Comparison of Prevalence and Associated Factors of Anxiety and Depression Among People Affected by versus People Unaffected by Quarantine During the COVID-19 Epidemic in Southwestern China

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Background: At the end of 2019, the COVID-19 outbreak began in Wuhan, Hubei, China, and spread rapidly to the whole country within 1 month. This new epidemic caused a great mental reaction among the public. This study aimed to assess and compare the prevalence and associated factors of anxiety and depression among the public affected by quarantine and those unaffected during the COVID-19 outbreak in southwestern China in early Feb. 2020.

Material/Methods: Data were collected using the self-rating anxiety scale (SAS) and the self-rating depression scale (SDS) administered to 1593 respondents aged 18 years and above. The respondents were grouped as 'affected group' and 'unaffected group' on the basis of whether they or their families/colleagues/classmates/neighbors had been quarantined.

Results: Among 1593 participants, the prevalence of anxiety and depression was approximately 8.3% and 14.6%, respectively, and the prevalence in the affected group (12.9%, 22.4%) was significantly higher than that in the unaffected group (6.7%, 11.9%). Lower average household income, lower education level, having a higher self-evaluated level of knowledge, being more worried about being infected, having no psychological support, greater property damage, and lower self-perceived health condition were significant associated with higher scores on the SAS and SDS. People living in Chongqing had higher SAS and SDS scores than those living in Yunnan Province.

Conclusions: The prevalence of anxiety and depression of the affected group are higher than in the unaffected group during the COVID-19 outbreak in southwestern China in early Feb. 2020. The government should focus more on providing economic and medical support to improve the general population's mental state.

MeSH Keywords: **Anxiety • COVID-19 • Depression • Public Health**

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Background

At the end of 2019, a series of pneumonia cases of unknown cause were reported in Wuhan, Hubei, China, and the epidemic spread rapidly to all 34 provinces in China within 1 month. The new pneumonia was quickly confirmed to be caused by a novel coronavirus (SARS-CoV-2), and the WHO named it the novel coronavirus disease: coronavirus disease 2019 (COVID-19). SARS-CoV-2 is spread by human-to-human transmission via droplets or direct contact. Among the patients with COVID-19, the most common symptoms were fever (43.8% on admission and 88.7% during hospitalization) and cough (67.8%) [1]. On Feb 11, 2020, among a total of 44 672 confirmed cases, 5% became critical cases, and the case-fatality rate was 2.9% in Hubei and 0.4% outside Hubei [2]. On Feb 29, 2020, the case-fatality rate was 1.4% among 1099 patients from 30 provinces in China with laboratory-confirmed COVID-19 [1]. To date, no treatments or vaccines have been proven to be effective for COVID-19, and there is unlikely to be a viable vaccine for at least another 12–18 months [3]. On Feb 28, the WHO raised the COVID-19 risk to 'very high' at the global level. As of Mar 2, 2020, the WHO had reported a total of 88 948 confirmed cases and 2915 deaths in China and 8774 confirmed cases and 128 deaths in 64 other countries [4]. The uncertain case-fatality rate and explosive spread of SARS-CoV-2 caused a great psychological reaction among the public, including anxiety, fear, panic, anger, and depression.

The Chinese government has enacted a range of policies to prevent further disease transmission. Wuhan city was put under lockdown since Jan 23, 2020, and many other cities in China implemented similar policies in the next few days. As of Jan 24, 2020, southwestern China, including Chongqing City, Sichuan Province, Guizhou Province and, Yunnan Province, have initiated first-level responses to major public health emergencies. Rapid measures have been taken to isolate confirmed or suspected patients and trace and quarantine their close contacts. Situation updates of COVID-2019 and health information have been widely disseminated through TV, internet, radio, and newspapers, and even broadcast on the streets and in villages. The government has encouraged civilians to reduce their going out and gathering. In this situation, many industries have suffered property damage worth hundreds of millions of yuan. The Chinese government has introduced some policies to compensate the losses of enterprises and individuals by reducing taxes, providing low-interest loan support, and full refunds for individuals who already purchased a ticket for public transportation.

