

The Impact of Psychological Burdens and Vaccine Worries on Confidence and Adherence to Governmental Policies Against COVID-19 Among Patients with Substance Use Disorder: A Cross-Sectional Study in Taiwan

Dian-Jeng Li ^{1,2,*}, Joh-Jong Huang ^{3,*}, Su-Ting Hsu¹, Hui-Ching Wu⁴, Kuan-Ying Hsieh¹, Guei-Ging Lin¹, Pei-Jhen Wu¹, Chin-Lien Liu¹, Frank Huang-Chih Chou ¹

¹Kaohsiung Municipal Kai-Syuan Psychiatric Hospital, Kaohsiung, Taiwan; ²Department of Nursing, Meiho University, Pingtung, Taiwan; ³Faculty of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung City, Taiwan; ⁴Department of Social Work, Taiwan Social Resilience Center, National Taiwan University, Taipei, Taiwan

*These authors contributed equally to this work

Correspondence: Frank Huang-Chih Chou, Kaohsiung Municipal Kai-Syuan, Psychiatric Hospital, No. 130, Kaisyuan 2nd Road, Lingya District, Kaohsiung, 802211, Taiwan, Tel +886 7-751-3171 Ext. 2302, Fax +886 7-771-2494, Email f50911.tw@yahoo.com.tw; Hui-Ching Wu, Department of Social Work, National Taiwan University, No. 1, Section 4, Roosevelt Road, Taipei, 10617, Taiwan, Tel +886 2-3366-9483, Fax +886 2-2368-0532, Email hchingwu@ntu.edu.tw

Introduction: The coronavirus disease 2019 (COVID-19) pandemic has had an impact on patients with substance use disorder (SUD). We aimed to investigate factors associated with confidence and adherence to governmental policies against COVID-19 (social desirability) among patients with SUD.

Methods: This cross-sectional study was conducted during 2020 to 2021. Patients with SUD and healthy controls were recruited. The severity of sleep disturbance, social desirability, drug dependence, vaccine worries, other psychological burdens and demographic variables were collected through self-administrated questionnaires. Differences between the SUD and control groups were estimated. Hierarchical regression analysis was used to identify significant relationships between social desirability and other factors.

Results: In total, 58 of patients with SUD and 47 healthy controls were recruited. The patients with SUD had a lower level of social desirability and more severe sleep disturbance than the control group. Older age, more severe sleep disturbance, lower level of drug dependence, and lower level of vaccine worries were significantly associated with a higher level of social desirability among the patients with SUD.

Conclusion: Our results show the importance of timely interventions for drug dependence and to address vaccine worries in patients with SUD.

Keywords: drug dependence, coping strategies, sleep disturbance, vaccine worries, COVID-19

Introduction

Impact of the COVID-19 Pandemic on Patients with Substance Use Disorder

The coronavirus disease 2019 (COVID-19) pandemic has resulted in fear, anxiety, and depression in the public and affected mental health.¹ In Taiwan, an online survey with public reported that 55.8% of the participants had sleep disturbance, and 10.8% reported having suicidal ideas.² Moreover, the COVID-19 pandemic has also led to an increased psychological burden in patients with mental illnesses.³ Previous studies have revealed increased rates of substance use disorder (SUD), including tobacco, marijuana, and alcohol, after major disasters such as hurricanes, earthquakes or

terrorist attacks.⁴⁻⁶ Hypothesis of self-medication⁷ and social cognitive theory⁸ have been proposed to suggest post-disaster substance abuse and mental health burdens, and subjects have been shown to have decreased self-efficacy of their coping, increased psychological burden and subsequently increased self-medication for substance after a disaster.⁹ Increased rates of substance and alcohol use have been reported during the COVID-19 pandemic.¹⁰ Moreover, individuals with SUD have been shown to have a higher risk of COVID-19 infection¹¹ and also undesirable outcomes due to the progression of SUD.¹² For instance, social-economic burden caused by the pandemic may exaggerate stressors and interfere with adherence to treatment.¹² Another study also highlighted the vulnerable nature of patients with substance-related problems.¹³ Consequently, further studies on the burden of the COVID-19 pandemic in individuals with SUD are warranted.

Coping Strategies for Individuals During the COVID-19 Pandemic

In addition to the psychological impact of the pandemic, it is also crucial to investigate the effect of other factors, such as coping strategies. Positive coping behaviors and resilience have been shown to be related to positive mental and psychological health outcomes.^{14,15} In addition, positive thinking, active and adaptive coping strategies have been reported to enhance psychological wellbeing and quality of life when facing challenges during the COVID-19 pandemic.^{16,17} Among healthcare workers in Taiwan, active coping behaviors (such as seeking COVID-19-related knowledge) have been associated with a better quality of life in mental component summary.¹⁸ Another survey recruiting Taiwanese's publics reported that lower level of risk perception toward COVID-19, higher perceived social support, and higher level of self-reported health before COVID-19 were significantly higher level of self-confidence against COVID-19.¹⁹ Moreover, higher level of risk perception mediated the association between lower perceived social support and higher level of active coping with COVID-19.²⁰ In addition, active and adaptive coping have been shown to moderate or decrease psychological burdens including depression, anxiety, sleep disturbance, and burnout.^{16,21} Regarding the issue of substance use, a previous study reported an association between substance abuse and ignoring social distancing, representing a negative coping mechanism.²² However, factors associated with the coping strategies in patients with SUD have not been fully examined in previous studies. Moreover, active coping has been reported to be potentially associated with sleep disturbance among patients with depressive disorder.³ Due to the inconclusive findings and unexplored factors, further studies are needed to investigate the detailed etiologies between coping strategies and related factors.

