

Effects of Beliefs, Conspiracy Theories, and Vaccine Hesitancy on the Vaccination Status of Patients with Severe Mental Illness in a Tertiary Psychiatric Care Hospital in Türkiye

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ABSTRACT

Background: The aim of the study was to investigate the relationship between the vaccination rates and vaccine hesitancy and the adoption of conspiracy theories by patients with severe mental illness in Türkiye.

Methods: Ninety-eight outpatients with schizophrenia and 105 outpatients with bipolar disorder were included. A sociodemographical data form, a survey on beliefs and conspiracy theories on vaccines and Vaccine Hesitancy Scale were obtained. Vaccinated and unvaccinated groups were compared and evaluated separately for patients with schizophrenia and bipolar disorder.

Results: Sixty-one (62.24%) patients in the schizophrenia group and 86 (81.90%) patients in the bipolar disorder group were vaccinated, and the vaccination rate in the schizophrenia group was significantly lower ($P=.002$). There was no significant difference in terms of Vaccine Hesitancy Scale scores or adoption of any particular conspiracy theory between patients with schizophrenia and bipolar groups. However, vaccinated and unvaccinated patients of schizophrenia and bipolar disorder groups differed in terms of adopting beliefs and conspiracy theories on vaccines. Sixty-five (75.58%) of the vaccinated patients in the bipolar group agreed with the statement "vaccines are safe," while this rate was 8 (42.11%) in the unvaccinated patients ($P=.004$). In the schizophrenia group, however, the main difference between the vaccinated and unvaccinated patients was adopting the beliefs that "vaccines have serious side effects" and "vaccines may cause homosexuality" ($P=.0341$ and $P=.003$, respectively).

Conclusion: The vaccination status of patients with schizophrenia might be under the stronger influence of conspiracy theories and specialized mental health interventions may be needed to ensure vaccination in patients with schizophrenia.

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INTRODUCTION

A novel type of pathogen causing pneumonia-like symptoms was identified in December 2019 in Wuhan, China, and subsequently identified as a novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The outbreak of coronavirus disease 2019 (COVID-19), the disease caused by SARS-CoV-2, was declared a pandemic by the World Health Organization (WHO) in 2020. As of May 2022, there have been more than 500 million confirmed cases of COVID-19, including more than 6 million deaths.¹ In order to curb these devastating public health results and even end the pandemic, WHO underlines the importance of equitable access to safe and effective

vaccines.² Despite the proven health benefits, the effectiveness of vaccination policy would be determined by the public's knowledge, beliefs, and attitudes toward vaccination. Unfortunately, knowledge, belief, and attitudes are known to be prone to cognitive biases and several detrimental social psychological effects, which may be functioning toward the COVID-19 pandemic as well.³ The term "vaccine hesitancy" is coined to refer to "a delay in acceptance or refusal of vaccination despite the availability of vaccination services."⁴ Surveys in 2021 report that between 40% and 50% of all respondents worldwide are hesitant to receive the COVID-19 vaccine,

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and higher vaccine hesitancy is reported among ethnic minorities, females, less educated, and socioeconomically disadvantaged individuals.⁵

Patients with mental health issues, particularly with severe mental illness (SMI), might be more vulnerable to COVID-19 for a couple of reasons. First, due to immanent cognitive biases of mental health issues, they might be expected to be more hesitant about vaccination. Considering previous pandemics, it has been documented that 80% of the patients with SMI were unvaccinated for influenza.⁶ It has been reported that patients with SMI showed less willingness to COVID-19 vaccines⁷ and received COVID-19 vaccination.⁸ Second, the high prevalence of medical comorbidity in SMI puts a sheer number of patients with SMI into the high-risk group for COVID-19. Eventually, a premorbid diagnosis of schizophrenia is associated with 2-3 times higher mortality in COVID-19 infections.⁸

