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ORIGINAL PAPER

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Perceptions, Attitudes and Intentions of Greek Parents Toward their Underaged Children Vaccination Against Covid 19

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ABSTRACT

Background: Vaccination of children along with public health protection measures can limit transmission of SARS-COV-2. **Objective:** The aim of the study was to identify the attitudes and perceptions of Greek parents that affect their intention to vaccinate their children against COVID-19. **Methods:** The sample of the study consisted of 230 parents of underaged children who were administered a demographic characteristics questionnaire and the "Parental Acceptability of Free COVID-19 Vaccination for Children Under the Age of 18 Years" scale. **Results:** The majority of participants were females (70.4%), aged 41-50 years old (43.3%), married (86.5%), with university degree (63.5%). The prevalence of parental acceptability of free covid-19 vaccination was moderate (36.6 %) and a small percentage (23.9%) had already vaccinated their children. According to the univariate logistic regression analysis, female gender (adjusted odds ratio [AOR] 3.05, 95% CI 1.43-6.47, $p=0.004$), highest educational level ([AOR] 2.66, 95% CI 1.21-5.84, $p=0.015$), history of seasonal influenza vaccination ([AOR] 2.08, 95% CI 1.09-3.98, $p=0.026$) and self-reported vaccination ([AOR] 17.38, 95% CI 2.29-131.86, $p=0.006$) were significantly associated with parental acceptability of vaccination. Increasing positive attitude perceptions was associated with an increased likelihood of parental acceptability of COVID-19 vaccination. **Conclusion:** The moderate parental acceptability of underaged children vaccination against COVID 19 and its association with perceptions and attitudes of parents found in the present study, indicate that it is important to raise awareness of parents about the vaccination of their children and public health policies need to focus on

strengthening positive attitudes, increasing social consensus and facilitating the desired behavior.

Keywords: COVID 19, vaccination, children, parents, attitudes, intention.

1. BACKGROUND

Vaccination is a core measure for the protection and promotion of public health and an undeniable human right (1). During the pandemic the availability of a vaccine for SARS-CoV-2 has been considered as the "key" to control the pandemic (2). Priorities of the scientific community for SARS-COV-2 vaccination are older adults, adults and then children. Children without underlying diseases are at low risk of SARS-COV-2 disease, have milder symptoms and a better prognosis (3, 4).

In the European Union, approval for the vaccination of older adults was given at the beginning of 2021, while for children aged 12-17 years in May 2021 (5) and the vaccination of children under the age of 5 to 11 years was approved subject to parental consent, on November 25, 2021 (5). In Greece, vaccination for SARS-COV-2 in the age group 12-17 years began in July 2021 (6) and for the ages 5-11 years on December 15, 2021 (7).

The rapid development of the pandemic has led parents to make immediate decisions about vaccinating both themselves and their children. The phenomenon of "distrust of vaccines", i.e. the doubt about vaccines, their action or the refusal of vaccination, even when they are immediately available (8) as well as the hesitation towards vaccination of children (9) took on sig-

nificant dimensions. Numerous studies have highlighted the reluctance of the SARS-CoV-2 vaccine in the general population but also in health professionals (10, 11).

Factors that influence parents’ attitudes towards their children vaccination are related to their hesitation are personal beliefs, fears and concerns about vaccine safety, lack of information from health care providers (12) and religious reasons (13). Despite the benefits of the vaccine, there is intense fear and concern about the safety and efficacy of it, with unpredictable future consequences for the general population (15, 16). This is reinforced by the fact that these vaccines receive immediate marketing authorization and are inadequately tested in the population compared to other vaccines (17).

The success of the SARS-CoV-2 vaccination program depends on the willingness of the public to be vaccinated (18). As parents are responsible for making decisions for their children, the studies aim to assess parents’ perceptions, attitudes and intentions regarding their children’s SARS-CoV-2 vaccination (19). According to the Theory of Planned Behavior (TPB), the intention of parents to vaccinate their children is a combination of their “attitude” towards vaccines, which is based on the pros and cons of vaccination, the “subjective norms” for vaccination of children such as social consent to vaccination behavior and their perception of factors that enhance or prevent vaccination as well as conditions and resources (perceived behavioral control) (20).

2. OBJECTIVE

The purpose of this study was to investigate the intention of Greek parents towards the vaccination of their children against SARS-CoV-2 as well as the factors that contribute to it according to the theory of designed behavior.

