

Associations Between Psychosocial Influence, Positive Thinking, and Vaccine Attitudes in Patients with Schizophrenia During the COVID-19 Pandemic

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Background: The rate of vaccination is lower in patients with schizophrenia than in the general population, and therefore, further investigation into the psychosocial impact of COVID-19 on these patients and their vaccine attitudes is warranted. In this study, we investigated factors influencing vaccine attitudes in patients with schizophrenia and explored the interactions among these factors.

Methods: Cross-sectional, self-report surveys were conducted among Taiwanese patients with schizophrenia to collect data on vaccine attitudes and associated variables. Our sample was drawn from the largest psychiatric specialty hospital in Taiwan. As of December 1, 2022, 88% of the Taiwanese population had received at least two doses of the COVID-19 vaccine. Factors influencing vaccine attitudes and potential moderators were investigated through correlation analyses, hierarchical regression, and Hayes' Process Macro.

Results: This study included 457 patients. Our results revealed that social anxiety and social desirability were respectively positively and negatively correlated with vaccine attitudes. Positive thinking moderated the overall effect of social influence on vaccine attitudes. Low levels of positive thinking intensified the effect of social influence on vaccine hesitancy.

Conclusion: This study clarified the association of social influence with vaccine attitudes and the moderating effect of positive thinking on this association. Reputable medical centers can enhance patients' confidence in vaccination policies and foster positive thinking to increase vaccine acceptance among patients with schizophrenia.

Keywords: schizophrenia, COVID-19, Societal Influences Survey Questionnaire, vaccine attitudes, positive thinking, psychosocial impact

Introduction

After its emergence in late 2019, COVID-19 considerably affected individuals' mental health by imposing a substantial psychological burden on the general population,¹ health-care workers,^{2,3} and patients with mental disorders.⁴⁻⁷ For example, patients with schizophrenia faced multidimensional effects of COVID-19.

The coronavirus pandemic has had a significant impact on both health and social systems⁸ and it could potentially alter the health conditions of patients with schizophrenia.⁸ Because of their susceptibility to respiratory infections,⁹ these patients exhibited a high risk of COVID-19-related mortality.¹⁰ Schizophrenia was characterized by a range of symptoms commonly classified into positive (eg, hallucinations, delusions, disorganized speech, catatonic behavior), negative (eg, blunted affect, alogia, anhedonia, avolition, social withdrawal), and cognitive symptoms (eg, impaired attention, working memory, and executive functioning).¹¹ In addition, core disturbances in self-experiences—such as disrupted self-boundaries, thought insertion, derealization, and loss of agency—were identified as central features of the disorder.¹² These combined impairments could compromise an individual's ability to understand, evaluate, and act on health-related information. As shown in prior research, individuals with psychotic disorders were among the least likely to receive vaccines, likely due to substantial impairments in decisional capacity that affected risk perception, trust, and motivation to engage in preventive health behaviors.¹³

Patients with schizophrenia experienced extensive psychological stress during the pandemic attributable to factors such as increased distress, sleep disturbances, depression, and anxiety due to quarantine measures.¹⁴ Prolonged social isolation and widespread COVID-19-related misinformation likely contributed to the onset of psychotic symptoms in these patients.¹⁵ Psychotic relapses may result from environmental factors, poor treatment adherence, and inflammatory response due to COVID-19.¹⁶ A study demonstrated that COVID-19 led to severe psychotic episodes and poor prognoses of psychotic disorder.¹⁷ In summary, COVID-19 imposed an appreciable psychological burden on individuals that was attributable to both infection and social isolation.

