The Differences of the Psychological Status of the Public Between Hubei Provinces and Other Provinces After the COVID-19 Outbreak: a Cross-sectional Study

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Abstract

Background: Assessing the psychological status of public from different areas after the COVID-19 outbreak in China and analyzing the risk factors.

Methods: A cross-sectional survey via online questionnaires was conducted. Occurrence of pressure, anxiety and depression were measured with Perceived Stress Scale (PSS), Generalized Anxiety Scale (GAD-7), and Patient Health Questionnaire-9 (PHQ-9), respectively.

Results: The study included 3300 participants, with 1644 from Hubei and 1656 from outside Hubei. The rates of anxiety and depression among subjects from Hubei were 59.6% and 52.3%, while the corresponding rates for those outside Hubei were 44.4% and 46.6%. The scores of PSS, GAD-7, and PHQ-9 in Hubei were significantly higher than those in other areas ($t = 3.823, 5.860, 2.211$; $P < 0.05$). Multiple linear regression analysis indicated that among the participants from Hubei, the higher the educational background, the history of psychosis, the worse their physical health, the COVID-19 infected, isolated, and their families infected with the COVID-19, their mental health was relatively poor. In the participants outside Hubei, the more unstable their marriage status, the worse their physical health, isolated, and their families infected with the COVID-19, the worse their mental health level.

Conclusions: The stress, anxiety, and depression of the public in Hubei are more prominent and the factors that affect their mental health are more complex. When conducting psychological intervention on the general public, we still need to formulate special intervention plans according to the different characteristics of different groups of people to provide them with appropriate crisis intervention services.

Background

On January 23, Wuhan City, the initial city outbreak of COVID-19, experienced an unprecedented disaster. One week after the outbreak, on January 30, the World Health Organization declared the outbreak a public health emergency of international concern [1]. Considering the high infectivity of COVID-19, the Wuhan municipal government immediately suspended all public transportation to prevent further transmission during the Spring Festival, which was then imitated by several other neighboring cities [2]. At the same time, however, the measures taken by the government to seal the city and the lockdown inevitably caused negative impacts on the life of the public.

This epidemic may become a significant stressor in people's lives, and exposure to such emergencies may cause many psychological and social problems, including some common mental disorders [3]. Relevant research shows that mental health issues cluster around the following themes: anxiety-based symptoms including those of acute stress disorder and post-traumatic stress disorder; grief reactions and depression; generalized distress including increased stress levels and sleep disruption [4]. While 2003, the severe acute respiratory syndrome (SARS) epidemic occurred in Guangdong Province was also a public health emergency. It is one of the well-known infectious diseases with global influence and eventually affected more than 29 countries, resulting in 8,422 cases and 916 deaths worldwide [5]. China as one of the most severely affected countries suffered from an enormous strike. Due to the high infectious potential and mortality rate of SARS, the epidemic led to panic in the affected countries [6]. Studies conducted a corresponding investigation on the mental state of the public after the outbreak of SARS and found that a high level of distress due to SARS was documented in the community [7]. Meanwhile, Lau et al found that the SARS epidemic caused tremendous damage to the public and many individuals exhibited post-traumatic stress symptoms [8]. It was reported that mood disorders were common in the general population during the SARS epidemic [9]. It has been found that even at a relatively low level of spread among the population, the SARS outbreak still had a significant psychological impact, as well as emotional difficulties most frequently reported problems [10].

Generally speaking, after a major disaster or emergency, the psychological conditions of the public may change to different extents. After the outbreak of COVID-19, the latest relevant reports have pointed out that, the epidemic has caused a parallel epidemic of fear, anxiety, and depression [11], similar results were found in Duan and Zhu's research which implied that an increase of psychological problems during this epidemic was noted [12]. Although they conducted a survey on the psychological situation of the corresponding population in time after the outbreak, relevant studies did not specifically analyze the psychological differences between the population in different areas with different severity. Besides, little is known about which factor may be associated with the appearance of the negative change during the epidemic. Therefore, the purpose of this study is to make a comparative analysis of the people who have lived in Hubei Province and the people in other provinces to find out what differences exist in the psychological impact during the epidemic and to discover the differences of their opinion on the epidemic. Meanwhile, through this study, it is expected to find relevant influencing factors that may cause psychological problems during the outbreak. Only by grasping the characteristics of their psychological changes and what are the help they mostly wanted, can we further summarize the characteristics of people's psychological reactions under public health emergencies, and generate future psychological intervention strategies according to the psychological reaction characteristics of people under different epidemic conditions.

