# Predictive factors for enhanced community mental health vulnerability in this COVID-19 pandemic era

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**Abstract**

**Objective** Explore the mental health status and its influencing factors of local community residents under the post-epidemic era of COVID-19 in China.

**Methods** The basic information scale, self-rating depression scale (SDS) and self-rating anxiety scale (SAS) were used to carry out an online questionnaire survey among community residents in Jiangsu Province, China, and the influencing factors of depression and anxiety were analyzed by multivariate logistic regression.

**Results** A total of 993 residents completed the mental health survey. It was found that the incidence of depressive and anxiety symptoms was 37.06% and 22.86%. Multivariate logistic regression analysis showed that women [OR (95% CI) = 26.239 (14.743-46.698)], college degree and above [OR (95% CI) = 1.843 (1.085-3.130)] and ordinary residents [OR (95% CI) = 2.222 (1.441-3.425)] were risk factors for depressive symptoms, urban residents had lower risk [OR (95% CI) = 0.655 (0.394-0.829)]. Women [OR (95% CI) = 33.595 (15.812-71.381)], ordinary residents [OR (95% CI) = 3.017 (1.602-5.680)] were risk factors for anxiety symptoms, while the incidence was reduced in professional and technical personnel [OR (95% CI) = 0.271 (0.123-0.597)], workers [OR (95% CI) =

0.383 (0.168-0.876)], soldiers or policemen [OR (95% CI) = 0.200 (0.042-0.961)], married residents [OR (95% CI) = 0.463 (0.230-0.931)], and urban residents [OR (95% CI) = 0.531 (0.251-0.824)].

**Conclusion** The incidence of symptoms of depression and anxiety among residents was relatively high under the post-epidemic era of COVID-19, which could be affected by various factors.

## 1 Introduction

The COVID-19 seriously threatens the physical and mental health and causes widespread public panic all over the world.[1] In the context of the COVID-19 pandemic, symptoms of anxiety, depression and insomnia have been discovered in different populations.[2-3] According to the data released by several reports, the number of confirmed cases and deaths of COVID-19 patients continues to increase globally.[4-6] A study by Harvard University showed that the COVID-19 pandemic will have a lasting impact on the physical and mental health.[7] In the later stage of the pandemic, people will experience psychological problems such as emotional instability, relaxation and depression, and diminished motivation,[8] the impact of the pandemic on individual mental health may persist for years after the pandemic.[9] At present, the prevention and control of COVID-19 in China is at the stage of regular pandemic prevention and control, and outbreaks occur in different regions from time to time. Due to the continuous occurrence of the pandemic, the small-scale occurrence of multiple or scattered epidemics will cause residents to have different degrees of mental health problems or mental illnesses, which will have a certain impact on the physical and mental health of community residents. The origin is unclear, and the specific drugs are still unclear. Some residents are prone to pessimism, helplessness, panic, and even anxiety, depression, insomnia and other symptoms.[10,11] Besides, it seems that under the post-epidemic era, COVID-19 have another impact on the just resumed life and work, which will lead to physical and psychological disorders of the residents, making them feel hopeless and helpless, panic, and even anxiety, depression, insomnia and other symptoms.[12,13] However, the current research on the impact of COVID-19 on mental health is mostly limited to the first round of the outbreak, and there is no known research on the long-term impact of ongoing pandemic prevention and control on the mental health. The mental health literacy of residents in different regions has significant difference, which could be affected by age, education level, occupation, place of residence, etc. This paper aims to explore the mental health status and related factors of residents in Jiangsu Province under the post-epidemic era of COVID-19, with the aim to provide scientific basis for government departments to provide reasonable mental health intervention in the context of the epidemic.

## 2 Methods

### 2.1 Participants

From July 26, 2021 to August 30, 2021, the convenience sampling method was used to select community residents in 13 jurisdictions in Jiangsu Province to complete the online questionnaires. Inclusion criteria: residents living in Jiangsu Province; age ⩾ 18 years old; uninfected COVID-19; voluntary participation in this study. Exclusion criteria: infected by COVID-19; illiterate or unable to use smart devices; residents who can't use the questionnaire star.

### 2.2 Questionnaire and evaluation criteria

Self-made basic information scale, self-rating depression scale (SDS) and self-rating anxiety scale (SAS) were used for investigation, which were widely applied in Chinese population.[14-16]

The basic information scale includes: gender, age, educational level, marriage, occupation, region, mental health status and other demographic data.