3. MATERIAL AND METHODS

Research type

The present is a cross-sectional correlational study which was carried out on parents of underaged children through an online platform during the period of January-March 2022.

Participants and Data Collection

The sample included 230 persons which were conveniently selected in social media. The selection criteria included being adult parents and guardians of underaged children who could fluently speak and write in Greek language.

Measures

The questionnaire “Parental Acceptability of Free COVID-19 Vaccination for Children Under the Age of 18 Years” based on the Theory of Planned Behavior (TPB), was used in the present study (21).

At the first part of the questionnaire, participants answered in a 5-point Likert scale about the possibility of having their underaged children take up free COVID-19 vaccination.

The second part included the Positive Attitude Scale (4 items) and the Negative Attitude scale (5 items) with answers varying from 1 (disagree) to 3 (agree). The Cronbach’s alpha values of these two scales were 0.822 and 0.561, respectively.

	n (%)
Gender	
Male	68 (29.6)
Female	162 (70.4)
Age (years)	
18-40	94 (40.9)
41-50	111 (48.3)
51+	25 (10.9)
Highest educational level	
Primary school	1 (0.4)
Junior high school	8 (3.5)
Senior high school	34 (14.8)
College	41 (17.8)
University	83 (36.1)
Postgraduate studies	63 (27.4)
Age of child (years)	
0-3	25 (10.9)
4-6	50 (21.7)
7-12	104 (45.2)
13-17	51 (22.2)
Have you ever been vaccinated for seasonal flu?	
No	94 (40.9)
Yes, within the year	84 (36.5)
Yes, in the past	52 (22.6)
Do you have a family member with a history of COVID-19?	
Yes	126 (54.8)
No	104 (45.2)
Have you been vaccinated for SARS-COV-2?	
Yes	205 (89.1)
No	25 (10.9)

Table 1. Descriptive statistics of demographic and other characteristics of the participants (N=230)

The third part evaluates parents’ frequency of their exposure to information related to COVID-19 vaccination on social media in the past month with answers varying from 1 (almost none) to 4 (always).

Finally, questions concerning demographic characteristics and, information concerning vaccination for influenza and SARS-COV-2, were also included.

Procedure

For the cultural adaptation of the tool, guidelines of Guillemín et al. (22) were followed. Initially, a reverse translation of the questionnaire was performed, from English to Greek and vice versa by two independent translators. A pilot study was also conducted by randomly administering the questionnaire to 10 people.

The research tool was adapted in online form with the google forms program. It was then posted on social media.

Ethical considerations

The research protocol was approved by the Research Ethics Committee of the University of West Attica (Ref. No: 113011/17-12-2021). During the data collection all the research ethics principles were applied. A consent form of

	n (%) or mean (SD)
Have you vaccinated your child for SARS-COV-2?	
Yes	55 (23.9)
No	175 (76.1)
What is the chance of your child under 18 getting the free SARS-COV-2 vaccine? (N=175)	
Very unlikely	51 (29.1)
Unlikely	33 (18.9)
Neutral	27 (15.4)
Likely	28 (16.0)
Very likely	36 (20.6)
Perceptions related to COVID-19 vaccination based on the theory of planned behavior	
Positive attitudes toward COVID-19 vaccination [Scale score, mean (SD)]	7.30 (2.03)
COVID-19 vaccination is highly effective in protecting your child from COVID-19 (agree)	107 (46.5)
Taking up COVID-19 vaccination can contribute to the control of COVID-19 in Greece (agree)	172 (74.8)
Greece will have an adequate supply of COVID-19 vaccine (agree)	160 (69.6)
Negative attitudes toward COVID-19 vaccination [Scale score, mean (SD)]	7.15 (1.95)
Your child will have severe side effects after receiving COVID-19 vaccination (agree)	36 (15.7)
The protection of COVID-19 vaccines will only last for a short time (agree)	117 (50.8)
Your child is afraid of vaccination (agree)	89 (38.7)
You do not have time to take your child for COVID-19 vaccination (agree)	13 (5.6)
Perceived subjective norm related to child's COVID-19 vaccination: your family member would support you in having your child take up COVID-19 vaccination [Scale score, mean (SD)]	3.33 (3.98)
Agree	117 (50.9)
Perceived behavioral control to have the child take up COVID-19 vaccination: having the child receive COVID-19 vaccination is easy for you if you want them to [Scale score, mean (SD)]	1.54 (1.30)
Agree	167 (72.6)
Influence of social media related to COVID-19 vaccination	
Frequency of exposure to positive information related to COVID-19 vaccination (eg, new vaccines entering clinical trials, promising efficacies of the vaccines, and vaccines will enter the market soon) on social media [Scale score, mean (SD)]	1.70 (0.89)
Almost none	28 (12.2)
Rarely	51 (22.2)
Sometimes	112 (48.7)
Always	39 (17.0)
Frequency of exposure to negative information related to COVID-19 vaccination (eg, concerns about efficacies and supplies, side effects of the vaccines, and receiving vaccines will cause COVID-19) on social media [Scale score, mean (SD)]	1.58 (0.90)
Almost none	37 (16.1)
Rarely	50 (21.7)
Sometimes	115 (50.0)
Always	28 (12.2)
Frequency of exposure to negative information about other vaccine incidents in Greece (eg, selling problematic vaccines and severe side effects) on social media [Scale score, mean (SD)]	1.17 (0.91)
Almost none	65 (28.3)
Rarely	76 (33.0)
Sometimes	75 (32.6)
Always	14 (6.1)
Influence of mass media related to COVID-19 vaccination	
Frequency of exposure to positive information related to COVID-19 vaccination (eg, new vaccines entering clinical trials, promising efficacies of the vaccines, and vaccines will enter the market soon) on media [Scale score, mean (SD)]	2.03 (0.88)
Almost none	15 (6.5)
Rarely	41 (17.8)

