude represents parents' positive or negative judgment toward vaccinating their child with the COVID-19 vaccine. In general, attitude positively explains intention.<sup>2</sup> Moreover, it also can explain the intention to vaccinate adults.<sup>4</sup> Based on this, the first hypothesis that was set out for the study was stated as follows:

H1: Parents' attitudes toward vaccinating children and their intention to vaccinate children are positively related.

## Subjective Norms' Influence on Parents' Intention to Vaccinate Their Children

The social expectations and social pressures influencing the approval or disapproval of a specific behavior are interpreted subjectively by an individual.<sup>2</sup> In this study, subjective norms refer to the level to which an individual perceives the opinion of those significant others, such as family, other parents, and physicians, to be necessary. This may increase parents' willingness to vaccinate their children aged 12 to 17. According to Hofstede's index,<sup>10</sup> in collectivist cultures where social norms and social conditions take importance over individual choices, parents are more likely to base their decision on vaccinating their 12–17-year-old children on the views and opinions of close family members and other parents. This approach reflects the cultural emphasis on group consensus and decision-making as a whole. Therefore, the second hypothesis for this study was stated as:

H2: There is a positive correlation between parental intention to vaccinate children and subjective norms.

## Effect of Parents' Perceived Control on Their Intention to Vaccinate Children

Perceived control refers to an individual's evaluation of the simplicity or difficulty of performing a particular behavior, considering anticipated challenges or obstacles and prior experiences.<sup>2</sup> In this study, perceived control refers to individuals' perceived ability to vaccinate their child aged 12–17 or declining to do so. The research found a positive relationship between perceived control and intention to perform a behavior.<sup>2</sup> Thus, the third hypothesis was stated as:

H3: Parents' perceived control and intention to vaccinate children are positively related.

## Effect of Parents' Perceived Fear of the COVID-19 Vaccine on Their Intention to Vaccinate Children

The components of TPB may consider the indirect impact of fear. Fear of the COVID-19 vaccine can influence an individual's perception of subjective norms as well as his or her attitude toward a specific behavior. Fear of the COVID-19 vaccine, on the other hand, does not function as a distinct component or framework within the TPB framework. Thus, fear of the COVID-19 vaccine may also affect parents' intention to vaccinate their children against COVID-19.<sup>11</sup> Therefore, the fourth hypothesis was stated as:

H4: Parents' fear of the COVID-19 vaccine and intention to vaccinate children are negatively related.

The questionnaire's accuracy and cultural relevance were guaranteed by a rigorous translation and back-translation procedure. The questionnaire was originally written in English and then translated into Arabic, taking great care to reduce biases associated with language. Expert back-translation techniques that followed Brislin's recommendations<sup>12</sup> guaranteed linguistic and cultural appropriateness. To ensure instrument validity and reliability, a pilot survey was carried out post-translation on 10% of the sample. In the end, this pilot group was not included in the analysis. The Statistical Application of Cronbach's Alpha in Reliability attitudes, subjective norms, intention, and fear of the COVID-19 vaccine were (0.97; 0.78; 0.93, and 0.92). The predictive validity testing revealed a significant correlation indicating good validity.

## Statistical Analysis

The study was designed with a 90% power level and a 95% confidence interval, with a p-value of less than 0.05 indicating statistical significance and a 5% margin of error. A sample size of at least 385 participants was calculated using the Raosoft sample size calculator, based on the estimated population of 1,069,000 in the target age group for the year 2019–2020.

Descriptive statistics summarized the demographic details of participants. Multiple regression analysis evaluated the impact of various factors (antecedents of intention) on parents' intentions to vaccinate their children against COVID-19, with model fit and explanatory power indicated by R, R-Square, Adjusted R-Square, Standard Error, F-value, and p-value. Individual contributions of each antecedent were assessed through regression analysis, reporting coefficients (B), standard errors, beta values, t-values, and significance levels to evaluate each predictor's influence on the dependent variable (parents' vaccination intention). Stepwise regression analysis was used to determine each variable's (attitudes,

fear of the COVID-19 vaccine, subjective norms, perceived behavioral control) importance and contribution to the vaccination intention, highlighting the incremental impact of adding each variable to the model.

