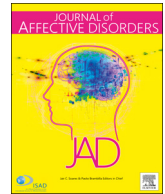




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Short communication

Prevalence of depression and its association with quality of life in clinically stable patients with COVID-19



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ABSTRACT

Introduction: High risk of mental health problems is associated with Coronavirus Disease 2019 (COVID-19). This study explored the prevalence of depressive symptoms (depression hereafter) and its relationship with quality of life (QOL) in clinically stable patients with COVID-19.

Methods: This was an online survey conducted in COVID-19 patients across five designated isolation hospitals for COVID-19 in Hubei province, China. Depression and QOL were assessed with standardized instruments.

Results: A total of 770 participants were included. The prevalence of depression was 43.1% (95%CI: 39.6%–46.6%). Binary logistic regression analysis found that having a family member infected with COVID-19 (OR = 1.51, $P = 0.01$), suffering from severe COVID-19 infection (OR = 1.67, $P = 0.03$), male gender (OR = 0.53, $P < 0.01$), and frequent social media use to obtain COVID-19 related information (OR = 0.65, $P < 0.01$) were independently associated with depression. Patients with depression had lower QOL than those without.

Conclusion: Depression is highly prevalent in clinically stable patients with COVID-19. Regular screening and appropriate treatment of depression are urgently warranted for this population.

Introduction

The Coronavirus Disease 2019 (COVID-19) was first reported in Wuhan at the end of 2019, before spreading rapidly to other provinces of China. Patients infected with COVID-19 experienced physical discomfort, fear of developing complications, and discrimination by the mass media (e.g., WeChat and Weibo) (Lu et al., 2020; Shigemura et al.,

2020). These negative feelings could lead to elevated risk of psychiatric problems, particularly, depressive symptoms (depression hereafter) (Bondade et al., 2019; Ren et al., 2019; Xiang et al., 2020). Moreover, since infected patients were treated in designated isolation hospitals for COVID-19, the loneliness and social isolation could trigger depression as well (Li et al., 2020).

Depression could worsen the prognosis of COVID-19. For example,

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psychological distress and depression may have a negative impact on patients’ immune system response (Leonard, 2001). Patients with depression may also have negative attitudes towards antiviral therapy, which may reduce their treatment adherence and recovery. Previous studies found that patients could experience persistent depression even after the outbreak of infectious diseases. For instance, the prevalence of depression among patients with SARS were 18% at 1 month after their discharge (Wu et al., 2005), and 15.6% at 30-month assessment after SARS outbreak (Mak et al., 2009). Depression was also related to a range of negative outcomes, such as poor functional outcomes (Gao et al., 2019; Knight et al., 2018; Villarreal-Zegarra and Bernabe-Ortiz, 2020; Woo et al., 2016; Zainal et al., 2019). In order to improve the recovery of COVID-19 patients and assist health authorities to develop effective preventive measures and treatment of depression, it is important to explore the pattern of depression and its associated correlates.

To date, there have been very few studies investigating the occurrence of depression in COVID-19 patients. A recent pilot study in an isolation unit of a general hospital which examined the mental health status of 106 COVID-19 patients between February 2 and February 16, 2020 (i.e., early stage of the outbreak) found a prevalence of depression of 49.06% (Zhao et al., 2020). However, the study had limitations due to small sample size (N = 106), single study site, lack of information on the severity of COVID-19 in patients, and omission of multivariate analyses. In addition, quality of life (QOL) is a comprehensive health outcome, which reflects individuals’ perceptions of their physical and mental health, social relationships and overall wellbeing (Carlozzi et al., 2011; Papakostas et al., 2004). However, the impact of depression on QOL in clinically stable COVID-19 patients remains unclear. To date there have been no epidemiological data on depression and its association with QOL in COVID-19 patients.

Therefore, we set out to examine the prevalence of depression and its association with QOL in clinically stable patients infected with COVID-19.

Methods

Participants recruitment

An online cross-sectional survey was conducted in COVID-19 patients across five designated isolation hospitals for COVID-19 between February 24 and March 8, 2020 (i.e., late stage of the COVID-19 outbreak) in Wuhan, Hubei province in China. Patients treated in these hospitals were invited to join this study at anytime before their discharge. To be eligible, participants were: 1) aged 18 years and above; and 2) being diagnosed with clinically stable COVID-19 judged by case doctor based on the Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 6) in China (General Office of the National Health Commission, 2020). The ethical committee of

Peking Union Medical College Hospital reviewed and approved the study protocol (S-K1081). Informed consents were obtained prior to participation in the online survey.