Aim of the Study

The psychological impact of COVID-19 on patients with SUD and coping strategies with COVID-19 have been explored. However, few studies have investigated the factors associated with coping strategies against COVID-19 in patients with SUD. As substance abuse has been associated with poor adherence to social distancing,²² exploring factors associated with coping strategies may be beneficial for authorities to better understand the etiologies and develop policies to improve infection control.

We hypothesized that several psychological factors may affect confidence and adherence to governmental policies against COVID-19. Therefore, the aim of this cross-sectional study was to investigate factors associated with coping strategies against COVID-19 among patients with SUD, with a particular focus on coping strategies for confidence and adherence to governmental policies against COVID-19.

Methods

Participants, Procedures and Ethics

With reference to our previous works,²³⁻²⁶ this study derived data from a massive survey, which was developed to estimate the psychological and social impacts of the COVID-19 pandemic on patients with mental disorders and healthy subjects at Kaohsiung Municipal Kai-Syuan Psychiatric Hospital (KSPH) and affiliated institutes. Participants were enrolled through printed advertisements. In addition, online advertisements were also posted on social media, including Facebook and LINE. The period of recruitment was from November 11, 2021 to October 31, 2022, and the survey was conducted with paper-and-pencil questionnaires. Research assistants could explain the procedures to each participant

before participation. The inclusion criteria of the patients with SUD were those who: 1) were diagnosed with SUD by psychiatrists at KSPH, 2) were followed up at the outpatient department of KSPH, 3) could fully realize the purpose of the study and adhere to the instructions, 4) were aged more than 20 years, and 5) signed informed consent. The exclusion criteria of the patients with SUD were those who: 1) exhibited predominantly cognitive impairment that they could not complete the questionnaires, such as during intoxication or withdrawal, and 2) were diagnosed with major mental disorders such as major depressive disorder, bipolar disorder, schizophrenia, schizoaffective disorder, neurodevelopmental disorders, and neurocognitive disorders. In addition, healthy subjects were recruited as control group. The inclusion criteria of the healthy subjects were those who: 1) were aged more than 20 years, 2) signed informed consent, and 3) reported that they did not have any medical history of mental illness. Subjects with missing data were also excluded. This study was approved by the Institutional Review Board of KSPH (KSPH-2021-17). We conducted these studies according to the current revision of national legal requirements (Human Subjects Research Act, Taiwan) and complied with the Declaration of Helsinki. Each participant provided informed consent prior to participation.

Measures

The Disaster-Related Psychological Screening Test (DRPST)

The DRPST was applied to rapidly screen for symptoms of depression and post-traumatic stress disorder (PTSD) at the COVID-19 pandemic. The DRPST has been shown to be reliable and well-validated.^{27,28} To estimate the severity of depression, three items of the DRPST were applied to measure the level of depressed mood, fatigue or loss of energy, and worthlessness in recent 2 weeks. Each question was graded on a two-point Likert scale, and it ranges from 0 (no) to 1 (yes). A higher total score indicates a higher level of depression.

Four of the questions from the DRPST were used to estimate the symptoms of PTSD, including re-experience of COVID-19, hypervigilance, avoidance, and somatic symptoms. Each question was graded with a five-point Likert scale, where it ranged from 1 (not at all) to 5 (extreme). A higher total score indicates a higher severity of PTSD. Details of the DRPST are listed in [Supplementary Table S1](#).

Level of Sleep Disturbance

The Pittsburgh Sleep Quality Index (PSQI) was developed to comprehensively assess sleep status, and it has been verified with acceptable validity and reliability.²⁹ Four questions of the PSQI were selected to measure the severity of sleep disturbance in the current study, including waking up in the middle of the night, difficulty to fall asleep, enthusiasm, and subjective sleep quality in the preceding one month ([Supplementary Table S1](#)). Each item was rated on a four-point Likert scale, and the scores ranged from one to four. A higher total score indicates more severe sleep disturbance.

The Societal Influences Survey Questionnaire (SISQ)

The SISQ was established to measure the coping strategies and psychosocial impact on subjects during the COVID-19 pandemic, and it has good validity and reliability.^{30,31} The SISQ contains 15 items in five categories, namely social distance, social desirability, social anxiety, social adaptation, and social information. For the coping strategies against COVID-19 we focused on the social desirability category, which includes questions that assess the level of confidence and adherence to governmental policies against COVID-19 ([Supplementary Table S1](#)). Each item was estimated with a four-point Likert scale, with scores ranging from one (never) to four (often). A higher total social desirability score indicated higher confidence and adherence toward governmental policies against COVID-19.