In addition to the aforementioned burden, COVID-19's psychosocial impact and patients' vaccine attitudes are key concerns in individuals with schizophrenia. Social distancing and other preventive measures implemented during the pandemic negatively affected patients with schizophrenia. For example, they exhibited poorer social interactions than did the general population.¹⁸ Social distancing and isolation further imposed a psychological burden on these patients.^{14,19} Obtaining COVID-19-related information from the Internet, television, or radio exerted both positive and negative effects on individuals with schizophrenia. A study involving health-care workers revealed a significant association between receiving COVID-19-related information from multiple sources and having high confidence levels.²⁰ Another study suggested that acquiring COVID-19-related information enhanced individuals' intention to self-isolate.²¹ However, excessive exposure to pandemic-related news exacerbated anxiety and stress in the general population.²² Among patients with schizophrenia, gathering COVID-19-related information was significantly associated with psychological distress and sleep disturbance.⁵

Negative vaccination attitudes are a crucial problem in patients with schizophrenia. However, both preventive measures and vaccination were required to reduce the risk of long COVID during the pandemic.²³ A meta-analysis indicated that patients with schizophrenia had an elevated risk of COVID-19-related mortality.²⁴ Notably, antipsychotics and other psychotropic medications can interact with Paxlovid, a common antiviral medicine for COVID-19.²⁵ Regarding vaccination, the rates of receiving initial and booster doses were lower in patients with schizophrenia than in the general population.^{26,27} Such differences are especially pronounced among individuals with schizophrenia who are older or male.²⁸ Patients with schizophrenia experienced lower rates of COVID-19 infection but higher mortality, largely due to low vaccination uptake.²⁹ This may be attributed to the fact that individuals with psychiatric disorders—especially those with schizophrenia or related conditions—were more likely to refuse the COVID-19 vaccine.³⁰ Thus, researchers should investigate these patients' willingness to be vaccinated and the psychosocial impact COVID-19 had on this population.

The multidimensional effects of COVID-19 on patients with schizophrenia are dependent on COVID-19's psychosocial impact⁵ and patients' motivation to receive a vaccination.³¹ The swift development of COVID-19 vaccines has evolved into a politicized issue, drawing significant attention from both mainstream and social media.³² Factors such as the accelerated timeline, concerns over potential side effects,³³ and individuals' political beliefs may all influence their willingness to receive the vaccine.³⁴ This indicated that attitudes toward vaccination were shaped by a complex process. However, few studies have comprehensively explored the determinants of vaccine attitudes in these patients. The interactions between psychological burden, psychosocial impact, and vaccine attitudes remain unclear. The rate of COVID-19-related mortality was higher in patients with schizophrenia than in the general population,¹⁰ and therefore, the factors influencing vaccine attitudes in these patients should be identified. Thus, we conducted this cross-sectional

study to identify key factors influencing vaccine attitudes in patients with schizophrenia. Our objectives were to investigate the association between COVID-19's psychosocial impact and patients' vaccine attitudes and identify factors moderating this association.

Methods

Study Cohort and Ethical Considerations

This study was conducted using data from an ongoing cross-sectional survey for measuring the multidimensional effects of COVID-19 on patients with mental disorders, health-care workers, and the general population.^{1–7,35–38} Patients with schizophrenia were recruited through printed advertisements posted in public areas of Kaohsiung Municipal Kai-Syuan Psychiatric Hospital (KSPH), the largest psychiatric specialty hospital in Taiwan, and its affiliated institutes as well as through online advertisements shared on social media platforms. Cross-sectional surveys were conducted using paper-and-pencil questionnaires. For this study, we used data corresponding to the period from October 2022 to March 2023, which coincided with the third wave of COVID-19 in Taiwan. As of December 1, 2022, 88% of people in Taiwan had received at least two doses of the COVID-19 vaccine.³⁹ We included patients who received a psychiatrist-made diagnosis of schizophrenia, were hospitalized in either the acute or the chronic ward of KSPH, could understand the study objectives and follow instructions from research assistants, were aged ≥ 20 years, and provided informed consent before the survey. Patients were excluded if they exhibited substantial cognitive impairments that could interfere with their ability to complete the questionnaires. The study protocol was approved by the Institutional Review Board of KSPH (KSPH-2020-03, KSPH-2021-08, and KSPH-2023-04). We conducted these studies in accordance with the latest revision of national legal requirements (Human Subjects Research Act, Taiwan) and complied with the Declaration of Helsinki. Each participant provided informed consent before participating.