SDS contains 20 items in total, questions 1, 3, 4, 7, 8, 9, 10, 13, 15, and 19 are positive scoring questions, and questions 2, 5, 6, 11, 12, 14, 16, 17, 18, and 20 are reverse scoring questions. The total score is multiplied by 1.25 to get an integer to obtain the standard score. The depression symptom categories were defined as non (score < 53) and depressive (score, ≥53).

SAS contains 20 items, of which 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15, 16, 18, 20 are positive scoring questions, and questions 5, 9, 13, 17, 19 are reverse scoring questions. The total score of each item is multiplied by 1.25 to get an integer to obtain the standard score. The anxiety symptom categories were defined as non (score, <50) and anxiety (score, ≥50).

### 2.3 Survey method and quality control

After verified by experts in the department of psychology of Wuxi Mental Health Center, the above questionnaires were subjected tothe "Questionnaire Star" online survey platform. The electronic questionnaires were distributed throughout the province through the Jiangsu Provincial Psychological Assistance Center, psychological assistance institutions, mental health service teams, and mental health medical institutions. All electronic questionnaires are anonymous and voluntary. Target training was organized for all participating investigators, and consistency test was conduct with the Kappa value of 0.901-0.982. Two deputy chief physicians were subjected to review the

questionnaire. Questionnaires with logical errors or serious data missing were eliminated, and 5% of the negative respondents were randomly selected for review.

### 2.4 Statistical analysis

A database was established through the "Questionnaire Star" statistical platform, SPSS 22.0 software was used to perform statistical analysis on the data. Continuous variables were analyzed by t test, categorical variables were analyzed by $\chi 2$ test, variables with statistically significant differences were subjected to unconditional binary logistic regression analysis, and multivariate analysis was performed. The independent variable assignments were performed as Table 1. $P<0.05$ was considered to be statistically significant.

## 3 Results

### 3.1 Incidence and univariate analysis of depressive and anxiety symptoms

A total of 1021 people completed the questionnaire, 28 unqualified questionnaires were removed, and the final questionnaire effectiveness rate was 97.25%. We performed a statistical test (using t-test and ANOVA) between the two groups of data (1021) and (993), and there was no statistical difference between the variables. Therefore, the data of 993 questionnaires was analysed in the study. Among them, males accounted for 27.69% (275/993), females accounted for 72.31 (718/993), aged 18-95 years, M=32 years old. The incidence of depressive symptoms was 37.06%, and the incidence of anxiety symptoms was 22.86%. Univariate analysis of depressive symptoms showed that there were statistically significant differences among gender ($P$=0.000), age ($P$=0.000), education level ($P$=0.03), occupation ($P$=0.001), personnel type ($P$=0.000), region ($P$=0.000), and whether there was a history of mental illness ($P$=0.001), insomnia symptoms ($P$=0.003), anxiety ($P$=0.003), and depression ($P$=0.019). Univariate analysis of anxiety symptoms showed that there were statistically significant differences between gender ($P$=0.000), age ($P$=0.004), occupation ($P$=0.000), personnel type ($P$=0.000), region ($P$=0.000), and whether there was a history of mental illness ($P$=0.001) and anxiety ($P$=0.001). See Table 2.

### 3.2 Factors influencing incidence of depressive and anxiety symptoms

The statistically significant variables in the univariate analysis results were included in the multivariate logistic regression model, and the results showed that female ($P$=0.000), college or above ($P$=0.000), and ordinary residents ($P$=0.000) were risk factors for developing depressive symptoms, while urban residents reduced the risk of developing depression. In terms of the influencing factors of the incidence of anxiety

symptoms, female ($P$=0.000) and ordinary residents ($P$=0.000) were risk factors for anxiety symptoms, while married, professional and technical personnel, on-the-job workers, urban residents, military or police were protective factors. The results are shown in Table 3 and 4.