Methods

1. Participants

We conducted this cross-sectional study at the time when WHO announced the COVID-19 as a Public Health Emergency of International Concern. The whole survey persisted nearly 3 weeks until the end of February. Due to the impact of the epidemic, we couldn't conduct face-to-face assessment on participants. Therefore, we adopt the most secure and effective method of network self-assessment. On one hand, we can spread the questionnaire to a greater extent, on the other hand, we can quickly retrieve the questionnaire and give timely feedback to all the participants, and provide them with different degrees of psychological support online (including the different link of relaxation training according to their scores / the hotline number of psychological assistance in our hospital).

Only adults (aged ≥ 18 years) of Chinese nationality who were able to provide verbal informed consent were recruited in the study using convenience and snowball sampling methods. The online survey was initially distributed to community residents who were encouraged to pass it on to others. A total of 3680 participants were recruited. Among them, 380 were excluded due to incomplete survey responses, or they are health workers who worked at the frontline. (Due to their endurance of above-normality stressors, it may influence the overall results). The recuperation rate of the questionnaire was 89.7%. All responses were anonymous. The survey questionnaire included questions about demographic characteristics, the experience of the COVID-19 epidemic, related opinions on this epidemic, self-perceived health status, Perceived Stress Scale (PSS), Generalized Anxiety Scale (GAD-7), and 9-item patient health questionnaire (PHQ-9). The study was approved by the hospital ethics committee. In this survey, participants were divided into 2 different groups: One survey involved 1644 adult residents who have lived in Hubei since the COVID-19 outbreak, excluding those who have left Hubei since the outbreak; the other survey involved adults nationwide outside Hubei, with a sample size of 1656.

2. Measures

2.1 The Questionnaire of demographic characteristics, related experience, and opinion on COVID-19

The demographic background survey includes gender, age, marital status, educational level, and employment status. Experience related to the epidemic includes whether they have been infected with COVID-19, whether their family members have been infected with COVID-19, and whether they have been quarantined. Opinions on the epidemic include the most demanding help, the most dominant source of nervousness, and the most dominant source of sadness during the epidemic.

2.2 Self-perceived health status

The rating is based on a 5-point scale: 1 point is that the physical condition is very good; 2 points is that the physical condition is good; 3 points is that the physical condition is average; 4 points is that the physical condition is poor; 5 points is that the physical condition is very poor.

2.3 Perceived Stress Scale (PSS) [13]

It is a self-assessment scale developed by Cohen et al. to assess the degree of stress an individual feels in the past month. There are 10 items in the PSS-10 version used in this study, including 6 items with negative description (item 1, 2, 3, 6, 9, 10) and 4 items with positive description (item 4, 5, 7, 8). Each item is scored on a 5-grade scale ranges from 0 to 4. The total score is the sum of the scores for all items. The higher the score, the greater pressure the individual experiences. The Chinese version of the scale has been proved to have good reliability and validity [14].

2.4 Generalized Anxiety Scale (GAD-7) [15]

The GAD-7 consists of seven items, each item scores by 0-3 points, the total score range is 0-21 points. Among them, 0-4 points are no anxiety; 5-9 points are mild anxiety; 10-14 points are moderate anxiety; 15-21 points are severe anxiety. The scale has been used in China for many years and has been proved to have good reliability and validity, which can help to distinguish the severity of anxiety [15].

2.5 9-item patient health questionnaire (PHQ-9) [16]

It consists of 9 items, each item scores 0-3 points, the total score range is 0-27 points. Among them, 0-4 points are no depression; 5-9 points are mild depression; 10-14 points are moderate depression; 15-19 points are moderate and severe depression; 20-27 points are severe depression. The scale has been used in China for many years and has been proved to have good reliability and validity, which helps to distinguish the severity of depression [17].

2.6 Statistical analysis

For each scale, the scores were summed. The mean scores were then used for comparison among groups using the T-test and analysis of variance (ANOVA) statistics. First, the influencing factors that may be related to PSS, GAD-7, and PHQ-9 were screened out by one-way ANOVA, and then these factors were incorporated into the multiple linear regression model, and the relevant influencing factors of the total scores of the above three scales were analyzed respectively. All data were analyzed using Statistical Package for Social Sciences (SPSS) version 21.0. P-values of less than 0.05 were considered statistically significant (2-sided tests).

Results

1. General information

1.1 Demographic and epidemic related information

The survey involved 3300 participants, including 880 men (26.67%) and 2420 women (73.33%). Among all, 1644 were from Hubei Province, with an average age of 44.20 ± 11.33 years old; 1656 participants were from outside Hubei (involves 15 provinces), with an average age of 39.18 ± 15.69 years old (there was no significant difference in average age between the two groups: $t = 1.063$, $p = 0.288$). For participants from Hubei, 52 had suffered from psychiatric diseases, including 12 with depression, 8 with bipolar disorder, and 32 with anxiety. For those outside Hubei, 68 had suffered from psychiatric diseases, including 4 with drug-induced mental disorder, 16 with depression, and 48 with anxiety disorders. Table 1 presents the remaining demographic information.