Study Variables

Vaccination Attitudes

The Vaccination Attitude Examination (VAX) scale was used to assess patients' vaccine attitudes. This scale was reported to exhibit strong validity and reliability.⁴⁰ The Chinese version of the VAX was reported to exhibit acceptable reliability.³⁵ The VAX comprises 12 items, including “Although most vaccines appeared to be safe, problems might have remained undiscovered” and “Authorities promoted vaccination for financial gain, not for people's health.” Each response was scored on a 6-point Likert-type scale, with end points ranging from 1 (“strongly agree”) to 6 (“strongly disagree”). A higher overall score on VAX indicated stronger vaccine hesitancy ([Supplementary Table S1](#)).

Social Anxiety, Social Desirability, and Social Information

Three subscales of the Societal Influences Survey Questionnaire (SISQ)—social anxiety, social desirability, and social information—were used to measure the psychosocial impact of COVID-19. The SISQ has been reported to exhibit strong validity and reliability.^{1,37} It comprises 15 items, which constitute 5 categories: social distance, social anxiety, social desirability, social information, and social adaptation. Each response is scored on a 4-point Likert scale, with end points ranging from 1 (“never”) to 4 (“often”). The social anxiety subscale comprises 4 items, including “I worried about the pandemic affecting my work” and “I felt anxious or fearful because of the pandemic.” A higher total score on this subscale indicates a higher level of anxiety due to external factors during the COVID-19 pandemic. The social desirability subscale comprises 3 items, including “I believe that self-management of health can help control the spread of COVID-19.” A higher score indicates a higher level of confidence in and a higher level of adherence to government policies regarding COVID-19. The social information subscale comprises 2 items, including “I constantly sought the latest pandemic news through television, the computer, or the phone.” A higher score indicates a higher level of inclination to seek COVID-19-related information ([Supplementary Table S1](#)).

Positive Thinking

Lo's Healthy and Happy Lifestyle Scale (LHHLS) was used to measure positive thinking. LHHLS evaluates well-being in relation to mental health and lifestyle. It was reported to exhibit acceptable reliability and good validity.³⁶ LHHLS

comprises 2 subscales: self-efficacy and positive thinking. Positive thinking is assessed using 6 items, including “I am optimistic about my future” and “I feel that life is carefree.” Each response is scored on a 5-point Likert scale, with end points ranging from 1 (“never”) to 5 (“always”). Respondents are asked to evaluate their feelings over the previous 2 weeks. A higher score on LHHLS indicates a higher level of positive thinking ([Supplementary Table S1](#)).

Demographic Characteristics

The following demographic data were collected from the patients: age (yr), sex (male or female), education level (high school or below, college, and graduate school or above), holding religious beliefs (yes or no), and history of comorbidities (yes or no). Vaccine acceptance tends to be lower in younger individuals, women, and individuals with lower education levels than in others.⁴¹ Religious beliefs influence vaccine acceptance and vaccine hesitancy.⁴² Furthermore, the preexistence of comorbidities influences individuals’ willingness to be vaccinated.⁴³

Statistical Analysis

Data were analyzed using SPSS (version 27.0; IBM Corporation, Armonk, NY, USA). Descriptive statistics were used for demographic characteristics and quantitative variables. We employed several analytical methods to examine how the psychosocial impact of COVID-19—specifically social anxiety, social desirability, and social information—affects patients’ vaccine attitudes, and to assess the moderating role of positive thinking in these relationships. Correlation analyses, such as Pearson correlation analysis and point-biserial correlation analysis and hierarchical regression were performed to identify factors associated with vaccine attitudes. To assess the moderating effect of positive thinking, we first conducted regression analyses with social anxiety, social desirability, and social information as independent variables predicting vaccine attitudes. We then introduced positive thinking into the model as a moderating variable. Finally, we analyzed the moderating effect of the interaction between psychosocial impact and positive thinking on vaccine attitudes. Adjusted R^2 , ΔR^2 , and ΔF values were calculated to assess model fit. Once the interaction terms between psychosocial impact variables and positive thinking showed a significant effect on vaccine attitudes, the moderating effect of positive thinking was further analyzed using Hayes’ PROCESS Macro. This analysis aimed to examine the associations between psychosocial impact and vaccine attitudes among patients with varying levels of positive thinking.⁴⁴

