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Original Article

COVID-19 vaccine hesitancy of adolescents with psychiatric disorders and their parents: data from a child psychiatry outpatient clinic

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ABSTRACT

Background. Vaccinating adolescents and determining the factors influencing their vaccination status are critical in the event of a pandemic. One of the factors affecting vaccination is vaccine hesitancy, which is an increasing problem worldwide. Vaccine hesitancy and the vaccination rates of some special groups, such as psychiatric patients and their families, may differ from the general population. The purpose of this study was to identify any vaccine hesitancy to the coronavirus disease 2019 (COVID-19) vaccination in adolescents evaluated in a child psychiatry outpatient clinic, as well as to determine the factors influencing vaccination in these adolescents and their families.

Methods. Two hundred forty-eight adolescents examined in the child psychiatry outpatient clinic were evaluated using a semi-structured psychiatric interview, strengths and difficulties questionnaire (SDQ), the fear of COVID-19 scale, and a form about coronavirus vaccine hesitancy. The parents completed the vaccine hesitancy scale and answered the vaccine hesitancy questions.

Results. The vaccination rate was higher in patients with anxiety disorders. The patient's age (odds ratio [OR]:1.59; 95% confidence interval [CI]:1.26, 2.02), the parent's vaccine hesitancy (OR: 0.91; CI:0.87-0.95), the status of chronic disease in a family member (OR: 2.26; CI:1.10, 4.65), and the vaccination status of the adolescent's parents (OR:7.40; CI:1.39, 39.34) were found to be predictive for adolescent vaccination. While 2.8% of the adolescents said that they were definitely against getting vaccinated, 7.7% were undecided. While the rate of undecided parents was 7.3%, those who were against vaccination was 1.6%.

Conclusions. Age, parental vaccine hesitancy, and parental vaccination status can affect the vaccination of adolescents admitted to a child psychiatry clinic. Recognizing vaccine hesitancy in adolescents admitted to a child psychiatry clinic and in their families is beneficial for public health.

Key words: vaccination, vaccine hesitancy, adolescent, COVID-19.

Vaccine hesitancy is an important public health problem observed worldwide, including countries that have achieved high immunization rates with high levels of vaccination.[1] According to the World Health Organization (WHO), vaccine hesitancy, despite the presence of a vaccination service, is a complex concept that includes the delay and rejection of a vaccine, which may be affected by the vaccine, by time, and by context.[2] Vaccine hesitancy runs on a continuum ranging from acceptance of the vaccine to complete rejection of all vaccines and there are complex interactions between political, cultural, social, and individual factors about vaccinations.[3] Many reasons can be listed for vaccine hesitancy. These reasons include concerns about the safety of the vaccine, concerns about severe side effects, distrust of the healthcare system, thoughts on vaccine ineffectiveness, misinformation, and social myths.[2,4]

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In the SAGE Working Group Vaccine Hesitancy Determinants Matrix, factors influencing vaccine hesitancy are classified into three categories: contextual, individual and group, and vaccine/vaccination specific influences.[5] Socioeconomic, religious, political and cultural effects are defined as contextual factors, while factors such as vaccine safety, risks and benefits, and cost are classified as features directly related to vaccination. Features such as knowledge, awareness, beliefs about health, characteristics of family members, and personal experiences are defined as individual and group influences.[5]

The concept of vaccine hesitancy, which has become more prominent as a result of the erroneous association between the measles mumps rubella (MMR) vaccine and autism[6] worldwide, as well as claims that some toxins in vaccines cause hyperactivity[7] and false beliefs about the interaction between vaccines and autism[8,9], has been brought to the forefront even more with the coronavirus disease 2019 (COVID-19) vaccination in the pandemic.

The Centers for Disease Control and Prevention (CDC) recommends that everyone aged five years or older should be vaccinated for COVID-19 for protection.[10] Therefore, factors related to child and adolescent vaccination came to the fore during the pandemic.