## 4 Discussion

As the domestic pandemic prevention and control has achieved important results in stages, the economic and social order has been restored at an accelerated pace, and the people have gradually returned to their pre-pandemic work and life. However, due to the continuous outbreak of COVID-19, the pandemic prevention and control has been a long-term task.[17-20] The source of the new coronavirus has not been determined, and no specific drugs and specific treatments have been found for the COVID-19. There are many uncertainties in the long-term development of the pandemic. The pressure caused by pandemic prevention and control is more uncontrollable than the general pressure. Although the normalized management and control caused by the local outbreak of the pandemic can effectively reduce the risk of infection,[21,22] it seriously affects the quality of life of community residents, causing repeated trauma to the psychological state, and also causes the interruption of interpersonal functions, which in turn leads to anxiety and depression and other negative emotions. However, at present, the impact of the COVID-19 on residents' mental health and status is mostly concentrated in the initial outbreak stage, there are few studies on the adverse mental health consequences caused by repeated pandemics. This study conducted a survey on the mental health status of residents in Jiangsu province through an online survey, and found that the incidence of depressive symptoms was 37.06%, and the incidence of anxiety symptoms was 22.86%, which was lower than the public's depressive and anxiety symptoms during the first outbreak of COVID-19, 33.21% and 41.28% respectively.[23] The incidence of depressive symptoms was slightly higher than that reported by Xiao. er al (33.46%),[24] and the incidence of anxiety symptoms was slightly lower than that reported by Wang. et al (28.8%) [25] and Xiao Julan et al (26.83%) [24], close to the research results of Chen Suhong et al. (22.6%).[26] However, the incidence of anxiety and depressive symptoms were significantly higher than the public anxiety prevalence rate of 7.6% [27] and the depression prevalence rate of 6.8% [28] in the general domestic situation. However, it is worth noting that the poor mental health of domestic residents is still worthy of our attention.[25] Although the state has adopted various scientific epidemic prevention and control measures and launched a large number of epidemic-related physical and mental health education work, the mental health of community residents is still worthy of our attention.

There is still room for further improvement. Even under the normalized control of the pandemic, the mental health problems of community residents are still relatively common. Therefore, it is necessary to pay more attention to the mental health of community residents under the normalized control of the pandemic, and to provide psychological intervention and social support for residents with psychological distress in a timely manner.

Women were found more likely to have anxiety and depressive symptoms than men, which is similar to the survey results on the prevalence of depression in China and the United States. [28] The main reason may be that women are more psychologically vulnerable than men. They are more vulnerable and bear the double burden of family and occupation under the stress of the COVID-19, which leads to more prone to symptoms of anxiety and depression.[29,30] Ordinary residents were more prone to anxiety and depression than those related to pandemic prevention and control (medical workers, community volunteers, and village committee cadres, etc.), which is consistent with the better mental health status of medical staff during the COVID-19 outbreak found in other studies.[31]

Compared with rural areas, urban residents are less prone to depression and anxiety. It may be that urban residents had received more social support, as well as more scientific pandemic control, which lead to the psychological distress caused by panic and helplessness can be avoided. Some domestic studies have also been confirmed that rural residents, with less knowledge of prevention and control, were more prone to psychological problems.[32] We also found that community residents with higher education were more likely to have depressive symptoms, which was contrary to other studies finding that higher education is a protective factor for negative emotions,[33] suggesting that the higher the education level, the more concerned about the pandemic information, the more sensitive against various information may lead to certain mental health problems. This aspect needs to be further confirmed by follow-up studies with larger samples.

Unemployed residents are more prone to anxiety symptoms than working community residents (professional technicians, on-the-job workers, soldiers or police and et al.). Under the backgroud of the pandemic, the impact on those with a stable income is relatively small, while the unemployed residents are inherently unstable economically, which lead to anxiety and other negative emotions. In addition, similar to the results of other studies, being married was a protective factor for mental health status under the normalized control of the

pandemic.[34,35] Because married patients have the help of their families, they can obtain more psychological comfort and support from the outside world, and can better sort out and relieve their negative emotions and help improve their psychological impact.

Although the mental health problems of community residents in relatively developed areas under the repeated impact of the pandemic were evaluated, but there are also some limitations. The sample size is relatively small. The impact of other life emergency events on the psychology of the respondents has not been fully evaluated. This survey is an online survey conducted during the special period of home isolation when the pandemic broke out again in Jiangsu Province. Due to voluntary participation and the influence of the use of electronic devices and other tools, there are certain deviations in the number of recovered samples, as well as in the distribution of age, occupation, etc. This study is a cross-sectional study, and causal relationships cannot be inferred between all factors. In the future, the sample size should be expanded, the variables of the investigation group and questionnaire should be increased, and follow-up research should be further carried out to further investigate and study the public psychology after the pandemic.

To sum up, the mental health of community residents still deserves further attention in this COVID-19 pandemic era. Therefore, under the COVID-19 pandemic era, it is still necessary to continue to pay more attention to the mental health of community residents, analyze related risk factors, and carry out targeted health education and psychological intervention to avoid the occurrence of related adverse events.

## 5 Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## 6 Ethics Statement

This study was approved by the Ethics Committee of Wuxi Mental Health Centre, with the grant number of WXMHCIRB2010LLky053, and the informed consent was obtained from all subjects. All methods were carried out in accordance with relevant guidelines and regulations.