Results

This study included 457 patients with schizophrenia (mean age: 57.16 ± 11.26 ; men: 61.1%). Among the patients, 91.2% had a high school education or below, 51.4% held religious beliefs, and 36.1% had comorbidities. [Table 1](#) presents the demographic characteristics of the study cohort. The results of Pearson correlation analysis ([Table 2](#)) indicated that

Table 1 Demographic Characteristics of the Study Cohort (N = 457)

Variables	Frequency	Percentage (%)
Sex		
Male	279	61.1
Female	178	38.9
Education level		
High school or below	411	91.2
College	38	8.4
Graduate school or above	2	0.4
Holding religious beliefs		
Yes	235	51.4
No	213	46.6
Comorbidities		
Yes	165	36.1
No	292	63.9

(Continued)

Table 1 (Continued).

	Mean	SD	Minimum	Maximum
Age	57.16	11.26	20.00	83.00
Social anxiety	6.76	3.11	4.00	16.00
Social desirability	8.46	3.69	4.00	16.00
Social information	3.54	1.77	2.00	8.00
Positive thinking	17.04	6.64	6.00	30.00
Vaccine attitudes	36.96	9.79	12.00	58.00

Table 2 Correlation Matrix for the Study Variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Sex										
2. Age	−0.04									
3. College/high school or below	−0.02	−0.17**								
4. Graduate school or above/high school of below	0.05	−0.04	−0.02							
5. Holding religious beliefs	−0.02	−0.06	0.08	0.06						
6. Comorbidities	−0.13**	0.07	0.12*	−0.05	0.06					
7. Social anxiety	−0.06	−0.22**	0.21**	−0.06	0.12*	0.07				
8. Social desirability	−0.11*	−0.15**	0.20**	0.03	0.20**	0.08	0.70**			
9. Social information	−0.12*	−0.22**	0.24**	0.00	0.22**	0.07	0.71**	0.69**		
10. Positive thinking	−0.30**	−0.21**	0.17**	0.02	0.12**	0.14**	0.25**	0.46**	0.33**	
11. Vaccine attitudes	0.02	−0.07	0.01	−0.04	−0.09	0.00	0.12*	−0.16**	0.02	0.04

Notes: Sample size = 457; * $p < 0.05$, ** $p < 0.01$.

vaccine attitudes were positively correlated with social anxiety ($r(455) = 0.12$; $p < 0.05$) but negatively correlated with social desirability ($r(455) = -0.16$; $p < 0.01$).

Hierarchical regression was performed to analyze the direct and moderating effects of the study variables on vaccine attitudes. In the first step, the statistical model was adjusted for demographic characteristics (eg, age, sex, education level, religious beliefs, and comorbidities; adjusted $R^2 = 0.01$). In the second step, the model was fitted with social anxiety, social desirability, and social information ($\Delta R^2 = 0.11$; $\Delta F = 19.68$; $p < 0.001$). Social anxiety was found to be positively associated with vaccine attitudes ($\beta = 1.36$; $p < 0.001$), whereas social desirability was negatively associated with them ($\beta = -1.25$; $p < 0.001$). In the third step, positive thinking was introduced into the model ($\Delta R^2 = 0.15$; $\Delta F = 19.83$; $p < 0.001$). This variable was positively associated with vaccine attitudes ($\beta = 0.35$; $p < 0.001$). In the final step, interaction terms were incorporated into the model ($\Delta R^2 = 0.24$; $\Delta F = 17.78$; $p < 0.001$). The results (Table 3) indicated the presence of

Table 3 Predictors of and Moderating Effects on Vaccine Attitudes Analyzed Through Hierarchical Regression

Variables	Vaccine Attitudes							
	Model 1		Model 2		Model 3		Model 4	
	β	SE	β	SE	β	SE	β	SE
Sex	0.15	0.97	−0.21	0.92	0.97	0.94	0.72	0.89
Age	−0.06	0.04	−0.03	0.04	0.01	0.04	0.01	0.04
College/high school or below	0.27	1.77	0.11	1.70	−0.37	1.67	0.42	1.59
Graduate school or above/high school or under	−6.07	6.95	−0.35	6.59	−0.45	6.45	−1.53	6.33
Holding religious beliefs	−1.54	0.94	−0.84	0.91	−0.86	0.89	−1.15	0.84

(Continued)

Table 3 (Continued).