In the early stage of the SARS outbreak, many psychiatric symptoms were reported, such as persistent depression, anxiety, panic attacks, and even self-harm [5], and there were higher levels of depression in people who had themselves or their family and friends been quarantined or who suspected that they were infected [6]. Zhang reported that the rates of depression, neurasthenia, fear, anxiety, and hypochondriasis were 36.40%, 37.21%, 79.70%, 33.41%, and 27.69%, respectively, among 2709 civilians in Zhejiang Province during the outbreak of human H7N9 avian influenza [7]. The National Health Commission of China promulgated the notification of basic principles for emergency psychological crisis interventions for COVID-2019 on Jan 26, 2020 [8]. This notification stated that the public might experience panic, disappointment, and anger, especially those who had confirmed or suspected infection of SARS-CoV-2; that people who were in quarantine might experience anxiety, discrimination, boredom, loneliness, guilt, and stigma; and that mental health support should be provided for the public in need. Then, online psychological counseling services and psychological assistance hot-lines were rapidly established by mental health professionals in medical institutions, universities, and academic societies throughout all 31 provinces, municipalities, and autonomous regions in mainland China, which provide free 24-h services every day including weekends, as well as providing psychological self-help intervention systems and artificial intelligence (AI) programs for psychological crises intervention [9].

In public health emergencies, the public often presents varying degrees of psychological reactions related to the epidemic situation. If those reactions cannot be relieved in time, they are likely to lead to further irrational behaviors, such as the panic buying of materials in Beijing during SARS, the rush for salt during the Fukushima nuclear leak in Japan, and more serious violent behavior [10]. Although the epidemic was in a rapid outbreak stage, some individuals seemed to remain unaware of the true danger of SARS-CoV-2. It is unclear whether there is any difference in psychological response between individuals who directly felt the threat of COVID-2019 (were quarantined or their acquaintance were quarantined) and people who were not directly affected by the epidemic. Anxiety and mood disorders are the most common mental health problems in the general population all over the world [11], and there are important connections between anxiety and depression and occurrence of viral diseases [12]. However, the epidemiological data on the Chinese general population remain unavailable, and how to best respond to challenges during the outbreak is unknown [13]. Therefore, determining the prevalence of anxiety and depression, as well as differences and associated factors among the public, is the first important step for implementing early targeted intervention, reducing the possibility of further irrational behaviors and helping people return to normal life. This study aimed to assess and compare the prevalence and associated factors of anxiety and depression among people affected by quarantine and those unaffected during the COVID-19 outbreak in southwestern China in early Feb. 2020.

Material and Methods

Ethics approval

Ethics approval was obtained from the Medical Ethics Committee of West China Second Hospital of Sichuan University (2020011). The participants read an informed consent notice before starting the questionnaire. If they agreed to participate in the study, they could choose to start filling out the questionnaire. If they did not agree to participate in the study, they could click to exit in any time. Confidentiality was maintained by omitting personal identifiers.

Study setting

A cross-sectional study was conducted from 4 Feb to 10 Feb 2020. The study was conducted in southeastern China, including Sichuan Province, Chongqing City, Guizhou Province, and Yunnan Province. Chongqing City is adjacent to Hubei Province (Figure 1).

Study participants

We used convenience sampling to select participants via an online questionnaire; the link is *https://jinshuju.net/f/Szvar5*. Six researchers collected data by sending the link to local chat groups involving various people through WeChat, the most-used chat app in China. We obtained 1987 responses, and a total of 1593 participants were included for final statistical analysis after exclusion of responses that did not meet the inclusion criteria (regarding location and age), responses missing data, and responses with obviously false answers. The effective response rate was 80.2%. Our quality control methods also included the conditions that the same IP address could only answer once and that an appropriate length of time was taken to provide each answer. If the time spent on the survey was less than 2 minutes, the response was considered invalid. The sample included only adults aged 18 years and above. Participants were grouped into the 'affected group' and 'unaffected group' on the basis of whether they or their families/colleagues/classmates/neighbors had been quarantined.

Sociodemographic characteristics

The sociodemographic variables considered in the analysis were gender (male/female); age (<30, 30~39, 40~49, and ≥50 years); education level, classified as 'junior middle school and below', 'senior middle school', and 'university and above'; marital status, classified as 'single', 'married/cohabiting', and 'divorced/widowed'; and occupational status, classified as 'student', 'working', and 'not working'. Region (rural/urban) was also included. Average household income (Chinese yuan [CNY], 7.0 Chinese yuan=$1 US) was categorized as '<1500', '1500~2999', '3000–5999', '6000–8999', and '≥9000'.
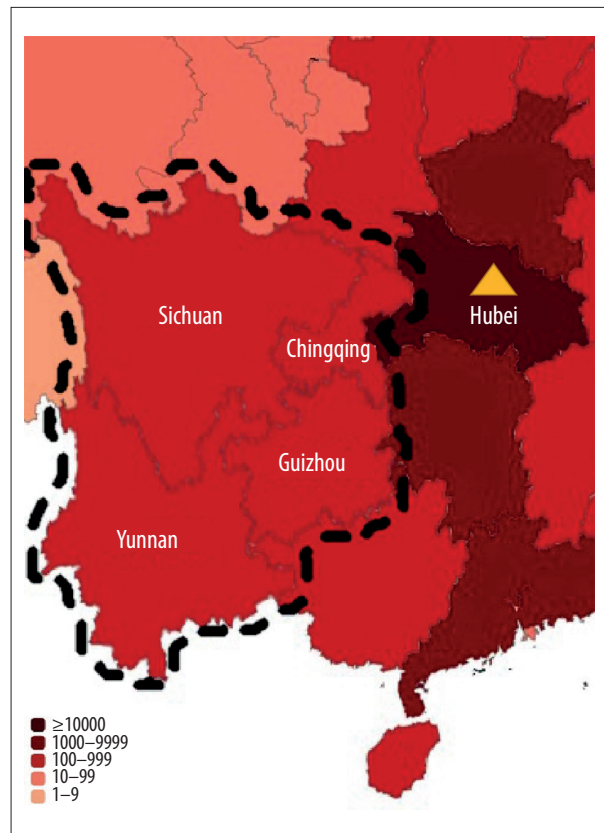