## Ethical Consideration

This study complies with the Declaration of Helsinki. Compliance with ethics was strictly maintained. Parents and school administrators were asked for their informed consent, and they were given guarantees about their right to withdraw confidentiality and voluntary participation. Coded identifiers were used to maintain data confidentiality, and survey data was safely stored with only the principal investigator having access to it. The Ethical Review Committee (ERC) of the University of Jordan's School of Medicine institutional review board committee, reviewed and approved this study (Approval number 5083/2021/67.)

## Results

The researchers were able to recruit participants, of those we included 396 parents. Our study's reduction in participants from 600 to 396 was due to strict adherence to inclusion and exclusion criteria, which ensured data accuracy and reliability. This decision was based on a thorough examination of responses for completeness and precision, as well as ethical considerations. The method used not only guaranteed the scientific accuracy of our findings but also aligned with ethical research practices, eventually enhancing the credibility and validity of our study's conclusions.

## Participants' Profile and Characteristics

Table 1 lists the participants' characteristics. Half the participants (208/396, 52.5%) lived in Amman the capital of Jordan. Mothers accounted for 80.1% (317/396) of participants, with the remaining being fathers (79/396, 19.9%). Most mothers (197/396, 49.7%) had a bachelor's degree, and (162/396, 40%) worked full-time. Similarly, most fathers (162/396, 40.9%) had a bachelor's degree and worked full-time (195/396, 49.2%). 80.3% (318/396) of participants had a household income of more than 705 USD per month, considered roughly the average national income per person per month. 78.5% (311/396) of participants reported not having chronic diseases. However, 89.1% (353/396) reported receiving the COVID-19 vaccine, and 43.4% (172/396) reported previously being diagnosed with COVID-19. 42.7% (169/396) of participants reported having one child aged 12–17, with 96% (380/396) of children not having a chronic disease. Only 19.9% (79/396) of parents and 8.6% (34/396) of children took the influenza vaccine in the last 12 months. Although 94.7% (375/396) of children were fully

**Table 1** Parents' Demographic Characteristics

Variable	Frequency (%)
<b>Person who Filled the Questionnaire</b>	
Mother	317(80.1%)
Father	79(19.9%)
<b>Governorate</b>	
(Amman)	208(52.5%)
(Balqa'a)	36(9.1%)
(Karak)	18(4.5%)
(Zarqa)	23(5.8%)
(Aqaba)	31(7.8%)
(Madaba)	4(1%)
(Irbid)	42(10.6%)

(Continued)

Table I (Continued).

Variable	Frequency (%)
(Ajloun)	1(0.3%)
(Jerash)	8(2.0%)
(Tafelah)	8(2.0%)
(Mafraq)	1(0.3%)
(Ma'an)	16(4.0%)
<b>Marital Status</b>	
Married	375(94.7%)
Widow	11(2.8%)
Divorced	10(2.5%)
<b>Number of Children</b>	
1	169(42.7%)
2	132(33.3%)
3	65(16.4%)
4	21(5.3%)
More than 5	9(2.3%)
<b>Mother's Education Level</b>	
Less than secondary	22(5.6%)
Secondary school	41(10.4%)
Diploma	74(18.7%)
Bachelor	197(49.7%)
High education	62(15.7%)
<b>Mother's Occupation Description</b>	
Special work (owned time)	22(5.6%)
Part time	27(6.8%)
Full time	162(40.9%)
Retired	44(11.1%)
Unemployed	141(35.6%)
<b>Father's Education Level</b>	
Less than secondary	27(6.8%)
Secondary school	70(17.7%)
Diploma	41(10.4%)
Bachelor	162(40.9%)
High education	96(24.2%)

(Continued)