It is reported that individuals share their concerns, mistrust, and rumors about vaccines with other people before reaching accurate and evidence-based information.⁹ It has been demonstrated that conspiracy theories, which constitute a portion of these public sharing, might alter vaccination intentions.¹⁰ Although there is a theoretical debate at an etiological level as to whether belief in conspiracy theories and paranoid ideation are separate but correlated factors or a continuum,¹¹ phenomenologically there is solid evidence indicating the correlation between belief in conspiracy theories and paranoid ideation, and schizotypy.¹² These findings are suggestive of the possibility that individuals with psychotic illness may be more prone to adopt conspiracy theories and make decisions under their influence. Despite these, to our knowledge, there is still no study examining the relationship between conspiracy theories and vaccination behavior in patients with SMI. This study aims to measure the extent to which specific conspiracy theories spread among patients with SMI and to determine whether this spread and vaccine hesitancy levels are related to the vaccination status of patients with SMI in Türkiye.

MAIN POINTS

- Vaccination rates of schizophrenia patients are lower than those of bipolar disorder patients.
- Despite the difference in vaccination rates between the schizophrenia and bipolar patient groups, Vaccine Hesitancy Scale scores were equivalent, suggesting that additional instruments may be needed to predict vaccination status in schizophrenia.
- Endorsing the statement “vaccines may cause homosexuality” increased the rate of non-vaccination approximately 11 fold in the schizophrenia group.
- While any conspiracy theory was not a predictor of non-vaccination in bipolar disorder groups, endorsement of the statement “vaccines are safe” increased vaccination.

MATERIAL AND METHODS

Participants and Sample Size

Ninety-eight patients with schizophrenia and 105 patients with bipolar disorder who voluntarily agreed to participate and signed the informed consent form were included in the study. The research was conducted with participants who applied to the outpatient clinic of the University of Health Sciences, Erenköy Mental and Neurological Diseases Research and Training Hospital. Participants who were under the age of 18, over the age of 65, diagnosed with alcohol or substance abuse and mental disability, illiterate, had received ECT treatment in the previous 6 months, suffering from cognitive dysfunction due to a general medical condition that may interfere with the interview, and those within the first month after discharge from the psychiatric service were not included in the research. The minimum sample size required was calculated with the G*Power software (V3.1.9.2) (α -error 0.05, power 0.80, and effect size 0.4).

Ethical Approval

This study was performed under the ethical standards of the World Medical Association Declaration of Helsinki. The research was authorized by the Ethics Committee of University of Health Sciences, Erenköy Mental and Neurological Diseases Research and Training Hospital on human research (Institutional Research Board No: 20/09/2021-32).

Measures

Sociodemographic Characteristics: Sociodemographic variables examined in this research included age, education level, income level, occupation status, household members, and vaccination status.

Vaccine Hesitancy Scale: Vaccine Hesitancy Scale (VHS) was developed by Larson et al¹³ for pandemics, and its validity and reliability were adapted into Turkish by Çapar and Çınar.¹⁴ Çapar and Çınar's study revealed a 2-factor structure: The mistrust factor was associated with vaccine hesitancy arising from mistrust in the information provided by health authorities, and the risk factor was associated with a perceived risk of vaccines irrelative to authorities. The Cronbach's alpha coefficient determined in the study in which the scale was translated and adapted into Turkish was expressed as 0.901. In the current study, the determined Cronbach's alpha coefficient was 0.690.

Survey Form: The survey form, which was prepared based on the conspiracy theories (“Vaccines may cause homosexuality”) and beliefs (“Vaccines have serious side effects”) about vaccination that the researchers received from patients and their caregivers in their clinical practice, included 7 statements that could be responded with the

options of agree and disagree. Table 3 contains the complete beliefs and conspiracy theories tested in the survey form.