Adolescents' vaccine hesitancy and vaccine acceptance are complex issues that not only concern themselves but also their parents. In the decision to accept the vaccine, the characteristics of adolescents such as their cognitive development, their peer relationships, risky behaviors, and independence from their parents may be effective.[11] The factors that affect the vaccine hesitancy of parents are concerns about vaccine safety and the possible side effects of the vaccine.[12] In various studies, the COVID-19 vaccine acceptance rate of parents or the rate of parents willing to vaccinate their children was reported as 72.6% in China[13], 82.1% in Italy[14], 55.5% in the USA[15], and 36.3% in Türkiye.[16] Adolescent vaccine acceptance rates were 51.7% in the USA[15], 62.7% in France[17], and 49.6% in Korea.[18] In a study in Türkiye, 43.5% of the adolescents who were examined in the pediatric outpatient clinic were vaccinated against COVID-19 and 27.4% did not want to be vaccinated.[19]

Psychiatric patients are one of the risk groups for vaccine hesitancy and vaccine acceptance, and it was seen that the data related to the effect of psychiatric disorders on vaccine hesitancy and the acceptance of the COVID-19 vaccination were contradictory. It was found that vaccine acceptance changed in patients with psychiatric disorders[20], and vaccine hesitancy was high in severe psychiatric patients.[21] It was also found that COVID-19 vaccine hesitancy was higher in adults with psychiatric disorders such as depression, anxiety disorders, post-traumatic stress disorder, and attention deficit and hyperactivity disorder (ADHD).[22] Additionally, higher vaccine hesitancy levels were related to depression and peritraumatic stress and anxiety.[23] However, there are also some studies with adults that showed that psychiatric disorders did not affect vaccination status.[24,25] In a study involving only inpatient adolescents, it was stated that the vaccination rates were similar to the vaccination rates in the general population.[26]

Based on the literature, it is thought that it is important to reveal the vaccination status and vaccination hesitancy levels of adolescents with psychiatric diseases. Studies evaluating vaccine hesitancy towards the COVID-19 vaccination in adolescents evaluated in an outpatient clinic and their families have not been found. This study aimed to determine the vaccine hesitancy and some individual and family factors that may affect the vaccine hesitancy of adolescents and their families evaluated in an outpatient clinic. Secondly, it aimed to determine some sociodemographic, individual and familial characteristics that may predict the vaccination of an adolescent evaluated in an outpatient clinic. Lastly, the study compared the vaccination status of adolescents diagnosed with a psychiatric disorder and adolescents with typical development who applied for counseling

in a psychiatry clinic with adolescents who did not have a psychiatric diagnosis.

Material and Methods

Procedure and Data Collection

This was a cross-sectional study of adolescents between the ages of 12 and 18 years who were admitted to the Child and Adolescent Psychiatry Outpatient Clinic of Gülhane Training and Research Hospital. After obtaining approval from the ethics committee, 380 adolescents who were examined between November 2021 and January 2022 were reached. The adolescents with missing forms, with an intellectual disability, who were illiterate, with an acute psychotic disorder, or whose parents or themselves did not provide written or verbal consent to participate were excluded from the study. Thus, 248 adolescents with written consent from both themselves and their parents were included in the study. The parents were asked to fill out a sociodemographic data form, answer questions about the COVID-19 vaccine, and complete the vaccine hesitancy form. Adolescents filled out the Fear of Coronavirus questionnaire and provided their thoughts on the COVID-19 vaccine. The Fear of COVID-19 Scale was administered to adolescents to assess their fear of coronavirus at the time and before the discovery and availability of the vaccine. Using this information, the study aimed to compare fear in the pre-vaccination and post-vaccination periods.

Measurements

Sociodemographic Data and Vaccine Hesitancy Assessment Form: From the reviewed literature, COVID-19 vaccine hesitancy was evaluated with the questionnaires developed by the researchers[13,27,28] and so, in line with this literature, questions were prepared by the researcher for the evaluation of the vaccine hesitancy in the present study. The study participants were asked about their age and the ages of their parent(s), their educational status, their opinion on vaccination for their families and the whole society, their reasons for not being vaccinated, whether the family had contracted COVID-19, and whether there were hospitalizations or losses in the family because of COVID-19. The form was filled out by both the adolescent and their parents. All participants were asked, "What do you think about the COVID-19 vaccination?" and "What do you think about family members getting the COVID-19 vaccination?". A choice was made between 'definitely should be vaccinated', 'vaccination may be optional', 'only those in the risk group should be vaccinated', 'I am undecided', and 'definitely should not be vaccinated'. Additionally, "What is the most important reason not to get vaccinated?" and "What is the most important reason to get vaccinated?" were asked.

