

The residents' mental health status and community's role during COVID-19 epidemic : a community-based cross-sectional study in China

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Research article

Keywords: COVID-19; coronavirus ; mental health; anxiety; depression; community; impact factors

Posted Date: April 7th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-20269/v1>

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Abstract

BACKGROUND The related research of coronavirus disease 2019 (COVID-19) epidemic on mental health of community residents is still lacking. Here we reported the mental health status of Chinese residents as well as community's prevention and control during the epidemic period of COVID-19, and further explored the influencing factors of mental status.

METHODS In this cross-sectional study, a convenience sampling and snowball sampling methods were adopted from February 16 to February 23, 2020 and Chinese community residents were included according to the inclusion and exclusion criteria. Three questionnaires including General Anxiety Disorder 7(GAD-7), Patient Health Questionnaire 9 (PHQ-9), and a self-designed "Community prevention and control questionnaire" were used. A multivariate linear regression analysis was conducted to analyze the impact factors of anxiety and depression.

RESULTS A total of 3001 community residents were included in this study. 85.6% and 83.7% of participants had minimal anxiety and depression respectively. 16.6% of participants demonstrated that the communities they lived in had confirmed cases. 95.3% of participants reported that the residents were screened for mobility and contact history. 97.8% of participants reported entrance and exit of community were managed in their communities. 97.5% and 99% of participants were required to take body temperature and wear masks in their communities. 92% communities had their public areas and facilities disinfected every day and 95.4% communities have conducted health education about COVID-19. Factors including gender, education level, chronic illness, the frequency of going out, achieving information about COVID-19 by community and newspaper, and confirmed cases in the community, show association with community residents' anxiety and depression.

CONCLUSIONS the vast majority of Chinese residents have little anxiety and depression, and most communities had adopted standardized control measures in accordance with government's regulations and policy which plays an important role in the control of COVID-19 and improving residents' anxiety and depression.

Background

Coronavirus disease 2019 (COVID-19) outbreaked in Wuhan, China in December 2019(1), and has been declared as a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO)(2). COVID-19 still kept spreading in the globe and the number of confirmed cases kept growing every day. By Mar 28, 2020, 202 Countries, areas or territories were reported cases of COVID-19 (3) and 575444 people worldwide were diagnosed with COVID-19, including 85228 cases in United States of America, 82230 cases in China, and 86498 cases in Italy(4). China is the first country infected with COVID-19 and responded quickly and formulated a series of comprehensive prevention and control measures based on community in order to detect cases early and prevent the epidemic from spreading at the initial stage of epidemic(5). The community was requested fully participation in the management of self-isolation and enhancement of public compliance. Epidemiological investigation and close contact management were brought into act in the community(5). In addition, many communities were requested to strengthen the management of population

movement, health condition monitoring, medical observation, isolation of persons from the epidemic-center and contacts tracing(6), which may last for an unpredictable time. Therefore, most of the community residents had to stay home for isolation. The implication of comprehensive and strict prevention measures for reducing the spread of contagious COVID-19 may lead to severe distress, symptoms of anxiety and depression in community residents. Hence, the psychological status of community residents needs to be taken into account during the COVID-19 epidemic, which is an essential part of prevention and control of the COVID-19(7).

At present, information and research regarding the community residents' mental health during the COVID-19 epidemic is still lacking. In this study, we conducted a cross-sectional study to investigate Chinese residents' anxiety and depression as well as the status of community prevention and control in Chinese mainland, then further explored the influencing factors of mental status to provide support for targeted psychological interventions and community prevention.

Methods

Study design and participants

A cross-sectional survey on community residents was conducted in Chinese mainland from February 16 to February 23, 2020. A convenience sampling and a snowball sampling were adopted. The study's samples were comprised of 3001 residents in the communities from 30 provinces or districts. The study was approved by West China Hospital of Sichuan University Biomedical Research Ethics Committee. Community residents were invited to participate in this study if they, a) lived in China mainland since January 1, 2020, b) agreed to participate in the study and signed informed consent, c) could fully understand all the items in the scale, d) could use mobile phone and operate the questionnaire filling tool, e) are able to complete all items of the questionnaire. In addition, questionnaires would be excluded from analysis when completed time was less than 3 minutes or more than 30 minutes.