Procedure

Data were collected between November 2021 and April 2022. Patients were informed about the aim of the study and gave informed consent before starting the survey. The patients who received at least 1 dose of any COVID-19 vaccine are considered vaccinated. Both the schizophrenia and the bipolar disorder groups were further divided into 2 groups as “vaccinated” and “unvaccinated.”

Statistical Analysis

IBM Statistical Package for the Social Sciences Statistics 16.0 package program (SPSS Inc.; Chicago, IL, USA) was performed for statistical analysis in the current study. Descriptive variables were reported as mean (SD), median (range), n, and percentage. The compatibility of the variates to normal distribution was analytically (Kolmogorov-Smirnov and Shapiro-Wilk tests) examined. The Student's

t-test was used to compare parametric numerical data, the Mann-Whitney *U*-test was used to compare non-parametric numerical data, and the chi-square test was used to compare categorical data separately for patient groups with schizophrenia and bipolar disorder. The Fisher's exact test was used for the comparison of categorical variables when more than 20% of cells had expected frequencies < 5. The factors affecting vaccine hesitancy were then examined by creating multiple logistic regression models separately for patient groups with schizophrenia and bipolar disorder. For statistical significance, a total type-I error rate of 5% was used.

RESULTS

Descriptive Statistics

A comparison of the sociodemographic variables and clinical data of patients with schizophrenia and bipolar disorder is shown in Table 1. The mean (SD) age of patients with schizophrenia was 38.71 (10.05) and the mean (SD) age of patients with bipolar disorder was 35.50 (11.71).

Table 1. The Comparison of Sociodemographic and Clinical Data of Patients with Schizophrenia and Bipolar Disorder

	Patients with Schizophrenia (n=98) (mean ± SD) or [median (range) or n (%)]	Patients with Bipolar Disorder (n=105) (mean ± SD) or [median (range) or n (%)]	<i>P</i>
Age (years)	38.71 ± 10.05	35.50 ± 11.71	.155
Gender	Male: 72 (73.47%) Female: 26 (26.53%)	Male: 57 (54.29%) Female: 48 (45.71%)	.005
Marital status	Married: 19 (19.39%) Single: 72 (73.47%) Divorced: 7 (7.14%)	Married: 33 (31.43%) Single: 68 (64.76%) Divorced: 4 (3.81%)	.107
Education	Below high school: 49 (50%) Above high school: 49 (50%)	Below high school: 32 (30.48%) Above high school: 73 (69.52%)	.005*
Occupation status	Unemployed: 62 (63.26%) Employed: 28 (28.57%) Retired: 8 (8.17%)	Unemployed: 58 (55.24%) Employed: 40 (38.09%) Retired: 7 (6.67%)	.354
Income level	3650 ± 10000	4100 ± 13000	.166
Healthcare worker	Yes: 3 (3.06%) No: 95 (96.94%)	Yes: 6 (5.71%) No: 99 (94.29%)	.500
Household status	Alone: 25 (25.51%) Family: 73 (74.49%)	Alone: 19 (18.09%) Family: 86 (81.91%)	.200
Number of offsprings	0.0 (5)	0.0 (5)	.035
Disease duration (years)	10 (42)	5 (38)	.002
History of previous psychiatric hospitalization	Yes: 61 (63.54%) No: 35 (36.46%)	Yes: 68 (64.76%) No: 37 (35.24%)	.857
Regular psychiatric drug use	Yes: 62 (63.27%) No: 36 (36.73%)	Yes: 60 (57.14%) No: 45 (42.86%)	.373
Presence of non-psychiatric illness	Yes: 29 (29.90%) No: 68 (70.10%)	Yes: 28 (26.67%) No: 77 (73.33%)	.610
Presence of a severe medical illness in the family	Yes: 17 (17.35%) No: 80 (82.65%)	Yes: 28 (26.92%) No: 76 (73.08%)	.110
Smoking	Yes: 60 (61.22%) No: 38 (38.78%)	Yes: 66 (62.86%) No: 39 (37.14%)	.811

The chi-square test, Fisher's exact test, Mann-Whitney *U*-test, and Student's *t*-test were performed. n, sample size. **P* < .05.

