RESEARCH LETTER

Attitudes towards COVID-19 vaccination: A comparison between persons with different chronicity of pre-pandemic depressive, anxiety or obsessive–compulsive disorders

Persons with mental disorders face an increased risk of COVID-19-related hospitalization and mortality.[1–3] This gives reasons to prioritize them for vaccination,[4] but their willingness to receive a COVID-19 vaccine remains unclear. We investigated the association of attitudes towards COVID-19 vaccination with mental disorders and symptom severity in persons with and without depressive, anxiety or obsessive–compulsive disorders (OCD).

Between 1 April 2020 and 11 June 2021, fourteen waves of online COVID-19 questionnaires were distributed among participants ($n = 2748$) of three psychiatric case–control cohorts that started in early 2000: Netherlands Study of Depression and Anxiety, Netherlands Study of Depression in Older Persons, and Netherlands Obsessive Compulsive Disorder Association Study. Detailed information has been reported elsewhere.[5] The question 'What is your current situation or view regarding vaccination against the COVID-19 virus?' was not included in the online COVID-19 questionnaire until 23 February 2021 (the twelfth wave), when vaccines started to become available in the Netherlands. The current study consisted of 936 individuals (response rate 34.1%) with ($n = 709$) and without ($n = 227$) mental disorders who responded to the question of attitudes towards COVID-19 vaccination at least once at the twelfth, thirteenth and fourteenth waves (mean age 58.7 [SD 12.4] years, 63.1% female).

We used participants' first response of attitudes towards COVID-19 vaccination because their responses appeared to be consistent across the three waves of online questionnaires. They were categorized as willing to get vaccinated (including vaccinated persons) or unsure/unwilling to get vaccinated. We repeatedly collected information on whether participants themselves or household members had been diagnosed with COVID-19, and whether close contacts died from COVID-19 throughout the fourteen waves of online questionnaires. Participants who reported the experience at any wave were categorized as yes, otherwise no. We assessed symptom severity using four rating scales which have been validated in psychiatric cohorts: 16-item Quick Inventory of Depressive Symptoms, 21-item Beck Anxiety Inventory, 11-item Penn State Worry Questionnaire and 6-item de Jong Gierveld Loneliness scale,[5] at the same time as we collected information on attitudes towards COVID-19 vaccination.

Mental disorders were diagnosed using DSM-IV-based clinical interview at pre-pandemic waves, including major depressive disorder, dysthymia, panic disorder, generalized anxiety disorder, agoraphobia, social anxiety disorder and OCD. We counted the number of waves a participant attended and the number of waves at which a participant had a current (6-month recency) disorder between 2006 and 2016. We divided the number of waves with a disorder by the number of waves attended yielding a ratio that represented the chronicity of disorders. Chronicity was categorized into no lifetime disorder (healthy controls), remitted disorder (participants who at baseline were diagnosed with a disorder that was persistently remitted during the remaining waves), low-to-medium chronicity (1%–50% of previous waves with disorders) and high chronicity (51%–100% of previous waves with disorders), conforming to prior analyses.[5]

Considering the relatively large proportion of non-responders in our study, we applied propensity score weighting[6] to address the potential problem of selective attrition bias. The propensity scores were estimated based on age, gender, education, source cohort and the chronicity of mental disorders. We performed logistic regression models to estimate the association of mental disorders, symptom severity, demographics and COVID-19-related factors with attitudes towards vaccination, weighted for the propensity scores.

Brenda W. J. H. Penninx and Erik J. Giltay joint senior authors. Brenda W. J. H. Penninx and Erik J. Giltay joint senior authors.

—WILEY—

Our study was approved by the Institutional Review Board of Vrije Universiteit Medical Center, Amsterdam, and adhered to the Declaration of Helsinki. All participants provided informed consent online.