1.2 Opinions on the epidemic situation

Opinions on the epidemic situation of the participants were obtained through the questionnaire. The most needed help of the participants in Hubei during the epidemic was: improved medical conditions (996 people, accounting for 60.6%), reasonable living arrangements (264 people, 16.1%); psychological support (176 people, 10.7%); no need for help (116 people, 7.1%); cooperation of the patients (56 people, 3.4%); and communications with their families (36 people, 2.2%). While the most needed help of the participants outside Hubei was: improved medical conditions (696 people, 42%); reasonable living arrangements (264 people, 15.9%); psychological support (260 people, 15.7%); no need for help (160 people, 9.7%); cooperation of the patients (168 people, 10.1%); and communications with their families (108 people, 6.5%).

Participants from Hubei ranked the top three stressful situations during the epidemic (multiple choices): infected people may not be quarantined (1272 people), shortage of protective supplies (1091 people), and infected people did not take protective measures (853 people). For participants outside Hubei, the ranking was: infected person may not be quarantined (867 people), increase of newly confirmed cases (832 people), and shortage of protective supplies (810 people).

The top three distressing situations for participants in Hubei during the epidemic were (multiple choices): helpless patients (1254 people), helpless medical staff (1232 people), and innocent people (869 people). For participants outside Hubei, the ranking changed into: helpless medical staff (1136 people), helpless patients (1008 people), and innocent people (945 people).

2. Analysis of scores of PSS, GAD-7, and PHQ-9 in different regions

The scores of PSS, GAD-7, and PHQ-9 in Hubei and outside Hubei are shown in Table 2. There are significant differences in the three scales between different regions ($t = 3.823$, $p < 0.001$; $t = 5.860$, $p < 0.001$; $t = 2.211$, $p = 0.027$, respectively). The results suggest that participants in Hubei suffered more pressure, anxiety, and depressive symptoms than those outside Hubei.

59.6% (980/1644) subjects from Hubei scored above the GAD-7 cut-off point, indicating widespread anxiety among the participants. While the corresponding rate of subjects outside Hubei was 44.4% (735/1656). The distribution of severity was shown in Figure 1a.

The PHQ-9, used to assess depression levels, showed that 52.3% (860/1644) subjects from Hubei had a standardized score of ≥ 5 , deemed as having depression symptoms, and the corresponding rate of subjects outside Hubei was 46.6% (772/1656). The distribution of severity was shown in Figure 1b.

3. Single factor analysis of the influencing factors of total scores of PSS, GAD-7, and PHQ-9

After grouping based on different demographic characteristics and epidemic information, the scores of the PSS among the participants were compared. The results showed that there were statistically significant differences ($P < 0.05$) in terms of educational background, previous mental illness, self-perceived physical health, infection of the COVID-19, quarantine, and whether their family members were quarantined. Comparison of the GAD-7 scores showed that the differences between different genders, different educational background, previous mental illness, self-perceived physical health, whether they were infected with COVID-19, and whether they were isolated were statistically significant ($P < 0.05$). And the PHQ-9 comparison results showed that there were statistically significant differences in different educational background,

previous mental illness, self-perceived physical health, whether they were infected with COVID-19, and whether they were isolated in different groups ($P < 0.05$). See Table 3 for details.

Similarly, for participants outside Hubei, the different scores of the PSS and GAD-7 showed statistically significant differences ($P < 0.05$). And the comparison of the PHQ-9 scores showed that there were statistically significant differences in self-perceived physical health and whether they were quarantined ($P < 0.05$). See Table 4 for details.

4. Multiple stepwise regression analysis of influencing factors of total scores of PSS, GAD-7, and PHQ-9

4.1 Multiple stepwise regression analysis on the influencing factors of total scores of PSS, GAD-7, and PHQ-9 in Hubei

Taking the total score of the PSS scale as the dependent variable and factors with statistical significance in univariate analysis as independent variables. Table 3 shows the assignment of each factor. The analysis results suggest that the main factors that influencing the PSS score are educational background, history of psychiatric related diseases, physical health, whether they were infected by the COVID-19, whether they were quarantined, and whether their family members were infected by the COVID-19 ($P < 0.05$), as shown in Table 5. The integrity test was performed on the regression equation $F(6, 1637) = 116.871$ ($P < 0.001$), and it shows that the fitted multiple linear stepwise regression equation has a statistical significance. After evaluating the regression equation model, the multiple correlation coefficient $R = 0.797$ and the coefficient of determination = 0.634 were calculated. These six independent variables can effectively explain the 63.4% variance of the stress level suffered by the participants.

