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Association of insomnia disorder with sociodemographic factors and poor mental health in COVID-19 inpatients in China

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Article info
Article history:
Received 16 May 2020
Received in revised form 8 June 2020
Accepted 8 June 2020
Available online 12 June 2020

Keywords:
COVID-19 inpatients
Insomnia disorder
Mental health

Abstract
Purpose: To examine insomnia disorder and its association with sociodemographic factors and poor mental health in 2019 novel coronavirus (COVID-19) inpatients in Wuhan, China.

Design and Methods: A total of 484 COVID-19 inpatients in Wuhan Tongji Hospital were selected and interviewed with standardized assessment tools. Insomnia disorder was measured by the Chinese version of the Insomnia Severity Index (ISI-7), a total score of 8 or more was accepted as the threshold for diagnosing insomnia disorder.

Results: The prevalence of insomnia disorder in the whole sample was 42.8%. Binary logistic regression analysis revealed that female gender, younger age, and higher fatigue and anxiety severity were more likely to experience insomnia disorder.

Conclusion: Given the high rate of insomnia disorder status among COVID-19 inpatients in Wuhan, China, and its negative effects, follow-up assessments and appropriate psychological interventions for insomnia disorder are needed in this population.

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1. Introduction

The 2019 novel coronavirus disease (COVID-19) epidemic has reached global proportions. The treatment and illness uncertainty of COVID-19 acute infectious pneumonia is associated with physical suffering; additionally, it impacts psychological wellbeing [1]. In China, over 42,000 medical workers (including psychiatrists [2]) from other regions of China have volunteered to work in Hubei province. Clinically, insomnia disorder is one of the major psychiatric disorders in adolescents; the main manifestations include perceived sleep dissatisfaction, and difficulty in initiating or maintaining sleep [3]. Insomnia disorder, however, is a painful condition that is often associated with cognitive impairment, mood disturbance, and fatigue [4]. In their study, Lai et al., reported a high prevalence of insomnia symptoms (34.0%) in health care professionals who treated coronavirus patients [5]. However, no prior studies have reported the prevalence of insomnia disorder and the associated factors in COVID-19 inpatients. Therefore, we conducted a Web-based survey to examine (1) the prevalence of insomnia disorder in COVID-19 inpatients in Wuhan, the center of an outbreak of COVID-19 in China; and (2) the sociodemographic and clinical correlates of insomnia disorder.
2. Methods

2.1. Setting and sampling

This cross-sectional study was conducted in Tongji Hospital, one of the isolated infectious hospitals in Wuhan, Hubei province in March 2020. COVID-19 inpatients were invited to participate in an online assessment before their discharge. Inclusion criteria comprised of (1) diagnosis of COVID-19; (2) over the age of 14; (3) Chinese-speaking and able to comprehend the contents of the research interview; and (4) willingness to give informed consent.

The Ethics Committee of the Peking Union Medical College Hospital approved this research protocol and methods (Reference number: S-K1081). All participants provided electronic copies of informed consent.

2.2. Data collection and measures

Participants’ socio-demographic and clinical data were collected using a form designed for this study. Participants could easily access the survey by scanning a quick response code (QR).

2.2.1. Insomnia severity

Insomnia severity was measured by the Insomnia Severity Index (ISI-7) [6,7]. The Chinese version of ISI-7 has been validated in Chinese populations (Cronbach's alpha = 0.81) [8]. All items were rated on a five-point scale ranging from 0 (none) to 4 (very). The total score ranges from 0 to 28 and the cut-off score for diagnosing insomnia disorder is ≥ 8 [9].

2.2.2. General mental health

General mental health was assessed using the 12-item General Health Questionnaire (GHQ-12) [10]. The Chinese version of GHQ-12 has been validated in Chinese populations (Cronbach's alpha = 0.79) [11]. Each item score is summed to yield a total score ranging from 0 to 12, with those scoring 4 or more being deemed to have poor mental health status [12,13].