Variables	Vaccine Attitudes							
	Model 1		Model 2		Model 3		Model 4	
	β	SE	β	SE	β	SE	β	SE
Comorbidities	0.21	0.99	0.29	0.94	-0.04	0.92	-0.20	0.87
Social anxiety			1.36***	0.23	1.52***	0.23	0.88***	0.25
Social desirability			-1.25***	0.18	-1.57***	0.19	-1.29***	0.20
Social information			0.22	0.39	0.17	0.38	1.17**	0.42
Positive thinking					0.35***	0.08	0.29***	0.08
Social anxiety× Positive thinking							0.14***	0.03
Social desirability× Positive thinking							-0.12***	0.03
Social information× Positive thinking							-0.18**	0.06
Adjusted R^2	0.00		0.11		0.15		0.24	
ΔR^2	0.01		0.12		0.04		0.09	
ΔF	0.89		19.68***		19.83***		17.78***	

Notes: Sample size = 457; ** $p < 0.01$, *** $p < 0.001$; Δ : increment of change.

moderating effects on the direct associations of social anxiety ($\beta = 0.14$; $p < 0.001$), social desirability ($\beta = -0.12$; $p < 0.001$), and social information ($\beta = -0.18$; $p < 0.01$) with vaccine attitudes.

As presented in Figure 1, social anxiety induced vaccine hesitancy more strongly in patients with a low level of positive thinking ($\beta = 2.01$; $t = 6.80$; $p < 0.001$) than in those with a high level of positive thinking ($\beta = 1.32$; $t = 5.53$; $p < 0.001$). As indicated in Figure 2, social desirability reduced vaccine hesitancy more strongly in patients with a high level of positive thinking ($\beta = -2.07$; $t = -1.18$; $p < 0.01$) than in those with a low level of positive thinking ($\beta = -0.76$; $t = -3.26$; $p < 0.001$). Among patients with a low level of positive thinking, those with a higher tendency to seek COVID-19-related information developed stronger vaccine hesitancy ($\beta = 2.26$; $t = 4.22$; $p < 0.001$; Figure 3).

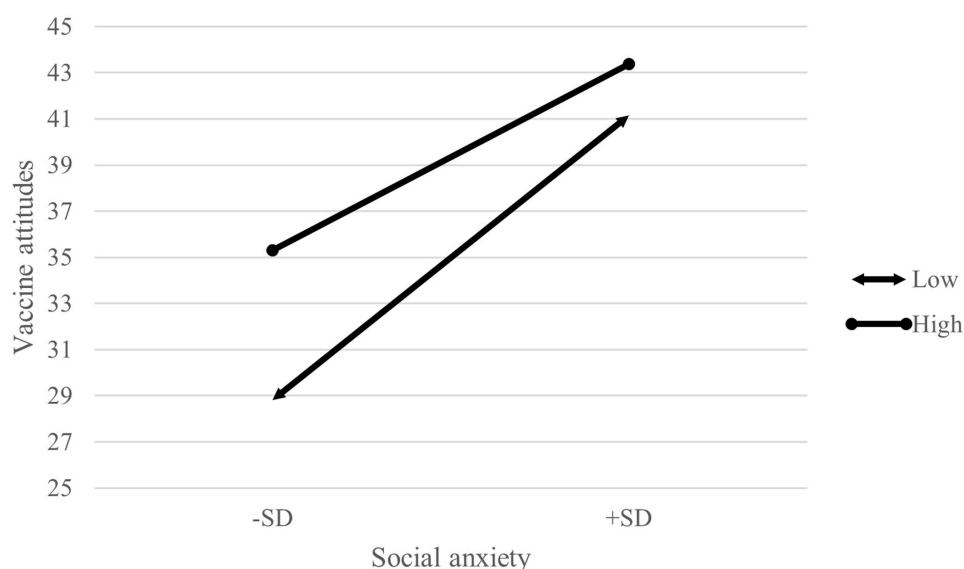


Figure 1 Moderating effect of positive thinking on the direct association between social anxiety and vaccine attitudes.