When taking the total score of GAD-7 as the dependent variable and the factors with statistical significance in the univariate analysis as independent variables for analysis. See Table 3 for the assignment of each factor. It suggests that the main factors affecting the score of the patient's anxiety scale are gender, history of psychiatric related diseases, physical health, whether they were infected with COVID-19, and whether they were quarantined ($P < 0.05$), see Table 5 for details. The integrity test performed on the regression equation $F(6, 1637) = 89.729$ ($P < 0.001$) shows that the fitted multiple linear stepwise regression equation has statistical significance. After evaluating the regression equation model, multiple correlation coefficient $R = 0.765$ and the coefficient of determination = 0.565 were calculated. Therefore, these five independent variables can effectively explain the 56.5% variance of anxiety.

If take the total score of PHQ-9 as the dependent variable and the factors with statistical significance in the univariate analysis as independent variables. The assignment of each factor is shown in Table 3. The results suggest that the main factors affecting the patients' depression scale scores are educational background, physical health, and whether they were quarantined ($P < 0.05$), see Table 5 for details. The integrity test for the regression equation $F(4, 1639) = 21.395$ ($P < 0.001$) shows that the fitted multiple linear stepwise regression equation has statistical significance. After evaluating the regression equation model, the multiple correlation coefficient $R = 0.678$ and the coefficient of determination = 0.438 were calculated. Therefore, these three independent variables can effectively explain the 43.8% variance of anxiety of anxiety.

4.2 Multiple stepwise regression analysis on the influencing factors of the total scores of PSS, GAD-7, and PHQ-9 of the participants outside Hubei

Likely, taking the total score of PSS as the dependent variable and the factors with statistical significance in the univariate analysis as independent variables. The analysis results imply that the main factors affecting the score of the patient's stress scale are marital status, physical health, and whether they were quarantined ($P < 0.05$), as shown in Table 6. The integrity test was performed on the regression equation $F(3, 1652) = 46.163$ ($P < 0.001$) indicating that the fitted multiple linear stepwise regression equation has statistical significance. After evaluating the regression equation model, multiple correlation coefficient $R = 0.731$ and coefficient of determination = 0.534 were calculated. Therefore, these three independent variables can effectively explain the 53.4% variance of anxiety.

When taking the GAD-7 scale total score as the dependent variable and the factors with statistical significance in the univariate analysis as independent variables for analysis. Analysis results suggest that the main factors affecting the score of patients' anxiety scale are physical health, whether they were quarantined, and whether their family members were infected with COVID-19 ($P < 0.05$), see Table 6 for details. The integrity test $F(4, 1651) = 100.047$ ($P < 0.001$) performed on the regression equation indicates statistical significance in the fitted multiple linear stepwise regression equation. After evaluating the regression equation model, the multiple correlation coefficient $R = 0.831$ and the coefficient of determination = 0.690 were calculated. These three independent variables can effectively explain 69.0% of the variance of anxiety.

If take the total score of the PHQ-9 scale as the dependent variable and the factors with statistical significance in the univariate analysis as independent variables. Analysis results show that the main factors affecting the scores of depression scale of patients are physical health and isolation ($P < 0.05$), see Table 6. The integrity test was conducted on the regression equation $F(2, 1653) = 25.235$ ($P < 0.001$), it shows

that the fitted multiple linear stepwise regression equation has statistical significance. After evaluating the regression equation model, the multiple correlation coefficient $R = 0.708$ and the coefficient of determination $= 0.481$ were calculated. Thus, these two independent variables can effectively explain the 48.1% variance of anxiety.

Discussion

This is the first study to investigate the mental health and their influencing factors of public from areas with severe epidemic three weeks after the occurrence of COVID-19, and the data was compared with those from areas with mild epidemic. We investigated 3300 participants in total, and found symptoms of anxiety, depression and pressure to be common in general public, though the severity of symptoms of the public in Hubei was greater.

After investigation, we found that the public believed that improvements in medical conditions would be their greatest help. Since our investigation was conducted in the early stage of the outbreak, the number of new diagnosis showed a blow-up tendency, while the number of infectious disease specialist hospital in China was very limited. The imbalance caused a shortage of hospital beds, many patients with mild diseases were encouraged to be quarantined at home, which inevitably increased their pressure. The second most needed help is reasonable arrangement of daily life. As a result of the epidemic, many people's life were disrupted. The original seven-day vacation was continuously extended. A survey found that people's daily life changed during the epidemic, which was getting up later and earlier dinner, it made many people become "night owls" [18]. These changes in schedules brought many people with discomfort in life, which further aggravated their bad mood. Besides, both groups thought that psychological support was very necessary. Because lifestyle changes can make people feel anxious [19], they felt that if they could receive appropriate psychological support during this period, they could have part of their psychological burden relieved. Through the above results, the government should expand medical resources in the first place in the face of severe outbreaks; and secondly, it is necessary to establish a psychological support intervention system for the public as soon as possible and provide reasonable life guidance to the public [20], so as to reduce psychological discomfort of the public. .