Figure 1. Cumulative Confirmed Cases of COVID-19 in southwest China until Mar 2.This map highlights four study region (black dashed area) and Hubei Province (yellow triangle) where the COVID-19 was first found. [The whole figure can be viewed at *https://voice.baidu.com/act/newpneumonia/newpneumonia/?from=osari_pc_3*].

Measurement of anxiety

Anxiety was measured using the self-rating anxiety scale (SAS) [14], composed of 20 terms that can be scored from 1 to 4 (1=rarely, 2=occasionally, 3=frequently, 4=always). Fifteen questions are scaled, and higher numbers indicate more severe symptoms. For the remaining 5 questions, lower scores indicate lower symptom severity. The level of severity of anxiety can be measured by an index score. The raw scores are converted to index scores by dividing the sum of the raw scores by 80 and multiplying by 100. In the Chinese public, the index score has the following 4 categories [15]: no anxiety (lower than 50); low anxiety (50~59); moderate anxiety (60~69), and severe anxiety (higher than 70). The Chinese version of the scale, with a Cronbach's alpha of 0.931, has been shown to have good internal consistency [16].

Measurement of depression

Depression was measured using the self-rating depression scale (SDS) [17], which includes 20 items that are constructed based on the clinical diagnostic criteria. The SDS includes 10 positive symptomatic and 10 negative symptomatic questions, and each question can be scored from 1 to 4 (1=none or a little of the time, 2=some of the time, 3=a good part of the time, 4=most or all of the time). The level of severity of depression can be measured by an index equal to the SDS sum score/80. In the Chinese general population, the index has the following 4 categories [15]: no depression (lower than 0.50); low depression (0.50~0.59); moderate depression (0.60~0.69), and severe depression (higher than 0.70).

Self-evaluated level of knowledge about COVID-19

To examine the self-evaluated level of knowledge about COVID-19, participants were asked, 'How much do you think you know about COVID-19?', and the participants chose a score from 1 to 5, ranging from 'I don't know about it at all' to 'I know it very well'.

Self-perceived health condition

To examine self-perceived health condition, participants were asked, 'How would you describe your health condition?', and the participants chose a score from 1 to 5, ranging from 'My health condition is very bad' to 'My health condition is very good'.

Concerns about being infected

To examine concerns about been infected, participants were asked, 'Are you worried that you or your family may be infected?', and the participants chose a score from 1 to 3, ranging from 'I am not worried at all' to 'I am very worried'.

Property damage due to COVID-19

To examine economic losses due to COVID-19, participants were asked, 'How much money have you lost during the COVID-19 outbreak until now?', and the participants chose '0', '<5000', '5000~9999', '10 000~29 999', or '>30 000' (Chinese yuan [CNY]).

Social support from the community/government agencies

To examine the social support from government agencies, the participants were asked, 'Have you received any financial support or practical help from the community/government agencies?' and 'Have you received any psychological support or consolation from the community/government agencies?', and the response options were yes/no.

Statistical analysis

Statistical analyses were performed using the statistical software package SPSS V.19.0 for Windows. Continuous data were described as the mean and standard deviation (SD). Categorical variables were displayed as numbers (percentages). We compared categorical variables between the affected group and the unaffected group by using the χ^2 test and Mann-Whitney U test, and differences in continuous variables between the 2 groups were assessed by analysis of variance (ANOVA). A *p* value less than 0.05 was considered significant. Multiple linear regression analysis was used to assess the effects of each variable on the sum of the SAS and SDS scores. All the factors in the univariate analysis were used for further analysis in the multiple linear regression analysis, and unordered multicategory variables were entered the multiple linear regression model as dummy variables.