2.2.3. Depressive symptom

The 9-item Patient Health Questionnaire (PHQ-9) was used to identify and measure the presence and severity of depressive symptom [14]. The Chinese version of PHQ-9 has been validated in Chinese populations (Cronbach's alpha = 0.86) [15]. The score ranges from 0 to 3 (0 = “Not at all” to 3 = “Nearly every day”) for each item (0–27 total score range), and higher total scores connotate more severe depressive symptoms [16].

2.2.4. Anxiety symptom

The anxiety symptom was measured by the Generalized Anxiety Disorder scale (GAD-7) [17]. The Chinese version of GAD-7 has been validated in Chinese populations (Cronbach's alpha = 0.89) [18]. Each item has four response options with scores ranging from 0 to 3 (0 = “Not at all” to 3 = “Nearly every day”), the higher total score (ranges from 0 to 21) signified more severe anxiety [17].

2.2.5. Fatigue severity

Fatigue severity was measured by an 11-point (0 = “no fatigue” to 10 = “worst fatigue”) numeric rating scale (NRS).

2.3. Statistical analysis

Data were analyzed using SPSS 25.0 (SPSS). Comparisons between insomnia disorder group and non-insomnia disorder group were conducted using the chi-square test, independent sample Student’s t-test, and Mann–Whitney U test, as appropriate. Binary logistic regression analyses with the ‘enter’ method were used to identify independent of insomnia disorder. Insomnia disorder was the dependent variable, and the independent variables included gender, age, education, marital and inpatient ward types, familial people or community members got infected, ways of getting COVID-19 related information, mental health status, fatigue severity, and the total scores of PHQ-9 and GAD-7. The statistical significance level was set to 0.05 for a two-tailed test.

3. Results

A total of 484 (99.0%) of the 489 COVID-19 inpatients met all participation criteria and completed the assessment. The prevalence of insomnia disorder was 42.8%. Considering the whole sample, the mean ISI score was 7.24 ± 2.058 (95% confidence interval (CI): 6.73–7.75). Mean ISI score of insomnia disorder group and non-insomnia disorder group were 12.41 ± 0.311 (95% CI: 11.80–13.02), and 3.38 ± 0.149 (95% CI: 3.08–3.67), respectively.

Table 1 presents the sociodemographic and clinical characteristics of the whole sample and separately according to insomnia disorder. Compared to COVID-19 inpatients without insomnia disorder, those with insomnia disorder were more likely to be married, female, and getting COVID-19 related information via social media, poor mental health status, and higher fatigue severity, higher PHQ-9, and GAD-7 total scores.

The independent demographic and clinical correlates of insomnia disorder are displayed in Table 2. Compared to non-insomnia disorder group, insomnia disorder was positively associated with fatigue severity (p < 0.05, OR = 1.22, 95% CI = 1.06–1.40), and the GAD-7 total score (p < 0.001, OR = 1.30, 95% CI = 1.18–1.44), but negatively associated with male (p < 0.05, OR = 0.59, 95%CI = 0.36–0.97) and age (p < 0.001, OR = 0.97, 95% CI = 0.97–0.99).

4. Discussion

This is the first study that examined insomnia disorder and its clinical correlates in COVID-19 inpatients in Wuhan, China. In this survey, 42.8% of COVID-19 inpatients reported insomnia disorder. This finding is supported by previous studies, that up to 96.2% of clinically stable COVID-19 patients reported post-traumatic stress symptoms [19]. The post-Severe Acute Respiratory Syndrome (SARS) group also reported more sleep disturbances, which was tested by the Sleep Assessment Questionnaire [20]. The sleep quality of the adult individuals who had self-isolated during the epidemic of COVID-19 in China is (8.482 ± 4.646), which was measured by the Pittsburgh Sleep Quality Index (PSQI) questionaire [21]. The prevalence of insomnia disorder in community-dwelling older people was 17.7% in Taiwan, China, which was considerably lower than our study (42.8%) [22]. The inconsistency may be partly because of the variance in measures of sleep quality, study population, and sample size.