We found that the participants from Hubei and those outside Hubei thought the lack of quarantine of potential infections and the shortage of protective supplies made them nervous. Because COVID-19 is highly contagious, people are most worried about whether they will be infected. Therefore, if the isolation measures were not implemented properly, it would inevitably make people feel anxious. As Shimura et al. found, after confirming that the virus can be passed from person to person, people's anxiety-related behaviors increased significantly [21]. For people outside Hubei, they believe that the increasing number of confirmed cases makes them feel nervous. Due to the rapid development of the new media nowadays, the public is able to receive information much quicker. Since China has fully learned the experience of SARS prevention and control, after the outbreak, China made the epidemic related information accessible and transparent at the very beginning, such that we can see the sharp increase in the number of newly diagnosed patients every day. On the one hand, this could inform the public about the severity of the outbreak and alert them such that they can take active protective measures to minimize the chance of infection. On the other hand, it represents the respect of the Chinese government for people worldwide. By reporting the latest progress of the outbreak to the world on a regular basis, the Chinese government provided a reference for the prevention and control measures to other countries. However, this inevitably brought certain psychological pressure on the public, and the pressure will be more prominent to the non-infected people. This suggests that we need to continue to strengthen the guidance of anxiety relief for this part of the public. .

All participants believed that helpless infected people, helpless medical staff, and innocent people were their dominant source of sadness. Due to the impact of the epidemic, many people were isolated and could not go home during the holidays, and the shortage of medical staff also made medical resources in a dilemma. These factors made people feel helpless. In addition, there were also numerous reports about infections of medical staff who were on the front line [22], which undoubtedly increased the sadness of the public. We realize that when providing psychological support to the public, we must fully consider their pity for infected people and medical staff, and increase their confidence from this aspect, encouraging them to pay more attention to positive reports about the epidemic rather than sinking into negative news repeatedly.

This study found that the scores of the stress, anxiety, and depression scales of the participants in Hubei were significantly higher than those outside Hubei. Although there have been reports of a mild stressful impact on people in non-epidemic areas, that these people did not feel helpless obviously [23]. A review of the published literature on COVID-19 suggests that the common psychological reactions of the public after the outbreak include anxiety, depression, and self-reported stress [24]. Although the above-mentioned reactions are common in the public, there is no comparative analysis of the psychological stress reaction between the public in the epidemic area and the public in the non-epidemic area so far. Our investigation further confirmed that people in the severe epidemic area underwent more intense pressure, and their anxiety and depression symptoms are more prominent. This can be fully explained by the detection rates of anxiety and depression symptoms in different areas. Thus, when we encounter similar outbreaks in the future, the focus of psychological intervention still needs to be placed in the origin of the epidemic first. As the Chinese government gradually realized this, it gradually increased the proportion of

psychiatrists and psychotherapists when dispatching different batches of medical teams to help Hubei, in order to be able to carry out psychological crisis intervention for the public in Hubei as soon as possible.

Through multiple regression analysis, we found that for participants in Hubei, the higher their education level, who had suffered from psychiatric diseases in the past, who thought that their health level was worse, who had been infected with COVID-19, who had been isolated and whose family members had been infected with COVID-19, the higher their stress level was. Women, who have suffered from mental diseases in the past, who think that their physical health are worse, who have been infected with COVID-19, who have been isolated, have more prominent anxiety symptoms. In addition, the higher the education level, the lower the self-perceived physical health and the experience of being isolated, the more severe the depressive symptoms. It can be seen that previous psychiatric diseases have greater impacts on the psychological state of people in the epidemic area. The outbreak of this epidemic is undoubtedly a crisis for these people, they tend to be more nervous and worried. This crisis affected their medical treatment to a certain extent and might make their mental symptoms worse [11]. This undoubtedly reminds us that we need to carry out crisis intervention services as early as possible and provide alternative medical treatment programs for this group to avoid their original disease recurrence and increase the social burden [25]. Besides, we found that those with poor self-perceived physical conditions endured more stress, anxiety, and depression. One reasonable explanation is that these people were not optimistic about their health, they were more worried that their bodies can not resist the virus, which could make them be more sensitive than ordinary people. As Wang et al. found, being satisfied with their own health can become a protective factor for people's mental health during the epidemic [26]. Those who had been quarantined due to the epidemic also showed a relatively poor mental health status. This result is similar to many reports [27-28]. Due to the social attributes of human beings, all humans are at risk of psychological harm when keeping in isolation [29], which reminds us that we should pay more attention to the mental health of those who have experienced isolation and provide them with timely psychological intervention. Furthermore, we found that women are more likely to experience anxiety than men, which is consistent with the report of Wang et al [30], indicating that women's emotional experience is more prominent and more worried when facing the epidemic. In this study, we were surprised to find that the higher the education level, the heavier the pressure and depression. Relatively speaking, lower educational level becomes a protective factor when facing the epidemic. The reason for this phenomenon may be that the higher the education level, the greater the amount of information they can receive about the epidemic. The overloaded information can put them in a relatively high-pressure environment [31]. The more delicate, the attitude towards things will be more serious. So in the face of such an outbreak, they tend to express more concerns, which undoubtedly becomes a burden on their emotions [32].