Vaccine Hesitancy Scale: The Vaccine Hesitancy Scale, which was developed by Kılınçarslan et al.[29] who performed its validity and reliability, is a 5-point likert type scale consisting of 12 items with a 3-factor structure. The Cronbach alpha internal consistency coefficient was 0.85.[29] The Vaccine Hesitancy Scale has three subscales.

The Benefit and Protective Value of the Vaccine Subscale: This subscale evaluated the positive features of the vaccine, was scored inversely, and an increase in these scores was associated with vaccine hesitancy.[29]

Vaccine Repugnance Subscale: This scale assessed the vaccine's negative consequences and side effects, as well as ideas about vaccine companies. An increase in these scores was associated with vaccine hesitancy.[29]

Solutions for Non-vacination Subscale: This subscale evaluated people's opinions about not vaccinating themselves and their children, and an increase in these scores was associated with vaccine hesitancy.[29]

Fear of COVID-19 Scale (FCV-19S): This 5-point Likert-type scale consisting of seven items was developed by Ahorsu et al.[30], and its Turkish validity and reliability study for

adults was completed by Bakioğlu et al.[31] The validity and reliability study for children and adolescents was completed by Gozpinar et al.[32] The Cronbach alpha internal consistency coefficient of the unidimensional scale was 0.88. It is a single factor scale that was added to the study to determine the coronavirus fear levels of the adolescents participating in the study.

Strengths and Difficulties Questionnaire-Adolescent Form (SDQ-A): The scale, developed by Goodman[33], has a self-report structure and its Turkish validity and reliability study was conducted by Güvenir et al.[34] on Turkish children aged 11-17 years. The scale has five subscales and the internal consistency coefficients range from 0.22 to 0.73.[34] It was added to the study to determine and adjust the internalizing and externalizing properties psychologically.

The Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL): It was developed as a semi-structured interview for the evaluation of psychopathology in school age children[35] and was adapted according to DSM 5.[36] Ünal et al.[37] confirmed the validity and reliability of this version. It was included in the study to determine psychiatric diagnoses using a semi-structured interview.

Statistical analysis

The IBM SPSS software package program (version 21.0) was used for statistical analysis. (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) The Kolmogorov-Smirnov test was used to test the normality analysis. The statistical significance level was selected as 0.05. The chi-squared test and the independent t test were used when appropriate assumptions were met. The Mann-Whitney U test was used when the necessary assumptions were not met. Fear of coronavirus before and after the availability of the vaccine for adolescents was analyzed with the paired samples t test. Backward binary logistic regression analysis was performed to determine the predictive factors in the vaccination of adolescents. The final logistic regression model was created by including the factors reported to be effective in the vaccination of adolescents in the literature, psychological factors and the variables obtained by adding the variables found to be significant in the basic statistics in this study. Age, gender, hospitalization due to COVID-19, death due to coronavirus in the family of the adolescent, chronic disase in the family member, externalizing score, internalizing score, educational status of parents, fear of coronavirus before and after the discovery of the vaccine, psychiatric diagnoses, and the parents' vaccine hesitancy scores were analyzed using backward logistic regression analysis to determine the factors that predict the vaccination of adolescents.

Results

Sociodemographic data

Adolescents aged 12-18 years were included in the study and the median age of the participants was 15 years (interquartile range[IQR]=2). Among the adolescents, 174 (70.2%) were female, and 74 (29.8%) were male. Of the adolescents, 46.8% (n=116) were vaccinated with one of the COVID-19 vaccines. Two hundred seventeen (88.2%) parents stated that they were vaccinated. The sociodemographic data of the vaccinated and unvaccinated adolescents are shown in Table I.

No statistical difference was found between vaccinated and unvaccinated adolescents in terms of being infected with COVID-19 themselves (p=1.000) or their family members (p=0.824) at any time, but the rate of vaccination was statistically significantly higher in the adolescents with a family history of chronic diseases (p=0.008) and those whose family member died (p=0.01) due to COVID-19. Further details about the data are presented in Table I.