Instrument

Anxiety

The GAD-7 is a brief self-report scale and efficient tool for screening General Anxiety Disorder (GAD) with seven items rated on a 4-point Likert-scale ranging from 0 (not at all) to 3 (nearly every day)(8, 9). The total score represents minimal (0–4), mild (5–9), moderate (10–14), and severe (15–21) anxiety symptoms, respectively. In the present study, the Cronbach's α was 0.92, test-retest reliability was also good (intraclass correlation = 0.83)(8).

Depression

The Patient Health Questionnaire 9 (PHQ-9) is a widely used instrument to measure the depression of the subjects, which includes nine questions rated on a four point scale ranging from 0 (not at all) to 3 (nearly every day). A total score ranges from 0 to 27 is categorized into minimal (0–4), mild (5–9), moderate (10–

14), moderately severe (15–19), and severe (20–27)(10). In the PHQ Primary Care Study, the Cronbach's α was 0.89. Test-retest reliability was excellent (intraclass correlation = 0.84)(11).

The status of community prevention and control

To evaluate the specific problems of status of community prevention and control during the COVID-19, we designed a "Community prevention and control questionnaire" under the guidance of two specialist nursing professors, which focused on the prevention measures that community had taken during the COVID-19 epidemic. This questionnaire consists of 7 items and participants should respond using "Yes" or "No." From the item 1, we could learn about the situation of confirmed cases around the participants. Items 2 to 6 evaluate the implementation of community's prevention and control measures such as personnel mobility management, body temperature measurement, wearing of masks, disinfection of public areas. Item 7 evaluates the community's health education about COVID-19.

Procedure and data collection

A networking questionnaire tool (<https://www.wjx.cn>) was adopted to transfer the paper-based questionnaire into a web page before we started the survey. One person typed the questionnaire, another person checked whether the questionnaire was consistent with the paper version. After the questionnaire has been completed, three medical staff and seven community residents were invited to fill out this questionnaire to investigate whether there were incomprehensible items or difficulties in completing questionnaire. Through the Chinese Association of Rehabilitation, Association of Community Rehabilitation, we distributed the questionnaire to communities in different provinces and invited eligible community residents to participate. An electronic informed consent was obtained from community members involved before collecting data. The questionnaire was collected from 16 February 2020 to 23 February 2020.

Statistical analysis

Data analysis was performed with SPSS version 21.0 (IBM Corporation, Armonk, NY, USA), assigning a significance level of 5% ($p \leq 0.05$). Descriptive statistics for social demographic variables, status of community prevention and control were presented as count (%), as well as anxiety and depression because of abnormal distribution. The Associations between social demographic variables, the status of community prevention and control, anxiety, and depression were examined by the multivariate linear regression analysis at enter regression model, the variables of GAD-7 and PHQ-9 were converted to normal distribution by Turkey method. We defined it indicates colinearity among independent variables when variance inflation factor (VIF) ≥ 2 .

Results

3001 community residents were included in this study, 72.2% of whom were women, 85.0% were young and middle-aged crowd. More than a half of community members involved were married. There were 97% of participants Han nationality. 36.3% of participants were undergraduate or more and 77.0% of participants were not medical personnel. 91.3% of participants were in good health and without any chronic illness. There were 33.0% of participants never going out and 58.9% of participants restricted the frequency of going out to no more than 6 times a week. Nearly a half were waiting for work at home. There were 68.6% of participants not living alone and nearly 60% living in urban city. TV News (92.1%), Wechat (88.8%), community (78.2%),

web page (75.7%) and other apps (74.0%) were the main approach to receive information about COVID-19 (Table 1).

