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COVID-19 Vaccine Acceptance among Patients with Mental Illness: A Case-Control Study after the Pandemic

Wanmai Woonkaew, MSW.[1], Chonnakarn Jatchavala, M.D., M.Sc.[1], Tharntip Sangsuwan, M.D.[2]

[1]Department of Psychiatry, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla 90110, Thailand.

[2]Department of Family and Preventive Medicine, Faculty of Medicine, Prince of Songkla University, Hat Yai, Songkhla 90110, Thailand.

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Abstract:

Objective: To investigate the prevalence of anxiety, optimism, and coronavirus disease 2019 (COVID-19) vaccine acceptance among patients with mental illnesses in Southern Thailand in the period after the pandemic.

Material and Methods: A total of 160 outpatients, 80 with mental disorders and 80 age- and gender-matched individuals without mental disorders, participated in this study between August and November 2023. Data were collected using self-reported questionnaires on perception and personal experience of COVID-19 vaccination, including the Thai version of the COVID-19 Anxiety Scale.

Results: The psychiatric group had significantly higher rates of unemployment (p-value=0.02), residence in the armed-conflict areas of Southern Thailand (p-value=0.03), and self-payment for treatment (p-value=0.003) compared with the non-psychiatric group. A smaller proportion of patients in the psychiatric group had received full vaccination, including at least one booster dose (52.5%), compared with the control group (75.0%; p-value=0.005). Levels of optimism and anxiety toward COVID-19 infection were mostly moderate and not significantly different between the groups. Statistically, individuals with mental illnesses perceived the severity of COVID-19 2.4 times lower than those without (p LR test=0.016). Most participants in both groups were willing to receive the COVID-19 vaccine if advised by their psychiatrists (68.8%), family doctors (73.8%), pharmacists (63.7% and 70.0%), or village health volunteers (VHVs) (56.2%).

Conclusion: Psychiatric patients were more likely to be unemployed, live in armed-conflict areas, pay for their own medical care, and have lower vaccination rates. At the same time, optimism and anxiety levels were similar compared to those of non-psychiatric groups regarding COVID-19.

Keywords: anxiety, COVID-19 vaccine booster, mental disorders, optimism, SARS-CoV-2

Contact: Chonnakarn Jatchavala, M.D., M.Sc.
Department of Psychiatry, Faculty of Medicine, Prince of Songkla University,
Hat Yai, Songkhla 90110, Thailand.
E-mail: jchonnak@gmail.com

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged globally in March 2020[1]. It profoundly affected both human health and daily life. As of January 2024, the World Health Organization (WHO) had reported over 774 million COVID-19 infections and more than 7 million deaths worldwide[2]. While the pandemic had a significant impact on all populations, one particularly affected and often overlooked population was individuals with mental illnesses[3]. Patients with severe mental illness, especially those with schizophrenia, other psychoses, and substance use disorders, have a COVID-19 mortality rate 2 to 3 times higher than that of the general population[4,5]. Their conditions are associated with immune system changes, including increased inflammation and dysfunctional T-cell activity[6,7]. They also have a higher risk of contracting the virus due to the social determinants of health, such as living in homeless shelters, and being more likely to miss out on vaccination[6,7]. In a global survey in 2022, only 23% of all countries prioritized vaccinating individuals with mental disorders against COVID-19[6].

During the pandemic, mental health services in middle-income countries such as Thailand were limited to emergency care and treatment for inpatients only. Thai Village Health Volunteers (VHV) played significant roles and had substantial impacts, not only on patients with COVID-19 but also in providing general healthcare and in COVID-19 prevention. Their duties included distributing psychotropic medication and monitoring relapses for patients with mental health issues in their communities[8]. The Early Career Psychiatrists Section of the World Psychiatric Association (WPA) suggested that government facilities should propose the integration of fundamental services into primary care settings, such as community, school, university, and workplace environments, to facilitate early prevention and detection of both COVID-19 and mental health concerns in the post-COVID-19 period. In Thailand, the VHVs have been instrumental in the COVID-19 vaccine campaign and community-level surveillance of outbreaks in the post-pandemic period[8,9].