While the fear of coronavirus mean score was 14.43 (standard deviation [SD]=6.40) before the development of the vaccine, it was 12.99

Table I. Sociodemographic data of vacinated and unvacinated adolescents.*

	Vacinated Adolescents	Unvacinated Adolescents	P
Age	15.0 (3.0)	14.0 (3.0)	<0.001
Gender			0.315
female	85 (73.3)	89 (67.4)	
male	31 (26.7)	43 (32.6)	
Maternal education			0.061
Not graduating high school	42 (40.0)	63 (60.0)	
High school graduate or higher	55 (51.4)	52 (48.4)	
Paternal education			0.08
Not graduating high school	34 (38.6)	54 (61.4)	
High school graduate or higher	60 (50.8)	58 (49.2)	
Monthly income			0.639
<2500 TL	17 (14.8)	25 (19.2)	
2500-8000 TL	85 (73.9)	90 (69.2)	
>8000 TL	13 (11.3)	15 (11.6)	
Parents			0.001
Vacinated	110 (95.7)	107 (81.7)	
Unvacinated	5 (4.3)	24 (18.3)	
COVID-19 history in a family member			0.824
Yes	59 (50.9)	59 (47.7)	
No	57 (49.1)	63 (52.3)	
Hospitalization of a family member due to COVID-19			0.174
Yes	17 (14.7)	12 (9.1)	
No	99 (85.3)	120 (90.9)	
Death of a family member due to COVID-19			0.010
Yes	10 (8.6)	2 (1.5)	
No	106 (91.4)	129 (98.5)	
Chronic disease of a family member			0.008
Yes	49 (45.4)	35 (28.5)	
No	59 (54.6)	88 (71.5)	
COVID-19 history of the adolescent			1.000
Yes	29 (25.0)	33 (25.0)	
No	87 (75.0)	99 (75.0)	

*Data are presented as n (%), except for age (in years), presented as median (interquartile range).

(SD=6.30) after the vaccine became available, and it decreased statistically significantly (paired samples test; p<0.001). When the coronavirus fear scores of vaccinated (mean±SD=12.82±6.27) and unvaccinated (mean±SD=13.15±6.34) adolescents were compared, no significant difference was found (independent t-test; p=0.68).

Vaccine Hesitancy

All adolescents that participated in the study answered the vaccine hesitancy questions. Of the adolescents, 47.8% thought that they should definitely be vaccinated for the benefit of society, and 52.8% said that they should definitely be vaccinated when they answered these questions for their own families. Whereas, 2.8% of the

adolescents stated that they were definitely against getting vaccinated considering the benefit to society, and 1.6% stated that their families thought that they definitely should not be vaccinated. A small number of parents (1.6%) stated that they were definitely against getting vaccinated considering the benefit to society, and 2% stated that their families thought that they definitely should not be vaccinated. The thoughts of the adolescents and their parents are presented in detail in Table II.

Eighty-four adolescents (49.1%) and ninety (50%) parents answered that there was no valid reason to the question concerning the most important reason not to be vaccinated. In the group that thought that there was a reason not to be vaccinated, side effects were the most frequently cited reason (for adolescents: 36.3%; n=62; for parents: 28.3%; n=51). Uncertainty about the effect of the vaccine and insufficient studies were the second most common reason (for adolescents: 21.7%; n=39; for parents: 14.6%; n=25).

When the vaccine hesitancy questionnaire scores of the parents were compared according to whether their children were vaccinated or not, the total score of vaccine hesitancy (p<0.001), solutions for non-vaccination (p<0.001), the benefit and protective value of the vaccine (p<0.001), and the vaccine repugnance scores (p<0.001), were statistically higher in the group whose children were not vaccinated (Table III). When the vaccine hesitancy questionnaire scores of the parents were compared according to whether their children had a psychiatric disorder or not, the total score of vaccine hesitancy (independent t-test, p=0.346), solutions for non-vaccination (Mann-Whitney U test, p=0.247), the benefit and protective value of the vaccine (Mann-Whitney U test, p=0.557), and the vaccine repugnance scores (Mann-Whitney U test , p=0.532), were not significantly different between the groups.

Psychopathology

The diagnosis of psychopathology was made using semi-structured psychiatric interviews and clinical examinations. The vaccination rate was 49.5% in adolescents with psychiatric disorders, and 30.6% in those without. A statistically significant difference was found between the vaccinated and unvaccinated adolescents in terms of psychiatric diagnoses (p=0.047). Adolescents with an anxiety disorder were vaccinated statistically significantly more (p<0.001) (Table IV).

Table II. Parents and adolescents' thoughts about vaccination.