Table 1
Demographic characteristic (n = 3001)

Variables		n	%
Gender	male	833	27.8
	female	2168	72.2
Age,years	≤18	431	14.4
	18–64	2552	85.0
	≥ 65	18	0.6
Nation	Han nationality	2910	97.0
	Minority nationality	91	3.0
Marital status	Unmarried	893	29.8
	Married	1990	66.3
	Divorced	100	3.3
	Widowed	18	0.6
Education level	Elementary school or less	133	4.5
	Middle school and High school	1063	35.4
	Professional education	715	23.8
	Undergraduate or more	1090	36.3
Domicile	Urban	1783	59.4
	Rural	1218	40.6
Occupation	Medical personnel	689	23.0
	Others	2312	77.0
Chronic illness	Yes	262	8.7
	No	2739	91.3
The frequency of going out	Never	989	33.0
	1 to 6 times	1768	58.9
	≥ 7times	244	8.1
working Status	Return to work	980	32.7
	Wait for work at home	1382	46.1
	home quarantine	270	9.0

Variables		n	%
	Others	369	12.3
dwelling status	living alone	939	31.3
	living with others	2062	68.7
approach of achieving knowledge about COVID-19	TV News	2765	92.1
	Wechat	2665	88.8
	Community	2347	78.2
	Web page	2271	75.7
	Other APP	2222	74.0
	Newspaper	627	20.9
	Others	279	9.3

In general, there were 85.6% and 83.7% of participants with minimal anxiety and depression. 11.5% and 13.3% of participants had experienced mild anxiety and depression respectively. 2.2% and 2.0% of participants stated moderate anxiety and depression, only 0.7% and 0.3% were severe. Meanwhile, the moderately severe depression was 0.7% (Fig. 1, Fig. 2).

The data in the Table 2 shows the status of community prevention and control. 16.6% of participants declared there were confirmed cases in the communities they lived. A total of 95.3% reported that residents were screened for mobility and contact history. 97.8% of participants indicated that entrance and exit of community were managed by their communities. There were 97.5% and 99% of participants required to take body temperature and wear masks in their communities, respectively. 92% communities had their public areas and facilities disinfected every day and 95.4% communities had conducted health education about COVID-19.

Table 2
The status of community prevention and control

Variables	Category	
	YES	NO
Confirmed cases in the community	498(16.6)	2503(83.4)
Your community had screened for residents' mobility and contact history	2859(95.3)	142(4.7)
The community had managed the entrance and exit of community	2935(97.8)	66(2.2)
The community had required all personnel in and out to monitor body temperature	2925(97.5)	76(2.5)
The community had required all personnel in and out to wear masks	2970(99.0)	31(1.0)
The community had disinfected the public areas and facilities everyday	2761(92.0)	240(8.0)
The community had conducted health education about COVID-19	2863(95.4)	138(4.6)

The data in the Table 3 shows the influencing factors of anxiety and depression by multivariate linear regression analysis. In terms of anxiety, the prevalence of male is higher than female ($P = 0.000$). Unmarried people's anxiety is different from other marriage situations ($P = 0.004$). The degree of anxiety and depression is negatively correlated with academic qualifications ($P = 0.000$). Residents with or without chronic diseases have different levels of anxiety and depression ($P = 0.000$). The frequency of going out is positively correlated with anxiety. The frequency of going out ranging from 0 to 6 shows significant difference with others in depression ($P = 0.001$). The prevalence of anxiety and depression among residents who were receiving information from community ($P = 0.045$, $P = 0.027$), newspaper ($P = 0.000$, $P = 0.000$) related to COVID-19 is lower than that of who did not. The web page's information involved also could evacuate residents' anxiety ($P = 0.000$). Residents with confirmed cases in their communities were more likely to experience anxiety and depression ($P = 0.000$, $P = 0.000$). There is less coincidence to obtain depression for residents whose communities disinfected public areas every day, while the health education of COVID-19 in community reduced the incidence of depression.

Table 3
Results of the multiple linear regression analysis with the anxiety and depression

