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Factors associated with depression in residents in the post-epidemic era

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Summary

Objective: To explore the factors associated with depression in residents in the post-epidemic era of COVID-19.

Methods: A multi-stage stratified random sampling method was used to conduct a questionnaire survey among community residents through self-designed questionnaires and self-rating depression scale (SDS). Multivariate logistic regression analysis was performed on the influencing factors of depressive symptoms.

Results: A total of 1993 residents completed the survey of depression status. The incidence of depressive symptoms was 27.04%. The multivariate logistic regression analysis showed that female (odds ratio (OR): 6.239, 95% confidence interval (CI): 2.743–10.698), body mass index (BMI) > 24 (OR: 2.684, 95% CI: 1.059–3.759) and drinking (OR: 1.730, 95% CI: 1.480–3.153) were the risk factors for developing depressive symptoms. Married (OR: 0.417, 95% CI: 0.240–0.652), monthly income (3001–5000 yuan, OR: 0.624, 95% CI: 0.280–0.756; >5000 yuan, OR: 0.348, 95% CI: 0.117–0.625), ordinary residents (OR: 0.722, 95% CI: 0.248–0.924) and urban residents (OR: 0.655, 95% CI: 0.394–0.829) were the protective factors of depressive symptoms.

Conclusions: Under the post-epidemic era of COVID-19, depressive symptoms are still common among community residents in China. Gender, BMI, drinking, marriage, monthly income and nature of personnel and residential area are associated with the incidence of depressive symptoms.

Introduction

Since the World Health Organization (WHO) declared the novel coronavirus pneumonia (COVID-19) epidemic as a public health emergency of international concern, the COVID-19 epidemic has caused varying degrees of impact on human physical and mental health, and has become the biggest threat to global health.^{1,2} Previous studies have shown that major economic

crises or natural disasters were often accompanied by an increase in depression, anxiety, post-traumatic stress disorder, substance abuse and suicide.^{3,4} A study of the general public's mental health during the COVID-19 outbreak found that more than half of the respondents' mental health was moderately to

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severely affected in the early stages of the outbreak and about one-third of the respondents had moderate to severe anxiety and depression symptoms,⁵ which decreased significantly with the passage of time and the improvement of the epidemic prevention and control.⁶ As the epidemic prevention and control in China has entered the stage of normalized stage, although the severity of the epidemic has eased, it still restricts residues' daily life and travel.⁷ At the same time, the increased prevention and control brought about by the local outbreak of the COVID-19 has a continuous impact on the mental health of residues, which has brought enormous pressure on the health care system of World. Depression is a comprehensive disease characterized by mental depression with low mood, slow thinking, reduced mental activity, low self-esteem, negativity and even suicidal tendencies and behaviors.⁸ According to the WHO survey, in different regions or countries, the lifetime prevalence of depression in adults ranges from 3.3% to 21.4%.⁹ Affected by COVID-19, studies have shown that the incidence of depressive symptoms in various regions has increased significantly, especially in developing countries, where the situation of patients with depression and the burden of disease is becoming increasingly severe.¹⁰ However, the current research on the impact of COVID-19 on mental health is mostly limited to the first outbreak of the epidemic,^{11,12} and there are few reports on the impact of normalized prevention and control of the epidemic on the incidence of depressive symptoms in community residents.¹³ The anti-epidemic policies of different countries have led to significant differences in the mental health status of residents. Through household surveys, this article investigated the occurrence of depressive symptoms among residents under the post-epidemic era, and the influencing factors were analyzed to provide scientific basis for administrative departments to provide reasonable intervention measures.

Materials and methods

Participants

From 26 July 2021 to 30 January 2022, a multi-stage stratified cluster random sampling method was used to select two streets in eight districts (counties) and three communities (residential communities) were selected from each street according to the population ratio. Residential population of 1008 households was investigated in total, and two residents over 18 years old were randomly selected from each household to complete the questionnaire. Inclusion criteria: (i) age $\geq$ 18 years old; (ii) resident for 6 months and (iii) voluntarily agree to participate in this survey. Exclusion criteria: (i) severe physical or mental illness; (ii) recent major stressful events and (iii) other circumstances that cannot cooperate with the completion of the investigation. A total of 1993 community residents completed the survey.