**Table I** (Continued).

Variable	Frequency (%)
<b>Father's Occupation Description</b>	
Special work (own time)	74(18.7%)
Part time	21(5.3%)
Full time	195(49.2%)
Retired	19(4.8%)
Unemployed	87(22.0%)
<b>Monthly Household Income</b>	
Less than 705 USD	78(19.7%)
More than 705 USD	318(80.3%)
<b>Chronic Disease</b>	
Yes	85(21.5%)
No	311(78.5%)
<b>Received Influenza Vaccine in the Last 12 Months</b>	
Yes	79(19.9%)
No	317(80.1%)
<b>Received COVID-19 vaccine</b>	
Yes	353(89.1%)
No	43(10.9%)
<b>Previously Diagnosed with COVID-19</b>	
Yes	172(43.4%)
No	224(56.6%)
<b>Family member/relative loss due to COVID-19</b>	
Yes	106(26.8%)
No	290(73.2%)
<b>Child Chronic Disease</b>	
Yes	16(4.0%)
No	380(96.0%)
<b>Child Routine Vaccines</b>	
Yes	375(94.7%)
No	21(5.3%)
<b>COVID-19 Vaccine</b>	
Yes	93(23.5%)
No	303(76.5%)

vaccinated against common diseases, only 23.5% (93/396) were vaccinated against COVID-19. The primary source of COVID-19 information among the participants was social, 54.3% (215/396).

## The Influence of Behavioral Antecedents and Fear on Parents' COVID-19 Vaccination Intentions

We used stepwise multiple regression tests to examine the impact of the all antecedents of intention considered in the study (attitudes, subjective norms, behavioral control, and fear of the COVID-19 vaccine) on parents' intention to vaccinate their children against COVID-19. The results reported in Table 2 represent the combined impact of these variables on the parents' intention to vaccinate their children against COVID-19. Notably, the multiple regression of the four sub-variables of antecedents of intention and their impact on the parents' intention to vaccinate their children against COVID-19 explained 80.7% of the variation in intention ( $R^2 = 0.807$ ,  $F = 408.749$ ,  $Sig = 0.000$ ). This suggests that parents' antecedents of intention have a substantial impact on whether they intend to vaccinate their children against COVID-19.

Next, the results of the regression for each antecedent (Table 3) including attitude, subjective norms, behavioral control, and fear of the COVID-19 vaccine significantly affected parents' intention to vaccinate their children against COVID-19. The model summary using multiple regression test. Table 3 reveals that with each additional factor only slightly increasing the model's predictive power, attitude is the most important factor (t-value of 13.256). Subjective norms also positively influence vaccination intentions, though the effect is smaller than that of attitude (t-value of 5.340). Fear of the COVID-19 vaccine has a significant negative effect on vaccination intentions with higher levels of fear of the COVID-19 vaccine, possibly related to concerns about vaccine safety or efficacy, are associated with lower intentions to vaccinate with t-value (-7.132) However, the Perceived behavioral control has a small, but significant, negative impact on vaccination intentions t-value (-2.869), (Table 3).

## Prediction of Parent's Intention to Vaccinate Their Children Against COVID-19 from the Antecedents of Intention

Stepwise multiple regression was used to determine the importance of each independent variable (attitudes, subjective norms, behavioral control, and fear) on parents' intention to vaccinate their children against COVID-19. (see Table 4)

**Table 2** Impact of All Antecedents of Intention (Attitudes, Subjective Norms, Behavioral Control, and Fear of the COVID-19 Vaccine) on Parents' Intention to Vaccinate Their Children Against COVID-19

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate	F-value	P-value*
I	0.898	0.807	0.805	0.52795	408.749	0.00*

**Notes:** \*Indicates significance at the 5% level. This model I: includes all variables considered in the study: attitudes, subjective norms, perceived behavioral control, and fear of the COVID-19 vaccine. The statistics in the table represent the combined impact of these variables on the parents' intention to vaccinate their children against COVID-19.