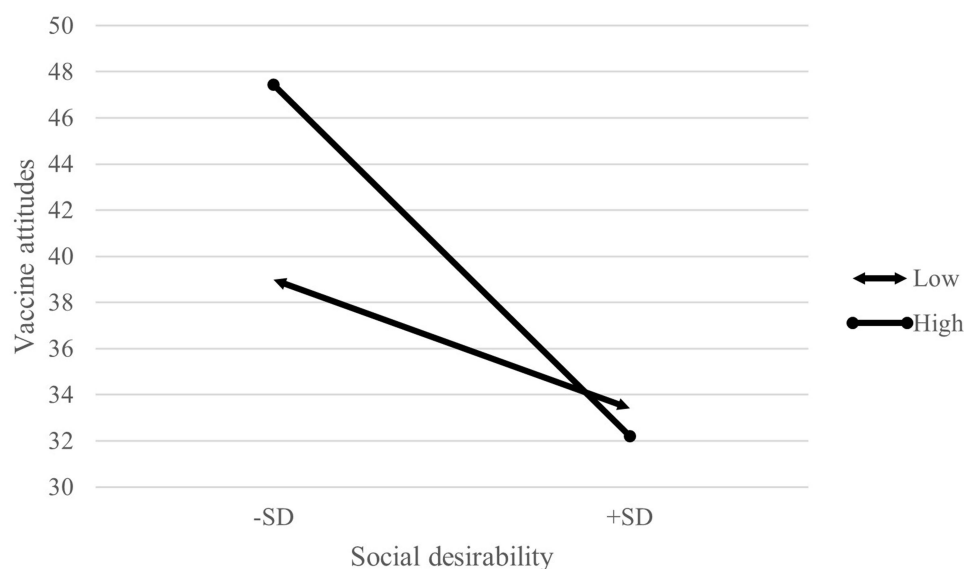


Figure 2 Moderating effect of positive thinking on the direct association between social desirability and vaccine attitudes.

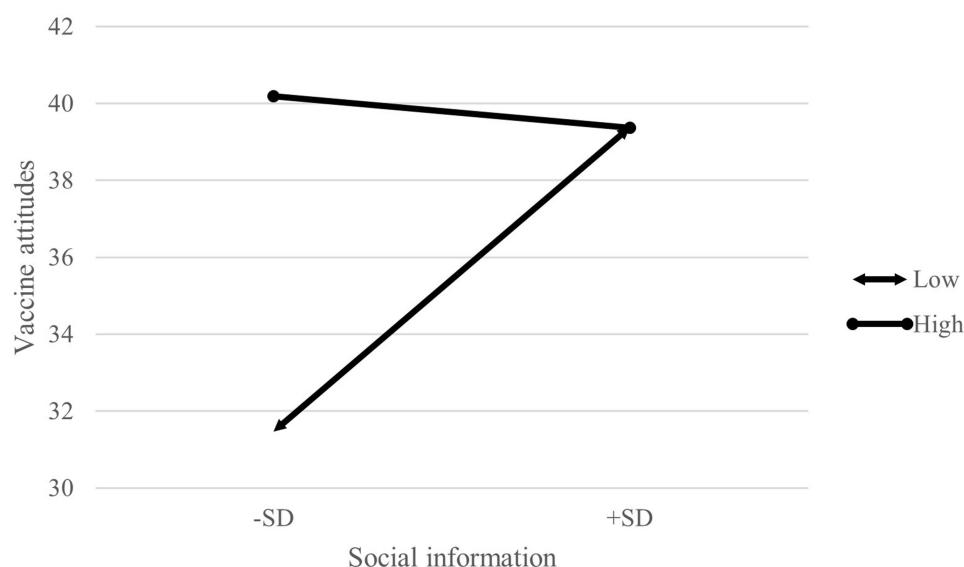


Figure 3 Moderating effect of positive thinking on the direct association between social information and vaccine attitudes.