Questionnaire and evaluation criteria

The self-designed questionnaire and self-rating depression scale (SDS) were used to investigate. The self-designed questionnaire includes: (i) General demographic information: gender, age (years), education level, marriage, occupation, region, body mass index (BMI) and personal monthly income (yuan), etc. (ii) Lifestyle and health status: smoking, drinking, exercise, chronic diseases (common chronic medical diseases diagnosed by medical institutions, such as high blood pressure, diabetes,

stroke, etc.). SDS contains 20 items in total, of which 1, 3, 4, 7, 8, 9, 10, 13, 15 and 19 are positive scoring questions, each of which is A, B, C and D scored according to 1, 2, 3 and 4; 2, 5, 6, 11, 12, 14, 16, 17, 18 and 20 are reverse scoring questions, and each question A, B, C and D is scored according to 4, 3, 2 and 1. The total score of each item is multiplied by 1.25 to get an integer as the standard score. Less than 53 means no depressive symptoms and ≥ 53 means depressive symptoms.

Investigation method and quality control

All participating investigators were organized for training, and conduct consistency test with the Kappa value of 0.89–0.972. Two deputy chief physicians were arranged to review the questionnaire. Questionnaires with logical errors or serious data missing will be eliminated, and 5% of the negative questionnaires will be randomly selected for review.

Statistical analysis

SPSS 22.0 software was used for statistical analysis. The enumeration data were described in the form of rate, and χ^2 test was used to conduct univariate analysis of each variable, and variables with statistically significant were subjected to unconditional binary logistic regression analysis. The assignments of independent variables are shown in Table 1. $P < 0.05$ was considered to be statistically significant.

Results

Basic information

A total of 1616 residues from 1008 households completed the questionnaires, 23 unqualified questionnaires were removed and finally 1993 valid questionnaires were obtained, with an effective rate of 98.86%. Among them, men accounted for 38.89% (775/1993) and women accounted for 61.11% (1218/1993), aged 18–95 years old, $M = 36$ years old. See Table 2.

Table 1. Assignments of variables related to logistic regression

Variable	Assignment
Depressive symptoms	0 = no, 1 = yes
Gender	0 = male, 1 = female
Age	0 = ≤ 30 , 1 = 30
Education level	0 = high school, 1 = college
Occupation	0 = laid off or unemployed, 1 = on-the-job worker, 2 = professional and technical personnel, 3 = retired
Marital status	0 = unmarried, 1 = married, 2 = divorced or widowed
BMI	0 = ≤ 18.5 , 1 = 18.5–23.9, 2 = 24
Monthly income	0 = ≤ 3000 , 1 = 3001–5000, 2 = ≥ 5000
Personnel type	0 = anti-pandemic-related personnel, 1 = ordinary residents
Region	0 = rural, 1 = urban
Chronic diseases	0 = no, 1 = yes
Exercise	0 = no, 1 = yes
Smoking	0 = no, 1 = yes
Drinking	0 = no, 1 = yes

Table 2. Incidence and univariate analysis of depressive symptoms

Factors	Total number	Number of depressive symptoms (%)	χ^2	P
Gender			36.74	<0.05
Male	775	151 (19.48)		
Female	1218	388 (31.86)		
Age (years)			12.09	<0.05
≤30	934	287 (30.73)		
>30	1059	252 (23.80)		
Education level			54.17	<0.05
≤High school	656	246 (37.50)		
≥College	1337	293 (21.91)		
Occupation			19.66	0.001
Laid off or unemployed	237	142 (59.92)		
On-the-job worker	902	302 (33.48)		
Professional and technical personnel	272	60 (22.06)		
Retired	582	35 (6.01)		
Marital status			8.67	0.04
Unmarried	467	188 (40.26)		
Married	1321	264 (19.98)		
Divorced or widowed	205	87 (42.44)		
BMI			16.47	<0.05
≤18.5	266	82 (30.83)		
18.5–23.9	1023	146 (14.27)		
>24	704	311 (44.18)		
Monthly income (yuan)			45.26	<0.05
≤3000	476	299 (62.82)		
3001–5000	824	156 (18.93)		
>5000	693	84 (12.12)		
Personnel type			58.13	<0.05
Anti-pandemic-related personnel	204	101 (49.51)		
Ordinary residents	1789	438 (24.48)		
Region			367.31	<0.05
Rural	562	323 (57.47)		
Urban	1431	216 (15.09)		
Chronic diseases			81.65	<0.05
No	1566	350 (22.35)		
Yes	427	189 (44.26)		
Exercise			21.38	<0.05
No	1169	271 (23.18)		
Yes	824	268 (32.52)		
Smoking			1.42	0.23
No	1455	404 (27.77)		
Yes	538	135 (25.09)		
Drinking			218.19	<0.05
No	1538	293 (19.05)		
Yes	455	246 (54.07)		