The Severity of Dependence Scale (SDS)

For individuals with SUD, the Severity of Dependence Scale (SDS) is used to estimate the severity of substance dependence.³² The SDS is composed of five items, and it uses a four-point Likert scale to measure the severity of addiction to illicit substances ([Supplementary Table S1](#)). A higher total SDS score indicated a higher severity of dependence. The Chinese version of the SDS has been verified with acceptable test-retest reliability (0.88) and internal consistency (Cronbach's alpha: 0.75).³³

Vaccination Attitude Examination (VAX) Scale

The Vaccination Attitude Examination (VAX) scale was developed to estimate the attitudes of participants to vaccination for COVID-19, and it has been verified to be a validated and reliable questionnaire.³⁴ The Chinese version of the VAX has also been reported to have acceptable reliability.²³ It contains four categories of questions including mistrust of vaccine benefits, preference for natural immunity, concerns about commercial profiteering, and worries about unforeseen future effects. In the current study, we used the category of concerns about commercial profiteering to estimate vaccine worries ([Supplementary Table S1](#)). This category contains items on mistrust toward governmental policies of vaccination, and the contents are comparable to the scales of social desirability. Each item was graded on a six-point Likert-type scale ranging from “strongly agree” to “strongly disagree”. A higher total score indicates stronger antivaccination attitudes and mistrust of the authorities.

Demographic Variables

The continuous variables included the participants' age and educational level (years). The categorical variables included sex, employment status (unemployed or employed), marital status (without partner or with partner), drinking alcohol (≥ 3 times per week or not), smoking (yes or no), regular diet (three or four meals a day, ≥ 5 days per week or not), and regular exercise (≥ 3 days per week or not).

Statistical Analysis

Initially, descriptive analysis was performed on the demographic characteristics. Differences between the patients with SUD and healthy subjects were compared using Pearson's χ^2 test or the independent *t*-test. To verify the reliability and validity of the selected items of PSQI, we performed further analysis. The internal consistency (Cronbach alpha values) was used to test the reliability of each factor, where a value greater than 0.7 indicated acceptable reliability.³⁵ To estimate the construct validity, exploratory factor analysis was applied. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett test were used. A KMO value of >0.60 and statistically significant value of $p < 0.05$ from Bartlett testing indicated the data was acceptable for factor analysis.³⁶ Total variance explained was also estimated. The amount of variance indicates how well a relevant construct can be measured. For the studies of social sciences, it is common to consider a solution that accounts for 50% of the total variance as satisfactory.³⁷ We then analyzed the predictors of confidence and adherence to governmental policies against COVID-19 (social desirability). Standardized regression coefficients of hierarchical regression analysis³⁸ were applied to identify the significant relationships between social desirability and psychological impact (severity of depression, PTSD, sleep disturbance, and drug dependence) as well as vaccine worries in a controlled model. We measured the invariance, which involved comparing models that imposed successive restrictions on model parameters in order of basic demographics (age, sex, employment status, educational level, marital status, smoking or not, drinking or not, regular exercise or not, and regular diet or not), psychological impact (severity of depression, PTSD, sleep disturbance, and drug dependence), and vaccine worries. Each model tested the invariance of the index parameters, including restrictions from the previous model. Hierarchical regression analysis was applied to verify whether the association with executive control remained significant when the effects of covariates were considered. All tests were two-tailed for multiple comparisons, and significance was defined as $\alpha < 0.05$ and exclusion of zero in the 95% of confidence interval (CI). Data were processed using SPSS version 23.0 for Windows (IBM Inc., Armonk, NY, USA).

Results

Demographic Analysis and Reliability/Validity of Selected PSQI Items

In total, we recruited 105 participants (58 in the SUD group and 47 in the control group), and the mean age was 47.54 ± 11.51 years. Thirty-six (62.1%) of the patients with SUD had opioid use disorder alone, four (6.9%) had amphetamine use disorder alone, and 18 (31.0%) had multiple substance use disorder. Compared with the control group, the SUD group had a significantly higher proportion of males (67.2% vs 29.8%, $p < 0.001$), lower proportion of having a partner (41.4% vs 76.6%, $p < 0.001$), higher proportion of smoking (62.1% vs 12.8%, $p < 0.001$), and lower proportion of regular exercise (56.9% vs 78.7%, $p = 0.018$). On the other hand, the SUD group had a lower educational level (11.78 ± 3.33

years vs 13.81 ± 3.02 years, $p = 0.002$), higher sleep disturbance score (7.17 ± 4.14 vs 5.45 ± 3.02 , $p = 0.019$), and lower social desirability score (8.91 ± 2.53 vs 9.87 ± 1.90 , $p = 0.029$). There were no significant differences in the other demographic data between the two groups (Table 1). On the other hand, the internal consistency coefficients (Cronbach's alpha) of selected items of PSQI were 0.838 for control group and 0.844 for patents with SUD, where they demonstrated with acceptable reliability.³⁵ Results of construct validity also indicated that the selected items of PSQI were validated for control group (KMO value: 0.743; Bartlett testing: $p < 0.001$; total variance explained: 71.97%) and SUD group (KMO value: 0.695; Bartlett testing: $p < 0.001$; total variance explained: 68.94%).