Assessment instruments

Basic social-demographic and clinical data were collected, and whether their family members infected with COVID-19, and the severity of COVID-19 infection during the hospitalization were inquired about. Severity of depression was evaluated with the validated 9-item Patient Health Questionnaire (PHQ-9), Chinese version (Chen et al., 2015; Kroenke et al., 2001), which had good reliability and validity (Choranbach a: 0.79 to 0.89) and were commonly used in Chinese population (Wang et al., 2014). The PHQ-9 is a self-rating scale, with the total score ranging between 0 and 27. A higher score indicates more severe depression. A PHQ-9 total score of ≥5 was considered as “having depression”, while a total score of ≥10 and ≥15 were defined as “moderate depression” and “severe depression”, respectively (Kroenke et al., 2010). The overall QOL was evaluated by the sum of the first two items of the World Health Organization Quality of Life-brief version (WHOQOL-BREF)-Chinese version (Fang, 1999; Harper et al., 1998), which was developed by WHO with satisfactory psychometric property (Xia et al., 2012). Sample questions included “how would you rate your quality of life?” and “how satisfied are you with your health?”. A higher score indicates a higher QOL.

Statistics

All the data were analyzed with SPSS 24.0. The basic demographic and clinical characteristics between patients with and without depression were compared using univariate analyses. The normal distribution of the continuous variables was examined by the P-P Plot. Binary logistic regression analysis with the “enter” method was used to explore the independent correlates of depression. Depression was the dependent variable, and those with a P value of <0.1 in univariate analyses were entered as independent variables. The relationship of depression with QOL was examined with analysis of covariance (ANCOVA) by adjusting for those with group differences in univariate analyses. Significance level was set as P<0.05 (two-tailed).

Results

From 784 COVID-19 patients who were invited, 770 met the study criteria and completed the assessment. The prevalence of depression was 43.1% (95% confidential interval (CI): 39.6%–46.6%). Specifically, the prevalence of mild, moderate, and severe depression was 24.5% (n = 189), 12.1% (n = 93), and 6.5% (n = 50), respectively. The mean total score of the PHQ-9 was 5.06 (standard deviation (SD) = 5.19).

Table 1
Univariate analysis of demographic and clinical characteristics.

Variables	Total (N = 770)		Depression (N = 332)		No Depression (N = 438)		Statistics		
	N	%	N	%	N	%	X ²	df	P
Male gender	370	48.1	132	39.8	238	54.3	16.08	1	<0.01
Married status	680	88.3	287	86.4	393	89.7	1.97	1	0.16
Educational level*	336	43.6	138	41.6	198	45.2	1.02	1	0.31
Living alone before admission	194	25.2	73	22.0	121	27.6	3.19	1	0.07
Family member infected with COVID-19	394	51.2	188	56.6	206	47.0	6.96	1	<0.01
Severe COVID-19 infection	93	12.1	48	14.5	45	10.3	3.11	1	0.08
Frequent social media use	438	56.9	167	50.3	271	61.9	10.31	1	<0.01
	Mean	SD	Mean	SD	Mean	SD	t	df	P
Age (years)	50.43	13.12	51.76	13.49	49.42	12.76	-2.46	768	0.01
Overall quality of life	5.94	1.46	5.33	1.31	6.40	1.41	10.72	768	<0.01

* College and above; Bolded values: <0.05; Abbreviations: COVID-19: Coronavirus Disease 2019.

Table 2
Socio-demographic variables independently associated with depression in patients with COVID-19.

Variables	Multivariate logistic regression analysis		
	P	OR	95% CI
Age (years)	0.12	1.01	1.00 - 1.02
Male gender	<0.01	0.53	0.39 - 0.72
Living alone before admission	0.37	0.85	0.60 - 1.21
Family member infected with COVID-19	0.01	1.51	1.12 - 2.04
Severe COVID-19 infection	0.03	1.67	1.04 - 2.66
Frequent social media use	<0.01	0.65	0.48 - 0.87
Study site	0.63	–	–

Bolded values: <0.05; study site was controlled as covariate.

Abbreviation: CI: confidential interval; OR: odds ratio; COVID-19: Corona Virus Disease 2019.