The incidence and univariate analysis of depressive symptoms

The incidence of depressive symptoms was 27.04%. The univariate analysis of depressive symptoms showed that there were statistically significance between different gender, age, education level, occupation, marital status, personnel type, BMI, monthly income, region, chronic diseases, exercise and drinking. See [Table 2](#).

Analysis of the influencing factors of the incidence of depressive symptoms

The statistically significant variables in the univariate analysis results were subjected in the multivariate logistic regression model, and the results showed that female, BMI > 24 and drinking were risk factors for depressive symptoms; married, higher monthly income, ordinary residents and urban residents were the protective factors of depressive symptoms. See [Table 3](#).

Discussion

The sudden outbreak of COVID-19 has brought an immeasurable impact on the normal lives of residues. With a series of strict prevention and isolation measures for a long time during the epidemic, the impact on the mental health cannot be ignored. This study found that the incidence of depressive symptoms among residents was 27.04%. Compared with the results of a study on 192 020 ordinary Chinese residents from 31 provinces during the first-round outbreak of COVID-19 with the morbidity rate of 31.2%,¹⁴ the depressive symptoms have decreased to a certain extent for the reason that for those in the non-core outbreak areas, the epidemic situation was in a state of domestic spread, overseas imports have been basically controlled and production and life have also recovered. The incidence of depressive symptoms in this study was higher than the incidence of depressive symptoms of residents in different parts of the country under ordinary circumstances in China. For example, the incidence of depressive symptoms in residents over 16 years old in Sichuan Province was 22.2%¹⁵ and the incidence rate of depressive symptoms in residents over 18 years old in Shandong Province was 21.8%.¹⁶ Although there were differences in the above survey results in different regions, it could be seen that the normalized control of the epidemic was associated with the increase in the incidence of depressive symptoms, and the mental health problems of residents are still more common under the post-epidemic era of COVID-19. Therefore, it is still necessary to pay more attention to the mental health status of residues under regular epidemic prevention and control of COVID-19 to provide psychological intervention and social support to residents with psychological distress in a timely manner.

Women were found with more prone to depressive symptoms than men, which was similar to the survey results on the prevalence of depression all over the world.^{17,18} Compared with men, women are psychologically more vulnerable and more sensitive to external stimuli. At the same time, women are faced with dual pressures from work and family in China. Under the post-epidemic era of COVID-19, a sharp increase in family pressure make women more prone to depressive symptoms.¹⁷ Residues with higher BMI index were more prone to depression than low BMI index, mainly because overweight and obesity are associated with depression.¹⁹ Besides, overweight or obese residues may be more prone to depressive symptoms due to lifestyle changes during the epidemic prevention and control.²⁰ We also found that drinking residents were more likely to develop depressive symptoms than those who do not drink, mainly due to the loneliness caused by epidemic prevention and control leading to drinking. Although drinking can improve the happiness of life index to a certain extent, frequent drinking leads to more prone to depressive symptoms.²¹ Ordinary residues were less likely to suffer from depression than those