Unlike participants in Hubei, for those outside Hubei, the more unstable their marital status, the worse their self-perceived health status, and the more pressure they felt when they were isolated. People with poor self-perceived health, quarantine experience, or their family members had been infected with COVID-19 expressed more anxiety symptoms. Besides, those with worse poor self-perceived health and quarantine experience exhibited more depressive symptoms. For people outside Hubei, there are relatively few influencing factors relating to the mental health status after the outbreak, while both groups had screened out similar factors, that is, they thought that their self-perceived health was poor, the mental health of the people who have been isolated was more prominent in stress, anxiety and depression symptoms. Besides, for participants outside Hubei, we found for the first time that the unmarried state became a protective factor for mental health, while the divorced or widowed had a significantly increased sense of stress. The reason for this conclusion may be that unmarried people have relatively few concerns in their lives. If they were quarantined, they may not need to worry about spreading the virus to their spouses or children, so there is no obvious pressure. Although for divorced and widowed people, although they may also be single, they have experienced the companionship of their spouses. In the face of the epidemic, especially when they need to be isolated at home, they may be more vulnerable to loneliness. After all, good family and social support will make people feel at ease [33].

Conclusion

Through this investigation, we found that the participants in Hubei Province and those outside Hubei had similar views on the epidemic situation. However, the mental health level of the former is significantly worse than that of the latter, and the related factors that affecting the former's mental health are more than the latter, with some unique influencing factors were screened out in both groups. Therefore, when conducting psychological intervention on the general public, we still need to formulate special intervention plans according to the different characteristics of different groups of people to provide them with appropriate crisis intervention services in a targeted manner, such that our services can play the best effect.

Declarations

Ethics approval and consent to participate: The research has got the institutional review board (IRB) approval of the Fourth People's Hospital of Chengdu, and all the subjects were recruited in the principle of voluntary.

Consent for publication: Not applicable.

Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: D.N.: conception and design; D.N., OY.Y.J., L.YG., G.T., L.CY., H.YL., L.FY., Z.L., Z.M., L.LS.and H.J.: conduction; D.N., L.YG and G.T.: statistical analysis; L.YG., W. HM., H. MX., Y. YC., C. Y., X. MX. and P. KL.: administrative, technical, or material support; D.N.: drafting of the manuscript; and OY.Y.J.: critical revision of the manuscript for important intellectual content. All authors read and approved the final paper.

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Tables

Table 1. Demographic and epidemic information distribution of participants in Hubei Province and other provinces

Item	Hubei Province (n = 1644)		Outside Hubei Province (n = 1656)	
	Number of people (n)	Percentage (%)	Number of people (n)	Percentage (%)
Gender				
Male	340	20.7	540	32.6
Female	1304	79.3	1116	67.4
Marriage				
Unmarried	180	10.9	556	33.6
Married	1376	83.7	1020	61.6
Divorce	52	3.2	76	4.6
Widowed	36	2.2	4	0.2
Education				
Primary school	0	0	20	1.2
Junior middle school	68	4.1	124	7.5
Secondary specialized school	52	3.2	52	3.1
High school	80	4.9	128	7.7
Junior college	192	11.7	444	26.8
Undergraduate	1060	64.5	724	43.7
Graduate	192	11.7	164	9.9
Occupation				
Yes	1576	95.9	1552	93.7
nothing	68	4.1	104	6.3
Previous mental illness or not				
Yes	52	3.2	68	4.1
No	1592	96.8	1588	95.9
Self-perceived health				
Very nice	208	12.7	304	18.4
Good	832	50.6	764	46.1
Ordinary	572	34.8	540	32.6
Bad	32	1.9	40	2.4
Very bad	0	0	8	0.5
COVID-19 infection or not				
Yes	24	1.5	20	1.2
No	1620	98.5	1636	98.8
Isolation or not				
Yes	424	25.8	164	9.9

No	1220	74.2	1492	90.1
Is the family infected with the COVID-19				
Yes				
No	148	9.0	20	1.2
	1496	91.0	1636	98.8

Table 2. Comparative analysis of PSS, GAD-7, and PHQ-9 of participants in Hubei Province and other provinces

	Hubei (N=1644)	Outside Hubei (N=1656)	T value	P value
PSS	16.21±7.17	14.33±6.99	3.823	<0.001
GAD-7	7.28±6.02	5.01±5.08	5.860	<0.001
PHQ-9	6.50±5.49	5.62±5.94	2.211	0.027