When the patient groups were compared in terms of age, no statistically significant difference was determined ($P=.155$). While 72 (73.47%) participants were male in the schizophrenia group, 57 (54.29%) participants were male in the bipolar disorder group ($P=.005$). Forty-nine (50.00%) of the participants in the schizophrenia group had a high school or higher education level, while 73 (69.52%) participants in the bipolar disorder group had a high school or higher education level ($P=.005$). In addition, the median (range) disease duration of patients with schizophrenia was 10 (42) and the median (range) disease duration of patients with bipolar disorder was 5 (38). Patients in the schizophrenia group had a longer disease duration than patients in the bipolar disorder group ($P=.002$). Nevertheless, the median (range) number of offspring of patients with schizophrenia was 0 (5) and the median (range) disease duration of patients with bipolar disorder was 0 (5). But statistical analysis results showed that the number of offspring in the bipolar patient group was higher than the number of offspring in the schizophrenia patient group ($P=.035$).

There was no significant difference between participants in the schizophrenia and the bipolar disorder groups in terms of other sociodemographic and clinical characteristics (see Table 1).

Comparison of Vaccination Status and Coronavirus Disease 2019 Infection Between Patients with Schizophrenia and Bipolar Disorder

A comparison of data on vaccination and COVID-19 infection between patients with schizophrenia and bipolar disorder is shown in Table 2. While 61 (62.24%) patients were vaccinated in the schizophrenia group, 86 (81.90%) participants were vaccinated in the bipolar disorder group, and the vaccination rate in the schizophrenia group was significantly lower ($P=.002$). Within the time interval of data collection, Sinovac-CoronaVac and Pfizer-BioNTech vaccines were accessible in Türkiye. Coronavirus disease 2019 vaccines were in the schizophrenia group, 49 (50.52%) participants were vaccinated with Pfizer-BioNTech, while in the bipolar disorder group, 70 (66.67%) participants were vaccinated with Pfizer-BioNTech, and the rate of vaccination with Pfizer-BioNTech in the bipolar disorder group was significantly higher ($P=.020$). Also, the rate of having a household member in a risk group for COVID was higher in the bipolar patient group than those in the schizophrenia group ($P=.043$). There was no significant difference between the schizophrenia and the bipolar disorder groups in terms of other data regarding vaccination and COVID-19 infection (see Table 2).

Table 2. Comparison of Data on Vaccination and COVID-19 Infection Between Patients with Schizophrenia and Bipolar Disorder

	Patients with Schizophrenia (n=98) [(median (range) or n (%)]	Patients with Bipolar Disorder (n=105) [(median (range) or n (%)]	P
History of COVID-19 infection	Yes: 19 (19.39%) No: 79 (80.61%)	Yes: 25 (23.81%) No: 80 (76.19%)	.445
Time elapsed after infection with COVID-19 (months)	0 (24)	0 (21)	.124
History of hospitalization for COVID-19 treatment	Yes: 9 (9.18%) No: 89 (90.82%)	Yes: 3 (2.86%) No: 102 (97.14%)	.056
History of intensive care admission for COVID-19 treatment	Yes: 0 (0%) No: 98 (100%)	Yes: 2 (1.90%) No: 103 (98.10%)	.498
Feeling at risk for COVID transmission	Yes: 19 (19.39%) No: 79 (80.61%)	Yes: 16 (15.24%) No: 89 (84.76%)	.434
Having a household member in a risk group for COVID	Yes: 14 (14.29%) No: 84 (85.71%)	Yes: 27 (25.71%) No: 78 (74.29%)	.043*
Immunization status with COVID-19 vaccines	Yes: 61 (62.24%) No: 37 (37.76%)	Yes: 86 (81.90%) No: 19 (18.10%)	.002*
Vaccination with Sinovac	Yes: 17 (17.35%) No: 81 (82.65%)	Yes: 25 (23.81%) No: 80 (76.19%)	.256
Vaccination with BioNTech	Yes: 49 (50.52%) No: 48 (49.88%)	Yes: 70 (66.67%) No: 35 (33.33%)	.020
Considering getting vaccinated with a domestic vaccine	Yes: 53 (54.08%) No: 45 (45.92%)	Yes: 64 (60.95%) No: 41 (39.05%)	.322
VHS insecurity subscale	10 (32)	8.50 (32)	.156
VHS risk subscale	6 (8)	6 (8)	.536
VHS total score	15 (40)	14 (38)	.212