**Table 3** The Impact of Individual Antecedents of Intention on Parents' Intention to Vaccinate Their Children Against COVID-19

Antecedents of Intention	B	Std. Error	Beta	t-value	P-value*
Attitude	0.675	0.051	0.563	13.256	0.000*
Subjective norms	0.302	0.057	0.216	5.340	0.000*
Perceived Behavioral Control	-0.114	0.040	-0.070	-2.869	0.004*
Fear	-0.228	0.032	-0.198	-7.132	0.000*

**Note:** \* Indicates significance at the 5% level.

**Table 4** Prediction of Parents' Intention to Vaccinate Their Children Against COVID-19 from the Antecedents of Intention by Stepwise Regression Analysis

Model Description		R	R2	F-value	t-value	P-value*
Model 1	Attitude alone	0.866	0.750	1183.993	13.256	0.000*
Model 2:	Attitude +Fear	0.887	0.787	726.226	-7.132	0.000*
Model 3:	Attitude +Fear +Subjective norms	0.896	0.803	532.432	5.340	0.000*
Model 4:	Attitude +Fear +Subjective norms +Behavioral Control	0.898	0.807	408.749	-2.869	0.000*

**Note:** \*Indicates significance at the 5% level.

The Most important factor in predicting parents' intention to vaccinate is the attitude, which alone is significantly predicted by their intention, accounting for 75% of the variance. Fear of the COVID-19 vaccine has a significant impact on vaccination intention, negatively influencing parents' decision-making. Fear of the COVID-19 vaccine increases the model's explanatory power to 78.7%. Adding subjective norms with the two previous variables had an R2 of 80.3%. Despite its negative impact, perceived behavioral control marginally increases the model's predictive power, The behavioral control with the previous three variables had an R2 of 80.7%.

## Relationship Between Attitude, Subjective Norm, Behavioral Control, Fear, and Parents' Intention to Vaccinate Their Children Against COVID-19

Table 5 demonstrates a simple regression analysis examining the relationship between attitudes, subjective norms, behavioral control, fear, and parents' intention to vaccinate their children against COVID-19. A higher level of positive attitude predicts and explains 75% of the variance in parental intention and perceived control (social influences and perceived social pressures) has a significant influence on parents' vaccination decisions to a lesser extent. Table 5 lists these results. Attitude ( $R = 0.866$ ,  $R^2 = 0.75$ ,  $\text{sig} < 0.0001$ ) and subjective norms ( $R = 0.795$ ,  $R^2 = 0.631$ ,  $\text{sig} < 0.0001$ ) were significantly positively related to parents' intention to vaccinate their children were significantly related ( $R = 0.866$ ,  $R^2 = 0.75$ ).

By contrast, Fear of the COVID-19 vaccine has a significant negative relationship with vaccination intention. Fear of the COVID-19 vaccine is associated with a lower likelihood of parents intending to vaccinate their children ( $R: 0.628$ ,  $R^2: 0.395$ ;  $\text{Sig}: < 0.0001$ ). Perceived Behavioral Control (ease of vaccinating) has a weak and non-statistically significant negative relationship with vaccination intention ( $R = 0.335$ ,  $R^2 = 0.112$ ;  $\text{sig} 0.199$ ). This suggests that perceived control is a strong predictor of parents' willingness to vaccinate their children.

## The Level of Parents' Intentions to Vaccinate Their Children Against COVID-19 According to the Educational Background of Their Parents

A post hoc analysis using the mean, standard deviation, two-way ANOVA, and Scheffe's test was performed to examine the differences in the level of parents' intentions to vaccinate their children against COVID-19 according to the mother's and father's educational background qualifications.

**Table 5** Relationships Between Attitude, Social Norm, Behavioral Control, Fear, and Parents' Intention to Vaccinate Their Children Against COVID-19

	R	R2	B	Beta	F-value	df	p-value
Attitudes	0.866	0.750	1.039	0.866	1183.993	395	0.000*
Subjective norms	0.795	0.631	1.112	0.795	674.702	395	0.000*
Perceived Behavioral Control	0.335	0.112	-0.547	-0.335	49.775	395	0.199
Fear	0.628	0.395	-0.723	-0.628	256.797	395	0.000*

**Note:** \*Indicates significance at the 5% level.

Table 6 revealed that higher education mothers have the greatest intention to vaccinate (Mean = 3.02), while secondary school graduates have the least (Mean = 2.68). Fathers' educational qualifications, like mothers', influence vaccination intention. Fathers with less than a high school diploma have the highest intention (Mean = 3.17).