Sometimes	96 (41.7)
Always	78 (33.9)
Frequency of exposure to negative information related to COVID-19 vaccination (eg, concerns about efficacies and supplies, side effects of the vaccines, and receiving vaccines will cause COVID-19) on media [Scale score, mean (SD)]	1.50 (0.84)
Almost none	34 (14.8)
Rarely	65 (28.3)
Sometimes	112 (48.7)
Always	19 (8.3)
Frequency of exposure to negative information about other vaccine incidents in Greece (eg, selling problematic vaccines and severe side effects) on media [Scale score, mean (SD)]	1.16 (0.94)
Almost none, n (%)	70 (30.4)
Rarely	71 (30.9)
Sometimes	72 (31.3)
Always	17 (7.4)

Table 2. Descriptive statistics of the perceptions related to SARS-COV-2 vaccination (N=230)

the participants was incorporated on the electronic platform. The processing of electronic data ensured the anonymity of parents. Permission was given by the developers of the questionnaire.

Data Analysis

For descriptive statistics, absolute and relative frequencies were used while mean and standard deviation (SD) was used in order to describe quantitative data in constructed scales. Parental acceptability of COVID-19 vaccination was set as the dependent variable. A univariate logistic regression model initially assessed the significance of the association between each of the background characteristics and the dependent variable. Background characteristics with $p < 0.05$ in the univariate analysis were adjusted in a multivariate logistic regression model. SPSS Statistics for Windows, version 25.0, was used for data analysis.

4. RESULTS

The majority of participants were females (70.4%), aged 41-50 years old (43.3%), married (86.5%), with university degree (63.5%), and public sector employees (41.3%). 89.1% of the participants had been vaccinated for SARS-COV-2 and had not contracted COVID-19 (72.6%). 45.2% of their children were 7 to 12 years old.

In the past month, 86.1% and 80.9% of participants reported wearing a face mask every time they had close contact with other people in the workplace and in other public settings, respectively (Table 1).

The prevalence of parental acceptability of free COVID-19 vaccination was 36.6% while 23.9% had already vaccinated their children (Table 2). 77.0% of participants declared that both parents agree on whether or not to get their child vaccinated for SARS-COV-2.