The chi-square test, Fisher's exact test, and Mann-Whitney *U*-test were performed. COVID-19, coronavirus disease 2019; n, sample size; VHS, Vaccine Hesitancy Scale. * $P < .05$.

Table 3. Comparison of Beliefs and Conspiracy Theories Regarding Vaccines According to Vaccination Status Among Patients with Schizophrenia and Bipolar Disorders

	Patients with Schizophrenia (n = 98)			Patients with Bipolar Disorder (n = 105)		
	Unvaccinated (n = 37) [n (%)]	Vaccinated (n = 61) [n (%)]	P	Unvaccinated (n = 19) [n (%)]	Vaccinated (n = 86) [n (%)]	P
Vaccines are safe.	Yes: 20 (54.05%) No: 17 (45.95%)	Yes: 43 (70.49%) No: 18 (29.51%)	.100	Yes: 8 (42.11%) No: 11 (57.89%)	Yes: 65 (75.58%) No: 21 (24.42%)	.004
Vaccines have serious side effects.	No: 5 (13.51%) Yes: 32 (86.49%)	No: 20 (32.79%) Yes: 41 (67.21%)	.034 ^e	No: 4 (21.05%) Yes: 15 (78.95%)	No: 30 (34.88%) Yes: 56 (65.12%)	.244
Vaccines may contain undetected harmful substances.	No: 11 (29.73%) Yes: 26 (70.27%)	No: 23 (37.70%) Yes: 38 (62.30%)	.421	No: 4 (21.05%) Yes: 15 (78.95%)	No: 30 (34.88%) Yes: 56 (65.12%)	.244
Serious side effects related to vaccines may occur in the long-term future.	No: 14 (37.84%) Yes: 23 (62.16%)	No: 15 (24.59%) Yes: 46 (75.41%)	.164	No: 2 (10.53%) Yes: 17 (89.47%)	No: 26 (30.23%) Yes: 60 (69.77%)	.079
Vaccines may reduce fertility in the future.	No: 8 (21.62%) Yes: 29 (78.38%)	No: 18 (29.51%) Yes: 43 (70.49%)	.391	No: 4 (21.05%) Yes: 15 (78.95%)	No: 25 (29.07%) Yes: 61 (70.93%)	.479
Vaccines are developed to serve pharmaceutical companies commercial profits but no other reasons.	No: 21 (56.76%) Yes: 16 (43.24%)	No: 32 (52.46%) Yes: 29 (47.54%)	.679	No: 7 (36.84%) Yes: 12 (63.16%)	No: 46 (53.49%) Yes: 40 (46.51%)	.189
Vaccines may cause homosexuality.	No: 16 (43.24%) Yes: 21 (56.76%)	No: 45 (73.77%) Yes: 16 (26.23%)	.003 ^a	No: 11 (57.89%) Yes: 8 (42.11%)	No: 63 (73.26%) Yes: 23 (26.74%)	.184

The chi-square and Fisher's exact test were performed.

n, sample size. ^aP < .05.