Table 7 showed there were only significant differences in vaccination intentions according to mothers' level of education at 5% level (F-value: 7.181, Sig: 0.000 significant). Although there are some notable differences in fathers' educational backgrounds, particularly between the lowest and highest levels, these differences are not as noticeable (F-value: 0.115, Sig: 0.977). This study used Scheffe's post hoc analysis (Table 8) to investigate how fathers' educational backgrounds affect their intentions to vaccinate their children. The analysis revealed significant differences in their educational levels. It showed that fathers, particularly those without a bachelor's or secondary school schooling were more likely to vaccinate their children than those with more advanced educational backgrounds.

**Table 6** Level of Parents' Intentions to Vaccinate Their Children by Parents' Educational Qualification

Mother's Qualification	N	Mean	Std. Deviation
Less than secondary	22	2.88	1.03
Secondary school	41	2.68	1.09
Diploma	74	2.70	1.05
Bachelor	197	2.85	1.22
High education	62	3.02	1.40
Total	396	2.83	1.20
Father's Qualification	N	Mean	Std. Deviation
Less than secondary	27	3.17	1.15
Secondary school	70	2.19	0.86
Diploma	41	2.62	1.18
Bachelor	162	2.96	1.14
High education	96	3.08	1.34
Total	396	2.83	1.20

**Table 7** Differences in the Level of Parents' Intentions to Vaccinate Their Children Against COVID-19 According to Mother's and Father's Educational Qualification by Two-Way ANOVA Test

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Qualification male	0.618	4	0.154	0.115	0.977
Qualification female	38.719	4	9.680	7.181	0.000*
Error	521.641	387	1.348		
Total	3740.875	396			
Corrected Total	564.708	395			

Note: \* Indicates significance at the 5% level.

**Table 8** Differences in the Level of Parents' Intentions to Vaccinate Their Children Against COVID-19 According to Fathers' Educational Qualification

(I) qualification	(J) qualification	Mean Difference (I-J)	P-value
Less than secondary	Secondary school	0.97738*	0.008
	Diploma	0.55081	0.450
	Bachelor	0.20370	0.949
	High education	0.08854	0.998
Secondary school	Less than secondary	-0.97738*	0.008
	Diploma	-0.42657	0.476
	Bachelor	-0.77368*	0.000
	High education	-0.88884*	0.000
Diploma	Less than secondary	-0.55081	0.450
	Secondary school	0.42657	0.476
	Bachelor	-0.34711	0.567
	High education	-0.46227	0.333
Bachelor	Less than secondary	-0.20370	0.949
	Secondary school	0.77368*	0.000
	Diploma	0.34711	0.567
	High education	-0.11516	0.963
High education	Less than secondary	-0.08854	0.998
	Secondary school	0.88884*	0.000
	Diploma	0.46227	0.333
	Bachelor	0.11516	0.963

Note: \*Indicates significance at the 5% level.

## Discussion

This research project investigates the various thought processes that parents go through when making important decisions about their children's vaccinations. This study investigates a variety of factors that influence parents' intentions of vaccinating their children against COVID-19. It emphasizes the significance of carrying out specific strategies within public health programs. Our findings indicate that parents' attitudes toward vaccines have a significant and positive effect on their intentions to vaccinate their children. This finding is consistent with previous research that found a positive relationship between attitudes and vaccine intention.<sup>2,13</sup> This emphasizes the importance of encouraging favorable attitudes toward vaccines through persuasive communication strategies.