Table 3. Multivariate logistic regression analysis of depressive symptoms

Factors	β	Wald χ^2	OR (95% CI)	P
Gender				
Male			1	
Female	3.267	123.402	6.239 (2.743–10.698)	<0.001
Marital status				
Unmarried			1	
Married	−0.126	2.490	0.417 (0.240–0.652)	0.004
Divorced or widowed	−1.289	0.972	0.786 (0.218–1.540)	0.681
BMI				
≤18.5			1	
18.5–23.9	0.567	2.653	1.288 (0.953–1.624)	0.340
>24	0.623	8.247	2.684 (1.059–3.759)	0.006
Monthly income (yuan)				
≤3000			1	
3001–5000	−0.223	2.206	0.624 (0.280–0.756)	0.007
>5000	−0.862	1.675	0.348 (0.117–0.625)	<0.001
Personnel type				
Anti-pandemic-related personnel			1	
Ordinary residents	−0.798	13.075	0.722 (0.248–0.924)	<0.001
Region				
Rural			1	
Urban	3.558	29.620	0.655 (0.394–0.829)	<0.001
Drinking				
No			1	
Yes	0.207	0.186	1.730 (1.480–3.153)	0.009

related to epidemic prevention (medical workers, community volunteers, cadres of village neighborhood committees, etc.), which may cause epidemic prevention-related personnel to face overloaded work, and at the same time, the wages and salaries are not matched, and they cannot balance family and work. The long-term and highly stressful epidemic prevention work has brought enormous pressure to this group, making it more prone to mental health problems.^{22,23,24}

Compared with rural residents, urban residents were less likely to develop depressive symptoms. It may be because urban residents received more social support and family care, and the epidemic prevention and control policies in urban maybe more scientific, while rural residents had long-term high-intensity physical labor and inconvenient medical care and layered prevention and control policies may lead to the occurrence of depressive symptoms, which was consistent with the results of related reports.²⁵ Residents with high incomes were less likely to develop depressive symptoms. It may be due to that residues with the higher personal income faced less economic pressure under the normalized prevention and control of the epidemic, and no significant impact on personal and family life, which protect them away from depression and other negative emotions. On the other hand, low-income residents were more prone to depressive-like symptoms due to economic constraints and instability caused by the normalized control of the epidemic, as well as the lack of good coping strategies and social support for psychiatric symptoms.²⁶ Being married was a protective factor for mental health under the normalized prevention and control of the epidemic.^{27,28} As one of the important sources of social support, marriage plays a crucial role in coping with the pressure of epidemic prevention and control. Besides, incomplete family structure will lead to psychological problems such

as emotional instability, impulsiveness, withdrawn, easy to produce negative emotions such as anxiety and apathy and difficult to adapt to the environment.

This study evaluated the incidence and influencing factors of depressive symptoms in community residents under the post-epidemic era of COVID-19; however, there were some limitations: the sample size was relatively small and the psychological changes of residents during the prevention and control period were not continuously and dynamically observed; the psychological impact of other recent life emergencies had also not been fully assessed; the occurrence of depressive symptoms is influenced by multiple factors, of which genetic factors play a major role, which was not covered in this article; this study used a cross-sectional design, which did not provide strong evidence of causation. In the future, the sample size should be expanded and a longitudinal design should be adopted to further explore the dynamic impact of normalized epidemic prevention and control on depressive symptoms in Chinese residents.

Conclusion

To sum up, under the post-epidemic era of COVID-19, the incidence of depressive symptoms among community residents in China has not decreased significantly with the passage of time and scientific prevention and control measures. It is suggested that although China has achieved certain results in epidemic prevention and control, there are still certain social problems to be solved in the long-term normalized epidemic prevention work. The results of this study suggest that the post-epidemic era of COVID-19, we should focus on women, BMI > 24, drinking, unmarried or divorced, anti-pandemic-related personnel, low-income and rural residents and actively formulate relevant policies for the primary prevention of depression, including targeted mental health education, raising awareness of depressive symptoms, carrying out targeted interventions for high-risk groups with depressive symptoms to strengthen attention, prevent recurrence and strengthen the popularization of knowledge about the COVID-19 epidemic.

Declarations

Availability of data and materials

Not applicable.

Ethics statement

This study was approved by the Ethics Committee of Wuxi Mental Health Centre, with the grant number of WXMHCIRB2020LLky053, and the informed consent was obtained from all subjects. All methods were carried out in accordance with relevant guidelines and regulations.

Authors' contributions

S.L. and H.Z. conceived the study. B.G., Q.Y., J.Y., Y.Ji and Y.Jiang performed the survey and summary. S.L., L.T. Y.J. and H.Z. wrote and revised the manuscript.

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Conflict of interest: None declared.

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