## 7 Author Contributions

Shiming Li and Haohao Zhu conceived the study, Bingbing Guo, Queping Yang and Ying Jiang performed survey and summary; Yingying Ji, Jieyun Yin, Lin Tian and Haohao Zhu wrote and revised the manuscript.

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## 1 Data Availability Statement

The dataset generated during and analysed during the current study are available from the corresponding author on reasonable request.

Table 1 Assignments of variables related to logistic regression

| Variable | Assignment |
|---|---|
| Depression, anxiety symptoms | 0=no，1=yes |
| Gender | 0=male，1=female |
| Age (years) | 0=≤30，1≥30 |
| Education level | 0≤high school，1≥college |
| Occupation | 0=laid off or unemployed，1 = professional and technical personnel, 2 = on-the-job worker, 3 = military or police, 4 = student |
| Marital status | 0=unmarried, 1=married, 2=divorced or widowed |
| Personnel type | 0=anti-pandemic related personnel, 1=ordinary residents |
| Region | 0=rural，1=urban |
| History of mental illness | 0=no，1=yes |
| History of insomnia | 0=no，1=yes |
| History of anxiety | 0=no，1=yes |
| History of depression | 0=no，1=yes |

Table 2 The mental health status of community residents under the COVID-19 in Jiangsu Province

| Factors | No. | No. of depressive symptoms (%) | $x^2$ | *P* | No. of anxiety symptoms (%) | $x^2$ | *P* |
|---|---|---|---|---|---|---|---|
| Gender | | | 151.82 | 0.000 | | 62.64 | 0.000 |
| Male | 275 | 18 (6.55) | | | 16 (5.82) | | |
| Female | 718 | 350 (48.75) | | | 211 (29.39) | | |
| Age (years) | | | 20.71 | 0.000 | | 15.56 | 0.004 |
| ≤30 | 434 | 187 (43.09) | | | 122 (28.11) | | |
| > 30 | 559 | 181 (32.38) | | | 105 (18.78) | | |
| Education level | | | 4.55 | 0.03 | | 0.02 | 0.89 |
| ≤high school | 156 | 46 (29.49) | | | 35 (22.44) | | |
| ≥college | 837 | 322 (38.47) | | | 192 (22.94) | | |
| Occupation | | | 19.66 | 0.001 | | 87.50 | 0.000 |
| Laid off or unemployed | 137 | 62 (45.26) | | | 53 (38.69) | | |
| Professional and technical personnel | 622 | 206 (33.12) | | | 91 (14.63) | | |
| On-the-job worker | 172 | 67 (38.95) | | | 57 (33.14) | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Military or police | 30 | 12 (40.00) | | | 5 (16.67) | | |
| Student | 32 | 21 (65.63) | | | 21 (65.63) | | |
| Marital status | | | 5.98 | 0.05 | | 20.26 | 0.000 |
| Unmarried | 317 | 133 (41.96) | | | 100 (31.55) | | |
| Married | 648 | 228 (35.19) | | | 123 (18.98) | | |
| Divorced or widowed | 28 | 7 (25.00) | | | 4 (14.29) | | |
| Personnel type | | | 42.01 | 0.000 | | 105.07 | 0.000 |
| Anti-pandemic related personnel | 561 | 159 (28.34) | | | 61 (10.87) | | |
| Ordinary residents | 432 | 209 (48.38) | | | 166 (38.43) | | |
| Region | | | 17.30 | 0.000 | | 41.78 | 0.000 |
| Rural | 212 | 142 (66.98) | | | 154 (72.64) | | |
| Urban | 781 | 226 (28.94) | | | 73 (9.35) | | |
| History of mental illness | | | 10.94 | 0.001 | | 10.68 | 0.001 |
| No | 883 | 311 (35.22) | | | 188 (21.29) | | |
| Yes | 122 | 57 (46.72) | | | 39 (31.97) | | |
| History of insomnia | | | 8.56 | 0.003 | | 3.69 | 0.055 |
| No | 950 | 343 (36.11) | | | 212 (22.32) | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Yes | 44 | 25 (56.82) | | | 15 (34.09) | | |
| History of anxiety | | | 8.56 | 0.003 | | 10.36 | 0.001 |
| No | 946 | 343 (36.26) | | | 213 (22.52) | | |
| Yes | 48 | 25 (52.08) | | | 14 (29.17) | | |
| History of depression | | | 5.5 | 0.019 | | 1.34 | 0.247 |
| No | 926 | 332 (35.85) | | | 201 (21.71) | | |
| Yes | 68 | 36 (52.94) | | | 26 (38.24) | | |