Females are more affected by insomnia disorder compared to males as reported by Roth [23], which is consistent with the findings of this study. Women older than 45 years are 1.7 times more likely to have insomnia than men [24]. The sex difference could
result from hormonal differences since insomnia emerges after the onset of menses in adolescence [25]. Negative effects such as anxiety and depression may cause insomnia [26]. Women are nearly twice as likely to suffer from depression compared with men, which may partially explain the increased insomnia disorder risk for females [27]. However, the positive association that we found between insomnia disorder with married marital status, getting COVID-19 related information via social media, higher PHQ-9 total score, and poor mental health status in univariate analysis disappeared in multivariate analysis, which suggested there may be variables mediating or moderating these associations.

In this study, younger age was a risk factor for insomnia disorder. Younger COVID-19 patients may prefer to spend more time using the internet and smartphones, and some negative news on social media may cause a higher prevalence of insomnia disorder [19]. In addition, younger patients are biologically more vulnerable to sleep deficiency [28], together with lifestyle factors, such as electronic media use may help explain the positive relationship between younger age and insomnia disorder.

The positive association between fatigue, anxiety, and insomnia disorder was observed in this study. Fatigue has been reported as one of the most frequent complaints of patients with insomnia [29]. Notably, fatigue is associated with many negative psychological outcomes, such as cognitive impairment [30] and depression [31], which may increase the risk of insomnia disorder [32,33]. Consistent with previous findings [34–36], a higher level of anxiety was positively associated with insomnia disorder in this study. The large-scale outbreak of COVID-19 has caused public panic and

### Table 1
Demographic and clinical characteristics of the whole sample and separately by insomnia disorder.

| Variables                              | Total sample (N = 484) | Patients with insomnia disorder (N = 207) | Patients without insomnia disorder (N = 277) | Statistics<sup>a</sup> |
|----------------------------------------|------------------------|-------------------------------------------|---------------------------------------------|-------------------------|
|                                        | n                      | %                                        | n                                           | %                       | n                        | %                        | χ² | df | P          |
| Male gender                            | 241                    | 49.8                                     | 84                                          | 40.6                    | 157                      | 56.7                     | 12.2 | 1  | <0.001     |
| Married                                | 444                    | 91.7                                     | 196                                         | 94.7                    | 248                      | 89.5                     | 4.2  | 1  | 0.042      |
| Education (College degree and above)   | 193                    | 39.9                                     | 89                                          | 43.0                    | 104                      | 37.5                     | 1.5  | 1  | 0.226      |
| General ward                           | 394                    | 81.4                                     | 164                                         | 79.2                    | 230                      | 83.0                     | 1.1  | 1  | 0.287      |
| Family members got infected            | 264                    | 54.5                                     | 116                                         | 56.0                    | 148                      | 53.4                     | 0.3  | 1  | 0.568      |
| Colleagues got infected                | 58                     | 12.0                                     | 31                                          | 15.0                    | 27                       | 9.7                      | 3.1  | 1  | 0.080      |
| Friends got infected                   | 38                     | 7.9                                      | 20                                          | 9.7                     | 18                       | 6.5                      | 1.6  | 1  | 0.200      |
| Getting COVID-19 related information via chatting | 216 | 44.6                                     | 99                                          | 47.8                    | 117                      | 42.2                     | 1.5  | 1  | 0.221      |
| Getting COVID-19 related information via social media | 352 | 72.7                                     | 163                                         | 78.7                    | 189                      | 68.2                     | 6.6  | 1  | 0.010      |
| Getting COVID-19 related information via watching television | 253 | 52.3                                     | 99                                          | 47.8                    | 154                      | 55.6                     | 2.9  | 1  | 0.090      |
| Poor mental health status<sup>b</sup>  | 141                    | 29.1                                     | 113                                         | 54.6                    | 28                       | 10.1                     | 113.5| 1  | <0.001     |

### Table 2
Independent demographic and clinical correlates of insomnia disorder (multiple logistic regression analysis).