Group		Anxiety				Depression			
		B	P	95%(CI)		B	P	95%(CI)	
Gender		-0.141	0.000	-0.209	-0.074	-0.079	0.018	-0.145	-0.013
Age,years	≤18	-0.101	0.103	-0.223	0.021	-0.128	0.036	-0.247	-0.008
	18–64	1				1			
	≥ 65	0.373	0.062	-0.018	0.764	-0.026	0.893	-0.408	0.356
Nation		-0.113	0.207	-0.288	0.062	-0.003	0.969	-0.174	0.168
Marital status	Unmarried	-0.129	0.004	-0.217	-0.040	0.043	0.327	-0.043	0.129
	Married	1				1			
	Divorced	-0.101	0.236	-0.267	0.066	0.144	0.082	-0.018	0.306
	Widowed	-0.186	0.343	-0.570	0.198	-0.110	0.565	-0.486	0.265
Education level	Elementary school or less	-0.135	0.103	-0.296	0.027	-0.262	0.001	-0.420	-0.104
	Middle and High school	-0.208	0.000	-0.300	-0.115	-0.235	0.000	-0.325	-0.145
	Professional education	-0.168	0.000	-0.252	-0.084	-0.168	0.000	-0.250	-0.086
	Undergraduate or more	1							
Domicile		0.023	0.512	-0.046	0.092	0.077	0.024	0.010	0.145
Occupation		0.033	0.509	-0.066	0.133	0.023	0.646	-0.074	0.120
Chronic illness		-0.297	0.000	-0.403	-0.190	-0.308	0.000	-0.412	-0.204
The frequency of going out	Never	1				1			
	1 to 6times	0.138	0.000	0.067	0.209	0.121	0.001	0.051	0.190
	≥ 7times	0.160	0.019	0.026	0.294	0.123	0.065	-0.007	0.254
working Status	Return to work	1				1			
	Wait for work at home	-0.009	0.891	-0.133	0.115	0.007	0.905	-0.114	0.128
	home quarantine	0.054	0.237	-0.036	0.144	0.076	0.092	-0.012	0.163
	Others	0.011	0.866	-0.122	0.145	-0.020	0.763	-0.150	0.110

	Group	Anxiety				Depression			
		B	P	95%(CI)		B	P	95%(CI)	
dwelling status	living alone	1				1			
	living with others	0.023	0.486	-0.042	0.089	0.021	0.516	-0.043	0.086
approach of achieving knowledge about COVID-19	TV News	-0.067	0.262	-0.184	0.050	-0.053	0.359	-0.167	0.061
	Wechat	0.047	0.358	-0.053	0.148	0.034	0.498	-0.064	0.132
	Community	-0.086	0.045	-0.170	-0.002	-0.092	0.027	-0.174	-0.010
	Webpage	0.143	0.000	0.064	0.221	0.073	0.062	-0.004	0.149
	Other APP	-0.004	0.927	-0.081	0.074	0.007	0.866	-0.069	0.082
	Newspaper	-0.194	0.000	-0.273	-0.116	-0.150	0.000	-0.227	-0.073
	Others	0.091	0.091	-0.015	0.196	0.058	0.271	-0.045	0.161
The status of community prevention and control	Confirmed cases in the community	0.163	0.000	0.082	0.243	0.195	0.000	0.116	0.274
	screen for mobility and contact history	-0.064	0.369	-0.205	0.076	0.000	0.996	-0.137	0.138
	managed entrance and exit of community	-0.039	0.748	-0.280	0.201	0.041	0.734	-0.194	0.275
	required all to monitor body temperature	-0.080	0.549	-0.340	0.181	-0.098	0.448	-0.353	0.156
	required all to wear masks	0.191	0.341	-0.202	0.583	0.199	0.310	-0.185	0.582
	disinfected the public areas and facilities everyday	-0.205	0.001	-0.327	-0.083	-0.114	0.060	-0.233	0.005
	conducted health education about COVID-19	-0.123	0.131	-0.283	0.037	-0.178	0.018	0.086	0.901

Discussion

It is well known that acute stress itself in disasters and public health emergencies could have a continuing effect on physical and psychological health(12, 13). During the epidemic, the community residents must be strictly managed in order to cut off the potential transmission of the disease. Moreover, increasing number of infected cases, strict prevention policy, temporary shortage of medical masks and alcohol across the country may further exacerbate the residents' fear, panic, and distress during the epidemic of COVID-19. The mental health of community residents may have problems under this uncommon situation and should not be overlooked. It is essential to maintain community residents' mental health for better control of the epidemic. Previously published researches discussed the psychological status of frontline medical staff and several types of online mental health services have been widely provided for those in need during epidemic in China(14–16). Whereas, there were deficient attention and research focused on community residents.