Mean (SD) of the positive attitudes toward COVID-19 vaccination was revealed as 7.30 (2.03) while negative attitudes as 7.15 (1.95). In Perceived subjective norm related to child’s COVID-19 vaccination (“your family member would support you in having your child take up COVID-19 vaccination”) 50.9% agreed with this statement while in

	OR (95% CI)	P
Gender		
Male	1	
Female	3.05 (1.43 - 6.47)	.004
Highest educational level		
High school or college or below	1	
University	1.73 (0.82 - 3.65)	.153
Postgraduate studies	2.66 (1.21 - 5.84)	.015
Have you been vaccinated for SARS-COV-2?		
No	1	
Yes	17.38 (2.29 - 131.86)	.006
Statistically significant results OR: Odds Ratio, CI: Confidence interval		

Table 3. Univariate logistic regression for parental acceptability of COVID-19 vaccination.

perceived behavioral control to have the child take up COVID-19 vaccination (“having the child receive COVID-19 vaccination is easy for you if you want them to”) 72.6% agreed with this statement. Among the participants, 65.7% were sometimes or always exposed to positive information related to COVID-19 vaccination in the past month while 62.2% were exposed to negative ones (Table 2).

According to the univariate logistic regression analysis, female gender (adjusted odds ratio [AOR] 3.05, 95% CI 1.43-6.47, $p = 0.004$), highest educational level ([AOR] 2.66, 95% CI 1.21-5.84, $p = 0.015$), history of seasonal influenza vaccination ([AOR] 2.08, 95% CI 1.09-3.98, $p = 0.026$) and self-reported vaccination ([AOR] 17.38, 95% CI 2.29-131.86, $p = 0.006$) were significantly associated with parental acceptability of COVID-19 vaccination (Table 3).

After adjusting for these significant demographic characteristics, positive attitudes toward COVID-19 vaccination ([AOR] 1.80, 95% CI 1.38-2.35) were associated with higher parental acceptability of COVID-19 vaccination while negative attitudes ([AOR] 0.54, 95% CI 0.420-0.70) were associated with lower acceptability. Regarding social media influence combined with media influence, neither

	AOR (95% CI)	P
Perceptions related to COVID-19 vaccination based on the theory of planned behavior		
Positive Attitude Scale	1.80 (1.38 – 2.35)	<.001
Negative Attitude Scale	0.54 (0.42 – 0.70)	<.001
Your family member would support you in having your child take up COVID-19 vaccination (i.e., perceived subjective norm)	1.19 (0.71 – 2.00)	.512
Having your child receive the COVID-19 vaccination is easy for you if you want them to (i.e., perceived behavioral control)	0.98 (0.54 – 1.77)	.934
Influence of social media and media related to SARS-COV-2 vaccination		
Frequency of exposure to positive information related to COVID-19 vaccination on social media and mass media	1.18 (0.95 – 1.46)	.134
Frequency of exposure to negative information related to COVID-19 vaccination on social media and mass media	0.97 (0.74 – 1.26)	.811
Frequency of exposure to negative information about other vaccine incidents in Greece on social media and mass media	0.90 (0.70 – 1.16)	.419
AOR: Adjusted Odds Ratio, CI: Confidence interval		

Table 4. Adjusted logistic regression for perceptions and influence of social media and media with parental acceptability of a COVID-19 vaccination.

exposure to positive nor negative information related to COVID-19 vaccination was associated with higher parental acceptability of COVID-19 vaccination (Table 4).

5. DISCUSSION

This was one of the first studies conducted in Greece aimed at the investigation of parental acceptability of free COVID-19 vaccination for children under the age of 18 years old.

In the present study, in the sample of 230 parents who had been vaccinated (89.1%), and applied the measures of personal protection, the prevalence of parental acceptability of free covid-19 vaccination was moderate (36.6 %) and a small percentage (23.9%) had already vaccinated their children. Parents seem to be more likely to accept and get a SARS-CoV-2 vaccine for themselves than for their child/children (23). Respectively, in the study of Galanis et al. (6) it was found that the intention of parents to vaccinate their children aged 12-17 years old was low (36%), or they did not want (33.5%) or they were not sure (30.5%) that they will their children vaccinated (6). In contrast, a study in South Korea showed a willingness rate of 76.5% to vaccinate their children aged 10-18 years against SARS-COV-2 when the vaccine would be available (24).

An interesting finding is that parents' vaccination against SARS-COV-2 and influenza increases the chances of their children receiving the SARS-COV-2 vaccine. Other studies have also shown that if there was a chance that they would be vaccinated themselves, that fact would also increase their acceptance for vaccination of their under-aged children against the SARS-COV-2 (25-28). Other findings are similar for seasonal influenza (25, 29, 30). Therefore, parents who are vaccinated themselves have a positive intention of having their children vaccinated.