Table 3. Single factor analysis of total scores of PSS, GAD-7, and PHQ-9 in Hubei Province

Variable and assignment	N	Mean ± SD			PSS	GAD-7	PHQ-9	PSS	GAD	PHQ
		PSS	GAD-7	PHQ-9	Statistic	Statistic	Statistic	P- Value	P- Value	P- Value
Gender					0.780a	2.256a	0.879a	0.436	0.025	0.380
Male1	340	15.67±6.90	5.98±5.91	6.04±5.25						
Female2	1304	16.35±7.25	7.62±6.01	6.62±5.55						
Marriage					2.239b	0.228b	0.498b	0.083	0.877	0.684
Unmarried1	180	18.58±7.30	7.93±4.58	6.56±3.72						
Married2	1376	16.01±7.09	7.19±6.21	6.53±3.70						
Divorce3	52	15.00±8.91	7.69±7.36	6.92±6.47						
Widowed4	36	13.67±5.57	7.00±1.73	4.33±2.18						
Education					4.764b	3.320b	4.304b	0.000	0.006	0.001
Primary school1	0	-	-	-						
Junior high school2	68	14.06±6.26	6.65±5.33	5.06±2.84						
Technical secondary school3	52	10.69±3.97	6.15±3.63	5.00±3.72						
High school4	80	13.45±3.89	3.05±3.02	3.25±2.43						
Junior College5	192	13.75±7.29	5.87±6.72	4.90±5.16						
Undergraduate6	1060	17.09±7.66	7.92±6.18	7.35±5.90						
Postgraduates7	192	17.21±4.27	7.48±5.23	5.69±4.34						
Occupation					1.351a	1.037a	0.684a	0.178	0.301	0.495
Yes1	1576	15.07±6.28	7.10±4.77	6.66±2.60						
No2	68	17.35±6.44	7.46±5.11	6.34±3.03						
Previous mental illness or not					3.044a	2.208a	1.934a	0.002	0.028	0.054
Yes1	52	18.33±7.14	8.36±5.11	6.86±5.58						
No2	1592	14.19±5.22	6.67±4.61	6.35±5.13						
Self perceived health					7.627b	5.517b	6.033b	0.000	0.001	0.000
Very good1	208	12.98±7.35	4.58±4.53	3.98±3.30						
Good2	832	15.80±6.72	7.15±6.20	6.38±5.44						
General3	572	17.69±7.14	7.38±3.96	7.42±5.87						
Poor4	32	21.63±9.50	8.45±6.03	9.50±5.93						
	0	-	-	-						

Very poor 5										
					2.664a	6.152a	2.644a	0.041	0.001	0.041
COVID-19 infection or not	24	21.53±4.38	13.30±2.19	9.50±2.74						
	1620	16.14±7.19	7.20±6.02	6.46±5.51						
Yes 1										
No 2										
Isolation or not	424	18.64±6.65	8.98±5.61	8.20±5.42	4.126a	3.416a	3.754a	0.000	0.001	0.000
	1220	15.37±7.17	6.69±6.05	5.91±5.40						
Yes 1										
No 2										
Is the family infected with the COVID-19					2.789a	1.622a	1.905a	0.006	0.106	0.058
	148	19.32±5.39	8.81±5.62	8.14±5.08						
Yes 1	1496	15.90±7.26	7.13±6.05	6.34±5.51						
No 2										

Note: a represents t value, b represents F value

Table 4. Single factor analysis of total scores of PSS, GAD-7 and PHQ-9 scales of participants outside Hubei Province