Predictors of Social Desirability Estimated Using Hierarchical Regression Analysis

We then examined associations between social desirability and psychological impact (severity of depression, PTSD, sleep disturbance, and drug dependence) as well as vaccine worries after controlling for covariates. The results are summarized in Table 2 and 3. After multiple adjustments, older age ($\beta = 0.54$, 95% CI: 0.07 to 0.3, $p = 0.004$), higher level of sleep disturbance ($\beta = 0.43$, 95% CI: 0.01 to 0.6, $p = 0.046$), lower level of drug dependence ($\beta = -0.54$, 95% CI: -0.74 to

Table 1 Characteristics of Demographic and Quantitative Variables

Group	Total (n=105)		SUD Group (n=58)		Control Group (n=47)		Statistics	
	Counts	%	Counts	%	Counts	%	χ^2	p
Sex							14.57	<0.001
Female	52	50.5	19	67.2	33	29.8		
Male	53	49.5	39	32.8	14	70.2		
Occupation							2.16	0.142
Unemployment	25	23.8	17	29.3	8	17		
Employment	80	76.2	41	70.7	39	83		
Marital status							13.15	<0.001
Without partner	45	42.9	34	58.6	11	23.4		
With partner	60	57.1	24	41.4	36	76.6		
Smoking							26.29	<0.001
No	63	60	22	37.9	41	87.2		
Yes	42	40	36	62.1	6	12.8		
Drinking ^a							3.73	0.053
No	80	76.2	40	69	40	85.1		
Yes	25	23.8	18	31	7	14.9		
Regular exercise ^a							5.57	0.018
No	35	33.3	25	43.1	10	21.3		
Yes	70	66.7	33	56.9	37	78.7		
Regular diets ^b							1.93	0.164
No	17	16.2	12	20.7	5	10.6		
Yes	88	83.8	46	79.3	42	89.4		
Continuous variable	Mean	SD	Mean	SD	Mean	SD	t	P
Age	47.54	11.51	48.6	13.01	46.26	9.34	-1.07	0.289
Educational level ^c	12.69	3.34	11.78	3.33	13.81	3.02	3.24	0.002
Sleep disturbance ^d	6.4	3.76	7.17	4.14	5.45	3.02	-2.39	0.019
Depression ^e	3.71	1.01	3.86	1.07	3.53	0.91	-1.69	0.095
PTSD ^e	9.25	3.26	8.95	2.81	9.62	3.74	1.05	0.298
Vaccine worries ^f	8.23	3.58	8.65	4.02	7.72	2.94	-1.32	0.191
Social desirability	9.34	2.31	8.91	2.53	9.87	1.90	2.22	0.029
Dependence level ^g	NA	NA	7.38	3.21	NA	NA	NA	NA

Notes: ^aThree times per week; ^bFive days per week; ^cMeasured by years; ^dMeasured by four selected items of Pittsburgh Sleep Quality Index; ^eMeasured by selected items of Disaster-Related Psychological Screening Test; ^fMeasured by selected items of Vaccination Attitude Examination; ^gMeasured by Severity of Dependence Scale; **Bolds:** statistical significance.

Abbreviations: NA, non-applicable; SD, standard deviation.

Table 2 Preliminary Model with Hierarchical Regression Analysis for Predictors of Social Desirability

Variable	β	t	95% of CI	P
Step 1				
Age	0.52	2.42	0.03, 0.33	0.024
Sex	0.18	0.63	-2.59, 4.82	0.538
Occupation	0.42	1.89	-0.26, 5.83	0.071
Educational level ^a	0.35	1.43	-0.15, 0.83	0.166
Marital status	0.11	0.49	-1.99, 3.24	0.627
Smoking	0.15	0.63	-2.20, 4.13	0.534
Drinking ^b	-0.23	-0.95	-3.80, 1.41	0.352
Regular exercise ^b	0.07	0.27	-2.40, 3.10	0.793
Regular diet ^c	0.14	0.63	-1.97, 3.66	0.539
Statistics (step 1)	F = 1.06, R ² = 0.32, p = 0.428			
Step 2				
Sleep disturbance ^d	0.43	2.16	0.01, 0.60	0.046
Dependence level ^e	-0.54	-3.02	-0.74, -0.13	0.008
PTSD ^f	-0.11	-0.59	-0.56, 0.32	0.566
Depression ^f	0.32	1.83	-0.13, 1.89	0.084
Vaccine worries ^g	-0.33	-2.25	-0.40, -0.13	0.038
Statistics (step 2)	F = 2.95, R ² = 0.71, p = 0.018			

Notes: ^aMeasured by years; ^bThree times per week; ^cFive days per week; ^dMeasured by four selected items of Pittsburgh Sleep Quality Index; ^eMeasured by Severity of Dependence Scale; ^fMeasured by selected items of Disaster-Related Psychological Screening Test; ^gMeasured by selected items of Vaccination Attitude Examination; Bolds: statistical significance.