| Variables                              | Insomnia disorder<sup>a</sup> |
|----------------------------------------|--------------------------------|
|                                        | P   | OR  | 95%CI |
| Male gender                            | 0.038 | 0.59 | 0.36–0.97 |
| Married                                | 0.845 | 0.93 | 0.42–2.03 |
| Education (College degree and above)   | 0.608 | 1.15 | 0.68–1.95 |
| General ward                           | 0.889 | 1.05 | 0.55–1.97 |
| Family members got infected            | 0.094 | 0.66 | 0.39–1.08 |
| Colleagues got infected                | 0.707 | 1.15 | 0.55–2.44 |
| Friends got infected                   | 0.577 | 1.32 | 0.49–3.55 |
| Getting COVID-19 related information via chatting | 0.587 | 1.15 | 0.70–1.87 |
| Getting COVID-19 related information via social media | 0.666 | 0.89 | 0.53–1.50 |
| Getting COVID-19 related information via watching television | 0.099 | 0.66 | 0.41–1.08 |
| Poor mental health status<sup>b</sup>  | <0.001 | 0.97 | 0.96–0.99 |
| Age (years)                            | 0.009 | 1.74 | 0.94–3.24 |
| PHQ-9 total score                      | 0.059 | 1.09 | 1.00–1.18 |
| GAD-7 total score                      | <0.001 | 1.30 | 1.18–1.45 |
| Fatigue severity                       | 0.005 | 1.22 | 1.06–1.40 |

<sup>a</sup> Measured by the General Mental Health-12, and the cut-off total score for poor mental health is ≥ 8.

COVID-19, the novel coronavirus disease; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalized Anxiety Disorder Scale-7.
mental health stress, physical discomfort, and uncertainty during isolation treatment, which may also increase patient anxiety [37]. There are several methodological limitations in this study. First, the study involved only patients attending in general wards and Intensive Care Unit in Tongji hospital in China, and 81.4% COVID-19 patients isolated and treated in general wards. Therefore, the sample was heterogeneous, which may limit the generalizability of the study findings. Second, considering the statistical power, some other factors, such as COVID-19 severity status, clinical symptoms and comorbidities, which may have an impact on insomnia, were not analyzed. Third, the cross-sectional design precludes making causal inferences. Besides, the self-reported clinical characteristics may cause reporting bias.

In conclusion, this study found that nearly half of the COVID-19 patients analyzed suffered from insomnia disorder during hospitalization. Future research should, therefore, include follow-up assessments and appropriate psychological interventions.

Ethical issues
This research protocol and methods were approved by the Ethics Committee of the Peking Union Medical College Hospital (Reference number: S-K1081).

Financial support
None.

Description of authors’ roles
Study design: Xin-Juan Wu, Yu-Fen Ma, Hui Wang. Data collection, analysis, and interpretation of data: Hai-Xin Bo, Hai-Bo Deng, Ying Wang, Yu-Wang, Jing Cao, Yuan Xu, Xiao-Jie Wang, Li-Yun Zhu, Qiao-Dan Lu; Drafting of the manuscript: Yu Wang, Li-Yun Zhu, Ying Wang; Critical revision of the manuscript: Hai-Xin Bo, Hai-Bo Deng, Jing Cao, Yuan Xu, Qiao-Dan Lu. Approval of the final version for publication: all co-authors.

Acknowledgments
We are grateful to all patients and the frontline clinicians in Tongji hospital who participated in this study.

Conflict of interest
None.

The ICMJE Uniform Disclosure Form for Potential Conflicts of Interest associated with this article can be viewed by clicking on the following link: https://doi.org/10.1016/j.sleep.2020.06.011.