During the academic year 2021, 88.3% of students at the Prince of Songkla University had received full vaccination (both vaccine doses) amid the pandemic[10]. However, no survey was conducted for booster doses once COVID-19 became endemic. Following the current management plans since 2022, the Thai Government has recommended the administration of updated vaccines, primarily from AstraZeneca or Pfizer-BioNTech, for booster shots, which has been the "vaccination acceptance" definition for the Thai government and this study[11]. While the majority of the students perceived the severity of the COVID-19 pandemic as high (51.1%) at the time of the survey, they simultaneously reported high levels of anxiety about the infection and high levels of optimism regarding the pandemic[10]. Statistical analysis revealed no significant association between anxiety or optimism and vaccine hesitancy in this university population. However, unrealistic optimism is associated with decreased participation in preventive healthcare and behaviors[12]. Moreover, increased anxiety about contracting COVID-19 among individuals in Northern Thailand significantly influenced the adoption of health-promoting and social behaviors, including the increased consumption of vitamins and herbs, during the pandemic[13].

A meta-analysis of 56 articles revealed that in 2022, 25% of the world's general population was hesitant to receive the COVID-19 vaccine[14]. Additionally, a study on 112 individuals diagnosed with schizophrenia in Tunisia found that 52.7% of them declined vaccination[15]. Therefore, it is essential to assess the motivations and factors influencing individuals' decisions to get vaccinated against COVID-19, and to devise initiatives to enhance vaccination rates, particularly among vulnerable populations, such as those

with mental illnesses, who demonstrate lower vaccine uptake due to various determinants. The vaccination patterns of these populations warrant thorough investigation for several reasons. Healthcare providers may consider the associated factors when devising strategies to improve COVID-19 vaccination rates among individuals with mental health conditions[9].

The primary objective of this case-control study was to evaluate the rate of COVID-19 vaccine uptake among individuals with mental disorders and to compare it with the vaccination rate among outpatients without mental conditions in Prince of Songkla University Hospital (Songklanagarind Hospital) in Southern Thailand during 2023, the post-COVID-19 era. This study sought additional data on physical care for psychiatric patients, particularly infection prevention beyond COVID-19. The findings will enhance the holistic care of psychiatric patients in Southern Thailand.

Material and Methods

Study design and setting

The current study employed a cross-sectional case-control design and was conducted at Songklanagarind Hospital (PSU Hospital), the largest university-based teaching hospital in the southern part of Thailand. Data were collected from August to November 2023. The sample size was calculated using the R program (n.for.2p) comparing proportions (p1=0.44316 and p2=0.15217), using convenience sampling to recruit participants. The significance level was 0.05, and the power was 80%. Inclusion criteria for psychiatric patients (case study group) included: (a) age between 20 and 59 years, (b) having an International Classification of Diseases, 10th Revision diagnosis of a mental health condition (Code F), and (c) possessing adequate Thai language skills[18]. The exclusion criteria were those who could not communicate/answer the questionnaire completely and who showed severe psychiatric manifestations, such as acute psychosis, at the time of the data collection. An inclusion criterion for non-psychiatric participants was no history of any psychiatric disorder. The control group comprised 80 outpatients from the Primary Care Unit of the same hospital, matched with 80 psychiatric patients from the psychiatric outpatient clinic based on gender and age.

The Human Research Ethics Committee of the Faculty of Medicine at Prince of Songkla University approved this study (Ref no: REC 66-044-3-1). Research assistants approached eligible psychiatric patients at the psychiatric outpatient clinic and outpatients without psychiatric disorders from the Primary Care Unit in PSU Hospital for recruitment. They provided the candidates with an information sheet. All eligible participants were then given time to consider participation in the study. Those who agreed signed a consent form authorizing the use of their information in the research questionnaire and permitting a retrospective review of their medical charts.

Participants consenting to partake were invited to a private location to complete the questionnaires. They had the option to discontinue at any time without providing a reason, and this decision would not impact their treatment.