Table 3 Final Model for Predictors of Social Desirability Estimated with Hierarchical Regression Analysis Among Patients with Substance Use Disorder

Categorical Variable	β	t	95% of CI	P
Sex	-0.27	-1.09	-0.50, 1.60	0.293
Occupation	0.27	1.63	-0.54, 4.15	0.122
Educational level ^a	0.12	0.55	-0.32, 0.55	0.591
Marital status	0.26	1.50	-0.59, 3.44	0.153
Smoking	0.30	1.63	-0.57, 4.49	0.121
Drinking ^b	-0.23	-1.31	-3.20, 0.75	0.207
Regular exercise ^b	0.12	0.70	-1.53, 2.76	0.551
Regular diet ^c	0.04	0.23	-2.16, 2.69	0.820
Continuous variable	β	t	95% of CI	P
Age	0.54	3.29	0.07, 0.30	0.004
Sleep disturbance ^d	0.43	2.16	0.01, 0.60	0.046
Dependence level ^e	-0.54	-3.02	-0.74, -0.13	0.008
PTSD ^f	-0.11	-0.59	-0.56, 0.32	0.566
Depression ^f	0.32	1.83	-0.13, 1.89	0.084
Vaccine worries ^g	-0.33	-2.25	-0.40, -0.13	0.038

Notes: ^aMeasured by years; ^bThree times per week; ^cFive days per week; ^dMeasured by four selected items of Pittsburgh Sleep Quality Index; ^eMeasured by Severity of Dependence Scale; ^fMeasured by selected items of Disaster-Related Psychological Screening Test; ^gMeasured by selected items of Vaccination Attitude Examination; Bolds: statistical significance.

-0.13, $p = 0.008$), and lower level of vaccine worries ($\beta = -0.33$, 95% CI: -0.4 to -0.13, $p = 0.038$) predicted a higher level of social desirability.

Discussion

Main Findings of the Current Study

We investigated the differences between patients with SUD and healthy controls, and found that the SUD group had a significantly lower level of confidence and adherence to governmental policies against COVID-19 and more severe sleep disturbance than the control group. We then examined the predictors of the lower level of adherence and confidence to governmental policies among the patients with SUD, and found that the significant predictors were older age, higher level of sleep disturbance, lower level of drug dependence, and lower level of vaccine worries.

Differences Between the SUD and Control Groups

The patients with SUD had a significantly lower educational level, higher proportion of males, and higher rate of smoking compared to the controls, which is comparable with previous studies.^{39,40} Since our patients had a higher proportion of opioid use disorder, the significantly higher rate of smoking is reasonable due to the association between smoking and opioid use.⁴¹ The patients with SUD also had a significantly lower rate of regular exercise than the controls. Although no previous research has discussed differences in regular exercise between patients with SUD and healthy controls, we suppose that it may be affected by the association between SUD and poor quality of life.⁴²

We also found a higher level of sleep disturbance among the patients with SUD compared with the healthy controls. Alcohol and substance use have been associated with insufficient hours of sleep.⁴³ Furthermore, an association between opioid use disorder and sleep disturbance has also been reported.^{40,44} Importantly, we found that the patients with SUD had a lower social desirability score, indicating a lower level of confidence and adherence to governmental policies. This is consistent with a previous study that demonstrated an association between substance abuse and poor adherence to social distancing.²² Our findings highlight the importance of further interventions to enhance confidence and adherence to policies for infection control in patients with SUD.

Associations Between Social Desirability and Age as Well as Psychological Impact

After adjustments, we found that older age was associated with a higher level of social desirability. This is consistent with our previous study,³⁰ in which we demonstrated positive coping strategies among older subjects. We hypothesize that older individuals may be more willing to follow authorities' instructions due to the higher mortality rate in older patients infected with COVID-19.⁴⁵ On the other hand, our results showed that a lower level of drug dependence was associated with a higher social desirability score. The association between coping strategies and severity of substance use or dependence has seldom been investigated before. A previous study showed that behavioral disengagement and self-blame coping were associated with more severe PTSD-related illicit substance use among trauma-exposed individuals.⁴⁶ This echoes our findings, and highlights the role of maladaptive or negative coping in the severity of substance use or dependence. Moreover, our results extend the application of previous evidence to coping strategies against COVID-19.

Another important finding in this study is that a higher level of sleep disturbance predicted a higher level of social desirability, demonstrating the impact of sleep disturbance on confidence and adherence to governmental policies. Although this finding is comparable with a previous study which reported an association between active coping and sleep disturbance,³ it is not supported by other evidence.¹⁶ The inconclusive findings of the correlation between positive coping and sleep disturbance highlight the complexity of the etiologies. In addition, excessive positive coping and related behaviors may be related to an increased mental health burden. For example, excessive media exposure to COVID-related news might trigger anxiety and psychological distress among the public.⁴⁷ Although the coping strategies discussed in the previous studies are not entirely comparable to social desirability, it may reflect the "too much of a good thing" aspect of positive coping. Further studies are warranted to explore the etiologies of the relationship between coping strategies and psychological burden.