Results

Participant characteristics

The characteristics of the survey participants are shown in Table 1. Most of the respondents – 976 (61.3%) – were female. The mean age of the respondents was 32.3 (SD±9.8) years; 1228 (77.1%) were in the age range of 18~39 years, 1285 (80.7%) had university and higher education, and 898 (56.4%) were married. Regarding occupation, more than half (67.9%) were employed. Most participants (85.5%) lived in an urban region, and 966 (60.6%) came from Sichuan Province. In total, 933 (58.6%) had an average household income of less than 6000 yuan.

Of the participants, 663 (41.6%) thought they knew the information about COVID-19 well (4 grade), 810 (50.8%) thought their health condition was good (4 grade), and 843 (52.9%) had little worry that they or their family would be infected. A small number of them (15.3%) had suffered economic losses exceeding 10 000 yuan after the COVID-19 outbreak. Of the participants, 217 (13.6%) reported that they had received financial support or practical help from the community/government agencies, and 643 (40.4%) had received psychological support or counseling from community/government agencies.

Comparison of characteristics between the 2 groups

A comparison between the 'affected group' and 'unaffected group' is shown in Table 1. The 'affected group' were significantly more likely to have poor health status (Z=−3.336, p=0.001) and to worry about being infected (χ^2=6.901, p=0.032). The percentage of the affected group who had received financial (χ^2=10.759, p=0.003) and psychological (χ^2=8.715, p=0.003) support from the community/government agencies was significantly higher than for the unaffected group.

Table 1. Comparison of sociodemographic characteristics and information affected by COVID-19 between the 2 subject groups.

Variables		All participants (N=1593) N (%)	Affected group (n=420) n (%)	Unaffected group (n=1173) n (%)	χ^2	p-value
Gender	Male	617 (38.7)	170	447	0.731	0.392
	Female	976 (61.3)	250	726		
Age group (years)	<30	749 (47.0)	211	538	3.437	0.329
	30~39	479 (30.1)	125	354		
	40~49	257 (16.1)	60	197		
	≥50	108 (6.8)	24	84		
Education level	Junior middle school and below	109 (6.8)	23	86	1.672	0.433
	Senior middle school	199 (12.5)	53	146		
	University and above	1285 (80.7)	344	941		
Marital status	Single	651 (40.9)	180	471	1.329	0.515
	Married/cohabiting	898 (56.4)	227	671		
	Divorced/widowed	44 (2.8)	13	31		
Occupational status	Student	226 (12.7)	68	158	5.384	0.068
	Working	1082 (67.9)	291	791		
	Not working	285 (17.9)	61	224		
Region	Rural	231 (14.5)	67	164	0.969	0.325
	Urban	1362 (85.5)	353	1009		
Area	Sichuan Province	966 (60.6)	242	724	2.690	0.442
	Chongqing City	211 (13.2)	61	150		
	Guizhou Province	206 (12.9)	61	145		
	Yunnan Province	210 (13.2)	56	154		
Average household income	<1500	89 (5.6)	16	73	9.143	0.058
	1500~2999	259 (16.3)	62	197		
	3000~5999	585 (36.7)	153	432		
	6000~8999	347 (21.8)	89	258		
	≥9000	313 (19.6)	100	213		
Self-evaluated level of knowledge about COVID-19	Not at all	11 (0.7)	2	9	−1.780*	0.075
	Low	39 (2.4)	14	25		
	Medium	312 (19.6)	90	222		
	Well	663 (41.6)	177	486		
	Very well	568 (35.7)	137	431		

Table 1 continued. Comparison of sociodemographic characteristics and information affected by COVID-19 between the 2 subject groups.

Variables		All participants (N=1593)	Affected group (n=420)	Unaffected group (n=1173)	χ^2	*p*-value
		N (%)	*n* (%)	*n* (%)		
Self-perceived health condition	Very bad	6 (0.4)	1 (0.2)	5 (0.4)	−3.336*	0.001
	Bad	35 (2.2)	13 (3.1)	22 (1.9)		
	Not too bad	398 (25.0)	119 (28.3)	279 (23.8)		
	Good	810 (50.8)	220 (52.4)	590 (50.3)		
	Very good	344 (21.6)	67 (16.0)	277 (23.6)		
Are you worried that you or your family may be infected?	Not at all	297 (18.6)	61 (14.5)	236 (20.1)	6.910	0.032
	A little worried	843 (52.9)	239 (56.9)	604 (51.5)		
	Very worried	453 (28.4)	120 (28.6)	333 (28.4)		
Property damage affected by COVID-19	0	500 (31.4)	123	377	1.635	0.802
	<5000	572 (35.9)	158	414		
	5000~9999	277 (17.4)	75	202		
	10 000~29 999	148 (9.3)	37	111		
	>30 000	96 (6.0)	27	69		
Have you received any financial support or practical help from the community/ government agencies?	Yes	217 (13.6)	77 (18.3)	140 (11.9)	10.759	0.002
	No	1376 (86.4)	343 (81.7)	1033 (88.1)		
Have you received any psychological support or consolation from the community/ government agencies?	Yes	643 (40.4)	195 (46.4)	448(38,2)	8.715	0.003
	No	950 (59.6)	225 (53.6)	725 (61.8)		