Measurements

The questionnaires were developed based on a review of existing literature, input from three experts, and a preliminary study conducted in 2021, yielding a Cronbach's alpha of 0.72[10]. The survey comprised the following five sections:

(1) Demographic information encompassing age, gender, place of residence, household income, education, occupation, welfare status, and religion.

(2) Participants' perceptions and personal experiences regarding the current COVID-19 situation and the COVID-19 vaccine, including their willingness to receive the vaccine if recommended by healthcare providers,

such as psychiatrists, family physicians, pharmacists, and VHVs (response: Yes/No); history of COVID-19 infection (response: Yes/No); and having friends or relatives who were previously infected with COVID-19 (response: Yes/No). Additionally, participants' perceptions of the severity of COVID-19, the safety of COVID-19 vaccines, and the effectiveness of COVID-19 vaccines were assessed (response for each perception was one of the following: None/Low/Moderate/High).

(3) Vaccination status: "How many doses of the vaccine have you received?" (response: Never/1 dose/2 doses/3 doses or more)

The COVID-19 Outbreak-Specific Optimistic Explanatory Style Scale, a 15-item questionnaire developed in Thai with a Cronbach's alpha of 0.83, measured the individuals' optimism regarding the current state of COVID-19. Responses were captured on a 5-point Likert scale, ranging from 5 ("strongly agree») to 1 ("strongly disagree»). Optimism levels were divided into five categories, namely very low, low, moderate, high, and very high[19].

The COVID-19 Anxiety Scale, a 9-item questionnaire in Thai with a Cronbach's alpha of 0.81, was developed to assess the anxiety levels associated with COVID-19. It utilized a 10-point Likert scale, with 10 indicating "most anxious» and 1 indicating "least anxious»[20].

Statistical analysis

We performed a descriptive analysis to delineate the distribution of demographic characteristics. We calculated descriptive statistics for patient demographic data using proportions, means, standard deviations (S.D.), medians, and interquartile ranges (IQR). We conducted group comparisons using the Chi-square test, Wilcoxon rank-sum test, and Mann–Whitney U test. Data analysis was executed using R, version 4.1.0 (R Foundation for Statistical Computing). We considered a p-value less than 0.05 to indicate statistical significance, and the study's preliminary assumptions were previously tested by logistic regression.

Results

Demographic data and personal and family history of COVID-19 infection between outpatients with and without mental disorders

This study included 160 adult participants divided into two groups, with 80 in the case study group and 80 in the control group. After matching for gender and age, the median age for both groups was 40.5 years. The majority of psychiatric patients were Buddhist (86.2%), not healthcare workers (47.5%), held at least a bachelor's degree (61.3%), and resided in Southern Thailand (96.2%). Most utilized the universal health coverage scheme for healthcare payments (43.8%) and reported a median monthly income of 20,000 Baht. A total of 66.2% had a previous COVID-19 infection, and 81.2% had a family member who was infected (Table 1). The primary diagnoses included depressive disorders (28.7%), psychotic disorders (26.2%), anxiety disorders (21.2%), bipolar disorders (11.2%), and other conditions (12.5%) (Figure 1).

In the control group, the majority of participants were Buddhist (82.5%), held a bachelor's degree or higher (58.8%), and worked outside the healthcare sector (66.2%). Most resided in Southern Thailand (95.0%), utilized the social security scheme for healthcare welfare (41.2%), and reported a median monthly income of 30,000 Baht. Outpatients without mental disorders indicated that COVID-19 had infected 67.5% of them and 85.0% of their family members (Table 1). Their prevalent medical conditions included metabolic syndrome (48.8%), acute infections (20.0%), routine check-ups (13.8%), acute pain (12.5%), and other ailments (5.0%) (Figure 1).

Comparing between the case study and control groups, a significantly higher proportion of outpatients with mental illnesses were found to be unemployed (40.0% vs.

20.0%, p-value=0.020), resided in the armed-conflict areas of Southern Thailand (20.0% vs. 8.8%, p-value=0.030), and paid out-of-pocket for their treatment (18.8% vs. 5.0%, p-value=0.003) (Table 1).