	For the public n (%)	For their family n (%)
Thought of adolescents about vaccination		
Definitely should be vaccinated	118 (47.8)	130 (52.6)
Vaccination should be optional	94 (38.1)	84 (34.0)
Vacination for the risk group only	9 (3.6)	7 (2.8)
Undecided	19 (7.7)	22 (9.0)
Definitely against vaccination	7 (2.8)	4 (1.6)
Thought of parents about vaccination		
Definitely should be vaccinated	154 (62.9)	157 (63.8)
Vaccination should be optional	62 (25.3)	64 (26.0)
Vacination for the risk group only	7 (2.9)	5 (2)
Undecided	18 (7.3)	15 (6.1)
Definitely against vaccination	4 (1.6)	5 (2)

Table III. Vaccine hesitancy scores of parents of vaccinated and unvaccinated adolescents.

Vaccine Hesitancy Scale Scores	Vacinated Adolescents Median (IQR)	Unvacinated Adolescents Median (IQR)	*p*
Subscale of Benefit and Protective Value of Vaccine	7 (5)	9 (6)	<0.001[a]
Vaccine Repugnance Subscale	12 (5)	14 (5)	<0.001[b]
Solutions for Nonvaccination Subscale	6 (5)	8 (3)	<0.001[b]
Vaccine Hesitancy Total Score	25 (12)	31 (10)	<0.001[b]

[a]Independent t-test, [b]Mann-Whitney U test, IQR: Interquartile range

Table IV. Psychiatric diagnoses of vaccinated and unvaccinated adolescents.

	Vacinated adolescents n (%)	Unvacinated adolescents n (%)
No psychiatric diagnosis	11 (30.6)	25 (69.4)
Depression	17 (44.7)	21 (55.3)
Anxiety disorders	48 (60.8)	31 (39.2)
ADHD	19 (42.2)	26 (57.8)
OCD	7 (36.8)	12 (63.2)
Other diagnosis	14 (45.2)	17 (54.8)

ADHD: Attention deficit and hyperactivity disorder, OCD: Obsessive-compulsive disorder

When the Strengths and Difficulties Questionnaire scores of the vaccinated and unvaccinated adolescents were compared, no significant difference was found in the internalizing (p=0.410), externalizing (p=0.994), prosocial (p=0.278), and total difficulties scores (p=0.599).

Logistic regression analysis

Age, gender, hospitalization due to COVID-19, death due to coronavirus in the family of the adolescent, chronic disease in the family member, externalizing score, internalizing score, educational status of parents, fear of coronavirus before and after the discovery of the vaccine, psychiatric diagnoses, and parent's vaccine hesitancy scores were analyzed using backward logistic regression analysis to determine the factors that predict the vaccination of adolescents (Nagelkerke R^2: 0.39). Age (OR: 1.59; 95% CI: 1.26, 2.02), the parent's vaccine hesitancy (OR: 0.91; 95% CI: 0.87-0.95), chronic disease of the family member (OR: 2.26; 95% CI: 1.10, 4.65), and the vaccination of the parents (OR: 7.40; 95% CI: 1.39-39.34) were determined to be predictive of the vaccination of the adolescents (Table V).

Table V. Predictive variables in adolescent vaccination.

	p	OR	95% CI
Age of the adolescent	<0.001	1.59	1.26-2.02
Parent Vacine Hesitancy Score	<0.001	0.91	0.87-0.95
Parental vaccination	0.019	7.40	1.39-39.34
Chronic disase in the family member	0.027		1.10-4.65

CI: Confidence Interval, OR: odds ratio

Discussion

It has been shown that vaccination rates have decreased in Türkiye and it has been emphasized that one of the most important reasons for this decrease is vaccine hesitancy.[38] Vaccine hesitancy and vaccine refusal, which have increased in importance during the pandemic period, have been investigated in current studies in psychiatric patients.[22,21] This study aimed to investigate the COVID-19 vaccination status, vaccine hesitancy and the factors affecting vaccination in adolescent psychiatric patients. Based on information obtained from adolescents and their parents evaluated in the child psychiatry outpatient clinic, it was determined that 46.8% of the adolescents had been vaccinated at least once, and this rate was 88.2% in their parents. Whether the adolescent was vaccinated or not, if the parents were vaccinated, the lower level of parental vaccine hesitancy, and a chronic disease in family members or the death of a family member due to the coronavirus were all statistically significant results. The vaccination rates among adolescents with anxiety disorders were found to be higher.