Discussion

We analyzed the effect of social influence on the vaccine attitudes of patients with schizophrenia during the COVID-19 pandemic. Our findings revealed a positive correlation between social anxiety and vaccine attitudes but a negative correlation between social desirability and vaccine attitudes. The psychological effects of pandemic-related changes in patients' external environment—for example, occupational changes, economic changes, and social distancing—were measured using the social anxiety subscale of SISQ.¹ The fear of negative changes in social status and financial situation likely reduced vaccine acceptance.⁴⁵

Social desirability reflected patients' levels of trust in and compliance with pandemic policies. Studies have reported negative vaccine attitudes to be associated with conspiracy beliefs and vaccine skepticism.^{46,47} Consequently, trust in government policies might mitigate vaccine hesitancy. Our findings align with those of other studies. External factors such as social anxiety and social desirability partially represented the levels of trust the patients had in government

policies. Higher levels of confidence in these policies were correlated with higher levels of vaccine acceptance.^{48–50} A study demonstrated that trust in health-care providers improved vaccine acceptance.⁵¹ Therefore, during pandemics, fostering trust in health-care providers and communicating accurate preventive measures may improve patients' adherence to public health guidelines.

We identified no significant association between patients' tendency to seek COVID-19-related information and vaccine attitudes. In line with our findings, a study revealed that seeking information did not necessarily influence individuals' vaccine attitudes.⁵² Rather, the information source and personal factors shaped individuals' willingness to be vaccinated. The levels of vaccine acceptance significantly differed between individuals receiving vaccine-related information from medical institutions or official media and those receiving information from unregulated platforms or social media.^{53–56} Because our sample comprised patients with schizophrenia, they likely had more opportunities to interact with health-care professionals than did the general population. Consequently, they were more likely than the general population to receive accurate information on vaccines. However, whether exposure to accurate information improved their vaccine attitudes remains to be clarified. Receiving information from various sources might have clouded patients' vaccine attitudes and increased cognitive complexity.⁵⁷

Effect of the Interaction Between Positive Thinking and Social Influence on Vaccine Attitudes

We identified no association between positive thinking and vaccine attitudes. However, further analysis performed using positive thinking as a moderator of the association between social influence and vaccine attitudes revealed that positive thinking moderated the associations of social anxiety, social desirability, and social information with vaccine attitudes. Specifically, among patients with a high level of positive thinking, social anxiety weakly induced vaccine hesitancy. Furthermore, in these patients, social desirability strongly reduced vaccine hesitancy. These findings suggest that the development of vaccine hesitancy is a complex process influenced by multiple factors. Although positive thinking did not directly affect vaccine hesitancy, it played a moderating role in shaping vaccine attitudes.

Negative thoughts often trigger a chain reaction, leading to further negativity. Positive thinking, which involves developing uplifting emotions and constructive habits, is essential for breaking the cycle of negativity. Evidence suggests that positive thinking can help with managing stress, anxiety, and other mental health problems.⁵⁸ It was reported to mitigate the role of stress in developing mental health disorders during the COVID-19 pandemic.⁵⁹ Positive thinking can improve mental health during public health crises.⁶⁰ Although concerns regarding the social and economic consequences of crises can markedly increase stress, positive thinking can mitigate the effects of concerns and stress.⁶¹ Our study provides empirical evidence of the moderating effect of positive thinking on stress due to external factors and thus vaccine hesitancy. To improve patients' compliance with preventive measures implemented during pandemics, positive thinking should be fostered through appropriate health education and training.

Although this study indicated that a strong desire to receive COVID-19-related information had no direct association with vaccine attitudes, actively seeking such information increased vaccine hesitancy in patients with a low level of positive thinking. The level of enthusiasm in acquiring pandemic-related information significantly influenced vaccine attitudes. A complete lack of interest in or avoidance of pandemic-related news was associated with vaccine hesitancy. Among patients who actively sought pandemic-related information, vaccine attitudes were influenced by the information source (eg, official media and social media) or personal factors (conspiracy beliefs).^{45,52} We discovered that positive thinking exerted moderating effects on relevant information seeking and its association with vaccine attitudes. Individuals not practicing positive thinking can be trapped in a vicious cycle of negativity under stress.⁵⁸ Further studies are required to clarify the causal relationship between negative emotions and active pursuit of pandemic-related information.