Table 1 Demographic variables of patients with mental illnesses and the control group from primary care unit

Demographic characteristics	Number (%)			Chi^2 p-value
	Total	General outpatient (N=80)	Psychiatric outpatient (N=80)	
Gender				1
Male	80 (50.0)	40 (50.0)	40 (50.0)	
Female	80 (50.0)	40 (50.0)	40 (50.0)	
Age (years)				0.925[a]
Median (IQR)	40.5 (30.5, 50.5)	40.5 (30.5, 50.5)	40.5 (30.5, 50.5)	
Religion				0.663
Buddhist	135 (84.4)	66 (82.5)	69 (86.2)	
Muslim or others	25 (15.6)	14 (17.5)	11 (13.8)	
Education level				0.986
Middle school or below	22 (13.7)	11 (13.8)	11 (13.8)	
High school	27 (16.9)	14 (17.5)	13 (16.2)	
Diploma	15 (9.4)	8 (10.0)	7 (8.8)	
Bachelor degree or above	96 (60.0)	47 (58.7)	49 (61.2)	
Occupation				0.020*
Health-related	21 (13.1)	11 (13.8)	10 (12.5)	
Not health-related	91 (56.9)	53 (66.2)	38 (47.5)	
Unemployed	48 (30.0)	16 (20.0)	32 (40.0)	
Income (Baht/month)				0.033[a*]
Median (IQR)	30,000 (15,000, 50,000)	30,000 (20,000, 50,000)	20,000 (10,000, 40,000)	
Domicile				0.030[b*]
Bangkok	4 (2.5)	1 (1.2)	3 (3.8)	
Other regions of Thailand	3 (1.9)	3 (3.8)	0 (0.0)	
Restive areas of southern Thailand	23 (14.4)	7 (8.8)	16 (20.0)	
Other southern	130 (81.2)	69 (86.2)	61 (76.2)	
Health-care welfare				0.003*
Universal health cover scheme	66 (41.2)	31 (38.8)	35 (43.7)	
Social security scheme	48 (30.0)	33 (41.2)	15 (18.7)	
State officer enterprise	27 (16.9)	12 (15.0)	15 (18.8)	
Self-payment	19 (11.9)	4 (5.0)	15 (18.8)	
History of COVID-19 infection				1
No	53 (33.1)	26 (32.5)	27 (33.8)	
Yes	107 (66.9)	54 (67.5)	53 (66.2)	
Family history of COVID-19 infection				0.673
No	27 (16.9)	12 (15.0)	15 (18.8)	
Yes	133 (83.1)	68 (85.0)	65 (81.2)	

There were 30 missing values for income
p-value≤0.05, IQR=interquartile range, COVID-19=coronavirus disease 2019, a=Mann-Whitney U test, b=Fisher's exact test, a, b*=p-value with Mann-Whitney U test/ Fisher's exact test

COVID-19 vaccination status of patients with mental illnesses and the control group from the primary care unit

Overall, the majority of the participants in both the groups received at least three doses of the COVID-19 vaccine (63.7%). However, the uptake of booster doses was significantly different between patients with mental disorders and those without. Only 52.5% of patients from the psychiatric unit received three or more doses of the COVID-19 vaccine compared to 75.0% of the control group (p-value=0.005) (Table 2).