In this study, the rate of vaccination was 49.5% in adolescents with psychiatric disorders, 30.6% in adolescents without a psychiatric diagnosis and 88.2% in all parents. As of March 12, 2022, in Türkiye, the rate of a one dose vaccination in adults was reported as 93.01%, and the rate of double dose vaccination was reported as 85.22% according to data from the Ministry of Health.[39] In a study evaluating the adolescent vaccination rates in the age range of 15-18 year olds in Türkiye, this was 43.5%.[19] The vaccination rate of at least one dose among parents was close but lower than the data given by the Ministry of Health. In adolescents with psychiatric disorders, although there is no data from the Ministry of Health, it is close to the data from the study conducted in Türkiye. When the articles of studies conducted in other countries were examined, just a study on adolescent psychiatric inpatients was found. In the study in the USA, it was shown that 30.5% of hospitalized patients were vaccinated with one dose before hospitalization, and 29.8% agreed to be vaccinated during hospitalization.[26] Although there is a partial difference in the present study compared to the data in the USA, the differences between the results may be due to the fact that the studies were conducted at different times of the pandemic and the most common diagnoses of inpatients and outpatients in child and adolescent psychiatry clinics were different.

One of the hypotheses of this study was that the vaccination status would be different in adolescents with different psychiatric disorders. According to the study, the vaccination rate for anxiety disorders was higher than for typically developing adolescents. In the literature, the effect of psychiatric disorders on the COVID-19 vaccination is contradictory. In a previous study, it was reported that there was no difference in vaccination rates for psychiatric disorders.[25] Meanwhile, another study found that vaccination rates were lower in people with severe psychiatric disorders.[40] In contrast, in the present study, the rate of vaccination was higher in adolescents with psychiatric disorders, especially in anxiety disorders. While interpreting the data, it should be considered that the diagnoses in the patient population included in the studies[25,40] are different, These studies were conducted in adults and the most common diagnoses were psychotic disorders, whereas anxiety disorder was the most common in our study, similar to child psychiatry diagnoses in the literature.[41] Anxiety about COVID-19 and concerns about health are shown to be associated with vaccine acceptance[42], but a low fear of COVID-19 has been associated with vaccine hesitancy.[43] Additionally, in a study evaluating vaccine hesitancy in adults with anxiety disorders, intolerance to uncertainty was associated with vaccine hesitancy.[44] Based on these results, it can be thought that adolescents with anxiety disorders may have higher anxiety about the coronavirus infection and efforts to reduce uncertainty may increase vaccination rates.

Determining the vaccination status and hesitancy about vaccination of patients admitted to the psychiatry clinic is a rather complex concept that is not only affected by psychiatric diagnoses. There are sociodemographic, parent-related, and vaccine-related factors that affect vaccine acceptance in adolescents.[45] Similar to studies in adults[46,47], parents' and adolescents' age, gender, educational status, and economic status were related to the acceptance of the COVID-19 vaccine.[45] In this study, the age of the adolescent were also found to be significant. This study revealed that increasing age is an important predictor of vaccination in the adolescent population with psychiatric disorders. Similarly, a meta-analysis including participants over the age of 16 years showed a correlation between increasing age and increasing vaccine acceptance.[48] However, there was an article that did not find a relationship between the vaccination rate and age in adolescents.[49] The reasons for the younger age in the unvaccinated group compared to the vaccinated group may include the low number of studies in young age[50] and, the unpredictability of possible long term side effects in the developing brain and body.

Another influential factor in the vaccination of adolescents may be the thoughts and decisions of the parents. It is complicated whether the parent or the adolescent makes the final decision regarding the adolescent's vaccination.[51] In this study, the factors found to be predictive of the vaccination rate in the patients examined in the child psychiatry clinic were the vaccination of parents and the level of parental vaccine hesitancy. Similar to the present study, it was revealed that the willingness of the parents to vaccinate is related to the adolescent's vaccine acceptance and hesitancy[45] and it was found that vaccination of one or both parents was related to the adolescent's decision to vaccinate.[49]