* Mann-Whitney U test.

Prevalence of anxiety and depression

Among the participants, the prevalence of anxiety was approximately 8.3% (133/1593, SAS index score ≥50) in southwestern China, and 5.8% (93/1593) had mild anxiety, 2.1% (33/1593) had moderate anxiety, and 0.4% (7/1593) had severe anxiety. Of the participants, the prevalence of depression was approximately 14.6% (234/1593, SDS index ≥0.50) in southwestern China, 8.3% (133/1593) had mild depression, 5.2% (83/1593) had moderate depression, and 1.1% (18/1593) had severe depression. The prevalence of anxiety and depression in the 'affected group' was significantly higher than in the 'unaffected group' (Z_a=3.961, p_a<0.001; Z_d=5.298, p_d<0.001) (Table 2).

Factors associated with the SAS and SDS: univariate analysis

In univariate analyses (Table 3), female gender was significantly associated with the sum of the SAS and SDS scores. Age, area of residence, marital status, self-perceived health condition, worry about being infected, economic loss, and receiving financial support or practical help were also significantly associated with SAS and SDS scores. The younger age group (<30 years old) had a significantly higher level of anxiety than the older age group (≥50 years old) (P=0.013) and had a significantly higher depressive level than the other age groups (p_1=0.004, p_2=0.001, p_3=0.005). Those who were divorced/ widowed had significantly more anxiety and depression than those with other marital status, and those who were single

Table 2. Prevalence of anxiety and depression.

Subject	Negative		Mild		Moderate		Severe		U	p value
	n (%)		n (%)		n (%)		n (%)			
SAS										
Total (N=1593)	1460	(91.7)	93	(5.8)	33	(2.1)	7	(0.4)		
Affected group (n=420)	366	(87.1)	33	(7.9)	19	(4.5)	2	(0.5)	3.961	<0.001
Unaffected group (n=1173)	1094	(93.3)	60	(5.1)	14	(1.2)	5	(0.4)		
SDS										
Total (N=1593)	1359	(85.4)	133	(8.3)	83	(5.2)	18	(1.1)		
Affected group (n=420)	326	(77.6)	47	(11.2)	41	(9.8)	6	(1.4)	5.298	<0.001
Unaffected group (n=1173)	1033	(88.1)	86	(7.3)	42	(3.5)	12	(1.1)		

Mann-Whitney U test.

had significantly more depression than those who were married/cohabiting. Participants from Chongqing City had significantly higher levels of anxiety and depression than participants from other areas. Those with 'very good' self-perceived health had lower levels of anxiety and depression than those in other groups. Those who were 'very worried' had higher levels of anxiety and depression than those in other groups. Those who had not experienced economic loss (0 Yuan) had a significantly lower level of anxiety and depression than those in the other groups. Occupational status and average household income were significantly associated (p<0.01) only with the SDS score. The student group had a significantly higher levels of depression than the other groups. The high average household income group (>9000 Yuan) had a significantly lower level of depression than the low average household income groups (<1500 vs. 1500~3000 Yuan). The region of residence was only associated with the SAS score.

A multiple linear regression analysis of SAS and SDS

The dummy variables of marital status were coded as married/cohabiting (0, 0, 0), single (0, 1, 0) and divorced/widowed (0, 0, 1). The dummy variables of occupational status were coded as student (0, 0, 0), working (0, 1, 0), and not working (0, 0, 1). The dummy variables for area of residence were coded as Chongqing City (0, 0, 0, 0), Sichuan Province (0, 1, 0, 0), Guizhou Province (0, 0, 1, 0), and Yunnan Province (0, 0, 0, 1).

In the 'affected group', the results of the multiple linear regression analysis (Table 4) showed that participants with lower average household income had higher SAS scores (Model 1), and those with a lower education level had higher SDS scores (Model 2). Participants from Chongqing City were more likely to have higher SAS and SDS scores than participants from Yunnan Province. The results of the multiple linear regression analysis also showed that participants with lower self-perceived

health condition had higher SAS and SDS scores, and those who had experienced more economic losses had higher SAS and SDS scores (Model 1. F=10.947, adjusted R^2=0.299, p<0.001; Model 2. F=9.192, adjusted R^2=0.260, p<0.001).