Overall, 52.5% of participants were vaccinated and 35.1% reported a positive attitude towards COVID-19 vaccination, while 8.1% and 4.3% expressed uncertainty and unwillingness for vaccination respectively. Older or more worried persons were more likely to be willing to get vaccinated, while female, persons with lower education, persons with more chronic mental disorders, those who were more lonely, and those who had been diagnosed with COVID-19 were more unsure/unwilling to get vaccinated (Figure 1). Regarding specific psychiatric diagnoses, agoraphobia was associated with a lower willingness to get vaccinated, while OCD was associated with a higher willingness compared to persons with no lifetime mental disorder (Figure S1). Similar results were found when analysing unsure and unwilling as separate outcomes.

In Dutch psychiatric case–control cohorts of middle aged and older persons, we identified several characteristics, including younger age, female, lower education and a history of COVID-19 infection, that were predictive of a lower willingness to get vaccinated. These findings are consistent with a previous study of general population.[7]

We found that persons with more chronic mental disorders were less willing to get vaccinated. In contrast, self-reported mental health conditions were unrelated to attitudes towards COVID-19 vaccination in the British general population.[7] Furthermore, in China, persons with depression or anxiety disorders were more willing to pay for the COVID-19 vaccine.[8] In our study, persons with OCD were more willing to get vaccinated, which may be due to the contamination subset of OCD with obsession over contracting or spreading germs. Contrastingly, those with agoraphobia were less willing to get vaccinated.

Prior research reported that concerns about the unforeseen future effects of vaccines, and general mistrust in the benefits and safety of vaccines were predictive of a negative attitude towards COVID-19 vaccination.[7] Our finding of worry symptoms being predictive of a greater willingness to get vaccinated supports the notion that worrying during the COVID-19 pandemic overshadows the concerns about the potential harms of vaccination.

Strengths of our study include the well-phenotyped psychiatric status based on several diagnostic interviews