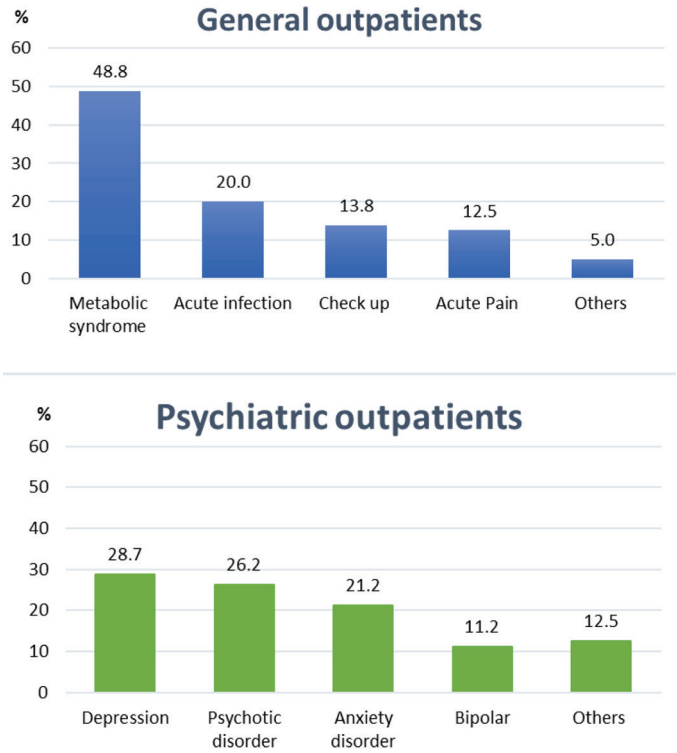

Figure 1 The clinical diagnoses of psychiatric outpatients and general outpatients recruited from the primary care unit

Table 2 COVID-19 vaccination status among psychiatric outpatients and the control group

	Number (%)			Chi^2 p-value
	Total	General outpatient (n=80)	Psychiatric outpatient (n=80)	
History of receiving COVID-19 vaccine				0.005*
Never/2 doses or less	58 (36.3)	20 (25.0)	38 (47.5)	
3 doses or more	102 (63.7)	60 (75.0)	42 (52.5)	

*p-value≤0.05, COVID-19=coronavirus disease 2019

Comparison of anxiety, optimism, and perception: Evaluating the attitudes of individuals with and without mental health conditions toward the COVID-19 pandemic and vaccination

A majority of the patients with mental conditions and the general outpatients from the primary care units indicated their willingness to receive additional COVID-19 vaccinations if recommended by their psychiatrists (68.6%) and family doctors (73.8%). Both the case and control groups expressed their intention to follow the pharmacists' recommendations regarding COVID-19 vaccination (63.7% and 70.0%, respectively). Moreover, over half of the participants in both the groups (56.2% for each) were likely to accept additional COVID-19 vaccinations if VHVs in their communities recommended them. No statistically significant difference was found in the intention to follow healthcare professionals' recommendations for the COVID-19 vaccine between the two groups.

Neither the case-study nor the control group exhibited a statistically significant difference in their perceptions of safety and effectiveness of COVID-19 vaccines. A majority of patients with mental illnesses considered the available COVID-19 vaccines in Thailand to be moderately safe and effective (67.5% and 72.5%, respectively), which was comparable to the perceptions of patients without mental conditions (63.7% and 76.2%, respectively). However, we noted that psychiatric outpatients predominantly viewed the current COVID-19 pandemic as having low severity (43.8%), in contrast to the control group, which mostly perceived the pandemic's severity as moderate (52.5%). The differences in perceptions regarding the current severity of the COVID-19 pandemic between the two groups were statistically significant (p-value=0.041) (Table 3).

Amid the anxiety associated with the current COVID-19 pandemic, a substantial proportion of patients, regardless of mental disorder status, reported moderate anxiety levels (51.2% of those with mental disorders and 62.5% of those without). Conversely, a majority of individuals with mental health conditions exhibited moderate optimism regarding the COVID-19 situation (53.8%), whereas the control group generally showed high optimism (50.0%). Nevertheless, statistical analyses revealed no significant difference in the levels of anxiety or optimism towards COVID-19 between the case and control groups (Table 3).

Comparison of demographic characteristics, perceptions regarding the COVID-19 pandemic, and history of vaccination among individuals with mental disorders and a control group

Logistic regression was performed to compare demographic characteristics, perceptions regarding the COVID-19 pandemic, and history of vaccination among individuals with mental disorders and a control group.