Variable and assignment	N	Mean ± SD			PSS	GAD-7	PHQ-9	PSS	GAD	PHQ
		PSS	GAD-7	PHQ-9	Statistic	Statistic	Statistic	P- Value	P- Value	P- Value
Gender					1.683a	0.418a	0.720a	0.093	0.676	0.472
Male1	540	13.49±7.11	4.86±5.46	5.32±6.19						
Female2	1116	14.73±6.91	5.08±4.90	5.77±5.82						
Marriage					4.134b	1.282b	2.495b	0.007	0.280	0.059
Unmarried1	556	15.85±7.29	5.45±5.65	6.68±6.55						
Married2	1020	13.71±6.72	4.91±4.79	5.13±5.53						
Divorce3	76	11.32±6.57	3.47±4.23	4.79±5.83						
Widowed4	4	16.00	5.00	5.00						
Education					0.919b	1.454b	0.894b	0.481	0.193	0.499
Primary school1	20	12.80±7.46	5.20±7.33	5.20±9.95						
Junior high school2	124	15.61±6.93	6.87±6.35	5.97±7.94						
Technical	52	16.07±9.15	6.69±6.02	6.85±7.56						
secondary school3	128	15.91±7.24	6.09±5.24	7.50±7.32						
	444	14.16±6.34	4.68±4.86	5.12±5.38						
High school4	724	13.71±7.39	4.70±4.95	5.64±5.60						
Junior College5	164	14.93±5.88	4.46±4.25	4.85±4.79						
Undergraduate6					0.684a	1.338a	0.391a	0.495	0.182	0.697
Postgraduates7	1552	13.07±6.28	4.90±4.77	5.46±2.60						
	104	14.35±6.44	5.23±5.11	5.79±3.03						
Occupation					0.158a	0.381a	1.271a	0.875	0.703	0.205
Yes1										
No2	68	14.59±6.04	5.47±3.69	7.41±4.68						
	1588	14.31±7.04	4.99±5.14	5.54±5.98						
Previous mental illness or not					7.248b	10.953b	9.595b	0.000	0.000	0.000
Yes1	304	12.08±5.63	3.49±4.48	3.87±4.70						
No2	764	13.97±6.40	4.53±4.47	4.94±5.18						
	540	15.40±7.66	5.87±5.39	6.92±6.59						
Self perceived health	40	21.40±9.56	11.70±6.63	11.90±8.03						
	8	26.00±2.83	16.50±6.36	18.0±12.73						
Very good1										
Good2					1.376a	2.040a	0.825a	0.169	0.042	0.410
General3										

Poor4											
Very poor5	20	18.60±5.81	9.60±5.73	7.80±6.14							
	1636	14.27±6.70	4.95±5.06	5.59±5.94							
COVID-19 infection or not					2.477a	2.761a	2.980a	0.014	0.006	0.003	
Yes1	164	16.88±7.63	7.07±5.68	8.22±6.84							
No2	1492	14.05±6.87	4.78±4.97	5.34±5.77							
Isolation or not					1.376a	2.040a	0.825a	0.169	0.042	0.410	
Yes1	20	18.60±5.81	9.60±5.73	7.80±6.14							
No2	1636	14.27±6.70	4.95±5.06	5.59±5.94							
Is the family infected with the COVID-19											
Yes1											
No2											

Note: a represents t value, b represents F value

Table 5. Multiple stepwise regression analysis of influencing factors of total scores of PSS, GAD-7, and PHQ-9 in Hubei Province

Scale	Items	B	Standard error of B	Standardized B	T-value	P-value
PSS	Constant	22.463	7.958	-	2.823	0.005
	Educational level	1.004	0.303	0.156	3.316	0.001
	Mental illness or not	-8.518	3.093	-0.130	-2.754	0.006
	Physical health	2.348	0.481	0.228	4.878	0.000
	COVID-19 infection	-3.281	1.135	-0.131	-2.891	0.004
	Isolation or not	-2.506	1.173	-0.100	-2.136	0.033
	Is the family infected with COVID-19	-2.363	0.764	-0.144	-3.093	0.002
GAD-7	Constant	14.266	6.875	-	2.075	0.039
	Gender	1.924	0.718	0.130	2.680	0.008
	Mental illness or not	-5.948	2.660	-0.108	-2.236	0.026
	Physical health	1.533	0.414	0.177	3.703	0.000
	COVID-19 infection	-5.507	2.378	-0.101	-2.127	0.034
	Isolation or not	-2.068	0.672	-0.150	-3.080	0.002
PHQ-9	Constant	4.609	5.510	-	0.836	0.403
	Education level	0.571	0.235	0.116	2.430	0.016
	Physical health	1.497	0.377	0.190	3.972	0.000
	Isolation or not	-1.833	0.604	-0.146	-3.035	0.003

Table 6. Multiple stepwise regression analysis of influencing factors of total scores of PSS, GAD-7, and PHQ-9 of participants outside Hubei Province

Scale	Items	B	Standard error of B	Standardized B	T-value	P-value
PSS	Constant	17.825	2.511	-		0.000
	Marriage	-2.092	0.590	-0.167	7.100	0.000
	Physical health	2.096	0.422	0.234	-3.544	0.000
	Isolation or not	-2.385	1.101	-0.102	4.970	0.031
					-2.165	
GAD-7	Constant	9.484	4.509	-	2.103	0.036
	Physical health	1.669	0.308	0.256	5.412	0.000
	Isolation or not	-1.863	0.830	-0.110	-2.244	0.025
	Family infected with COVID-19	-3.286	1.352	-0.071	-2.430	0.016
PHQ-9	Constant	6.289	2.002		3.142	0.002
	Physical health	1.972	0.359	-	5.497	0.000
	Isolation or not	-2.640	0.936	0.259	-2.819	0.005
				-0.133		

Figures

Figure 1

The different proportions of anxiety and depression between subjects from and outside Hubei.