In the 'unaffected group', the results of the multiple linear regression analysis (Table 5) showed that participants with a higher self-evaluated level of knowledge and having experienced more economic losses had higher SAS scores (Model 1). Participants who had not received psychological support or counseling from the community/government agencies were more likely to have higher SDS scores (Model 2). Participants who were divorced/widowed were more likely to have higher SAS and SDS scores than those who were married/cohabiting. Participants from Chongqing City were more likely to have higher SAS and SDS scores than participants from Yunnan Province. The results of the multiple linear regression analysis also showed that those with poorer self-perceived health condition and greater worry about being infected had higher SAS and SDS scores (Model 1. F=14.019, adjusted R^2=0.167, p<0.001; Model 2. F=11.817, adjusted R^2=0.142, p<0.001).

Discussion

The prevalence rates of anxiety and depression were approximately 8.3% and 14.6%, respectively, in this study, which is lower than that reported in studies of other health emergencies. For example, 39% the public expressed anxiety about avian influenza in France [18], 48% of the general public had anxiety-depression symptoms after over 1 year of Ebola outbreak in Sierra Leone [19], 73% of residents had low mood and 57% had irritability during the SARS outbreak in Hong Kong [20], 16% of the public felt anxious during the early stage of the influenza A (H1N1) outbreak in the Netherlands [21], and the percentage of 'very' or 'fairly' worried people in the general

Table 3. Factors associated with the SAS and SDS: univariate analysis.

Group		SAS			SDS		
		Mean±SD	F	p value	Mean±SD	F	p value
Gender	Male	35.88±9.67	4.294	0.038	36.11±11.64	8.313	0.004
	Female	36.85±8.79			37.79±11.15		
Age group (years)	<30	37.08±9.88	2.801	0.039	38.37±12.12	6.063	<0.001
	30~39	36.18±8.59			36.45±10.58		
	40~49	35.97±8.47			35.71±10.58		
	≥50	34.75±7.47			35.12±9.94		
Education level	Junior middle school and below	37.13±9.36	0.311	0.733	37.92±12.46	1.485	0.227
	Senior middle school	36.36±9.66			38.25±12.14		
	University and above	36.43±9.06			36.90±11.14		
Marital status	Single	36.33±9.15	7.215	0.001	38.17±11.81	14.591	<0.001
	Married/cohabiting	36.32±8.60			36.07±10.55		
	Divorced/widowed	41.62±16.31			43.86±16.34		
Occupational status	Student	37.17±9.52	1.424	0.241	40.39±12.77	11.152	<0.001
	Working	36.50±9.18			36.71±11.07		
	Not working	35.80±8.69			37.14±11.37		
Region	Rural	37.72±10.55	5.053	0.025	38.29±12.87	2.766	0.097
	Urban	36.26±8.88			36.95±11.09		
Area	Sichuan Province	35.48±8.12	50.737	<0.001	35.77±10.48	43.175	<0.001
	Chongqing City	43.39±12.89			45.10±13.64		
	Guizhou Province	35.19±7.14			36.10±9.56		
	Yunnan Province	35.33±7.77			36.48±11.22		
Average household income	<1500	38.10±9.92	1.021	0.395	39.26±12.54	2.555	0.037
	1500~3000	36.51±9.05			38.33±12.01		
	3000~6000	36.65±9.40			37.17±11.43		
	6000~9000	36.25±8.69			36.82±10.96		
	<9000	35.93±9.04			35.85±10.67		
Self-evaluated level of knowledge about NCP	Not at all	31.36±6.90	1.218	0.301	30.11±8.81	1.562	0.182
	Low	38.21±8.40			38.59±11.88		
	Medium	36.55±8.39			37.73±10.92		
	Well	36.46±9.29			37.20±11.21		
	Very well	36.43±9.45			36.79±11.77		

Table 3 continued. Factors associated with the SAS and SDS: univariate analysis.