The Impact of Vaccine Worries on Social Desirability

We also found that a lower level of vaccine worries was related to a higher level of social desirability. Previous studies have investigated the interaction between attitude toward vaccinations and coping strategies. For example, refusal to receive the human papillomavirus vaccination has been associated with behavioral disengagement and negative coping in female students.⁴⁸ Another study demonstrated that actively focusing on problems (coping with stress) drives satisfaction and confidence in vaccine information from the authorities.⁴⁹ However, this is not entirely comparable with our previous work, in which we found that higher vaccine worries were associated with a higher level of awareness of the pandemic situation among healthcare workers.²³ We hypothesize that our findings may be due to differences in the studied population and coping strategies (awareness of the pandemic vs adherence to policies). Nevertheless, our findings may show the importance of proper interventions for those with vaccine worries.

Limitations

There are several limitations to the current study. First, the data were derived from one cross-sectional survey. Thus, we cannot identify the time effect on the association between social desirability and other variables. Second, the study was conducted at a single center, and this may limit the interpretation of the results and generalizability compared with a multi-center study. Third, due to the high comorbidity between SUD and other mental illnesses, excluding participants with major mental illnesses may limit the generalizability and applicability to the real world.

Conclusions

The patients with SUD had a significantly lower level of confidence and adherence to governmental policies against COVID-19 than the healthy controls. Furthermore, we identified that a higher level of sleep disturbance, lower level of drug dependence, and lower level of vaccine worries were associated with a higher level of confidence and adherence to governmental policies against COVID-19. Our findings highlight the clinical implications and importance of timely interventions for individuals with drug dependence and vaccine worries. Due to the shortage of resources for SUD treatment during the COVID-19 pandemic,^{12,13} authorities should establish proper treatment programs for those with SUD. Furthermore, timely and accurate information of COVID-19 vaccines should be provided by authorities, as this may reduce the misunderstanding and mistrust of vaccinations. On the other hand, regular screening and prompt interventions for sleep disturbance and other psychological burdens are also crucial for patients with SUD, especially during the COVID-19 pandemic. Further studies with comprehensive assessments are suggested to better understand the etiologies of the association between psychological burden and positive coping. In addition, longitudinal follow-up studies may also be helpful to clarify the time effect of the association between coping strategies and psychological burden as well as vaccine worries.

Funding

This study is supported by grants from the National Science and Technology Council, Taiwan (MOST 112-2314-B-280-001).

Disclosure

Dian-Jeng Li and Joh-Jong Huang are co-first authors for this study. The authors alone are responsible for the content and writing of this paper, and all authors declare that they have no conflicts of interest for this work.

References

1. Hsieh KY, Kao WT, Li DJ, et al. Mental health in biological disasters: from SARS to COVID-19. *Int J Soc Psychiatry*. 2021;67(5):576–586. doi:10.1177/0020764020944200
2. Li DJ, Ko NY, Chen YL, et al. COVID-19-related factors associated with sleep disturbance and suicidal thoughts among the Taiwanese public: a Facebook survey. *Int J Environ Res Public Health*. 2020;17(12):4479.
3. Li DJ, Hsu ST, Chou FH, et al. Predictors for depression, sleep disturbance, and subjective pain among inpatients with Depressive Disorders during the COVID-19 pandemic: a cross-sectional study. *Int J Environ Res Public Health*. 2021;18(12):6523.