Unsure/Unwillingness to get vaccinated (n=116) vs. Willingness to get vaccinated (n=820) using propensity scores (with age, gender, education, cohort, and chronicity of mental disorders)
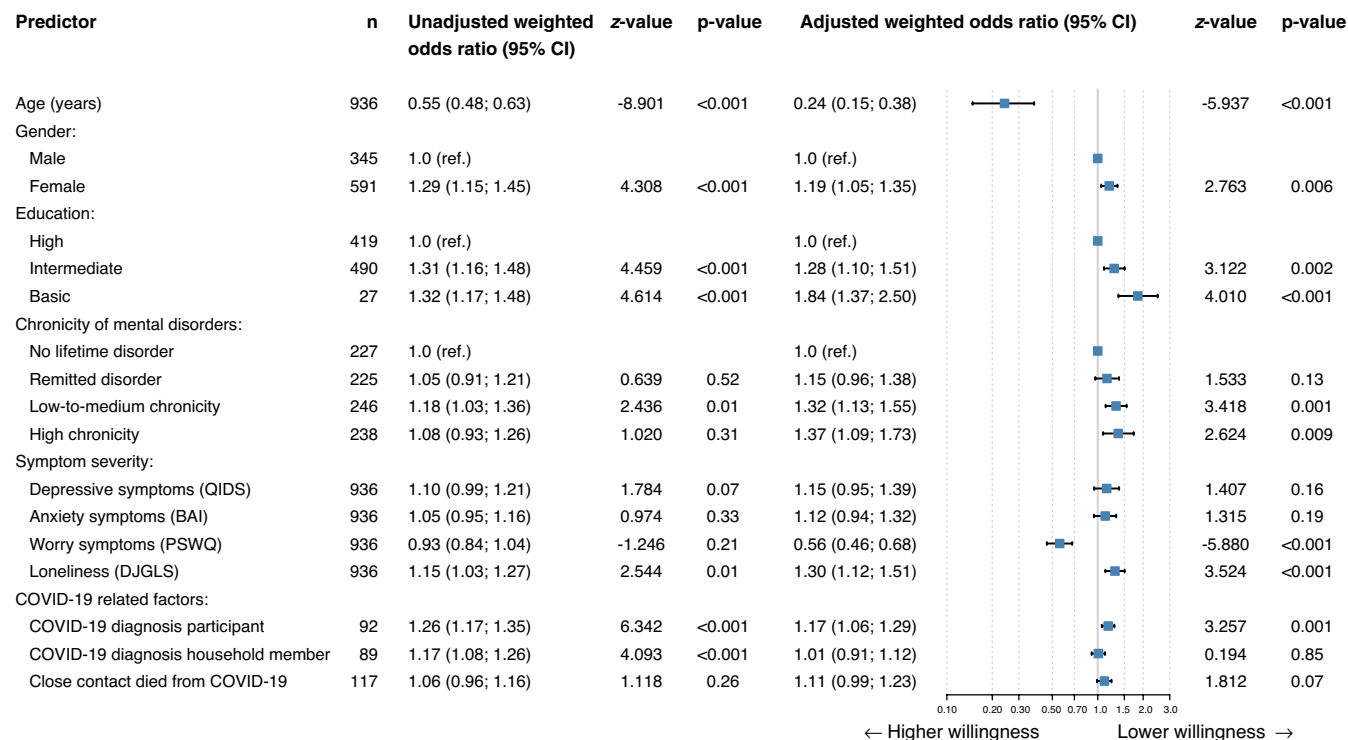
Predictor	n	Unadjusted weighted odds ratio (95% CI)	z-value	p-value	Adjusted weighted odds ratio (95% CI)		z-value	p-value
Age (years)	936	0.55 (0.48; 0.63)	-8.901	<0.001	0.24 (0.15; 0.38)		-5.937	<0.001
Gender:								
Male	345	1.0 (ref.)			1.0 (ref.)			
Female	591	1.29 (1.15; 1.45)	4.308	<0.001	1.19 (1.05; 1.35)		2.763	0.006
Education:								
High	419	1.0 (ref.)			1.0 (ref.)			
Intermediate	490	1.31 (1.16; 1.48)	4.459	<0.001	1.28 (1.10; 1.51)		3.122	0.002
Basic	27	1.32 (1.17; 1.48)	4.614	<0.001	1.84 (1.37; 2.50)		4.010	<0.001
Chronicity of mental disorders:								
No lifetime disorder	227	1.0 (ref.)			1.0 (ref.)			
Remitted disorder	225	1.05 (0.91; 1.21)	0.639	0.52	1.15 (0.96; 1.38)		1.533	0.13
Low-to-medium chronicity	246	1.18 (1.03; 1.36)	2.436	0.01	1.32 (1.13; 1.55)		3.418	0.001
High chronicity	238	1.08 (0.93; 1.26)	1.020	0.31	1.37 (1.09; 1.73)		2.624	0.009
Symptom severity:								
Depressive symptoms (QIDS)	936	1.10 (0.99; 1.21)	1.784	0.07	1.15 (0.95; 1.39)		1.407	0.16
Anxiety symptoms (BAI)	936	1.05 (0.95; 1.16)	0.974	0.33	1.12 (0.94; 1.32)		1.315	0.19
Worry symptoms (PSWQ)	936	0.93 (0.84; 1.04)	-1.246	0.21	0.56 (0.46; 0.68)		-5.880	<0.001
Loneliness (DJGLS)	936	1.15 (1.03; 1.27)	2.544	0.01	1.30 (1.12; 1.51)		3.524	<0.001
COVID-19 related factors:								
COVID-19 diagnosis participant	92	1.26 (1.17; 1.35)	6.342	<0.001	1.17 (1.06; 1.29)		3.257	0.001
COVID-19 diagnosis household member	89	1.17 (1.08; 1.26)	4.093	<0.001	1.01 (0.91; 1.12)		0.194	0.85
Close contact died from COVID-19	117	1.06 (0.96; 1.16)	1.118	0.26	1.11 (0.99; 1.23)		1.812	0.07