Group		SAS			SDS		
		Mean±SD	F	p value	Mean±SD	F	p value
Self-perceived health condition	Very bad	41.25±13.25			38.96±11.95		
	Bad	47.14±10.45			50.36±12.88		
	Regular	39.61±9.78	41.040	<0.001	40.78±12.05	34.553	<0.001
	Good	35.92±8.26			36.30±10.35		
	Very good	32.98±8.20			33.53±10.61		
Worried about being infected	Not at all	33.83±9.12			35.05±11.93		
	A little worried	36.44±8.97	21.709	<0.001	37.13±11.05	8.418	<0.001
	Very worried	38.27±9.09			38.52±11.38		
Property damage	0	34.64±8.25			35.31±10.78		
	<5000	36.59±8.64			37.70±11.16		
	5000~10 000	38.25±9.98	9.826	<0.001	38.70±12.17	5.503	<0.001
	10 000~30 000	38.55±10.57			38.48±11.75		
	>30 000	36.99±10.05			36.76±11.51		
Financial support or practical help	Yes	38.22±9.99	9.215	0.002	38.65±11.93	4.451	0.035
	No	36.20±8.98			36.90±11.26		
Psychological support or consolation	Yes	36.39±8.79	0.091	0.763	36.77±10.79	1.164	0.281
	No	36.53±9.39			37.39±11.74		
Affected and unaffected	Affected group	38.18±10.22	20.219	<0.001	39.39±12.65	22.636	<0.001
	Unaffected group	35.86±8.66			36.34±10.76		
Total		36.47±9.15			37.14±11.37		

population fluctuated between 9.6% and 32.9% during the swine flu outbreak in the UK [22]. Possible reasons for these differences are as follows. First, the Chinese government took quick and strong measures to ensure citizens' sense of security and frequently disseminated situation updates of COVID-19. Rapidly sharing information about the epidemic is an effective way to reduce public panic [23]. Second, people have a high cognitive level of COVID-19. The general population's level of knowledge about the disease plays an important role in reaction to an epidemic crisis [18, 24]. In our study, 77.3% of participants thought they had a higher level of knowledge about COVID-19, and the result is consistent with the knowledge test on COVID-19 (the total score was 20), on which 70.13% scored above 15 [25]. Third, China quickly established a psychological assistance system, and 40.4% of participants in this study had received psychological support or counseling. The system might be an effective way to relieve negative emotions of the public. Finally, a possible reason might be the use of different

instruments and cut-off points to measure anxiety and depression, different stages of epidemic development, exposure to different epidemics, different study designs, and different cultural backgrounds.

However, our estimates are higher than those found in another study that found a 3.7% prevalence of depression symptoms in the general population right after the SARS epidemic in Taiwan [6]. A possible explanation is that people's negative psychological response to the epidemic decreased during the course of the outbreak, and other studies have reported a similar conclusion [26,27].

In the affected group, the prevalence rates of anxiety and depression were approximately 12.9% and 22.4%, respectively, presenting a prevalence of anxiety higher than the reported 7.6% of the public who had contact with Middle East Respiratory Syndrome patients and who showed anxiety symptoms in

Table 4. Factors associated with the SAS and SDS in the affected group: multivariable analyses.

Variable	B	SE	t	p value	Adjusted R²
Model 1. SAS, F=10.947, p<0.001					
Average household income	−0.975	0.441	−2.210	0.028	0.299
Yunnan	10.807	1.631	6.628	<0.001	
Self-perceived health condition	−3.660	0.610	−6.000	<0.001	
Property damage	1.035	0.348	2.973	0.003	
Model 2. SDS, F=9.192, p<0.001					
Education level	−1.546	0.632	−2.445	0.015	0.260
Yunnan	8.936	2.075	4.307	<0.001	
Self-perceived health condition	−4.469	0.776	−5.758	<0.001	
Property damage	1.374	0.443	3.103	0.002	

Table 5. Factors associated with the SAS and SDS in the unaffected group: multivariable analyses.

Variable	B	SE	t	p value	Adjusted R²
Model 1. SAS, F=10.947, p<0.001					
Divorced/widowed	4.825	1.461	3.302	0.001	0.167
Yunnan	6.626	0.945	7.014	<0.001	
Knowledge	0.621	0.289	2.149	0.032	
Self-perceived health condition	−2.762	0.321	−8.603	<0.001	
Worried	1.620	0.353	4.590	<0.001	
Property damage	0.634	0.190	3.336	0.001	
Model 2. SDS, F=9.192, p<0.001					
Divorced/widowed	7.313	1.843	3.969	<0.001	0.142
Yunnan	8.010	1.191	6.726	<0.001	
Self-perceived health condition	−3.109	0.405	−7.682	<0.001	
Worried	1.232	0.445	2.769	0.006	
Psychological support or consolation	1.327	0.665	2.026	0.043	

South Korea [28]. In the unaffected group, the prevalence rates of anxiety and depression were approximately was 6.7% and 11.9%, significantly lower than in the affected group. This finding is consistent with those reported by other studies. Ko et al. demonstrated that people presenting isolation behavior had higher level of depressive during the SARS epidemic [6]. Jalloh et al. reported that knowing someone quarantined for Ebola was independently associated with anxiety-depression [19]. In total, 34% of horse owners who were quarantined had high psychological distress during the equine influenza outbreak compared with the general population in Australia [29]. In situations where quarantine is considered necessary, a recent review suggests that officials should quarantine each person for no longer than required, provide a clear explanation for quarantine and information about protocols, and make sure that sufficient supplies are guaranteed [30].