References
[1] Bao Y, Sun Y, Meng S, et al. 2019-nCoV epidemic: address mental health care to empower society. Lancet 2020;395:e37–8. https://doi.org/10.1016/S0140-6736(20)30309-3.
[2] National Health Commission of the People’s Republic of China. Press conference on March 26. Available online: http://www.nhc.gov.cn/jyl/202003/news/3574/202003/4a2d5a68c344168b569757f44c700.shtml. [Accessed 16 May 2020].
[3] Winkelman JW. CLINICAL PRACTICE. Insomnia disorder. N Engl J Med 2015;373:1437–44. https://doi.org/10.1056/NEJMcp1412740.
[4] Qaseem A, Kansagara D, Fochi EA, et al. Clinical guidelines committee of the American College of P. Management of chronic insomnia disorder in adults: a clinical practice guideline from the American College of Physicians. Ann Intern Med 2016;165:125–33. https://doi.org/10.7326/M15-2175.
[5] Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA network open 2020;3:e203976. https://doi.org/10.1001/jamanetworkopen.2020.3976.
[6] Gagnon C, Belanger L, Ivers H, et al. Validation of the insomnia severity Index in primary care. J Am Board Fam Med 2013;26:701–10. https://doi.org/10.3122/jabfm.2013.03.122241.
[7] Morin CM. Insomnia: psychological assessment and management. Guildford press; 1993.
[8] Yu DS. Insomnia Severity Index: psychometric properties with Chinese community-dwelling older people. J Adv Nurs 2018;66:2310–9. https://doi.org/10.1111/jan.13947.
[9] Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med 2001;2:297–307. https://doi.org/10.1016/s1389-9457(00)00054-4.
[10] Gureje O, Obikoya B. The GHQ-12 as a screening tool in a primary care setting. Soc Psychiatr Epidemiol 1990;25:276–80. https://doi.org/10.1007/BF00788650.
[11] Wang TZ, Huang L, Wu ZY. The application of Chinese health questionnaire for mental disorder screening in community settings in mainland China (article in Chinese). Zhonghua Liu Xing Bing Xue Zazhi 2003;24:769–73.
[12] Wang S, Li R, Ungvari GS, et al. Poor mental health status and its associations with demographic characteristics and chronic diseases in Chinese elderly. Soc Psychiatr Epidemiol 2016;51:1449–55. https://doi.org/10.1007/s00127-016-1271-y.
[13] Phillips MR, Zhang J, Shi Q, et al. Prevalence, treatment, and associated disability of mental disorders in four provinces in China during 2001–05: an epidemiological survey. Lancef 2009;373:2041–53. https://doi.org/10.1016/s0140-6736(09)60660-7.
[14] Kroenke K, Spitzer R, Williams J. The PHQ-9: validity of a brief depression severity measure. Gen Intern Med 2001;16:606–13. https://doi.org/10.1046/j.1525-1497.2001.0160606.x.
[15] Wang W, Buan Q, Zhao Y, et al. Reliability and validity of the Chinese version of the Patient Health Questionnaire (PHQ-9) in the general population. Gen Hosp Psychiat 2014;36:539–44. https://doi.org/10.1016/j.genhosppsych.2014.05.021.
[16] CFK K, Li L, Xiang YT, et al. Quality of life and clinical correlates in older adults living in the community and in nursing homes in Macao. Psychogeriatrics 2017;17:194–9. https://doi.org/10.1111/pssy.12214.
[17] Spitzer RL, Kroenke K, Williams JBW, et al. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med 2006;166:1002–7. https://doi.org/10.1001/archinte.166.10.1002.
[18] He X, Li C, Qian J, et al. Reliability and validity of a generalized anxiety disorder scale in general hospital outpatients (article in Chinese). Shanghai Arch Psychiat 2010;22:200–3. https://doi.org/10.3969/j.issn.1000-0526.2010.04.002.
[19] Bo HK, Li W, Yang Y, et al. Posttraumatic stress symptoms and attitude toward crisis mental health services among clinically stable patients with COVID-19 in China. Psychol Med 2020;27:1–2. https://doi.org/10.1177/0033291720933813.