Comparison of Beliefs and Conspiracy Theories Between Vaccinated and Unvaccinated Patients with Schizophrenia and Bipolar Disorder

A comparison of belief in conspiracy theories involving vaccines according to vaccination status among patients with schizophrenia and bipolar disorder is shown in Table 3. While 41 (67.21%) of the vaccinated patients in the schizophrenia group endorsed the statement “vaccines have serious side effects,” 32 (86.49%) of the unvaccinated patients had a similar opinion ($P = .034$). Similarly, the number of participants in the schizophrenia group who endorsed the statement “vaccinations may cause homosexuality” was 16 (26.23%) in the vaccinated group, while 21 (56.76%) participants in the unvaccinated schizophrenia group thought similarly ($P = .003$). When the vaccinated and unvaccinated participants in the schizophrenia group were compared, no significant difference was found in terms of other beliefs or conspiracy theories about vaccines.

Comparison of data on beliefs about vaccines of the vaccinated and unvaccinated participants in the bipolar disorder group revealed a single statistically significant difference: the rate of participants who agreed with the statement that “vaccines are safe” was higher in vaccinated patients ($P = .004$) (see Table 3).

Evaluation of Factors That Effect Vaccination Status

In the logistic regression analysis model, it is determined that having schizophrenia increased the risk of non-vaccination 2.7 times ($P = .002$, 95% CI = 1.44-5.22) in the study sample (see Table 4).

The effect of sociodemographic and clinical variables and beliefs, and conspiracy theories on vaccines to vaccination status according to psychiatric disorder by multiple logistic regression is shown in Table 5. In the schizophrenia group, endorsing the statement “vaccines may cause homosexuality” and having non-psychiatric comorbidity had an effect on non-vaccination status. Endorsing the statement “vaccines may cause homosexuality” increased the risk of non-vaccination status approximately 11 times ($P = .050$, 95% CI = 1.10-144.77) ($P = .050$ is accepted as marginally significant). Having a non-psychiatric comorbid disease reduced the risk of non-vaccination status ($P = .016$, 95% CI = 0.07-0.76). In the bipolar disorder group, it was determined that only not endorsing the statement “vaccines are safe” increased the risk of non-vaccination ($P = .041$, 95% CI = 1.09-64.155).

DISCUSSION

Societal crises such as terrorist attacks, plane crashes, natural disasters, or wars have been reinforcing the

Table 4. The Effect of Having Schizophrenia to Vaccination Status by Logistic Regression

Independent Variables	Dependent Variable=Vaccination status (Ref=non-vaccination)		
	EXP (B)	95.0% CI for EXP	P
Constant	0.221		<0.001
Psychiatric disorder (Ref=Sch)	2.75	1.44-5.22	0.002

Note: $P = 0.050$ is accepted as marginally significant. Binary logistic regression analysis test was performed. CI: Confidence interval. Sch: Schizophrenia

Nagelkerke R Square: 0.069, df:1, $P = 0.002$

Table 5. The Effect of Sociodemographic, Clinical Data and Interpretation About Vaccines to Vaccination Status According to Psychiatric Disorder by Logistic Regression

Independent Variables	Dependent Variable = Vaccination Status (Ref = Non-Vaccination)					
	Schizophrenia			Mood Disorder		
	EXP (B)	95.0% CI for EXP	P	EXP (B)	95.0% CI for EXP	P
Constant	0.618		.172	2.01		.511
Vaccines are safe (ref=no)	1.71	0.59-4.87	.312	8.37	1.09-64.155	.041*
Vaccines have serious side effects (ref=yes)	1.07	0.32-3.58	.910*	0.77	0.06-10.12	.848
Vaccines may contain undetected harmful substances (ref=yes)	2.60	0.61-11.04	.196	0.32	0.03-3.36	.347
Serious side effects related to vaccines may occur in the long-term future (ref=yes)	0.59	0.13-2.59	.487	2.07	0.13-33.26	.605
Vaccines may reduce fertility in the future (ref=yes)	0.53	0.11-2.44	.413	2.51	0.28-22.64	.410
Vaccines are developed to serve pharmaceutical companies commercial profits but no other reasons (ref=yes)	1.24	0.24-6.28	.790	0.48	0.08-2.70	.408
Vaccines may cause homosexuality (ref=yes)	11.63	1.10-144.77	.050*	0.17	0.02-1.01	.052
Presence of non-psychiatric illness (ref=yes)	0.23	0.07-0.76	.016*	0.22	0.03-1.65	.144
Number of offsprings				0.56	0.28-1.11	.098
Disease duration (years)				0.90	0.79-1.03	.148