0.10 0.20 0.30 0.50 0.70 1.0 1.5 2.0 3.0

← Higher willingness   Lower willingness →

FIGURE 1 Predictors of attitudes towards COVID-19 vaccination. Odds ratios were weighted using propensity scores. Unadjusted weighted odds ratios were from models where predictors were entered separately; adjusted weighted odds ratios were from a model where all predictors were entered simultaneously. Symptom severity was based on standardized scores. QIDS, Quick Inventory of Depressive Symptoms; BAI, Beck Anxiety Inventory; PSWQ, Penn State Worry Questionnaire; DJGLS, de Jong Gierveld Loneliness scale

before the pandemic and the use of multiple validated symptom severity scales which enable a broad assessment of emotional states during the pandemic. Limitations include selectivity of the responders; compared to non-responders, responders were less likely to have high chronicity of mental disorders, resulting in underrepresentation of the most vulnerable groups in our sample. This may have biased our results towards an underestimation of the association between high chronicity of mental disorder and negative vaccination attitudes, which, however, may have been addressed by propensity score weighting. Furthermore, we were not able to distinguish the impact of specific concerns about COVID-19 vaccine from that of general worrying during the pandemic on the willingness to get vaccinated due to the lack of information.

In conclusion, our study identified factors including demographics, mental disorders, symptom severity and COVID-19 infection that were predictive of attitudes towards COVID-19 vaccination. Specifically, persons with more chronic mental disorders seemed to be less willing to get vaccinated. We invite clinicians to take into account these factors when giving advice to psychiatric patients on COVID-19 vaccination.

CONFLICT OF INTEREST

Prof. Penninx reports grants from Janssen Research and Boehringer Ingelheim, outside of the submitted work. All other authors declare no competing interests.

PEER REVIEW

The peer review history for this article is available at https://publons.com/publon/10.1111/acps.13399.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Kuan-Yu Pan[1,2]
Almar A. L. Kok[1,2]
Brenda W. J. H. Penninx[1,2]
Erik J. Giltay[3]

[1]*Department of Psychiatry, Amsterdam Public Health, Amsterdam University Medical Center, Vrije Universiteit, Amsterdam, The Netherlands*
[2]*Geestelijke gezondheidszorg (GGZ) InGeest Specialized Mental Health Care, Amsterdam, The Netherlands*
[3]*Department of Psychiatry, Leiden University Medical Center, Leiden, The Netherlands*

Correspondence
Kuan-Yu Pan, Department of Psychiatry, Amsterdam Public Health, Amsterdam University Medical Center, Vrije Universiteit, and GGZ InGeest Specialized Mental Health Care, Amsterdam, The Netherlands.
Email: k.y.pan@amsterdamumc.nl

REFERENCES

1. Wang Q, Xu R, Volkow ND. Increased risk of COVID-19 infection and mortality in people with mental disorders: analysis from electronic health records in the United States. World Psychiatry. 2021;20(1):124-130.

2. Vai B, Mazza MG, Delli Colli C, et al. Mental disorders and risk of COVID-19-related mortality, hospitalisation, and intensive care unit admission: a systematic review and meta-analysis. Lancet Psychiatry. 2021;8(9):797-812. doi:10.1016/S2215-0366(21)00232-7

3. Ceban F, Nogo D, Carvalho IP, et al. Association between mood disorders and risk of COVID-19 infection, hospitalization, and death: a systematic review and meta-analysis. JAMA Psychiatry. 2021;78(10):1079-1091.

4. Mazereel V, Van Assche K, Detraux J, De Hert M. COVID-19 vaccination for people with severe mental illness: why, what, and how? Lancet Psychiatry. 2021;8(5):444-450.

5. Pan KY, Kok AAL, Eikelenboom M, et al. The mental health impact of the COVID-19 pandemic on people with and without depressive, anxiety, or obsessive-compulsive disorders: a longitudinal study of three Dutch case-control cohorts. Lancet Psychiatry. 2021;8(2):121-129.

6. Guo S, Fraser MW. Propensity score analysis: Statistical methods and applications, 2nd ed. Sage Publications, Inc; 2015.

7. Paul E, Steptoe A, Fancourt D. Attitudes towards vaccines and intention to vaccinate against COVID-19: implications for public health communications. Lancet Reg Health Eur. 2021;1:100012.

8. Hao F, Wang B, Tan W, et al. Attitudes toward COVID-19 vaccination and willingness to pay: comparison of people with and without mental disorders in China. Bjpsych Open. 2021;7(5):e146.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.