From the present study's outcomes, most of community residents involved exhibit little anxiety and depression, while there are 14.4% and 16.3% of participants obtaining varying degrees of anxiety and depression which is higher than medical staffs' proportion (13.5%) in Zhou Zhu's survey(17). But both of the incidence of anxiety and depression are lower than YN Huang's study (34.0% and 18.1%) which also focus on Chinese population with the questionnaire GAD-7 and Center for Epidemiology Scale for Depression (CES-D) (18). The difference may be correlated to the sample size (n = 603) and number of the medical staff (n = 182).

In terms of community prevention and control measures, the vast majority of communities had adopted standardized control measures in accordance with the regulations of the Central People's Government of the People's Republic of China. For instance, screening for residents' mobility, managing the entrance and exit of community, monitoring body temperature and requiring wearing mask for all, and disinfecting the public areas and facilities every day. Also, we found that almost all communities in our study had conducted health education about COVID-19 which was an important and efficient approach to evacuate the residents' depression after impact factor analysis. 8.0% of communities didn't disinfect the public areas and facilities every day which may be associated with 40.6% of participants coming from rural areas, and some local government reported rural areas are disinfected every three days(17).

We also investigated the correlation among social-demographic, the status of community prevention and control as well as individual mental health. The Gender, education level, chronic illness, the frequency of going out, receiving information about COVID-19 from community and newspaper, and confirmed cases in the community have a relation with community residents' anxiety and depression. Notably, the education level is negatively correlated with residents' anxiety and depression which demonstrates the need to strengthen education for low-educated personnel in turn. Meanwhile, the confirmed cases in the community could affect the community residents' mental health due to the high infectivity of COVID-19. What's more, the results indicate that the strict prevention measures the community took, for instance, screening for mobility and contact history, managing entrance and exit of community, requiring all to monitor body temperature and wear masks, has no relation with the anxiety and depression of residents. On the contrary, the community's education and prevention measure have a significant effect to improve residents' anxiety and depression, showing the important role of community during the epidemic. And on Mar 5, 2020, for further promoting the community prevention and education, the Ministry of Civil Affairs of the People's Republic of China has implemented a series of measures to enhance informatization and intellectualization of community based on

the big data(19). Except for the above results, we find there was no difference in anxiety and depression between medical staff and non-medical staff, which may closely relate to community education and prevention as well as the rapid and widespread dissemination of official information on COVID-19, so as to the community residents could respond the infection disease scientifically and effectively.

This study has several limitations. First, although 3001 community residents were included in the study, there is possible selection bias: we recruited participants by the members of the Chinese Association of Rehabilitation, Association of Community Rehabilitation distributing the survey to their provinces resulting in uneven sample sources. There may be systematic differences between those who were included in our study and those not included, whereas the sample size of our study is relatively large and may have little effect on the results. Second, cross-sectional data can not establish causation between impact factors and the outcome variables. But the relationship we found here can prove the important role of community in the control of COVID-19 and mental status management.

Conclusion

In conclusion, although under the uncommon situation of COVID-19 and the strict community prevention and control measures, the vast majority of Chinese residents have minimal anxiety and depression. On the other hand, in the face of highly infectious COVID-19, the effective community prevention and control policy played an important role in disease control, and to some extent, maintaining a good psychological status of Chinese residents.

Abbreviations

COVID-19 :coronavirus disease 2019;PHEIC:Public Health Emergency of International Concern;WHO;World Health Organization;GAD-7;General Anxiety Disorder 7;PHQ-9;Patient Health Questionnaire 9;CES-D;Center for Epidemiology Scale for Depression.

Declarations

Ethics approval and consent to participate: The study was approved by West China Hospital of Sichuan University Biomedical Research Ethics Committee. All participants completed an electronic informed consent.

Consent for publication: Not applicable.

Availability of data and materials: The dataset supporting the conclusions of this article is included in the article. Additional data are available upon individual and reasonable request to corresponding author.

Competing interests: None declared

Funding: This study was supported by the West China Hospital, Sichuan University, Chengdu, Sichuan, PR China[grant number;HX-2019-nCoV-011]. The funding bodies had no role in the design of the study, data collection, analysis and interpretation of data, and writing of the manuscript.

Authors' contributions: Simin Li and Zhiyu Ye were conceived and planned the study. Simin Li analyzed, interpreted the data and drafted the manuscript. Critical revision of the manuscript for important intellectual content: Quan Wei, Chunping Du, Chengqi He. Study supervision: Quan Wei, Chunping Du.