4. Flory K, Hankin BL, Kloos B, Cheely C, Turecki G. Alcohol and cigarette use and misuse among Hurricane Katrina survivors: psychosocial risk and protective factors. *Subst Use Misuse*. 2009;44(12):1711–1724. doi:10.3109/10826080902962128
5. North CS, Ringwalt CL, Downs D, Derzon J, Galvin D. Postdisaster course of alcohol use disorders in systematically studied survivors of 10 disasters. *Arch Gen Psychiatry*. 2011;68(2):173–180. doi:10.1001/archgenpsychiatry.2010.131
6. Vlahov D, Galea S, Ahern J, et al. Consumption of cigarettes, alcohol, and marijuana among New York City residents six months after the September 11 terrorist attacks. *The American Journal of Drug and Alcohol Abuse*. 2004;30(2):385–407. doi:10.1081/ADA-120037384
7. Allen DF. The self-medication hypothesis of addictive disorders: focus on heroin and cocaine dependence. In: *The Cocaine Crisis*. Boston, MA: Springer US; 1987.
8. Bandura A. Human agency in social cognitive theory. *The American Psychologist*. 1989;44(9):1175–1184. doi:10.1037/0003-066X.44.9.1175
9. Alexander AC, Ward KD. Understanding postdisaster substance use and psychological distress using concepts from the self-medication hypothesis and social cognitive theory. *J Psychoact Drugs*. 2018;50(2):177–186. doi:10.1080/02791072.2017.1397304
10. Roberts A, Rogers J, Mason R, et al. Alcohol and other substance use during the COVID-19 pandemic: a systematic review. *Drug Alcohol Depend*. 2021;229(Pt A):109150. doi:10.1016/j.drugalcdep.2021.109150
11. Wang QQ, Kaelber DC, Xu R, Volkow ND. COVID-19 risk and outcomes in patients with substance use disorders: analyses from electronic health records in the United States. *Mol Psychiatry*. 2021;26(1):30–39. doi:10.1038/s41380-020-00880-7
12. Ornell F, Moura HF, Scherer JN, et al. The COVID-19 pandemic and its impact on substance use: implications for prevention and treatment. *Psychiatry Res*. 2020;289:113096. doi:10.1016/j.psychres.2020.113096
13. Melamed OC, Hauck TS, Buckley L, Selby P, Mulsant BH. COVID-19 and persons with substance use disorders: inequities and mitigation strategies. *Subst Abuse*. 2020;41(3):286–291. doi:10.1080/08897077.2020.1784363
14. Finstad GL, Giorgi G, Lulli LG, et al. Resilience, coping strategies and posttraumatic growth in the workplace following COVID-19: a narrative review on the positive aspects of trauma. *Int J Environ Res Public Health*. 2021;18(18):9453. doi:10.3390/ijerph18189453
15. Labrague LJ. Psychological resilience, coping behaviours and social support among health care workers during the COVID-19 pandemic: a systematic review of quantitative studies. *J Nurs Manag*. 2021;29(7):1893–1905. doi:10.1111/jonm.13336
16. Budimir S, Probst T, Pieh C. Coping strategies and mental health during COVID-19 lockdown. *J Ment Health*. 2021;30(2):156–163. doi:10.1080/09638237.2021.1875412
17. Murukesu RR, Singh DKA, Shahar S, Subramaniam P. Physical activity patterns, psychosocial well-being and coping strategies among older persons with cognitive frailty of the “WE-RISE” trial throughout the COVID-19 movement control order. *Clin Interv Aging*. 2021;16:415–429. doi:10.2147/CIA.S290851
18. Kao WT, Hsu ST, Chou FH, et al. The societal influences and quality of life among healthcare team members during the COVID-19 pandemic. *Front Psychiatry*. 2021;12:706443. doi:10.3389/fpsy.2021.706443
19. Li DJ, Ko NY, Chen YL, et al. Confidence in coping with COVID-19 and its related factors among the public in Taiwan. *Psychiatry Clin Neurosci*. 2020;74(11):608–610. doi:10.1111/pcn.13128
20. Li DJ, Ko NY, Chang YP, Yen CF, Chen YL. Mediating effects of risk perception on association between social support and coping with COVID-19: an online survey. *Int J Environ Res Public Health*. 2021;18(4):1550.
21. Lou NM, Montreuil T, Feldman LS, et al. Nurses’ and physicians’ distress, burnout, and coping strategies during COVID-19: stress and impact on perceived performance and intentions to quit. *J Contin Educ Health Prof*. 2022;42(1):e44–e52. doi:10.1097/CEH.0000000000000365
22. Taylor S, Paluszek MM, Rachor GS, McKay D, Asmundson GJG. Substance use and abuse, COVID-19-related distress, and disregard for social distancing: a network analysis. *Addict Behav*. 2021;114:106754. doi:10.1016/j.addbeh.2020.106754
23. Hsieh KY, Li DJ, Chou FH, et al. Relationship of societal adaptation with vaccine worries among healthcare workers during the COVID-19 pandemic: the mediating effects of posttraumatic stress disorder. *Int J Environ Res Public Health*. 2022;19(15):9498. doi:10.3390/ijerph19159498
24. Hsieh K, Kao W, Chou F, et al. Predictors for probable posttraumatic stress disorder among outpatients with psychiatric disorders and their caregivers during the COVID-19 pandemic: a cross-sectional study in Taiwan. *Taiwan J Psychiatry*. 2021;35(1):32–39. doi:10.4103/TPSY.TPSY_7_21
25. Li DJ, Wu HC, Chou FH, et al. The social and mental impact on healthcare workers: a comparative and cross-sectional study during two waves of the COVID-19 pandemic in Taiwan. *Medicine*. 2022;101(42):e31316. doi:10.1097/MD.00000000000031316
26. Li DJ, Chou LS, Chou FH, et al. COVID-related psychological distress fully mediates the association from social impact to sleep disturbance among patients with chronic schizophrenia. *Sci Rep*. 2021;11(1):16524. doi:10.1038/s41598-021-96022-2
27. Chou FH, Su TT, Ou-Yang WC, et al. Establishment of a disaster-related psychological screening test. *Aust N Z J Psychiatry*. 2003;37(1):97–103. doi:10.1046/j.1440-1614.2003.01087.x
28. Chou FH, Chou P, Lin C, et al. The relationship between quality of life and psychiatric impairment for a Taiwanese community post-earthquake. *Qual Life Res*. 2004;13(6):1089–1097. doi:10.1023/B:QURE.0000031337.73269.64
29. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989;28(2):193–213. doi:10.1016/0165-1781(89)90047-4
30. Li DJ, Kao WT, Shieh V, Chou FH, Lo HA. Development and implementation of societal influences survey questionnaire (SISQ) for peoples during COVID-19 pandemic: a validity and reliability analysis. *Int J Environ Res Public Health*. 2020;17(17):6246.
31. Lo A, Jun BO, Shieh V, et al. A comparative study of social impacts of the COVID-19 pandemic on republic of Korea, Japan, and Taiwan. *Psychiatry Invest*. 2021;18(10):1006–1017. doi:10.30773/pi.2021.0220
32. Gossop M, Darke S, Griffiths P, et al. The severity of dependence scale (SDS): psychometric properties of the SDS in English and Australian samples of heroin, cocaine and amphetamine users. *Addiction*. 1995;90(5):607–614. doi:10.1046/j.1360-0443.1995.9056072.x
33. Chen VC-H, Chen H, Lin T-Y, et al. Severity of heroin dependence in Taiwan: reliability and validity of the Chinese version of the Severity of Dependence Scale (SDS [Ch]). *Addict Behav*. 2008;33(12):1590–1593. doi:10.1016/j.addbeh.2008.06.001
34. Martin LR, Petrie KJ. Understanding the dimensions of anti-vaccination attitudes: the vaccination attitudes examination (VAX) scale. *Ann Behav Med*. 2017;51(5):652–660. doi:10.1007/s12160-017-9888-y
35. Hinton PR, McMurray I, Brownlow C. *SPSS Explained*. Routledge; 2014.
36. Tabachnick BG, Fidell LS. *Using Multivariate Statistics*. 5th edition ed. New York, NY, USA: Allyn and Bacon; 2007.