Table 3 Multivariate logistic regression analysis of influencing factors of depressive symptoms

Table 3 Multivariate logistic regression analysis of influencing factors of depressive symptoms

| Factors | $\beta$ | Wald$\chi^2$ | OR (95% *CI* ) | *P* |
|---|---|---|---|---|
| Gender | | | | |
| Male | | | 1 | |
| Female | 3.267 | 123.402 | 26.239(14.743-46.698) | 0.000 |
| Age (years) | | | | |
| ≤30 | | | 1 | |
| > 30 | -0.137 | 0.647 | 0.872(0.625-1.217) | 0.421 |
| Education level | | | | |
| ≤high school | | | 1 | |
| ≥college | 0.611 | 5.124 | 1.843(1.085-3.130) | 0.024 |
| Occupation | | | | |
| Laid off or unemployed | | | 1 | |
| Professional and technical personnel | -0.239 | 0.622 | 0.788(0.435-1.426) | 0.430 |

| | | | | |
|---|---|---|---|---|
| On-the-job worker | -0.336 | 1.094 | 0.714(0.380-1.342) | 0.296 |
| Military or police | 0.461 | 0.654 | 1.586(0.518-4.852) | 0.419 |
| Student | -0.061 | 0.011 | 0.941(0.305-2.900) | 0.915 |
| Personnel type | | | | |
| Anti-pandemic related personnel | | | 1 | |
| Ordinary residents | 0.798 | 13.075 | 2.222(1.441-3.425) | 0.000 |
| Region | | | | |
| Rural | | | 1 | |
| Urban | 3.558 | 29.620 | 0.655(0.394-0.829) | 0.000 |
| History of mental illness | | | | |
| No | | | 1 | |
| Yes | 0.090 | 0.044 | 1.094(0.475-2.522) | 0.833 |
| History of insomnia | | | | |
| No | | | 1 | |
| Yes | 0.726 | 2.709 | 2.067(0.871-4.909) | 0.100 |
| History of anxiety | | | | |
| No | | | 1 | |
| Yes | 0.142 | 0.100 | 1.153(0.477-2.788) | 0.752 |

| | | | | |
|---|---|---|---|---|
| History of depression | | | | |
| No | | | 1 | |
| Yes | 0.207 | 0.186 | 1.230(0.480-3.153) | 0.666 |

Table 4 Multivariate logistic regression analysis of influencing factors of anxiety symptoms

| Factors | $\beta$ | Wald$\chi^2$ | OR (95% *CI*) | *P* |
|---|---|---|---|---|
| Gender | | | | |
| Male | | | 1 | |
| Female | 3.514 | 83.535 | 33.595(15.812-71.381) | 0.000 |
| Age (years) | | | | |
| ≤30 | | | 1 | |
| > 30 | 0.324 | 0.885 | 1.383(0.704-2.719) | 0.347 |
| Occupation | | | | |
| Laid off or unemployed | | | 1 | |
| Professional and technical personnel | -1.306 | 10.488 | 0.271(0.123-0.597) | 0.001 |
| On-the-job worker | -0.959 | 5.176 | 0.383(0.168-0.876) | 0.023 |
| Military or police | -1.608 | 4.036 | 0.200(0.042-0.961) | 0.045 |
| Student | -0.290 | 0.164 | 0.748(0.184-3.046) | 0.685 |
| Marital status | | | | |
| Unmarried | | | 1 | |

| | | | | |
|---|---|---|---|---|
| Married | -0.770 | 4.674 | 0.463(0.230-0.931) | 0.031 |
| Divorced or widowed | -1.769 | 3.533 | 0.171(0.027-1.079) | 0.060 |
| Personnel type | | | | |
| Anti-pandemic related personnel | | | 1 | |
| Ordinary residents | 1.104 | 11.697 | 3.017(1.602-5.680) | 0.001 |
| Region | | | | |
| Rural | | | 1 | |
| Urban | 2.022 | 45.809 | 0.531(0.251-0.824) | 0.000 |
| History of mental illness | | | | |
| No | | | 1 | |
| Yes | 0.451 | 0.993 | 1.570(0.646-3.816) | 0.319 |
| History of anxiety | | | | |
| No | | | 1 | |
| Yes | -0.457 | 0.585 | 0.633(0.196-2.042) | 0.444 |