Acknowledgments: We are grateful to the residents who participated in the study. Members of the Chinese Association of Rehabilitation, Association of Community Rehabilitation facilitated data collection. Jianmei Zhang, Xuyi Wu, Hongying Jiang filled out and gave meaningful comments on the questionnaire before investigation. Qian Wang, Siyi Zhu and Xi Yu gave helpful revision to the manuscript.

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Figures

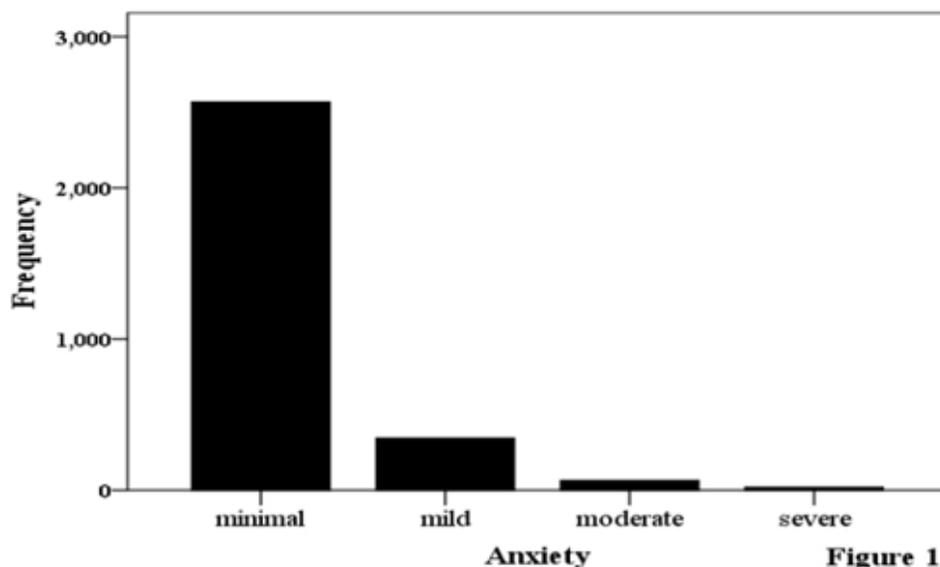


Figure 1

The anxiety of Chinese residents

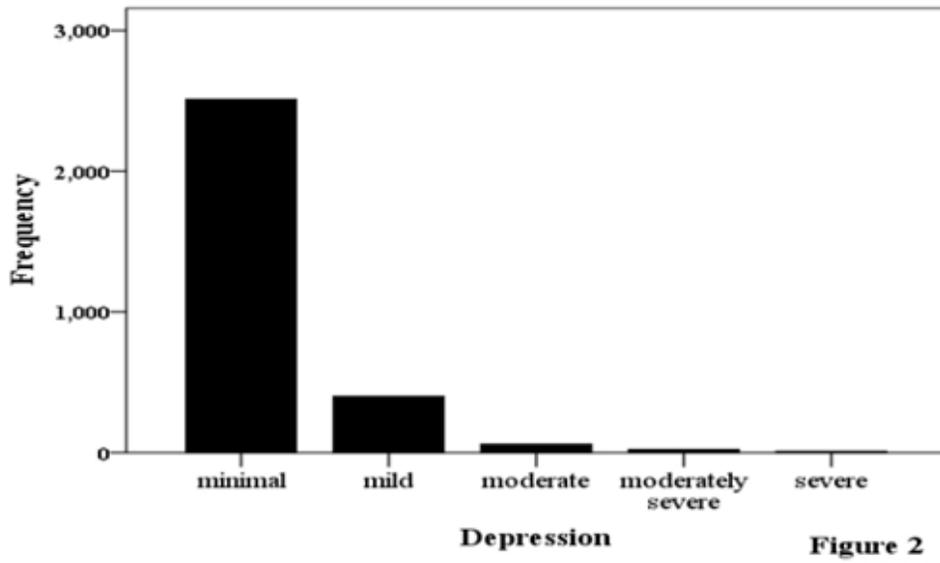


Figure 2

The depression of Chinese residents