The selection process began with univariate analyses of each variable. Variables showing significant univariate results (p-value<0.2) were selected as candidates for further study. Multivariate models assessed whether these variables significantly contribute to the outcome after adjusting for other factors, with a significance threshold of p-value<0.05. To control for potential confounding variables, we performed multiple logistic regression analysis, including employment status, healthcare welfare, perception of COVID-19 severity, history of COVID-19 vaccination, and anxiety toward COVID-19 (except income because of too many missing values (30 cases), and domicile because most people live in other southern regions, except Songkhla and the restive areas of Southern Thailand)

The final logistic regression model identified healthcare welfare, perception of COVID-19 severity, and history of COVID-19 vaccination as statistically significant factors (Table 4).

Table 4 shows that patients with psychiatric disorders were 3.59 times more likely to pay for all their treatments, both mental and physical, compared to the control group

or general outpatients recruited from primary care units (95%CI 1.02, 12.57). Additionally, patients diagnosed with psychiatric disorders were 2.40 times (95% CI 0.90, 6.40) and 2.62 times (95% CI 1.05, 6.55) more likely to perceive the severity of the COVID-19 pandemic as low compared to those without psychiatric disorders (p-value=0.016). After adjusting the odds ratio, the case-study group or patients with mental disorders reported receiving fewer COVID-19 vaccine boosters or at least 3 doses (OR 0.4 with 95% CI 0.19, 0.83 and p-value=0.013).

Table 3 Attitudes toward the COVID-19 pandemic and vaccination in people with and without mental illnesses: comparing anxiety, optimism, and perception

	Number (%)			Chi^2 p-value
	Total	General outpatient (N=80)	Psychiatric outpatient (N=80)	
Likely to receive the COVID-19 vaccine if recommended by family doctor or psychiatrist				0.600
No	46 (28.7)	21 (26.2)	25 (31.2)	
Yes	114 (71.3)	59 (73.8)	55 (68.8)	
Likely to receive the COVID-19 vaccine if recommended by pharmacist				0.502
No	53 (33.1)	24 (30.0)	29 (36.3)	
Yes	107 (66.9)	56 (70.0)	51 (63.7)	
Likely to receive the COVID-19 vaccine if recommend by VHV				1
No	70 (43.8)	35 (43.8)	35 (43.8)	
Yes	90 (56.2)	45 (56.2)	45 (56.2)	
Perception of COVID-19 severity				0.041*
Not severe/low	55 (34.4)	20 (25.0)	35 (43.8)	
Moderate	75 (46.9)	42 (52.5)	33 (41.2)	
High/very high	30 (18.7)	18 (22.5)	12 (15.0)	
Perceptions of the safety of COVID-19 vaccines				0.589
Not safe/low	31 (19.4)	18 (22.5)	13 (16.3)	
Moderate	105 (65.6)	51 (63.7)	54 (67.5)	
High	24 (15.0)	11 (13.8)	13 (16.2)	
Perception of effectiveness of COVID-19 vaccines				0.500
Not effective/low	18 (11.2)	10 (12.5)	8 (10.0)	
Moderate	119 (74.4)	61 (76.2)	58 (72.5)	
High	23 (14.4)	9 (11.3)	14 (17.5)	
Level of optimism regarding COVID-19 pandemic				0.587[a]
Low	7 (4.4)	4 (5.0)	3 (3.8)	
Moderate	79 (49.4)	36 (45.0)	43 (53.7)	
High	74 (46.2)	40 (50.0)	34 (42.5)	
Anxiety toward COVID-19 pandemic				0.180
Low	40 (25.0)	15 (18.8)	25 (31.3)	
Moderate	91 (56.9)	50 (62.5)	41 (51.2)	
High	29 (18.1)	15 (18.7)	14 (17.5)	

[a]Fisher's exact test
*p-value≤0.05, COVID-19=coronavirus disease 2019

Table 4 Comparison of demographic variables, perception of COVID-19 pandemic, and vaccine acceptance between individuals with mental disorders and the control group