Subjective norms, such as expectations from society and peer pressure, have a significant impact on parents' vaccination intentions. The findings of this study show a significant correlation between parental vaccination intentions and the perception of vaccinations as socially acceptable. Public health campaigns can influence vaccination intentions positively by focusing on social approval and recommendations from reliable parties. However, in this context, Cascini et al<sup>14</sup> reported it is critical to recognize the potential disadvantages of dependence on social media as a primary source of information, as it may expose parents to incorrect information which was the primary source of information for the participants in this study.

Perceived control incorporates barriers such as parental confidence in decision-making and vaccine accessibility, which has a small effect on vaccination intentions. However, it is still critical to address perceived control issues, such as accessibility and obstacle challenges, to mitigate the negative impact they have on vaccination intention. Effective strategies would need to recognize and reduce these perceived norms, thereby improving vaccine accessibility and convenience. For fear of the COVID-19 vaccine, this research indicates that parents' decisions are influenced by concerns about the COVID-19 vaccine's protection and efficacy, as well as fear of the COVID-19 vaccine about its novelty. These fears of the COVID-19 vaccine are further exacerbated by the widespread spread of false information on social platforms. To effectively address concerns, public health campaigns must prioritize the reduction of these fears of the COVID-19 vaccine and the dissemination of precise, transparent information.

According to this study's findings, parental COVID-19 vaccination rates were higher than those of their children. This observation can be explained by the hypothesis that parents are more likely to vaccinate themselves than their children, which is consistent with the findings reported by Yilmaz and Sahin,<sup>15</sup> Regarding complex Aspects of Health Behavior Decision-Making; Both our study and the research of Nindrea et al<sup>16</sup> highlight the complexities of health behavior decision-making when it comes to COVID-19 vaccination of children. Perceived control, a fundamental component of health behavior theories, is influenced by a variety of circumstances, contexts, and sociocultural factors. During the pandemic, it is critical to have a thorough understanding of these factors to create successful communication and public health strategies to increase childhood vaccination rates.

The impact of educational qualifications on vaccination, intentions is significant. According to this study, there is a significant relationship between mothers' educational attainment and their intention to vaccinate their children against COVID-19. This finding is consistent with previous research that has found a correlation between vaccine willingness and higher education.<sup>17</sup> Furthermore, according to Brandstetter et al<sup>18</sup> vaccine hesitancy among adolescents and their fathers is significantly influenced by their level of education, which has been confirmed by additional research.<sup>19,20</sup>

## Conclusion

This study emphasizes a novel perspective on the question of vaccination intent. The study Identifies the complex interaction of variables that influence parental decisions regarding the COVID-19 vaccination of their children. This draws attention to the importance of implementing targeted communication strategies, initiating public health initiatives, and engaging healthcare practitioners to address vaccine hesitancy. These strategies must work to promote positive attitudes, focus on positive social influences, deal with perceived control barriers, alleviate fears of the COVID-19 vaccine, and recognize the importance of educational achievement to vaccination intentions.

## Study Limitations

The cross-sectional design we chose restricts the ability to find causal relationships. Furthermore, using a convenience sample of self-reported data can create bias due to the possibility of social interests affecting responses. It's worth noting that our Jordan-specific findings may not be universally applicable. Furthermore, the relatively small sample size may have an impact on the accuracy of the results. Also have to keep in mind that excluding specific groups, such as adoptive parents and refugees, may limit the effectiveness of our program strategies. Respondent bias is a concern that arises in survey-based research. We did not investigate socioeconomic factors other than parental education in detail. Finally, the perspectives of children were only briefly explored.

## Data Sharing Statement

Due to confidentiality agreements, supporting data can only be made available to bona fide researchers subject to a non-disclosure agreement. Details of the data and how to request access are available from available upon request from the corresponding author [Eman F. Badran].

## Ethical Approval

Before executing the study, the design was reviewed and approved by The Ethical Review Committee (ERC) of the University of Jordan's School of Medicine institutional review board committee approved this study, (approval Number: 5083/2021/67).

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or all these areas; took part in drafting, revising, or critically

reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Disclosure

The authors report no conflicts of interest in this work.

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