$P = .050$ is accepted as marginally significant. Multiple logistic regression analysis test was performed.

Nagelkerke R^2 : 0.245, df : 8, $P = .013$ for schizophrenia group.

Nagelkerke R^2 : 0.354, df : 10, $P = .045$ for mood disorder group.

* $P < .05$.

influence of conspiracy theories throughout history¹⁵ and the COVID-19 pandemic was no exception.¹⁶ Although there is a theoretical debate at an etiological level as to whether belief in conspiracy theories and paranoid ideation are separate but correlated factors or a continuum,¹¹ phenomenologically there is solid evidence indicating the correlation between belief in conspiracy theories and paranoid ideation, and schizotypy.¹² Predictably, belief in conspiracy theories is correlated with delusion-proneness and paranoia,¹⁷ and psychotic-like experiences¹⁸ in the course of the COVID-19 pandemic as well. Consequently, there have been both observational¹⁹ and quasi-experimental²⁰ reports of high contagion of conspiracy theories to patients with schizophrenia through the COVID-19 pandemic. These findings might indicate a tendency of patients with schizophrenia to believe in conspiracy theories. Previous findings also indicate that belief in conspiracy theories might reduce vaccination intention.^{12,13,21} This phenomenon may result in lower vaccination rates in schizophrenia patients.

Vaccination rates of participants with schizophrenia and bipolar disorder were 62% and 81%, respectively, in the study sample, which reached a statistically significant level. Although it is not possible to compare these rates with the healthy population due to the lack of a control group in the study, the finding that the schizophrenia group was significantly less vaccinated than the bipolar group may indicate a need for higher prioritization of this group for vaccination campaigns. The current study consisted of patients with SMI living in Istanbul and with ongoing psychiatric treatment; thus, true vaccination levels might be estimated as much lower in a community-based epidemiological study. Given the findings about the higher mortality of COVID-19 infection in patients with

SMI,⁸ this vaccination rate gap might lead to detrimental consequences of pandemics for patients with SMI. These findings indicate that in pandemic situations healthcare workers should be aware of the vaccination status of their patients, especially those with psychotic illnesses, within the scope of their responsibility for their physical health.

Despite the significant difference in vaccination status, VHS total and subscale scores did not differ significantly between the schizophrenia and bipolar disorder groups. Statistical analysis of the present study revealed that endorsing the statement “vaccines may cause homosexuality” increased non-vaccination risk approximately 11-fold, while any conspiracy theory beliefs had a statistically significant effect on the vaccination status of the bipolar group. These findings suggest that VHS may still be an adequate tool for patients with bipolar disorder if used as a stand-alone tool, but in schizophrenia, an additional assessment of conspiracy theories may be necessary to be able to estimate vaccination status.

The schizophrenia group and the bipolar disorder group did not differ in terms of frequency of adopting any particular conspiracy theory, but the adoption of a conspiracy theory regarding homosexuality built the most powerful factor for non-vaccination in the schizophrenia group. Cultural dimensions such as collectivism or power distance might be associated with specific types of conspiracy theories.²² Western societies seemingly adopted a predominantly technology-related cluster of conspiracy theories such as viruses spreading through 5G²³ or vaccines containing microchips; eastern societies might have adopted a predominantly sexuality-related cluster of conspiracy theories including vaccines causing homosexuality,²⁴ male sexual dysfunction,²⁵ and infertility²⁶ through the pandemics. We have tested another sexuality-related

conspiracy theory that vaccines may reduce fertility, but the statistical analysis did not reveal a significant effect on vaccination status in both groups. There is a need for further academic research on the relationship between cultural characteristics and the prevalence of particular conspiracy theories.