Variables	Crude odds ratio (95% confidence interval)	Adjusted odds ratio (95% confidence interval)	p-value LR test
Health-care welfare			0.007*
Universal health cover scheme	Reference	Reference	
Social security scheme	0.40 (0.18, 0.88)	0.45 (0.20, 1.04)	
State enterprise officer	1.11 (0.45, 2.72)	1.32 (0.51, 3.40)	
Self-payment	3.32 (1.00, 11.07)	3.59 (1.02, 12.57)	
Perception of COVID-19 severity			0.016
High/very high	Reference	Reference	
Not severe/low	2.62 (1.05,6.55)	2.40 (0.90,6.40)	
Moderate	1.18 (0.50,2.79)	0.80 (0.31,2.04)	
History of COVID-19 vaccine taken			0.013
Never/2 doses or less	Reference	Reference	
3 doses or more	0.37 (0.19, 0.72)	0.40 (0.19, 0.83)	

*p-value≤0.05, LR test=likelihood ratio test, COVID-19=coronavirus disease 2019

Discussion

Main findings and prior studies

Previous studies on the administration of COVID-19 vaccine boosters during the pandemic were primarily conducted to investigate the fear and anxiety associated with the infection and vaccine side effects, targeting high-risk groups, such as healthcare workers, young people, and the elderly. However, the current study was focused on the optimistic perceptions regarding the pandemic, particularly among those with mental health conditions. This case-control study was the first conducted among psychiatric patients post-pandemic to evaluate the uptake of vaccine boosters, anxiety levels, and optimism regarding the current COVID-19 situation, especially in Southern Thailand, particularly the armed-conflict areas in the three border provinces.

In the final quarter of 2023, 75.0% of patients without mental health conditions (recruited from primary care units) received COVID-19 vaccine boosters, as recommended by the Thai government since February 2022. This figure was higher than the 69.4% reported in the latest survey of the general population across five provinces at the end of 2022[21]. Although the survey did not include the southern part of Thailand, the rate of increase seemed relatively low. There might be less concern about COVID-19 after the pandemic ended among the Thai population. Nevertheless, Thailand's prevalence of vaccine acceptance exceeded that of some low- and middle-income countries, such as India (58.28%) in 2023[22]. The current study revealed a 52.5% prevalence among psychiatric outpatients, marking the first reported prevalence of COVID-19 vaccine booster uptake among Thai individuals with mental disorders. Notably, a large proportion of individuals with mental disorders did not receive the booster vaccine compared to the control group in this study[23,24]. Although this study does not propose that Thai psychiatric patients should be prioritized for COVID-19 vaccination—as was done in the UK, Italy, and China—during the pandemic[7], the rates of vaccine acceptance and booster uptake appear to reflect how the Thai government failed to address inequities, contrary to the WHO's ethical

principle of all-kind vaccination. Another ethical principle that was neglected was the equal consideration of marginalized groups, among whom psychiatric patients are included[7]. One striking finding highlighting the persistence of inequality for this marginalized group is that psychiatric patients had to pay out-of-pocket for what was supposed to be a 'free vaccine' during the data collection period. Psychiatric patients may still face out-of-pocket costs due to miscommunication from health-care providers and a lack of awareness regarding the availability of the free vaccine, since psychiatric symptoms and drug adherence were more focused on among this population.

Although we matched the gender and age of the case study group, significant differences persisted in some demographic data. Psychiatric patients were 3.59 times more likely to pay for their treatment than the general patients in the control group. The case study group additionally exhibited significantly higher unemployment rates and a lower average household income. Previous research had shown a significant association between financial difficulties and unemployment with COVID-19 vaccination uptake, particularly after the first dose[25]. Consequently, these factors might influence the willingness of psychiatric patients to receive the COVID-19 booster vaccine in the post-COVID pandemic era. Furthermore, the results indicated that patients with psychiatric conditions were more likely to live in the restive areas of Southern Thailand, which may affect their health behaviors, including COVID-19 vaccination, due to security concerns. Studies have reported a 30% or greater increase in COVID-19 vaccine hesitancy in conflict settings globally, which could contribute to the lower booster vaccine uptake rate observed in this study[26].