On the basis of our findings, we recommend enhancing patients' trust in government policies and encouraging patients to seek relevant information from credible sources (health-care providers) to improve their compliance with preventive measures. We further recommend promoting positive thinking through targeted training or health education

adherence to preventive measures during pandemics. These efforts would increase the overall effectiveness of public health interventions during crises.

Positive thinking in individuals with schizophrenia is often impaired by negative symptoms, low motivation, and cognitive distortions. However, growing evidence supports the use of interventions such as positive psychology exercises,⁶² recovery-oriented approaches,^{63,64} mindfulness-based programs,^{65,66} peer support and recovery narratives,^{67,68} and exercise interventions⁶⁹ to enhance optimism, emotional resilience, and engagement in treatment. These strategies are particularly effective during periods of symptom stability and may contribute to improved quality of life and long-term recovery.

Limitations

This study has some limitations. First, it was conducted at a single center, which may limit the applicability of our conclusions to different regions or environments. Second, the exclusion of patients with major mental illnesses, despite research indicating a strong comorbid association between schizophrenia and other psychiatric disorders, may reduce the relevance of our findings in real-world contexts. This exclusion narrowed the scope of this study, reducing its applicability to populations in which mental health comorbidities are prevalent and thus limiting our understanding of the broader patient population affected by schizophrenia. In the future, multicenter studies involving a diverse range of patients should be conducted to validate our findings and enhance their real-world relevance. Third, we lacked information on the specific platforms the patients used to obtain pandemic-related information, which limited our ability to precisely analyze the association between information seeking and vaccine attitudes. Finally, the absence of a formal assessment of symptom severity (eg, PANSS, BPRS, or CGI) should be acknowledged as a study limitation. Considering ethical requirements and the inherent limitations of survey research, we were unable to include clinical evaluations of participants' psychiatric symptoms. All participants were able to independently complete the questionnaires, which suggests that they did not exhibit severe cognitive or symptomatic impairments. However, the lack of standardized severity data limits our ability to control for potential confounding effects arising from symptom heterogeneity. Future studies may benefit from incorporating validated clinical scales to better account for these variables.

Conclusion

We investigated the association between COVID-19's psychosocial impact and vaccine attitudes in hospitalized patients with schizophrenia as well as the moderating effect of positive thinking on this association. Our findings indicated that social anxiety, trust in government policies, and adherence to preventive measures significantly influenced patients' vaccine acceptance during the pandemic. Positive thinking moderated the association between patients' exposure to pandemic-related information and their vaccine attitudes. To improve patients' compliance with preventive measures, their trust in government policies should be enhanced, and they should be encouraged to seek information from reliable sources, such as health-care providers. Furthermore, positive thinking should be fostered through targeted training and health education to improve patients' adherence to pandemic guidelines.

Highlights

- Social anxiety increases vaccine hesitancy in patients with schizophrenia.
- Social desirability reduces vaccine hesitancy in patients with schizophrenia.
- Positive thinking moderates how social influence affects patients' vaccine attitudes.
- Enhancing trust in policies and promoting credible information-seeking may increase vaccine acceptance in schizophrenia patients.
- Encouraging positive thinking may boost preventive adherence and public health impact during pandemics.

Data Sharing Statement

The data presented in the manuscript are available from the corresponding author (Dr. Joh-Jong Huang, email: jjhua@seed.net.tw) upon reasonable request.

Ethics Approval and Consent to Participate

Data were derived through a series of investigations. The study protocol was approved by the Institutional Review Board of Kaohsiung Municipal Kai-Syuan Psychiatric Hospital (permit numbers: KSPH-2020-03, KSPH-2021-08, and KSPH-2023-04). All procedures adhered to the current revision of the national legal requirements for human research (Human Subjects Research Act, Taiwan). Informed consent was obtained from all patients before their participation.

Acknowledgments

Dian-Jeng Li and Wen-Chun Wang are co-first authors for this study. We thank all the participants in this study and support from the Department of Health, Kaohsiung City and Kaohsiung Municipal Kai-Syuan Psychiatric Hospital.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This study received no financial support from any funding agency in the public, private, or not-for-profit sector.

Disclosure

The authors declare no conflicts of interest in this work.

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