[20] Moldofsky H, Patcai J. Chronic widespread musculoskeletal pain, fatigue, depression and disordered sleep in chronic post-SARS syndrome: a case-controlled study. BMC Neurol 2011;11:37. https://doi.org/10.1186/1471-2377-11-37.
[21] Xiao H, Zhang Y, Kong D, et al. Social capital and sleep quality in individuals with COVID-19 in China. Psychol Med 2020;20:71–2. https://doi.org/10.1017/S0033291720000095.
[22] Su TP, Huang SR, Chou P. Prevalence and risk factors of insomnia in adults living in the community and in nursing homes in Macao. Psychogeriatrics 2004;38:706–13. https://doi.org/10.1111/j.1440-1614.2004.0154.x.
[23] Roth T. Insomnia: definition, prevalence, etiology, and consequences. J Clin Sleep Med 2007;3:57–10. https://doi.org/10.5066/2007.02.0016.
[24] Ohayon MM. Epidemiology of insomnia: what we know and what we still need to learn. Sleep Med Rev 2002;6:97–111. https://doi.org/10.1053/smrv.2002.0186.
[25] Johnson EO, Roth T, Schultz L, et al. Epidemiology of DSM-IV insomnia in adolescence: lifetime prevalence, chronicity, and an emergent gender difference. Pediatrics 2006;117:e247–56. https://doi.org/10.1542/peds.2004-2629.
[26] Weibel S, Jermann F, Weiner L, et al. Insomnia in adult attention-deficit/hyperactivity disorder: a comparison with borderline personality disorder population in a clinical setting and control participants. Compr Psychiat 2017;76:119–28. https://doi.org/10.1016/j.comppsych.2017.04.009.
[27] Sarasini DJ. Depression in midlife women. Maturitas 2016;94:149–54. https://doi.org/10.1016/j.maturitas.2016.09.004.
[28] Zhang Q, Gao J, Tang Y, et al. Young adults are more vulnerable to chronic sleep deficiency and recurrent circadian disruption than older adults. Sci Rep 2018;8:11052. https://doi.org/10.1038/s41598-018-29358-x.
[29] Kyle SD, Crawford MR, Morgan K, et al. The Glasgow Sleep Impact Index (GSII): a novel patient-centred measure for assessing sleep-related quality of life impairment in Insomnia Disorder. Sleep Med 2013;14:493–501. https://doi.org/10.1016/j.sleep.2012.10.023.
[30] Forstner-Brochu E, Morin CM. Cognitive impairment in individuals with insomnia: clinical significance and correlates. Sleep 2014;37:1787–98. https://doi.org/10.5665/sleep.4172.
[31] Svertsen B, Salo P, Mykletun A, et al. The bidirectional association between depression and insomnia: the HUNT study. Psychosom Med 2012;74:738–65. https://doi.org/10.1097/PSY.0b013e31826248f4.
[32] Li L, Wu C, Gan Y, et al. Insomnia and the risk of depression: a meta-analysis of prospective cohort studies. BMC Psychiatr 2016;16:375. https://doi.org/10.1186/s12888-016-1075-3.

[33] Fan T-T, Chen W-H, Shi L, et al. Objective sleep duration is associated with cognitive deficits in primary insomnia: BDNF may play a role. Sleep 2019;42:zsy192. https://doi.org/10.1093/sleep/zsy192.

[34] Kirwan M, Pickett SM, Jarrett NL. Emotion regulation as a moderator between anxiety symptoms and insomnia symptom severity. Psychiatr Res 2017;254:40–7. https://doi.org/10.1016/j.psychres.2017.04.028.

[35] Mason EC, Harvey AG. Insomnia before and after treatment for anxiety and depression. J Affect Disord 2014;168:415–21. https://doi.org/10.1016/j.jad.2014.07.020.

[36] Osnes RS, Roadset JO, Fallestad T, et al. Insomnia late in pregnancy is associated with perinatal anxiety: a longitudinal cohort study. J Affect Disord 2019;248:155–65. https://doi.org/10.1016/j.jad.2019.01.027.

[37] Canady VA. COVID-19 outbreak represents a new way of mental health service delivery. Ment Health Wkly 2020;30:1–4. https://doi.org/10.1002/mhw.32282.