The demographic and clinical data are presented in Table 1. Depressed patients were more likely to be older ($P = 0.01$), have a family member infected with COVID-19 ($P < 0.01$), be female ($P < 0.01$) and have less use of social media to obtain COVID-19 related information ($P < 0.01$).

Table 2 shows that results of multiple logistic regression analysis. Depression was positively associated with having a family member infected with COVID-19 (OR = 1.51, $P = 0.01$) and suffering from severe COVID-19 infection (OR = 1.67, $P = 0.03$). Depression was negatively associated with male gender (OR = 0.53, $P < 0.01$) and frequent social media use (OR = 0.65, $P < 0.01$). After controlling the covariates, ANCOVA analysis revealed that patients with depression had a significantly lower QOL ($F_{(1, 770)} = 123.21$, $P < 0.01$).

Discussion

This was the first study to explore the prevalence of depression in clinically stable patients with COVID-19. We found that almost half (43.1%, 95%CI: 39.6%–46.6%) of the participants reported depression, which is similar to Zhao's study (49.06%) (Zhao et al., 2020), but higher than that in the general population during the COVID-19 outbreak (30.3%) (Wang et al., 2020). In response to the potential negative mental health impact of the COVID-19, the health authorities of China released the principles for crisis psychological interventions for the COVID-19 in late January 2020 (National Health Commission of China, 2020), which addressed the mental health needs of patients infected with the COVID-19. Subsequently, national academic associations on mental health developed guidelines and expert consensus of psychological interventions for those in need (Li et al., 2020). More recently, online psychological counseling services and education were widely implemented across China. However, the long term impact of these interventions on the COVID-19 patients is uncertain and remains to be examined.

Based on the distress/protection QOL model (Voruganti et al., 1998), QOL is closely associated with the interaction between distressing factors (e.g., physical and mental distress) and protective factors (e.g., good economic status). Due to the negative impact of depression on daily functioning and other related domains (Singleton, 2001), depression is likely to be negatively associated with QOL, which is confirmed by our study finding that COVID-19 patients with depression reported a lower QOL compared to those without. Similar findings were also found in other diseases, such as diabetes (Eren et al., 2008), coronary arterial diseases (Ruo et al., 2003), pulmonary diseases (Gudmundsson et al., 2006), and gastrointestinal diseases (Sainsbury et al., 2013).

As expected, patients with severe COVID-19 infection were at higher risk of depression. These patients experienced more severe physical distress caused by the infection, such as severe fever, breathlessness,

and cough, apart from the side effects of treatments. Greater physical distress could worsen depression. In addition, patients with infected family members were more likely to suffer from depression, probably due to excessive psychological pressure, guilt about the infection transmission to their family members, and community stigma (Xiang et al., 2020).

We also found that female patients were at higher risk of depression which is consistent with previous findings that females were more prone to develop stress-related mental illness, including depression (Bourke and Neigh, 2011; Dalla et al., 2005) than their male counterparts. Higher prevalence of depression in women was associated with hormonal changes (Marrocco and McEwen, 2016) and sex chromosome aneuploidies (Green et al., 2019). Neuroimaging studies of structural changes of the genu of the corpus callosum may implicate different risk of depression between genders (Lyon et al., 2019). Moreover, gut microbiota-immune-brain axis function may also contribute to gender differences in depression (Audet, 2019).

More frequent use of social media to obtain information about the COVID-19 outbreak appeared to be associated with lower risk of depression in this study. Since the onset of the COVID-19 outbreak, health authorities and academic associations in China have developed a range of online education on mental health and related services regarding the transmission of disease (e.g., WeChat and Weibo). Patients with more frequent access to social media were more likely to benefit from these online services. In addition, frequent communication with friends and updates about the COVID-19 using the social media platform could reduce patients' feelings of fear and uncertainty, which may help reduce the risk of depression.

Several limitations need to be addressed. First, this study only examined clinically stable patients with COVID-19 prior to discharge in Wuhan. Those patients residing in the community were not examined. Second, due to logistical reasons, depression was assessed by a self-report scale instead of using a structured diagnostic instrument. Third, some other factors that were linked with depression (e.g., social support) were not measured.

In conclusion, depression appeared to be highly prevalent in clinically stable COVID-19 patients. Due to its negative impact on QOL and recovery of COVID-19 patients, early identification, appropriate treatment and long-term assessment on depression need to be delivered in a timely fashion for COVID-19 survivors.

Declaration of Competing Interest

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2020.06.033.

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