According to our analysis, female gender and highest educational level, were significantly associated with parental acceptability of COVID-19 vaccination. In contrast, in the Altulaihi et al. study, gender, marital status, and educational level were not correlated with higher parental acceptance of the vaccine (30). Another interesting finding is that fathers were more positive about vaccination than mothers (31). The positive effect of high educational level of parents on their intention to vaccinate their children was also found in other studies (32, 30, 26, 33, 25). It is therefore important for fathers and people with low educational level to be approached appropriately as part of an organized health education program on the importance of vaccination.

In the present study, almost half of the participants (46.5%) answered that the SARS-COV-2 vaccine is highly effective in protecting their child from COVID-19. The same belief was expressed in China (57.3%) (21) and Turkey (69.9%) (26), although safety and efficacy concerns appear to be fueled by the novelty and rapid growth of the vaccine (23).

Another finding was the small percentage (15.7%) of parents who are concerned about the side effects of vaccines in their children as reported by another study (9.9%) (21). In contrast, in many recent studies, the possible side effects of vaccinating children are among the main reasons for refusing to vaccinate their children against SARS-COV-2. In Turkey, one reason for refusal is the fear of possible vaccine's side effects (40.4%) (33), in the USA, 36.8% believes that this vaccine will cause serious side effects or long-term health problems (32), while, in US Massachusetts and in China (61.5% and 80.95%, respectively) people are concerned about vaccine's side effects (34, 27).

The correlation of children's age with parental acceptability of COVID-19 vaccination varies in the international literature. In our study we did not find that the age of the children was significantly associated with the parental acceptability of COVID-19 vaccination, in contrast to the results of other studies (21, 30-32).

In our study, no significant correlation was found between exposure to positive or negative information in the media or social networking and parental acceptability. On the contrary, other studies showed that positive information related to COVID-19 vaccination was associated with higher acceptance of the vaccine by parents (21, 25).

Finally, a very interesting finding of our study is that increasing positive attitude perceptions were associated with an increased likelihood of parental acceptability of COVID-19 vaccination and negative attitude perceptions were associated with a reduction, similarly to another study (21). That is, the intention of parents towards their child's vaccination, in the present study seems to be related only to their attitude towards vaccination while factors such as subjective norms and perceived behavioral control do not seem to affect their intention. According to TPB, 3 factors should coexist for the manifestation of intention for a behavior. It is important that raising awareness measures and

public health policies to reinforce positive attitudes, stressing the importance and effectiveness of vaccination and strengthen the other two factors. These are social norms, such as increased social consent, acceptance of vaccination by significant others (i.e., health professionals and other social role models who accept and practice the vaccination of their children) and perceived control of behavior related to factors that enhance or prevent the occurrence of behavior, such as support from the environment, work, the state, and so on. This triple positive approach of the parents will strengthen their intention towards the desired behavior and will increase the possibility of the intention to be transformed into action, that is, to vaccinate their children. Of course, the TPB recognizes additional predictors of behavior (35), such as the previous behavior that in this case could be the vaccination of children according to the national vaccination program but also parents' vaccination rate themselves, which, in this study was found to be high as well as the moral norms for ethical conduct as well as the consequences and outcomes of such behavior. So, future studies should include all prognostic factors of an individual's behavioral intention so as to fully investigate factors related to parents' intention to vaccinate their children against SARS-COV-2.

Study limitations

Data collection over a specific short time period was a significant limitation of the study. The small conveniently selected sample used through an electronic platform, was also a limitation, since this sampling method involves a difficulty of results' generalization.

6. CONCLUSION

The present study showed a modest intention of parents to vaccinate their children against SARS-COV-2, which was associated with their own vaccination against SARS-COV-2 and influenza, female gender, higher education level and their personal positive attitude towards the vaccination of their children. According to TPB, a simultaneous multidimensional approach of parents is necessary. It should focus on public health measures and policies that may raise parents' awareness regarding their children's vaccination, enhance social consensus and encourage and facilitate the desired behavior.

- **Consent Form:** All participants were informed about subject of the study.
- **Author's Contribution:** A.P. and M.D. gave substantial contributions to the conception and design of the work in acquisition, interpretation of data and drafting the article. V.E. took part in analysis of data. A.P., P.A., and M.D. had a part in article preparing for drafting. A.P., T.A. D.M. V.E. M.M. P.A., A.M. and M.D. took part in revising it critically for important intellectual content and gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
- **Conflicts of interest:** There are no conflicts of interest.
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