This finding on the impact of a conspiracy theory characterized with homophobia may be related to male predominance in our sample. It was observed that the number of male patients was higher in both groups; this finding is in line with WHO reports of a predominance of men using outpatient services in non-high-income countries. Besides, the bipolar disorder group had higher education levels than the schizophrenia group, and this is also consistent with the previous findings.²⁷

Our findings indicate that vaccination intentions of patients with schizophrenia might be under a stronger influence of conspiracy theories even when they are not more commonly adopted. For this reason, special public health strategies may be required for patients with schizophrenia to battle vaccine myths, and specialized instruments may be required to predict vaccination decisions. Apart from vaccination during pandemic periods, conspiracy theories are also known to reduce treatment adherence in chronic conditions, such as to HIV medical treatment.²⁸ There is a lack of literature on the effect of conspiracy theories on treatment adherence in the treatment of chronic psychiatric diseases, and this issue should also be investigated. Clinicians should be aware of suggested communication strategies against health-related conspiracy theories, such as open-minded approach or restoring personal control, in order to reduce their impact.²⁹

The bipolar disorder group was significantly more vaccinated with BioNTech than the schizophrenia group. This finding may be partly the result of Türkiye's vaccination policy. Sinovac was authorized and distributed initially, followed by BioNTech by Turkish health authorities. This regimen led to the necessity to revaccinate people with BioNTech who had previously been vaccinated with Sinovac. Participants in the bipolar disorder group were shown to be more compliant with vaccination recommendations by health authorities, and 30% of this group had BioNTech doses after initial Sinovac injections, compared to 13% in the schizophrenia group. In conclusion, this difference in BioNTech doses may be a consequence of adherence to vaccination recommendations, rather than individual preference over different vaccines.

This study has several limitations. Outpatients with bipolar disorder provided a comparison group, but the absence of a control group with no psychiatric diagnosis is one of the main limitations. Another limitation was the lack of utilization of any diagnostic interview tools in the participant selection process and relying on diagnoses obtained from medical records. Since the study ground is deeply influenced by cultural variables, these findings

should be investigated in culturally diverse locations as well. Likewise, these findings were derived from patients with SMI with medication adherence and should be reinvestigated using a probability sampling method. Furthermore, our study lacks many clinical variables; thus, it was unable to investigate the relation between themes of conspiracy theories and delusions. Besides, we have not been able to test a wide variety of conspiracy theories or utilize a rating scale. Similarly, data regarding vaccination status were not obtained from electronic health records, but through statements of participants. Furthermore, despite previous findings that imply social media use might predispose belief in conspiracy theories, we did not investigate how participants were exposed to them. Our study could be delivered at a seemingly attenuated stage of the pandemic. Nevertheless, findings from previous pandemics in late history provided invaluable insight into the recent COVID-19 pandemic.³⁰ In this sense, results of the present study might contribute to awareness of the crucial vulnerability to conspiracy theories in patients with SMI. At the same time, hopefully, the results of current research might contribute to building preventive strategies for possible forthcoming pandemics that might be inevitable.

In conclusion, the results of the current study emphasize that the vaccination rates of patients with SMI, especially those with schizophrenia, are still significantly low. In addition, factors affecting vaccine hesitancy differ between patients with schizophrenia and bipolar disorder according to the present study findings. The vaccination status of patients with schizophrenia might be under the stronger influence of conspiracy theories even when they are not more commonly adopted.

Ethics Committee Approval: This study was approved by Ethics Committee of University of Health Sciences, Erenköy Mental and Neurological Diseases Research and Training Hospital (Approval No: 20/09/2021-32).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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