37. Beavers AS, Lounsbury JW, Richards JK, et al. Practical considerations for using exploratory factor analysis in educational research. *Pract Assess Res Eval*. 2013;18:1–13.
38. Vandenberg RJ, Lance CE. A review and synthesis of the measurement invariance literature: suggestions, practices, and recommendations for organizational research. *Organizational Res Methods*. 2000;3(1):4–70. doi:10.1177/109442810031002
39. Chung K-S, Wu H-C, Hsu C-Y, Lu Y-S, Li D-J. Factors impeding switching from methadone to buprenorphine in heroin users receiving methadone maintenance therapy - A naturalistic cohort study. *J Subst Abuse Treat*. 2019;105:51–56. doi:10.1016/j.jsat.2019.07.017
40. Li D-J, Chung K-S, Wu H-C, Hsu C-Y, Yen C-F. Factors affecting the dose of methadone among patients receiving methadone maintenance therapy in Taiwan. *Am J Addict*. 2018;27(3):225–230. doi:10.1111/ajad.12712
41. Rajabi A, Dehghani M, Shojaei A, Farjam M, Motevalian SA. Association between tobacco smoking and opioid use: a meta-analysis. *Addict Behav*. 2019;92:225–235. doi:10.1016/j.addbeh.2018.11.043
42. Tracy EM, Laudet AB, Min MO, et al. Prospective patterns and correlates of quality of life among women in substance abuse treatment. *Drug Alcohol Depend*. 2012;124(3):242–249. doi:10.1016/j.drugalcdep.2012.01.010
43. Kwon M, Seo YS, Park E, Chang Y-P. Association between substance use and insufficient sleep in u.s. high school students. *the Journal of School Nursing*. 2021;37(6):470–479. doi:10.1177/1059840519901161
44. Li D-J, Chung K-S, Wu H-C, Hsu C-Y, Yen C-F. Predictors of sleep disturbance in heroin users receiving methadone maintenance therapy: a naturalistic study in Taiwan. *Neuropsychiatr Dis Treat*. 2018;14:2853–2859. doi:10.2147/NDT.S177370
45. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. 2020;395(10229):1054–1062. doi:10.1016/S0140-6736(20)30566-3
46. Kearns NT, Contractor AA, Weiss NH, Blumenthal H. Coping strategy utilization among posttraumatic stress disorder symptom severity and substance use co-occurrence typologies: a latent class analysis. *Psychological Trauma: Theory, Research, Practice, and Policy*. 2021;13(8):929–939. doi:10.1037/tra0000964
47. Garfin DR, Silver RC, Holman EA. The novel coronavirus (COVID-2019) outbreak: amplification of public health consequences by media exposure. *Health Psychol*. 2020;39(5):355–357. doi:10.1037/hea0000875
48. Diaconescu LV, Gheorghie IR, Chesches T, Popa-Velea O. Psychological variables associated with HPV vaccination intent in Romanian academic settings. *Int J Environ Res Public Health*. 2021;18(17):8938. doi:10.3390/ijerph18178938
49. Clarke RM, Paterson P, Sirota M. Determinants of satisfaction with information and additional information-seeking behaviour for the pertussis vaccination given during pregnancy. *Vaccine*. 2019;37(20):2712–2720. doi:10.1016/j.vaccine.2019.04.008

Neuropsychiatric Disease and Treatment

Dovepress

Publish your work in this journal

Neuropsychiatric Disease and Treatment is an international, peer-reviewed journal of clinical therapeutics and pharmacology focusing on concise rapid reporting of clinical or pre-clinical studies on a range of neuropsychiatric and neurological disorders. This journal is indexed on PubMed Central, the 'PsycINFO' database and CAS, and is the official journal of The International Neuropsychiatric Association (INA). The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/neuropsychiatric-disease-and-treatment-journal>