Adolescent and parent vaccine hesitancy levels were evaluated separately as they may affect each other, and close percentages were found in both adolescents and parents. Of parents, 1.6% were definitely against vaccination, while 7.3% were undecided. The rate of adolescents who were definitely against vaccination was 2.8%, and the rate of those who were undecided was 7.7%. In a study in 2020, it was reported that 31% of parents were undecided and 3% of parents refused to vaccinate themselves and their children against COVID-19 in Türkiye.[52] The rate of parents who refuse the vaccine and undecided parents seems to have decreased. It may be due to the higher awareness of the vaccines among the adolescents and their families included in this study, or it may be due to the fact that this study was conducted more recently. In the literature, concerns about vaccine side effects[53] and uncertainties about vaccine efficacy were associated with higher vaccine hesitancy.[14] The most common reasons for not being vaccinated in this study were side effects and the uncertainty of the effect of the vaccine. Concerns about side effects and uncertainty of long-term effects of vaccines have also been found to be associated with vaccine hesitancy in different countries.[54-56] The increase in COVID-19 vaccination during the pandemic and the increase in knowledge about possible effects and side effects may be the reasons for the lower levels of vaccine hesitancy in this study.

Finally, some family-related factors were found to be important in the vaccination status of the adolescents in this study. The rate of vaccination was higher in adolescents with chronic diseases of family members, and death in their families. Chronic disease in one of the family members was a predictive factor for vaccination. In some studies, one of the most important reasons for vaccine acceptance is not wanting to infect others.[57,58] For this study's participants, it was thought that the concern that the disease would have negative consequences for their family members may have affected their vaccination status.

To the best of our knowledge, this study is the first to evaluate COVID-19 vaccine hesitancy in adolescents examined in an outpatient child psychiatry clinic. The strengths of this study are the evaluation of vaccine hesitancy

opinions of both adolescents and their parents in the vaccination of adolescents and the use of a psychiatric diagnosis using semi-structured interviews.

This study has some limitations. The adolescents examined in the Gülhane Training and Research Hospital and their families were included in the study, so its generalizability to all psychiatric patients and the public is poor. An important limitation is that patients with psychosis and bipolar disorder were not included in the study because during the data collection period there were no adolescents with these diagnoses among those who accepted to participate in the study. In addition, adolescents with intellectual disabilities or autism spectrum disorders were excluded from the study due to illiteracy and the validity and reliability data of the scales could not fully cover these groups. It is important to conduct further research with special study designs for these groups. In this study, adolescents who applied for counseling and showed typical development and those who did not have any psychiatric diagnosis were used as a comparison group, and the control group was not taken from the community. It should be kept in mind that these participants may not reflect community data. Adolescents retrospectively answered questions about their fear of the coronavirus before the discovery of the vaccine, it should be kept in mind that the results may also be affected by memory.

Consequently, in this study, it was found that vaccination of adolescents who applied to the child psychiatry outpatient clinic was associated with age, parental vaccination status, parental vaccine hesitancy, and having a chronic disease in a family member. The rate of vaccination was found to be higher in adolescents with anxiety disorders than in adolescents with typical development. It should not be forgotten that there are some factors that could not be controlled during the study. There are many factors affecting vaccine hesitancy and vaccination; such as COVID-19 mutations and vaccine response, vaccine related-factors, trust in vaccine companies, political and geographic factors, and the role of media.[5] Whether these factors have the same effect on adolescent psychiatric patients and the general population is a subject for further research. It is considered useful to evaluate these factors in further studies.

Determining the COVID-19 vaccination status and vaccine hesitancy of adolescents with mental disorders and their families may contribute to developing strategies during the pandemic and other vaccination policies for specific groups. Additionally, it is thought that mental health professionals can contribute to decreasing vaccine hesitancy by providing appropriate information about vaccine hesitancy or by ensuring that their patients have access to the necessary information. Lastly, studying what teenagers think about vaccines during a time when their individuality is becoming more important could help shape future vaccination policie.

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Ethical approval

This study protocol was approved by the Clinical Research Ethics Committee of Gülhane Faculty of Medicine in 2021 (19.10.2021-2021/12). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written and verbal consent was obtained from all participants and their parents / legal guardians in accordance with ethical standards.

Author contribution

The authors confirm contribution to the paper as follows: study conception and design:

BOA; data collection: BOA, GO; analysis and interpretation of results: BOA,MAC; draft manuscript preparation: BOA, GO, MAC. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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