In the affected group, the high level of anxiety was correlated with low average household income. The impact of COVID-19 is not only psychological but also economic. Those with low average household income lack the ability to face economic risks; in addition, being quarantined means that they are unable to deal with financial problems by going back to work or applying for a loan, and they cannot estimate how long this impact may last. These may be factors that triggered more anxiety and depression.

In the unaffected group, the high level of anxiety was related to a high self-evaluated level of knowledge about COVID-19. This is an unexpected result, and Purohit et al. also reported that greater knowledge about Zika significantly predicted Zika-related anxiety levels [31].Given the cross-sectional features of the study, the possibility that some anxious participants coped with their anxiety by seeking knowledge and information about the disease may have caused sampling bias. Our study showed the self-evaluated level of knowledge, not an individual's actual knowledge. We could not differentiate whether it is one's actual knowledge that was related with anxiety in this study, but Purohit et al. suggested that the perception of one's own knowledge is more strongly related to health anxiety than one's actual knowledge [31]. Another reason might be that the participants had misconceptions about COVID-19 caused by false propaganda, rumors, and defamation. Misconceptions can provoke anxiety, such as one report that caused the panicked buying 'Shuanghuanglian' (a traditional Chinese herbal medicine) among the general population during the early phase of the COVID-19 outbreak. Lienemann et al. reported that during the H1N1 epidemic in India, media reporting of inaccurate information contributed to widespread anxiety, fear, and panic in the general public [32]. We also found that a high level of depression was correlated with having no psychological support or counseling from the community/government agencies. The individuals who had depression symptoms instead tended to not seek help [33,34]. Their perception of stigma and embarrassment and their preference for self-reliance were the most important barriers to help-seeking [35]. Therefore, enhancing public knowledge about mental disorders is essential to increase help-seeking behavior [36].

In general, the high levels of anxiety and depression were associated with severe economic loss and low self-perceived health condition, and people living in Chongqing had higher SAS and SDS sum scores than those living in Yunnan Province. The higher levels of anxiety and depression might mean that there was a higher psychological impact caused by the additional economic impact of the disease. People who suffer economic loss have to bear the pressure of the loss and they also have to face the problem of how to recover the economic loss. Having poor health was associated with a high level of anxiety and depression during the COVID-19 epidemic. Having poor health makes one more likely to be infected by SARS-CoV-2, especially according to the news report that the infection is more likely to infect older men with comorbidities and can result in severe and even fatal respiratory diseases, such as ARDS [37]. In addition, some people who need medical support, such as patients with chronic diseases or cancer, cannot obtain medical resources in time during the COVID-19 epidemic. A study reported that individuals who are able to maintain better health, even under stressful epidemic situations, are more likely to resist the consequent mental impact [6]. Chongqing is contiguous to Hubei Province, so there are frequent population exchanges and, consequently, frequent virus transmission. People's mental responses were more strongly aroused by the geographical proximity. Shi et al. reported a similar result in north China during the SARS epidemic [38].

The limitations of this study are its cross-sectional design and its use of self-report data. Its sampling design is subject to many of the usual biases of internet-based surveys, and the sample is not necessarily representative of the general population. In addition, we did not consider other factors that may have confounded the outcomes, such as the actual level of knowledge about COVID-19 and the social support of family and friends, which are commonly considered to be associated with anxiety and depression. Finally, we only roughly divided the population into an 'affected group' and an 'unaffected group' according to their quarantine situation, and we did not conduct a subgroup analysis between population with different exposure levels. Future studies should delve deeper into those issues. The strength of the study is its use of timely data from a large number of respondents at the early stage in the COVID-19 epidemic and its scientific importance for the study of mental response and early intervention during the early stage of an epidemic of a novel virus.

Conclusions

This study aimed to assess and compare the prevalence and associated factors of anxiety and depression among the public affected by quarantine and unaffected during the COVID-19 outbreak in southwestern China in early Feb. 2020. The findings showed that the prevalence of anxiety and depression of the affected group are higher than unaffected group. The main factors associated with anxiety and depression in the 2 groups included the severe property damage and low self-perceived health condition. The economic support and medical support should be paid more attention to by the government to improve general population's mental state.

Conflicts of interest

None.

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