Our study findings indicated that individuals with mental health issues tend to perceive COVID-19 as being less severe than those without such conditions. This perception may be explained by the Protection Motivation Theory (PMT), which sheds light on vaccination behaviors among individuals with mental illnesses. Their cognitive assessment of the threat posed by COVID-19 might be distorted by their mental health conditions, leading to inappropriate coping mechanisms and an underestimation of the virus's severity, even as the pandemic subsides. Despite COVID-19 transitioning to an endemic phase and the availability of free vaccines to all Thai citizens since 2022, the potential for outbreaks and virus mutations persists. Therefore, interventions based on the Theory of Planned Behavior (TPB) could effectively influence this population's subjective norms and behavioral control. This intervention is particularly appropriate when psychiatrists, pharmacists, and VHVs assist as a visible endorsement of their status, "*health-care influencers*" in Thailand[27]. Notably, most participants from both the groups were willing to follow the vaccination recommendations of healthcare providers.

Clinical implications

The results indicated that most participants in both the case-study and control groups are inclined to receive additional COVID-19 vaccines if recommended by their family doctors, psychiatrists, pharmacists, and VHVs. This finding was consistent with that of a study on vaccine coverage and hesitancy in the same area, which underscored the significant role of healthcare workers in promoting COVID-19 vaccination among individuals with and without psychiatric conditions after the pandemic[10]. Consequently, healthcare providers should remain informed about the COVID-19 situation and vaccine updates and be prepared to guide their clients, but it should be with caution in cases of psychiatric patients, as their symptoms may distort cognition and judgment. Post-pandemic public health education should prioritize the accessibility of COVID-19 vaccine information, including details on vaccine safety, potential side effects, availability, and the fact that it was

obtainable 'free of charge', and enhance self-efficacy regarding the Protection Motivation Theory (PMT)[10]. For psychiatric patients and residents of conflict-affected areas in Southern Thailand, introducing vaccine clinics in community settings, such as the "mobile vaccine clinic" model, could enhance their accessibility[28]. This approach would be particularly beneficial as VHVs can conduct door-to-door outreach in their communities if needed[8], aligning with the majority of participants from both groups who expressed a willingness to accept additional vaccinations based on healthcare professionals' advice.

Limitations and suggestions

This study had several limitations, including its convenience sampling and cross-sectional design. Consequently, the study yielded limited results and a narrow scope for interpretation due to the lack of baseline measurement of willingness for vaccination and the absence of long-term follow-up. Additionally, the use of self-administered questionnaires might have caused misunderstandings regarding the intended meaning of some questions, despite the questionnaires demonstrating good reliability in previous studies on vaccine hesitancy among Thai university students during the pandemic. There may also be a need for more versions for specific populations, such as psychiatric patients and LGBTQ+. Other limitations were the quantitative nature of our data and the limited sample size, which comprised patients from only one hospital, albeit the largest university-based teaching hospital in Southern Thailand. We aimed to manage both groups in the case-control study, but using ICD-10 for inclusion and exclusion criteria may not effectively capture undiagnosed mental disorders in general patients, such as undiagnosed substance use disorders, or physical disorders in psychiatric patients[29]. Hence, this dataset may not accurately reflect the situation of individuals with mental disorders throughout Thailand after the pandemic. Moreover, demographic differences existed between groups, and the control group consisted of outpatients without psychiatric disorders selected from the hospital's primary care unit, which does not represent the general population without any disease during the study period. This could have affected the interpretation and clinical implications of the study's findings for the general population. Future studies should include individuals with specific psychiatric disorders from all regions of Thailand, enabling a comprehensive multi-center study. Additionally, future research should explore different instruments to measure optimism and anxiety regarding COVID-19 infection, incorporate more qualitative designs, and implement longitudinal surveillance or long-term follow-ups to monitor COVID-19 vaccine acceptance and refusal.

Conclusion

A relatively lower percentage of psychiatric outpatients in Southern Thailand had received full vaccination, including at least one booster dose, compared to patients without psychiatric conditions. Levels of optimism and anxiety about COVID-19 infection were generally moderate and did not differ significantly between those with mental disorders and the control group. Furthermore, individuals with mental disorders perceived the current severity of COVID-19 as less than those without mental health conditions. Consequently, healthcare providers should consider implementing more diverse intervention programs for health promotion among people with mental health conditions.

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Conflict of interest

There are no potential conflicts of interest to declare.

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